Western Trauma Association

PROGRAM

March 2-7, 2025

Fairmont Chateau Whistler
Whistler, British Columbia
Canada

SAVE THE DATE

Western Trauma Association

55th Annual Meeting

March 1 - 6, 2026

Location to be announced at the Business Meeting

Western Trauma Association

54th
ANNUAL MEETING

March 2 - 7, 2025
Fairmont Chateau Whistler
Whistler, British Columbia
Canada

Dear WTA Members, Friends and Guests:

"Oh Canada, My Home and Native Land" Welcome to Whistler for the 54th annual meeting of the Western Trauma Association!!

As many of you know, I was born and raised in Montreal, Canada and skied for many years at Mount Tremblant in the Eastern Laurentian Mountains. It was fun but I must admit to the fact that the best ski conditions have always been in Canada's Western Mountain range. As you will see Whistler-Blackcomb Ski Resort has so much to offer for everyone.

Once again Carrie and Amy worked diligently to make our meeting spectacular. Thanks to them and the Fairmont Whistler staff, we had very few glitches with hotel room reservations this year. We hope you will take advantage of all the amazing social events we have planned during the week. You will love the fun-filled events we have organized for our kids.

Jen Watters and the program committee have organized a phenomenal scientific program. 49 presentations including 15 abstracts from trainees vying for the Gene Moore and Earl Young Awards.Deb Stein and the Algorithm Committee will be leading discussions for four new or revised algorithms, our centerpiece documents of the WTA. Additionally, we have two case reports and a family abstract which are always interesting and fun.

It is time for us as Trauma and Acute Care Surgeons to start taking care of ourselves and each other. Our panel sessions address this important issue: "Do We Ever Recover? Wellness, Recovery and Human Performance" and "What's your Exit Strategy". My Presidential Address will focus on the importance of connections and belonging as a means to combat all of the psychological threats to our well-being.

Our Founder's Basic Science lecture will be presented by Dr. Michael Yaffe, a Trauma and Acute Care Surgeon as well as a spectacular Harvard scientist. His talk entitled, "Neutrophils, Inflammation and Wound Healing- What Trauma teaches us about Cancer and Vice- Versa" is not to be missed!

This year our Paint the Ceiling lecturer is Jason Schecterle and the title of the talk is "Burning Shield". Jason miraculously survived a fiery crash while on duty as a police officer. He discusses his heroic journey to recovery and beyond and what life is like after a near death experience.

I am excited to introduce our first annual WTA Off Piste Society. Open to all WTA attendees, this is a group of like-minded lower altitude WTAers who don't ski or snowboard but still want to have fun in the snow! Stephanie Savage and Stephanie Berry will lead a welcome session on Monday to discuss the theme of the Society and scheduled events.

Banquet night will include a Casino extravaganza!! Carrie and Amy have acquired a professional team of pit bosses, dealers and rollers to entertain you with blackjack, poker, baccarat, roulette, craps and a money wheel. End of the night prizes will be raffled off from your play money winnings! At the same time, we have a very special event planned for the kids: Pirates Plunder and Gala Party: Team competitions, dance party and lots of great food.

Finally, the WTA relies on your generous donations to keep our finances healthy. Please don't forget to donate to the Western Trauma Foundation so we can continue to fulfill our mission. Every little bit counts.

Serving as your President has truly been the highlight of my career. Our Association is one of a kind and epitomizes the importance of friends, family and science bundled into one glorious week. It has been a true honor and privilege.

Fondly,
Rick Miller, MD
President

TABLE OF CONTENTS

WTA MEETING APP
Download the WTA Meeting App to view the agenda, program book, CME info, important announcements and more!

CONTINUING MEDICAL EDUCATION CREDIT INFORMATION

Continuing Education (CE) Language

Western Trauma Association (WTA)
54th Western Trauma Association
Annual Meeting
Live March 3, 2025 – March 7, 2025
Enduring March 7 - June 7, 2025
Whistler, BC and On-Demand

Joint Accreditation Statement

In support of improving patient care, this activity has been planned and implemented by Amedco LLC and Western Trauma Association. Amedco LLC is jointly accredited by the Accreditation Council for Continuing Medical Education (ACCME), the Accreditation Council for Pharmacy Education (ACPE), and the American Nurses Credentialing Center (ANCC), to provide continuing education for the healthcare team. Professions in scope for this activity are listed below.Amedco Joint Accreditation Provider Number: 4008163

Physicians (ACCME) Credit Designation

Amedco LLC designates this live activity / enduring material for a maximum of **19.00** AMA PRA Category 1 CreditsTM. Physicians should claim only the credit commensurate with the extent of their participation in the activity.

American Board of Surgery (ABS) MOC

Successful completion of this CME activity, which includes participation in the evaluation component, enables the learner to earn credit toward the CME requirements of the American Board of Surgery's Continuous Certification program. It is the CME activity provider's responsibility to submit learner completion information to ACCME for the purpose of granting ABS credit. Up to **19.00** CE. Credits

You must request your certificate within 45 days of the activity to meet the deadline for submission to PARS. Creditsare generally reported during thefirst week of each month for those who claimed during the

CME INFORMATION

TO CLAIM CME

You will receive an email with instructions on completing the meeting evaluation to obtain your CME certificate. The certificate will be available immediately following the completion of the evaluation. These instructions will be sent to the email address used to register for the meeting.

How to Get Your Certificate

1. Go to wta.cmecertificateonline.com

2. Click on the WTA 54th Annual Meeting link.

3. Evaluate the meeting.

4. Print, download, or save your certificate for your records.

5. If you lose your certificate, or need help, go to help.cmecertificateonline.com

LEARNING OBJECTIVES

The overall purpose of this activity is to enable the learner to:

- Understand optimal management of antibiotics in the setting of massive hemorrhage.
- Improve care delivery in pediatric trauma patients.
- Understand the evolving guidelines for optimal VTE prophylaxis in traumatically injured patients with and without brain injuries.

2024-2025 LEADERSHIP

WTA MISSION STATEMENT

The Western Trauma Association is committed to the improvement of trauma care through research, education, sharing of clinical experiences, and the development of physicians of all specialties who are involved in the care of trauma patients. The goals of the Association are not only the intellectual growth attained through increased knowledge, but also the emotional growth attained through camaraderie and interaction with family and friends in an environment conducive to winter sports.

2024-2025 OFFICERS & COMMITTEE CHAIRS

Officers

President	Richard Miller, MD
President-Elect	Krista Kaups, MD
Vice President	Karen Brasel, MD
Secretary	Kimberly Davis, MD
Treasurer	Nicholas Namias, MD
Immediate Past President	Rosemary Kozar, MD, PhD

Board of Directors	**Term Ends**
Walter L. Biffl, MD	2026
Marc de Moya, MD	2027
Kenji Inaba, MD	2025
Rosemary Kozar, MD, PhD	2027
Robert Letton, MD	2027
Matthew Martin, MD	2026
Robert McIntyre, MD	2025
Stephanie Savage, MD	2025
Michael. S. Truitt	2026

Historian	**Term Ends**	**Algorithms Chair**	**Term Ends**
David Livingston, MD	2028	Deborah Stein, MD	2026
Program Chair	**Term Ends**	**Nominating Chair**	**Term Ends**
Jennifer Watters, MD	2025	Rosemary Kozar, MD, PhD	2025
Publications Chair	**Term Ends**	**Violence Prevention Chair**	**Term Ends**
Kevin Schuster, MD	2026	Rochelle Dicker, MD	2025
Multi-Center Trials Chair	**Term Ends**	**Social Media Ad-Hoc Chair**	**Term Ends**
Chad Ball, MD	2025	Bellal Joseph, MD	2025

2024-2025 COMMITTEES

Program Committee	Term
Jennifer Watters, MD, Chair	2023-2026
Kenji Inaba, MD Assoc Chair	2024-2027
Bryan Collier, DO	2023-2026
Elizabeth Benjamin, MD	2024-2027
Anne Rizzo, MD	2024-2027
Jasmeet Paul, MD	2023-2026
Erik Peltz, DO	2023-2025
Ed Rutherford, MD	2023-2026
Mark Seamon, MD	2024-2027
Michaela West, MD	2023-2026
Laura Moore, MD	2022-2025
Kevin Schuster, MD, ex-officio	2024-2025
Deborah Stein, MD, ex-officio	2024-2026
Chad Ball, MD, ex-officio	2022-2025
Richard Miller, MD, ex-officio	2024-2025

Publications Committee	Term
Kevin Schuster, MD Chair	2023-2026
Zsolt Balogh, MD	2022-2026
Allison Berndtson, MD	2023-2026
Thomas Carver, MD	2022-2026
Mitch Cohen, MD	2022-2025
Michael Cripps, MD	2022-2026
Christopher Dente, MD	2022-2026
Lawrence Diebel, MD	2023-2026
Ara Feinstein, MD	2022-2025
Joseph Galante, MD	2018-2025
Oliver Gunter, MD	2022-2026
Bellal Joseph, MD	2022-2025
Riyad Karmy-Jones, MD	2022-2026
Narong Kultvatunyou, MD	2023-2026
Robert Letton, MD	2016-2025
Eric Ley, MD	2023-2026
Alan Marr, MD	2022-2025
David Notrica	2023-2026
Susan Rowell, MD	2023-2026
Jack Sava, MD	2023-2026
R. Stephen Smith, MD	2023-2026

Algorithms Committee	**Term**
Deborah Stein, MD, Chair	2023-2026
Chasen Croft, MD	2023-2026
Charles Fox, MD	2022-2025
Tammy Kopelman, MD	2024-2027
Natasha Keric, MD	2022-2025
Andrew Kerwin, MD	2024-2027
Manuel Lorenzo, MD	2023-2026
Greg Magee, MD	2023-2026
Alicia Privette, MD	2023-2026
Morgan Schellenberg, MD	2023-2026
Kevin Schuster, MD, *ex-officio*	2023-2026
Jennifer Watters, MD, *ex-officio*	2024-2025
Raul Coimbra, MD, *ex-officio*	

Nominating Committee	**Term**
Rosemary Kozar, MD, PhD, Chair	2025
Walter L. Biffl, MD	2025
Jennifer Hartwell, MD	2025
Manuel Lorenzo, MD	2025
Robert McIntyre, MD	2025

Multi-Center Trials Committee	**Term**
Chad Ball , MD, Chair	2022-2025
Stepheny Berry, MD	2023-2026
Matthew Carrick, MD	2024-2027
Juan Duchesne, MD	2023-2025
David Kauvar, MD	2022-2025
Jennifer Mooney, MD	2023-2026
Justin Richards, MD	2024-2027
Lois Sayrs, PhD	2023-2026
Pascal Udekwu, MD	2024-2027
Christine Waller, MD	2022-2025

Violence Prevention Committee

Rochelle Dicker, MD, Chair
Michael Aboutanos, MD
Susan Biffl, MD
Rachael Callcut, MD
Bryan Collier, MD
Brent King, MD
Alexis Moren, MD
James Nielson, MD
Lesley Osborn, MD
Steven Moulton, MD
Keith Stephenson, MD
S. Rob Todd, MD
John Mark Vermillion, MD

Social Media Ad-Hoc Committee
Bellal Joseph, MD Chair
Alexis Moren, MD
Matthew Martin, MD
Lucy Kornblith, MD
Sarah Lombardo, MD
Dan Rossi, DO
Mark Seamon, MD

Western Trauma Foundation Board
David Livingston, MD, President
Susan Rowell, MD, MBA, Treasurer
Laura Moore, MD, Secretary
Enrique Ginzburg, MD
Brent King, MD
Rosemary Kozar, MD, PhD
Thomas Scalea, MD

WTA PRESIDENTS

Robert G. Volz, MD	1971	Vail
Robert G. Volz, MD	1972	Vail
Peter V. Teal, MD	1973	Vail
William R. Hamsa, MD	1974	Aspen
Arthur M. McGuire, MD	1975	Sun Valley
Lynn Ketchum, MD	1976	Snowmass
Fred C. Chang, MD	1977	Park City
Glen D. Nelson, MD	1978	Steamboat
Gerald D. Nelson, MD	1979	Snowmass
Kevin G. Ryan, MD	1980	Snowbird
David S. Bradford, MD	1981	Jackson Hole
Erick R. Ratzer, MD	1982	Vail
William R. Olsen, MD	1983	Jackson Hole
Earl G. Young, MD	1984	Steamboat Springs
Robert B. Rutherford, MD	1985	Snowbird
Rudolph A. Klassen, MD	1986	Sun Valley
Robert J. Neviaser, MD	1987	Jackson Hole
Robert C. Edmondson, MD	1988	Steamboat Springs
Ernest E. Moore, MD	1989	Snowbird
Stephen W. Carveth, MD	1990	Crested Butte
George E. Pierce, MD	1991	Jackson Hole
Peter Mucha, Jr., MD	1992	Steamboat

WTA PRESIDENTS Cont

David V. Feliciano, MD	1993	Snowbird
R. Chris Wray, MD	1994	Crested Butte
David A. Kappel, MD	1995	Big Sky
Thomas H. Cogbill, MD	1996	Grand Targhee
G. Jerry Jurkovich, MD	1997	Snowbird
James B. Benjamin, MD	1998	Lake Louise
Herbert J. Thomas III, MD	1999	Crested Butte
Barry C. Esrig, MD	2000	Squaw Valley
Steven R. Shackford, MD	2001	Big Sky
James A. Edney, MD	2002	Whistler-Blackcomb
J. Scott Millikan, MD	2003	Snowbird
Harvey J. Sugerman, MD	2004	Steamboat Springs
Scott R. Petersen, MD	2005	Jackson Hole
Harold F. Sherman. MD	2006	Big Sky
Frederick A. Moore, MD	2007	Steamboat Springs
James W. Davis, MD	2008	Squaw Valley
Grace S. Rozycki, MD	2009	Crested Butte
Robert C. Mackersie, MD	2010	Telluride
M. Gage Ochsner, MD	2011	Big Sky
R. Lawrence Reed, MD	2012	Vail
Mark T. Metzdorff, MD	2013	Snowmass
David H. Livingston, MD	2014	Steamboat Springs
Christine S. Cocanour, MD	2015	Telluride
Thomas M. Scalea, MD	2016	Squaw Valley
Carl J. Hauser, MD	2017	Snowbird
Dennis W. Vane, MD	2018	Whistler
Roxie M. Albrecht, MD	2019	Snowmass
David V. Shatz, MD	2020	Sun Valley
Robert McIntyre, MD	2022	Big Sky
Walter L. Biffl, MD	2023	Lake Louise
Rosemary Kozar, MD, PhD	2024	Snowmass
Richard Miller, MD	2025	Whistler

NEW MEMBERS

Western Trauma Association Welcomed the Following New Members in 2024

Allyson Hynes, MD, MPH, FACS
Milwaukee, WI
Emergency Medicine
Active Member

Alexis Moren, MD, MPH, FACS
Salem, OR
General Surgery
Active Member

Chad Wilson, MD, MPH
Houston, TX
Surgical Critical Care
Active Member

Elizabeth "Libby" Windell, DO
Salem, OR
Surgical Critical Care
Active Member

Kevin Wise, MD
Rochester, MD
General Surgery
Active Member

WESTERN TRAUMA FOUNDATION DONORS

Current lifetime accumulation status based on 2024 year end

SUMMIT ($25,000 and above)

Barry Esrig
David Feliciano & Grace Rozycki
Eric Ley
Ernest Moore
Thomas Scalea
Robert Volz

EXTREME ($10,000 – $24,999)

Roxie Albrecht
Gregory Campbell
Christine Cocanour
Thomas Cogbill
James Davis
Rosemary Kozar & Brent King
David Livingston
Andrew Michaels
Kimberly Peck
Jennifer Watters

COULOIR SOCIETY ($5,000 – $9,999)

Walter Biffl
Karen Brasel
Kimberly Davis
K Dean Gubler
Gregory Jurkovich
Krista Kaups
David Kissinger
Manuel Lorenzo
Ajai Malhotra
Matthew Martin
Robert McIntyre, Jr.
Mark Metzdorff
J. Scott Millikan
Nicholas Namias
Robert Neviaser
Scott Petersen
R. Lawrence Reed
Steven Shackford
David Shatz
Herbert Thomas, III
Dennis Vane
Michaela West

Double Black Diamond Club ($2,500 - $4,999)

John Adams
Bonny Baron
Denis Bensard
Allison Berndtson
Marilu Bintz
Carlos Brown
Kelley Bullard
Marc de Moya
Lawrence Diebel
George Dulabon
Soumitra Eachempati
Charles Fox
Rajesh Ganhdi
Enrique Ginzburg
James Haan
Laura Johnson
David Kappel
Riyad Karmy-Jones
M. Margaret Knudson
Richard Leone
Robert Letton
Robert Mackersie
James McCarthy
Richard Miller
Frederick Moore
Laura Moore
Steve Moulton
Patrick Offner
Cassandra Reynolds
Anne Rizzo
Steven Ross
Susan Rowell
Stephanie Savage &
Ben Zarzaur
Kevin Schuster
R. Stephen Smith
Keith Stephenson
Harvey Sugerman
Mark Tellez
S. Rob Todd
Scott Welle

WESTERN TRAUMA FOUNDATION DONORS

BLACK DIAMOND CIRCLE ($1,000 – $2,499)

Michael Aboutanos
Hasan Alam
Scott Armen
Benjamin Axtman
Erik Barquist
Christopher Barrett
Paul Beery
James Benjamin
Stepheny Berry
Megan Brenner
David Ciesla
Mitch Cohen
Raul Coimbra
Bryan Collier
Alain Corcos
Todd Costantini
Clay Cothren-Burlew
Rochelle Dicker
Doreen DiPasquale
Jay Doucet
Julie Dunn
Alexander Eastman
Matthew Eckert
Joel Elterman
Stephanie Ireland Gordy
Carl Hauser
Laura Haines
Dmitriy Karev
Natasha Keric
Andrew Kerwin
Guy Lanzi
William Long
Heather MacNew
John McGill
Barbara Mainville
Alicia Mangram
Alan Marr
Lisa McMahon
Caleb Mentzer
Margaret Morgan
M. Gage Ochsner
Keith O'Malley
Patrick O'Neill
Jasmeet Paul
Brianne & Erik Peltz
Samuel Prater
Soula Privolos
Eugene Reilly
Peter Rhee
Nelson Rosen
Henry Schiller
Martin Schreiber
Thomas Schroeppel
Aaron Scifres
Mark Shapiro
Harold Sherman
Deborah Stein
Ali Tabatabai
Mark Tellez
Desarom Teso
Brian Tibbs
Eric Toschlog
Michael Truitt
Gary Vercruysse
Steven Wald
Jordan Weinberg
Robb Whinney
Libby Windell

BLUE TRAIL ASSOCIATES ($500 – $999)

Reanna Adams
Saska Byerly
Howard Champion
Roy Cobean
Charles Cook
Michael Cripps
Alisa Cross
James Cushman
Warren Dorloc
Brian Eastridge
Loic Fabricant
Bruce Ferris
Alfonso Fonseca
Richard Gamelli
Larry Gentilello
Oliver Gunter
John Hall
Michael Hauty
David Hoyt
Olga Kaslow
Ryan Kennedy
Kerry Kole
Tammy Kopelman
Michael & Andrea Krzyaniak
Stanley Kurek
Matthew LaPorta
Ralph Layman
Richard Lesperance
M. Ashraf Mansour
Lisa McMahon
Andy Michaels
Frank Nastanski
Raminder Nirula
Michael Norman
David Notrica
Kumash Patel
John Pender
J. Bradley Pickhardt
Basil Pruitt
Paul Reckard
Andrew Rosenthal
Henry Sagi
Mark Seamon
George Singer
David Skarupa
Chance Spaulding
Ronald Tesoriero
George Testerman
Brian Thurston
Pascal Udekwu
R. Christie Wray, Jr
Amy Wyrzykowski

WESTERN TRAUMA FOUNDATION DONORS

GREEN TRAIL ASSOCIATES (up to $499)

Christopher Baker
Marshall Beckman
Elizabeth Benjamin
Scott Brakenridge
Kimberli Bruce
Caitlin Burke
Michael Cain
Rachael Callcut
Matthew Carrick
Donald Carter
Thomas Carver
Amanda Celii
Paul Chestovich
Rick Cirolli
Christine Ciszek
Martin Croce
Chasen Croft
Brandy Cross
Daniel Cullinane
Karole Davis
Matthew Davis
Millard Davis
Andrew Dennis
Brad Dennis
Christopher Dente
Jody Digiacomo
Megan Engelhardt
Alex Evans
Kelly Fair
Mark Falimirski
Ara Feinstein
John Fildes
Ailene Fitzgerald
Catherine Fontecha
Kalev Freeman
Warren Gall
Andrew Gaugler
Ernest Gonzalez
Alok Gupta
Rajan Gupta
Mark Hamill
Paul Harrison
Jennifer Hartwell
James Hebert
Jeff Heisler
Brian Hoey
Darrren Hunt
Kenji Inaba
Laurinda Jackson
Jay Johanningman
Bellal Joseph
Michelle Junker
Frederick Karrer
Jeremy Kauffman
John Kepros
Barbara Latenser
David Leshikar
Charles Mains
Robert Maxwell
Sean Monaghan
Sarah Moore
Matthew Moorman
Alexis Moren
Charlene Nagy
Todd Neideen
Adam Nelson
Jamison Nielsen
Robert O'Connor
Lindsay O'Meara
Cianna Pender
Antonio Pepe
Peter Perakis
Vagn Petersen
Laurens Pickard
George Pierce
Rebecca Plevin
Bruce Potenza
Rebecca Read
Dorothy Rowe
Edmund Rutherford
Jennifer Salotto
Jack Sava
Lois Sayrs
Carol Schermer
Kurt Stahlfeld
Carrie Steffen
Ricard Townsend
Daniel Vargo
John Mark Vermillion
Charlie Wade
Amy Weber
Connor Wiles
Slate Wilson
Scott Zakaluzny

IN MEMORIAM

Earl G. Young, MD — February 27, 1989

Gerald S. Gussack, MD — August 25, 1997

Peter Mucha, Jr., MD — August 9, 2006

W. Bishop McGill, MD — October 14, 2007

Ronald P. Fischer, MD — January 25, 2013

M. Gage Ochsner, MD — April 26, 2013

George Cierny, MD — June 24, 2013

R. Christie Wray, MD — November 18, 2013

Robert B. Rutherford, MD — November 22, 2013

Doreen DiPasquale, MD — January 7, 2014

Barbara Latenser, MD — June 15, 2015

Matthew L Davis, MD — September 3, 2015

Arthur M. McGuire, MD — January 28, 2016

Glen D. Nelson, MD — May 14, 2016

William R. Olsen — June 14, 2017

Erick R. Ratzer, MD — July 7, 2017

Stephen W. Carveth, MD — March 6, 2019

Basil A. Pruitt Jr., MD — March 17, 2019

IN MEMORIAM cont.

Peter V. Teal, MD — February 16, 2020

Robert C. Edmondson, MD — June 5, 2020

George E. Pierce, MD — June 18, 2020

Harvey J. Sugerman, MD — August 9, 2020

Michael A. Dubick, MD — November 13, 2020

Steven L. Wald, MD – January 12, 2021

Joseph C. Stothert, MD, PhD — March 5, 2021

James A. Edney, MD — August 7, 2021

Richard L. Gamelli, MD – May 3, 2022

Rudolph Klassen, MD – November 15, 2022

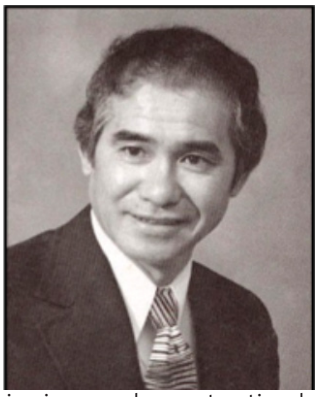
Thomas H. Cogbill, MD – December 31, 2022

Robert G. Volz, MD – December 17, 2023

David V. Feliciano, MD – January 4, 2024

Kevin G. Ryan, MD – May 8, 2024

EARL YOUNG RESIDENT PRIZE



Earl G. Young, MD
(1928-1989)

EARL YOUNG RESIDENT PRIZE FOR CLINICAL RESEARCH

The Earl Young Resident Prize for Clinical Research was established after the death of one of the Founding members of the Western Trauma Association. This prize is a continuation of Dr. Young's profound interest in the training of residents and his commitment to ongoing research. It is given each year to stimulate resident clinical research. Abstracts eligible for this award are submitted to the Program Committee for resident prize status and presentation at the annual meeting of the Western Trauma Association. A manuscript must be submitted to the Journal of Trauma and Acute Care Surgery in advance of the meeting for consideration of publication. The manuscript and presentation are judged with first and second place cash prizes and recognition given at the annual WTA annual banquet. The 1st place resident's name is listed in the annual meeting program book.

Dr. John Najarian characterizing Earl at a memorial service in his honor at the University of Minnesota:

Dr. Earl G. Young of Minneapolis was a founding member of the Western Trauma Association and its 14th President. He died of a myocardial infarction, Monday, February 27, 1989, while skiing at Snowbird during the 19th Annual Meeting of the Association.

Dr. Young received his medical degree from the University of Rochester, N.Y. and Ph.D. in surgery from the University of Minnesota. He completed advanced training in cancer research at Harvard, a fellowship in cardiovascular surgery at Baylor University in Houston and studied microvascular surgery at the University of California–San Diego.

He was a clinical professor of surgery at the University of Minnesota Medical School, and a practicing general and vascular surgeon at the Park-Nicollet Clinic in Minneapolis from 1960. He was nationally known and was actively involved in research and education throughout his career. In 1988, one year before his untimely death, he received the Owen H. Wangensteen Award for Academic Excellence from the University of Minnesota Health Science Center. It was awarded by an unprecedented unanimous vote of all 72 surgical residents.

The Residents Paper competition was begun in 1991 as a tribute to Dr. Young's memory and his "spirit of inquiry, love of learning ... and commitment in service to mankind."

EARL YOUNG RESIDENT AWARD RECIPIENTS

Resident	Institution	Year
Joseph Schmoker, MD	University of Vermont	1991
Joseph Schmoker, MD	University of Vermont	1992
Charles Mock, MD	University of Washington	1993
Gino Travisani, MD	University of Vermont	1994
Phillip C. Ridings, MD	Medical College of Virginia	1995
David Han, MD	Emory University	1996
Preston R. Miller, MD	Wake Forest University	1997
Geoffrey Manley, MD, PhD	University of California, San Francisco	1998
James M. Doty, MD	Medical College of Virginia	1999
David J. Ciesla, MD	Denver Health/University of Colorado	2000
Ricardo J. Gonzales, MD	Denver Health/University of Colorado	2001
Scott C. Brakenridge, MD	Cook County Hospital	2002
Adena J, Osband, MD	UMDNJ-New Jersey Medical School	2003
Cindy Lee, MD	UMDNJ-New Jersey Medical School	2004
Ernest A. Gonzalez, MD	University of Texas at Houston	2005
Jennifer M. Watters, MD	Oregon Health & Science University	2005
Jennifer J. Wan, MD	University of California, San Francisco	2006
Jennifer J. Wan, MD	University of California, San Francisco	2007
Keir J. Warner, MD	University of Washington	2008
T. W. Constantini, MD	University of California, San Diego	2009
C. Anne Morrison, MD	Baylor College of Medicine	2010
Marlin Causey, MD	Madigan Army Medical Center	2011
Phillip Letourneau, MD	University of Texas at Houston	2011
Gerard De Castro, MD	University of Maryland	2011
Matthew E. Kutcher, MD	University of California, San Francisco	2012

EARL G. YOUNG AWARD RECIPIENTS

Resident	Institution	Year
Kimberly Song, MD, MA	UMDNJ – New Jersey Medical School	2013
Lucy Kornblith, MD	UCSF/SFGH, San Francisco	2014
Hunter B. Moore, MD	Denver Health/University of Colorado	2015
George Black, MD	Madigan Army Medical Center	2016
Morgan Barron, MD	Madigan Army Medical Center	2017
John Kuckelman, MD	Madigan Army Medical Center	2018
Patrick Murphy, MD	Indiana University	2019
Alexandra Dixon, MD	Oregon Health & Science University	2020
Sabrinah Christie, MD	University of Pittsburgh	2022
Jeremy Kauffman, MD, MPH	Johns Hopkins University	2023
Joshua Dilday, DO	WTA Mulitcenter Trial	2024

ERNEST E. MOORE RESIDENT PRIZE

ERNEST E. MOORE RESIDENT PRIZE FOR BASIC SCIENCE RESEARCH

ERNEST E. MOORE, MD, FACS, MCCM, FACN, FACEP (HON), FRCS ED (HON) FRCST(HON), FRCSI(HON), FEBS EM SURG (HON)... first attended the WTA in 1977 and was the first member to sponsor surgical residents.

Dr. Moore was the Chief of Trauma at the Denver General Hospital for 36 years, Chief of Surgery for 28 years, and is a Distinguished Professor of Surgery at the University of Colorado. Under Dr. Moore's leadership, Denver General became internationally recognized for innovative care of the injured patient, and its trauma research laboratory has been funded by the NIH for 35 consecutive years. In July 2018, the center was renamed the Ernest E Moore Shock Trauma Center at Denver Health.

Dr. Moore has served as president of ten academic societies, including the Society of University Surgeons, American Association for the Surgery of Trauma, International Association for the Trauma and Surgical Intensive Care, and the World Society of Emergency Surgery. His awards include the Robert Danis Prize from the Society of International Surgeons, Orazio Campione Prize from the World Society of Emergency Surgery, Philip Hench Award from the University of Pittsburgh, Florence Sabin Award from the University of Colorado, Medallion for Scientific Achievement from the American Surgical Association, and Lifetime Achievement Awards from the Society of University Surgeons, American Heart Association, American College of Critical Medicine, Shock Society, and International Association for Trauma and Surgical Intensive Care. He has honorary fellowships in the Royal College of Surgeons of Edinburgh, the Royal College of Surgeons in Ireland, and the Royal College of Surgeons of Thailand.

Dr. Moore is co-editor of the textbook Trauma, in its 9th edition, Surgical Secrets in its 7th edition, and Trauma Induced Coagulopathy, in its 2nd edition; he has >2000 publications and has lectured extensively throughout the world. He is married to Sarah Van Duzer Moore, M.D., an internist at the University of Colorado Denver, and they have two sons: Hunter, a liver transplant surgeon at UCD and Peter a pulmonary/critical care intensivist at UCD. Dr. Moore's additional interests include endurance sports, mountaineering, skiing, and wapiti pursuit. He lives by the principle to work hard you must play hard, with the understanding that family is the ultimate priority.

The Ernest E. Moore Resident Prize for Basic Science Research has been established to encourage residents to become surgical investigators. Abstracts eligible for this award are submitted to the Program Committee for resident prize status presentation at the annual meeting of the Western Trauma Association. A manuscript must be submitted to the Journal of Trauma and Acute Care Surgery in advance of the meeting. The manuscript and presentation are judged with first and second-place cash prizes and recognition given at the annual WTA banquet. The first-place resident's name is listed in the annual meeting program book and on the website.

ERNEST E. MOORE RESIDENT PRIZE FOR BASIC SCIENCE RESEARCH RECIPIENTS

Resident	Institution	Year
Anders Davidson, MD	University of California, Davis	2019
Zachary Matthay, MD	University of California, San Francisco	2020
Ahmad Zeineddin, MD	University of Maryland	2022
Otto Thielen, MD	University of Colorado	2023
Benjamin Stocker, MD	University of Colorado	2024

THOMAS SCALEA NEW MEMBER RESEARCH AWARD

The Thomas Scalea New Member Research Award was designed to honor scholarly work done by a member within the first three years of membership in the Western Trauma Association. Dr. Scalea has trained scores of trauma fellows in diverse disciplines including Surgery, Medicine, and Emergency Medicine, this diversity recognized in the WTA membership. He brought each one interested in the WTA to their first meeting and introduced them to the other members. Almost all joined and a number have now been placed in important roles in the WTA including the Board of Managers, and key committees. Recognizing that the future of the WTA lies in the diversity of those who will follow, Dr. Scalea helped to establish this prize for our new members.

NEW MEMBER RESEARCH AWARD

Eligibility:

1. A new Active member (as opposed to a new senior member or a member that turns senior within the "window")
2. "New" means elected to active membership within three years of the date of submission.
3. Must submit a manuscript.
4. Must personally present the work at the annual meeting•

Process:

1. Eligible member; can be the only "new" member submitting (i.e., does not have to be a competition, but the prize is given on the merit of the work)
2. Oral and written presentations judged by the Publications Committee members.
3. No requirement that a Scalea Award be given every year.

THOMAS SCALEA NEW MEMBER RESEARCH AWARD RECIPIENT

Member	Institution	Year
Juan Duchesne, MD	Tulane University School of Medicine	2024

PRESIDENTIAL ADDRESS

IT'S ALL ABOUT THE JOURNEY: CONNECTIONS AND BELONGING

Tuesday, March 4, 5:00 pm – 6:00 pm

Richard Miller, MD

Fort Worth, TX

Dr. Richard (Rick) Miller has been a clinically active surgical leader for more than 30 years. He performed his surgical residency at Easton/Hahnemann University Hospital in Philadelphia and was the first Trauma/Surgical Critical Care fellow at Vanderbilt University Medical Center in Nashville, TN from 1990-1992. Right after fellowship, Rick and his young family moved to Greenville, SC where he spent 10 years running the Level 1 Trauma Center at the Greenville Hospital System. He served as the state Chair for ATLS and President of the South Carolina Chapter of the ACS.

Dr. Richard (Rick) Miller has been a clinically active surgical leader for more than 30 years. He performed his surgical residency at Easton/Hahnemann University Hospital in Philadelphia and was the first Trauma/Surgical Critical Care fellow at Vanderbilt University Medical Center in Nashville, TN from 1990-1992. Right after fellowship, Rick and his young family moved to Greenville, SC where he spent 10 years running the Level 1 Trauma Center at the Greenville Hospital System. He served as the state Chair for ATLS and President of the South Carolina Chapter of the ACS.

Dr. Miller was recruited back to Vanderbilt in 2002 serving first as the Trauma Medical Director, then the Chief of the Division of Trauma, Surgical Critical Care and Emergency General Surgery. Over the next 18 years, Miller rose through the academic ranks to full Professor of Surgery and was named the first Carol Ann Gavin Endowed Chair of the Trauma Center at Vanderbilt. He has received numerous awards for his leadership achievements throughout his career. In 2021, Miller moved to Fort Worth, Texas to lead the Department of Surgery at the JPS Health Network, serving as both the Chair and Chief of Surgery while also working as the Chief Medical Officer for three years.

PRESIDENTIAL ADDRESS cont.

Dr. Miller is currently Professor of Surgery at the Burnett TCU School of Medicine and is helping the Methodist Health System build a new Trauma Center in the fastest growing superb of the Dallas/Fort Worth Metroplex, Mansfield, Texas.

Dr. Miller has published more than 70 peer-reviewed articles and written 13 book chapters. He is an avid educator and lecturer with expertise in geriatric surgery and trauma, frailty, compassion fatigue and burnout. He is a certified physician coach and has a passion for health and wellness, clinician engagement and patient experience.

Rick has been an elite athlete for his entire life, swimming on the Canadian National Swim Team, participating in over 20 marathons, 2 Ironman Competitions and over a hundred Olympic and Sprint Distance triathlons. He represented the USA at the 2017 World Age Group Sprint Championships and placed 10th overall.

During this stage of his career, Dr. Miller believes it is important to stay in the trenches caring for critically ill and injured patients while also focusing on helping other physicians with health, wellness, life balance and having a strong sense of belonging and connection with their medical team.

Despite his very busy career, Rick's family remains the centerpiece of his life; sharing wonderful times with his wife of 40 years, Karen, his two daughters Alyssa and Stephanie, his sons-in-law Spencer and Steven, their family dog Sadie and last but not least their first grandchild, Reese.

It truly has been an honor and lifelong dream for Rick to serve as the President of the Western Trauma Association.

"PAINT THE CEILING" LECTURESHIP

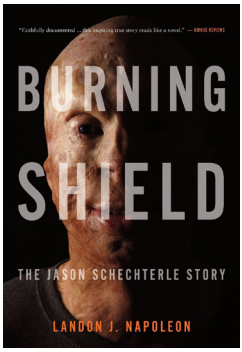
In 1997, Dr. Gregory "Jerry" Jurkovich delivered his Presidential Address entitled "Paint the Ceiling: Reflections on Illness". This was a personal account of his battle with non-Hodgkin's lymphoma. His deep insights were shared from a patient's perspective, even that of a stained ceiling that he observed while lying on his back. He proposed that future WTA Scientific Programs have some time "dedicated to our patients and to the Art of Medicine".

This lecture has become an annual invited lecture which is integral to the unique identity of the Western Trauma Association Annual Meeting. Unlike the scientific session program, this lecture focuses on the humanistic aspects of medicine and can be attended by all participants, guests, and their families. Past lectures have been personal, local, national, and global, covering topics such as first-person accounts of illness, social and societal aspects that affect all patient care, programs providing relief in troubled or impoverished areas, or personal reflections on delivering care in a humane, holistic fashion. A speaker is chosen annually by the current President of the WTA. The Western Trauma Foundation provides an honorarium and expenses for this lecture.

"PAINT THE CEILING" LECTURESHIP

Presenter	Year	Location
G. Jerry Jurkovich, MD	1997	Snowbird
John W. McGill, MD	1998	Lake Louise
William T. Close, MD	1999	Crested Butte
Jimmy Cornell	2000	Squaw Valley
Geoff Tabin, MD	2001	Big Sky
James H. "Red" Duke, MD	2002	Whistler
David V. Shatz, MD	2003	Snowbird
Susan and Tim Baker	2004	Steamboat Springs
Alex Habel, MD	2005	Jackson Hole
Andrew Schneider	2006	Big Sky
Ernest E. Moore, MD	2007	Steamboat Springs
Pamela Kallsen	2008	Squaw Valley
Sylvia Campbell, MD	2009	Crested Butte
William Schecter, MD	2010	Telluride
Jeff McKenney, MD	2011	Big Sky
Larry M. Gentilello, MD	2012	Vail
Neil L. Barg, MD	2013	Snowmass
Ziad Sifri, MD	2014	Steamboat Springs
Julie Freischlag, MD	2015	Telluride
Lewis Rubinson, MD, PhD	2016	Squaw Valley
Kenneth Waxman, MD	2017	Snowbird
Steven R. Shackford, MD	2018	Whistler
M. Margaret Knudson, MD	2019	Snowmass
MSgt Chris Willingham	2020	Sun Valley
Patrick J. Ireland	2022	Big Sky
Keegan Gallagher	2023	Lake Louise
Ahmad Zeineddin, MD	2024	Snowmass

"PAINT THE CEILING" LECTURE



BURNING SHIELD

Thursday, March 6, 5:20 pm – 6:00 pm

Jason Schechterle

Phoenix Arizona

Growing up, Jason had one dream - to serve as a Phoenix Police Officer. Inspired by the tragic loss of a local law enforcement hero, Jason worked persistently towards his dream. After serving four years in the Air Force, at the age of 26, Jason achieved his goal to work on the streets of Phoenix as a rookie police officer. Then, only 14 months into what was supposed to be a life-long career, Jason's life took an unexpected, dramatic and, at the time, tragic turn.

On the night of March 26th, 2001, a taxi cab crashed into the rear of Jason's patrol car. Upon impact, Jason's car burst into flames, trapping him inside with temperatures reaching over 700 degrees.

Through a series of miraculous and fateful circumstances, Jason survived the crash and ensuing physical and emotional catastrophe. He suffered severe burns to over 40% of his body which drastically altered his appearance. He has undergone more than 55 surgeries just to have the ability to accomplish simple daily tasks we often take for granted.

Jason's journey chronicles his fight for life, his triumph over tragedy and the inspiration that enables him to continue to overcome unimaginable adversity. His personal narrative exemplifies that the power of the human spirit can never be underestimated or extinguished.

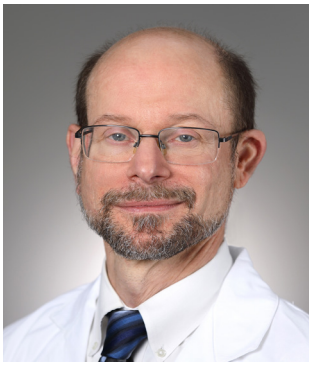
His story is one of life, rebirth and transformation. Jason represents the human experience at its very best - an ascent from despair to describing himself as the luckiest person alive!

FOUNDERS' BASIC SCIENCE LECTURE

This lecture was established by a founding member (Robert Volz, President 1971 & 1972) of the Western Trauma to enhance the academic mission and provide valuable basic science information that is relevant to the field of trauma. It is a scheduled part of the annual meeting in which an invited speaker is chosen to discuss a specific basic research topic that has clinical relevance to the care of the trauma patient. Honoraria and expenses are paid by the Western Trauma Foundation as part of its mission to support the academic endeavors of the Western Trauma Association. These surgeon/researchers are selected by the program committee for their specific expertise and contributions to the knowledgebase in the field of trauma. This lecture is often a combination of translational as well as basic science research.

Presenter	Year	Location
Raul Coimbra, MD	2009	Crested Butte
Lawrence Diebel, MD	2010	Telluride
Carl J. Hauser, MD	2011	Big Sky
Fred Moore, MD	2012	Vail
Steve Shackford, MD	2013	Snowmass
Hasan B. Alam, MD	2014	Steamboat Springs
Charles S. Cox, Jr. MD	2015	Telluride
Rosemary Kozar, MD	2016	Squaw Valley
Mitchell J. Cohen, MD	2017	Snowbird
Ernest "Gene" Moore, MD	2018	Whistler
Timothy R. Billiar, MD	2019	Snowmass
Martin A. Schreiber, MD	2020	Sun Valley
Elizabeth J. Kovacs, PhD	2022	Big Sky
Todd W. Costantini, MD	2023	Lake Louise
Shibani Pati, MD, PhD	2024	Snowmass

FOUNDERS' BASIC SCIENCE LECTURE



NEUTROPHILS, INFLAMMATION AND WOUND HEALING- WHAT TRAUMA TEACHES US ABOUT CANCER AND VICE VERSA

Wednesday, March 5, 8:20 am – 9:00 am

Michael Yaffe, MD, PhD
David H. Koch Professor of Science at MIT, and Attending Surgeon & Intensivist, Beth Israel Deaconess Medical Center, Harvard Medical School

Michael B. Yaffe, M.D., Ph.D., is the David H. Koch Professor of Science at MIT, and the Directorof the MIT Center for Precision Cancer Medicine, at the Koch Institute for Integrative Cancer Research. He is a Senior Associate Member of the Broad Institute, and an Attending Trauma Surgeon, and Intensivist in the Division of Acute Care Surgery, Traumaand Critical Care, Departmentof Surgery at Beth Israel Deaconess Medical Center, Harvard Medical School.

Dr. Yaffe received his B.S. degree in Materials Science and Engineering from Cornell University in 1981, and both his Ph.D. degree in Biophysical Chemistry/Pharmacology in 1987, and M.D. in 1989 from Case Western Reserve University. He completed his residency in general surgery at Deaconess Hospital/Harvard Medical School and University Hospitals of Cleveland, including 3 months at Maryland Shock-Trauma, followed bya Fellowship in Critical Care, Trauma & Burns in theHarvard-Longwood Program at Brigham and Women's Hospital & Beth-Israel Deaconess Medical Center

A retired Colonel in the U.S. Army Medical Corps, Dr. Yaffe was a member of the Army Institute for Surgical Research, and was later the Chief of Surgery ofthe 399th Combat Support Hospital, and then Chief of Surgery of the 803rd Hospital Center, at Fort Devens, Massachusetts. While deployed in Afghanistan in 2015 as the Chief of Surgery of the 402nd Forward Surgical Team under 1st Special Forces Group, Dr. Yaffe built the first Army Reserve GHOSST team (Golden Hour of Surgical Stabilization and Transport), a mobile surgical asset that co-deploys with Special Forces teams to treat and stabilize combat casualties at far forward locations.

He deployed to Central Americain 2018 with the 328th Combat Support Hospital under 7thSpecial Forces Group, where he was the Commander of the Mobile Surgical Team.

In Honduras, he built the current training program used by all Special Forces Medical Teams for Trauma Care in Austere Environments. His awards include the NATO medal, the Afghanistan Campaign medal, the Army Commendation Medal with two oak leaf clusters, and the Bronze Star.

Since 1998, Dr. Yaffehas directed a multi-disciplinary research laboratorythat uses a combination of experimental and computational approaches to study cellular responses to injury at the systems level. His work has led to the discovery of newsignaling pathways that control cell responses to DNA damageand radiation, and new insights into the roles of neutrophils in tissue injury, wound healing, and immuno-thrombosis following infection and trauma. Dr. Yaffe was the Scientific Editor-in-Chief of the journal Science Signalingfrom its founding until 2024, and has foundedseveral biotechcompanies, including Merrimack Pharmaceuticals, Applied BioMath, Thrombo-therapeutics,and Mitotica.

NOTES

NOTES

SUNDAY, MARCH 2, 2025

3:00pm - 7:30pm **REGISTRATION OPEN**
Frontenac Foyer

5:00pm - 7:00pm **WELCOME RECEPTION**
Frontenac

5:00pm - 7:00pm **KIDS WELCOME RECEPTION**
Macdonald EF

7:00pm - 8:00pm **PAST PRESIDENTS MEETING**
Empress B

MONDAY, MARCH 3, 2025

6:00am - 9:00am	**REGISTRATION & EXHIBITS OPEN** *Macdonald Foyer*	
6:30am - 8:30am	**ATTENDEE BREAKFAST** *Macdonald Foyer*	
7:00am - 9:00am	**FRIENDS & FAMILY BREAKFAST** *Portobello or Wildflower*	
7:00am - 9:00am	**SCIENTIFIC SESSION 1** **Moderator: Erik Peltz, DO** *Macdonald Ballroom* (EY) Indicates Earl G. Young Clinical Research Competition (EM)Indicates Ernest E. Moore Basic Science Research Competition	
7:00am - 7:20am	*1. THORACIC IRRIGATION USING 28 FRENCH CHEST TUBES REDUCES THE VOLUME OF RETAINED HEMOTHORAX IN SWINE* **(EE)** *Monica Seadler MD, Medical College of Wisconsin, Milwaukee, Wisconsin*	Page 48
7:20am - 7:40am	*2. EVALUATION OF EMERGENCY PULMONARY HILAR CONTROL FOR LETHAL VASCULAR INJURY IN SWINE* **(EE)** *Jonathan Livezey MD, Dwight D. Eisenhower Army Medical Center, Fort Eisenhower, Georgia*	Page 50
7:40am - 8:00am	*3. ADVERSE PULMONARY OUTCOMES AFTER SURGICAL STABILIZATION OF RIB FRACTURES USING RIBSCORE* **(EY)** *Nicolle Barmettler MD, University of Nebraska Medical Center, Omaha, Nebraska*	Page 52
8:00am - 8:20am	*4. TRANEXAMIC ACID REDUCES SYSTEMIC COMPLEMENT ACTIVATION IN TRAUMATIC BRAIN INJURY PATIENTS* **(EE)** *Elizabeth Maginot MD, University of Nebraska Medical Center, Omaha, Nebraska*	Page 54
8:20am - 8:40am	*5. POST-TBI TRANEXAMIC ACID BENEFITS DEMONSTRATE SEX DEPENDENCE* **(EE)** *Patricia Santos Carlin MD, Perelman School of Medicine at the University of Pennsylvania, Philadelphia, Pennsylvania*	Page 56
8:40am - 9:00am	*6. THE ROLE OF THE NEUROENDOTHELIAL AXIS IN TRAUMATIC BRAIN INJURY-INDUCED DISTANT ORGAN DAMAGE* **(EE)** *Marjorie Liggett MD, Northwestern University Feinberg School of Medicine, Chicago, Illinois*	Page 58
11:30am - 12:30pm	**OFF-PISTE SOCIETY MEETING** *Macdonald E*	
3:00pm - 4:00pm	**WTA BOARD MEETING** *Empress B*	
3:30pm - 6:00pm	**REGISTRATION & EXHIBITS OPEN** *Macdonald Foyer*	

MONDAY, MARCH 3, 2025

4:00pm - 6:00pm	**SCIENTIFIC SESSION 2** **Moderator: Anne Rizzo, MD** *Macdonald Ballroom* (EY) Indicates Earl G. Young Clinical Research Competition (EM)Indicates Ernest E. Moore Basic Science Research Competition	
4:00pm - 4:20pm	*7. A MULTI-CENTER ANALYSIS OF HYPERTONIC SALINE VERSUS BUFFERED HYPERTONIC SOLUTION IN TRAUMATIC BRAIN INJURY* **(EY)** *Chace Hicks MD, University of Tennessee Health Science Center Chattanooga, Chattanooga, Tennessee*	Page 60
4:20pm - 4:40pm	*8. IS EMBOLIZATION A SAFE AND EFFECTIVE TREATMENT OPTION FOR CERTAIN TRAUMATIC SUBDURAL HEMATOMAS* *James Haan MD, Department of Surgery, University of Kansas School of Medicine-Wichita; Department of Trauma Services, Ascension Via Christi Hospital Saint Francis, Wichita, Kansas*	Page 62
4:40pm - 5:00pm	*9. EXTERNAL FIXATION (EF) CLOSE TO POINT OF INJURY IS ASSOCIATED WITH DECREASED INFECTION RISK IN MILITARY COMBAT CASUALTIES* **(EY)** *Michael Cobler-Lichter MD, University of Miami Miller School of Medicine - DeWitt Daughtry Family Department of Surgery/Jackson Memorial Hospital's Ryder Trauma Center and US Army Trauma Training Center, Miami FL. Joint Trauma System, Defense Health Agency, Joint Base San Antonio-, Miami, Florida*	Page 64
5:00pm - 5:20pm	*10. ANTIBIOTIC REGIMEN OPTIMIZATION FOR SEVERE EXSANGUINATION IN A SWINE MODEL* **(EE)** *Andrew Anklowitz MD, Dwight D. Eisenhower Army Medical Center, Fort Eisenhower, Georgia*	Page 66
5:20pm - 5:40pm	*11. RANDOMIZED TRIAL ON LIMITED PERIOPERATIVE ANTIBIOTICS FOR FACIAL FRACTURES: ENOUGH IS ENOUGH* **(EY)** *Taryn Dee DO, Mount Sinai Hospital Chicago, Chicago, Illinois*	Page 68
5:40pm - 6:00pm	*12. DRUNK PLATELETS: ETHANOL INTOXICATION IS ASSOCIATED WITH PLATELET INHIBITION IN MALE TRAUMA PATIENTS* **(EY)** *Brittany Stansbury MD, St. Joseph's Hospital and Medical Center, Phoenix, Arizona*	Page 70
6:00pm - 7:00pm	**WTA MULTICENTER TRIALS MEETING** *Macdonald Ballroom*	
6:15pm - 7:30pm	**RESIDENT RECEPTION** *Deerhurst*	
6:15pm - 7:30pm	**NEW MEMBER/INITIATE RECEPTION** *Kananaskis*	

TUESDAY, MARCH 4, 2025

6:00am - 9:00am	**REGISTRATION & EXHIBITS OPEN** *Macdonald Foyer*	
6:30am - 8:30am	**ATTENDEE BREAKFAST** *Macdonald Foyer*	
7:00am - 9:00am	**FRIENDS & FAMILY BREAKFAST** *Portobello or Wildflower*	
7:00am - 9:00am	**SCIENTIFIC SESSION 3** **Moderator: Bryan Collier, DO** *Macdonald Ballroom* (EY) Indicates Earl G. Young Clinical Research Competition (EM) Indicates Ernest E. Moore Basic Science Research Competition	
7:00am - 7:20am	*13. UNIVERSAL COMPUTED TOMOGRAPHY FOR ABDOMINAL GUNSHOT WOUNDS: THE ROAD TO SELECTIVE MANAGEMENT AND FOCUSED OPERATIVE INTERVENTION* **(EY)** *Joshua Sumislawski MD, Vanderbilt University Medical Center, Nashville, Tennessee*	Page 72
7:20am - 7:40am	*14. TOURNIQUET USE IN PEDIATRIC TRAUMA: SAFE AND EFFECTIVE* **(EY)** *Erin Feeney MD, Children's Hospital of Pittsburgh, Pittsburgh, Pennsylvania*	Page 74
7:40am - 8:00am	*15. TRAUMATIC PNEUMOTHORAX IN CHILDREN: WHO NEEDS A CHEST TUBE PRIOR TO TRANSPORT?* **(EY)** *Ioannis Ziogas MD, MPH, University of Colorado, Aurora, Colorado*	Page 76
8:00am - 8:20am	*16. THE INCIDENCE OF HYPERTENSION FOLLOWING PEDIATRIC BLUNT RENAL TRAUMA IN A POPULATION-BASED COHORT WITH LONG-TERM FOLLOW-UP* **(EY)** *Matthew Parrish MD, Mayo Clinic, Rochester, Minnesota*	Page 78
8:20am - 8:40am	*17. UTILIZATION OF COMPUTED TOMOGRAPHY FOR PEDIATRIC CERVICAL SPINE CLEARANCE ACROSS A 24-HOSPITAL SYSTEM* *Katie Russell MD, Univerisity of Utah, Salt Lake City, Utah*	Page 80
8:40am - 9:00am	*18. SAFETY NET: PROMOTING SAFETY AND PREVENTION FIRE ARM INJURIES IN SCHOOLS* *Christina Colosimo DO MS, University of Arizona, Tucson, Arizona*	Page 82
9: 00 - 9:30am	"Safe Firearms Handling Basics" Course Feedback Session *Macdonald Ballroom*	

TUESDAY, MARCH 4, 2025

3:00pm - 4:00pm	**VIOLENCE PREVENTION COMMITTEE MEETING** *Beausejour*	
3:30pm - 6:00pm	**REGISTRATION & EXHIBITS OPEN** *Macdonald Foyer*	
4:00pm - 6:00pm	**SCIENTIFIC SESSION 4** **Moderator: Jennifer Watters, MD** *Macdonald Ballroom*	
4:00pm - 4:50pm	**19. PANEL: DO WE EVER RECOVER? WELLNESS, RECOVERY & HUMAN PERFORMANCE** *Panelists: Jamie Coleman, MD, Ben Zarzaur, MD, Jack Sava, MD, Bellal Joseph, MD, Mitch Cohen, MD*	
4:50pm - 5:00pm	*20. FAMILY ABSTRACT: WITS 2024 - ALASKA!* *Kimberly Davis MD MBA, Yale School of Medicine, New Haven, Connecticut*	Page 86
5:00pm - 6:00pm	**21. PRESIDENTIAL ADDRESS: IT'S ALL ABOUT THE JOURNEY: CONNECTIONS AND BELONGING** *Richard Miller MD*	Page 25

WEDNESDAY, MARCH 5, 2025

6:00am - 9:00am	**REGISTRATION & EXHIBITS OPEN** *Macdonald Foyer*	
6:30am - 8:30am	**ATTENDEE BREAKFAST** *Macdonald Foyer*	
7:00am - 9:00am	**FRIENDS & FAMILY BREAKFAST** *Portobello or Wildflower*	
7:00am - 9:00am	**SCIENTIFIC SESSION 5** **Moderator: Elizabeth Benjamin, MD** *Macdonald Ballroom*	
7:00am - 7:20am	*22. COAGULATION FACTOR XIII: AN UNRECOGNIZED REGULATOR OF FIBRINOLYTIC PHENOTYPES IN TRAUMA* *Peter Moore MD, University of Colorado Anschutz Medical Center & Denver Health Medical Center, Aurora, Colorado*	Page 90
7:20am - 7:40am	*23. THE EFFECT OF ELEVATION ON DEEP VEIN THROMBOSIS: A MULTICENTER COHORT STUDY* *Kaysie Banton, Injury Outcomes Network, Englewood, Colorado*	Page 92
7:40am - 8:00am	*24. EARLY VTE PROPHYLAXIS IN BIG 1 AND BIG 2 TRAUMATIC BRAIN INJURY PATIENTS: A FIVE-YEAR ANALYSIS* *Sigfredo Villarin Ayala MD, University of Arizona, Tucson, Arizona*	Page 94
8:00am - 8:20am	*25. ANTI-XA LEVEL MONITORING IN ELDERLY TRAUMA PATIENTS RECEIVING ENOXAPARIN PROPHYLAXIS* *Lillian Bellfi PharmD, BCCCP, LSU Health, New Orleans, LA, Louisiana*	Page 96
8:20am - 9:00am	**26. FOUNDER'S BASIC SCIENCE LECTURE: NEUTROPHILS, IN FLAMMATION, AND WOUND HEALING – WHAT TRAUMA SURGERY TEACHES US ABOUT CANCER AND VICE-VERSA** *Michael Yaffe, MD, PhD, Massachusetts Institute of Technology, Cambridge, Massachusetts*	Page 31
10:00am - 11:00am	**WTA SKI RACE (PRE-REGISTRATION REQUIRED)** *Mountain*	
11:30am - 1:30pm	**WTA MOUNTAIN PICNIC (come anytime)** *Garibaldi Lift Co. Bar & Grill*	

WEDNESDAY, MARCH 5, 2025

2:30pm - 5:00pm	**REGISTRATION & EXHIBITS OPEN** *Macdonald Foyer*	
3:00pm – 4:00pm	**WTA BUSINESS MEETING: MEMBERS ONLY** *Macdonald Ballroom*	
4:00pm - 6:00pm	**WTA BOOK CLUB** *Penthouse Suite*	
4:00pm - 6:00pm	**SCIENTIFIC SESSION 6** **Moderator: Mark Seamon, MD** *Macdonald Ballroom*	
4:00pm - 4:20pm	*27. ALGORITHM #1: CRITICAL DECISIONS IN TRAUMA: MANAGEMENT OF MANGLED EXTREMITY (2025 UPDATE)* *Andrew Kerwin, MD*	Page 100
4:20pm - 4:40pm	*28. ALGORITHM #2: GERIATRIC TRAUMA TRIAGE: A WESTERN TRAUMA ASSOCIATION CRITICAL DECISIONS ALGORITHM* *Natasha Keric, MD*	Page 102
4:40pm - 4:50pm	*29. SKEWERED ON A FENCE: A CASE REPORT* *Scott Levy MD, University of Michigan, Ann Arbor, Michigan*	Page 104
4:50pm - 5:00pm	*30. TRAUMATIC SUPRAHEPATIC INFERIOR VENA CAVA INJURY REPAIR* *Olatoye Olutola MD, University Hospitals, Cleveland, Ohio*	Page 106
5:00pm – 7:00pm	**FAMILY TUBING** *Whistler Bubly Tube Park*	

THURSDAY, MARCH 6, 2025

6:00am - 9:00am	**REGISTRATION & EXHIBITS OPEN** *Macdonald Foyer*	
6:30am - 8:30am	**ATTENDEE BREAKFAST** *Macdonald Foyer*	
7:00am - 9:00am	**FRIENDS & FAMILY BREAKFAST** *Portobello or Wildflower*	
7:00am - 9:00am	**SCIENTIFIC SESSION 7** **Moderator: Michaela West, MD** *Macdonald Ballroom*	
7:00am - 7:20am	*31. A WESTERN TRAUMA ASSOCIATION MULTI-CENTER PROSPECTIVE TRIAL OF PREHOSPITAL KETAMINE ADMINIS-TRATION AND ED DISPOSITION IN TRAUMA PATIENTS* *Carolyn Cook MD, WTA Multicenter Trial for Louisiana State University, New Orleans, Louisiana*	Page 108
7:20am - 7:40am	*32. THROMBOCYTOSIS IS DESIRABLE IN POLYTRAUMA-NATURAL HISTORY AND CLINICAL OUTCOMES* *Ahmed Faidh Ramzee MD, University of Newcastle, Newcastle,*	Page 110
7:40am - 8:00am	*33. ROBO-REGISTRAR RISING: LARGE LANGUAGE MODELS FOR TRAUMA CARE QUALITY METRICS* *Sean Perez MD, University of California San Diego Health, San Diego, California*	Page 112
8:00am - 8:20am	*34. PREDICTING FUTURE SUICIDE DEATH FOLLOWING TRAUMA CENTER TREATMENT OF SURVIVED SELF-INFLICTED INJURY: AN UNEXPECTED EFFECT OF INITIAL INJURY SEVERITY* *Andrew Schramm PhD, Medical College of Wisconsin, Milwaukee, Wisconsin*	Page 114
8:20am - 8:40am	*35. ALGORITHM #3: CRITICAL DECISIONS IN TRAUMA: PENETRATING CHEST TRAUMA* *Manuel Lorenzo, MD*	Page 116
8:40am - 9:00am	*36. ALGORITHM #4: CRITICAL DECISIONS IN TRAUMA: BLUNT CARDIAC INJURY* *Tammy Kopelman, MD*	Page 118

THURSDAY, MARCH 6, 2025

3:00pm - 4:00pm	**ALGORITHMS COMMITTEE MEETING** *Beausejour*	
3:00pm - 6:00pm	**REGISTRATION & EXHIBITS OPEN** *Macdonald Foyer*	
3:30pm - 4:00pm	**SPECIAL SESSION** DANGEROUS GAMES: TRAUMA SURGERY AT THE 2010 VANCOUVER OLYMPICS D. Ross Brown, MD, FRCSC, FACS, Kosar Khwaja, MD, FRCSC, FACS, Jay Doucet, MD, FRCSC, FACS Macdonald Ballroom	Page 120
4:00pm - 6:00pm	**SCIENTIFIC SESSION 8** **Moderator: Jasmeet Paul, MD** *Macdonald Ballroom*	
4:00pm - 4:20pm	*37. THE IMPACT OF PARTNERED ATTENDING IN HOUSE CALL ON NEUROPEPTIDE, IMMUNE, AND CARDIOVASCULAR BIOMARKERS IN TRAUMA SURGEONS: A PILOT STUDY* *Rebecca Ryznar PhD, Rocky Vista University, Centennial, Colorado*	Page 122
4:20pm - 4:40pm	*38. DISCORDANCE OF PERCEPTIONS AND EXPERIENCES OF TRAUMA SURGEONS AND THEIR FAMILIES* *Jennifer Hartwell MD FACS, University of Kansas Medical Center, Kansas City, Kansas*	Page 124
4:40pm - 5:20pm	**39. PANEL: WHAT'S YOUR EXIT STRATEGY?** Panelists: , Roxie Albrecht, MD, Alex Eastman, MD, David Livingston, MD, Rick Miller, MD, Susan Rowell, MD	
5:20pm - 6:00pm	**40. PAINT THE CEILING LECTURE: BURNING SHIELD** *Jason Schechterle*	Page 29
6:30pm – 9:00pm	**KIDS PARTY** *Macdonald EF*	
6:30pm – 9:00pm	**AWARDS & CASINO NIGHT** *Frontenac Ballroom*	

FRIDAY, MARCH 7, 2025

6:00am - 10:00am	**REGISTRATION OPEN** *Macdonald Foyer*	
6:30am - 8:30am	**ATTENDEE BREAKFAST** *Macdonald Foyer*	
7:00am - 9:00am	**FRIENDS & FAMILY BREAKFAST** *Portobello or Wildflower*	
7:00am - 10:00am	**SCIENTIFIC SESSION 9** **Moderator: Andrew Dennis, MD** *Macdonald Ballroom*	
7:00am - 7:20am	*41. EFFICACY OF A NOVEL SMARTPHONE BASED ULTRASONOGRAPHY CURRICULUM IN RAPIDLY TRAINING TRAUMA CARE PROVIDERS IN LOW-RESOURCE SETTINGS* *S.Ariane Christie MD, University of California, Los Angeles / University of Buea, Cameroon, Los Angeles, California*	Page 130
7:20am - 7:40am	*42. PROSPECTIVE OBSERVATIONAL STUDY OF SURGICAL RIB FIXATION IN SEVERE CHEST WALL INJURY PERFORMED IN PARALLEL WITH A RANDOMIZED CONTROLLED TRIAL* *David Meyer MD, McGovern Medical School at UTHealth, Houston, Texas*	Page 132
7:40am - 8:00am	*43. AN ALARMING RISE IN ADOLESCENT GUN VIOLENCE - EXAMINING TRENDS AT REGIONAL LEVEL 1 TRAUMA CENTERS* *Kevin Lang MD, University of Tennessee - Memphis, Memphis, Tennessee*	Page 134
8:00am - 8:20am	*44. ASSOCIATION OF STATE LEVEL CIVILIAN CONCEALED CARRY AND HANDGUN PURCHASE SAFETY TRAINING LEGISLATION WITH INJURIES, SUICIDE AND CRIME: AN ECOLOGICAL STUDY* *Mark Hamill MD, University of Nebraska Medical Center, Omaha, Nebraska*	Page 136
8:20am - 8:40am	*45. HE EFFECT OF PREHOSPITAL BLOOD PRODUCTS ON UNEXPECTED SURVIVAL: A MULTI-INSTITUTION STUDY* *Thomas Clements MD, The University of Texas Health Science Center at Houston, Houston, Texas*	Page 138
8:40am - 9:00am	*46. ATTENUATED INTERFERON-GAMMA FOLLOWING INJURY IS ASSOCIATED WITH CHRONIC CRITICAL ILLNESS* *Joseph Cuschieri MD, University of California San Francisco, San Francisco, California*	Page 140

FRIDAY, MARCH 1, 2024

NOTES

NOTES

Presentation # 1
Monday, February 3, 2025, 7:00am - 7:20am

THORACIC IRRIGATION USING 28 FRENCH CHEST TUBES REDUCES THE VOLUME OF RETAINED HEMOTHORAX IN SWINE

M Seadler, H Turner, M Mantz-Wichman, W Hayssen, K Yang, R Conrardy, M de Moya, T Carver
Medical College of Wisconsin
Milwaukee, Wisconsin

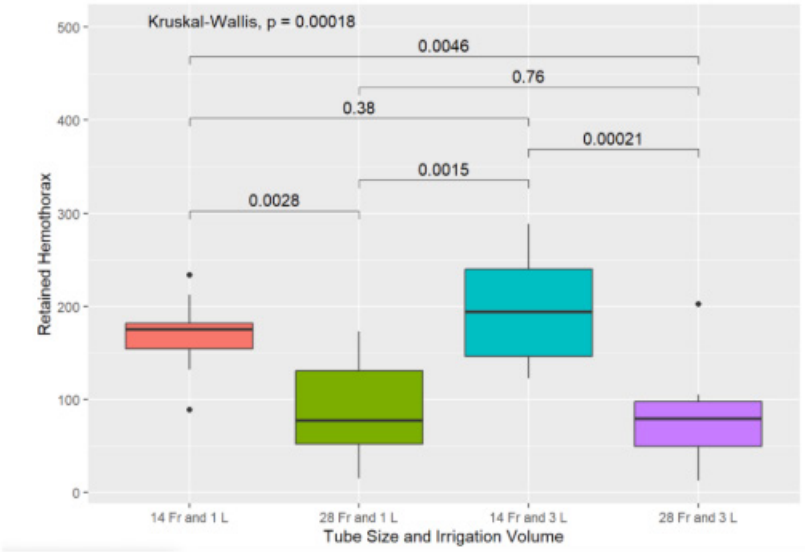
Presenter: Monica Seadler MD
WTA Sponsor: Thomas Carver

Introduction: Tube thoracostomy for the management of traumatic hemothorax is standard practice but there is still debate about whether pigtail chest tubes (14 Fr) are equivalent to large bore chest tubes (28 Fr) with regards to prevention of retained hemothorax (rHTX). While the literature supports thoracic irrigation to decrease rHTX, the efficacy of irrigation through a pigtail or optimal volume of irrigation are not known. This study evaluated thoracic irrigation via 14 Fr and 28 Fr chest tubes using a swine hemothorax model to evaluate the effect of tube size and volume of irrigation on rHTX. We hypothesized that 28 Fr chest tubes and 3L of irrigation would have lower volumes of rHTX.

Methods: Female Yorkshire/Landrace cross swine (40-55 kg) were used in this study (N=10/group). Bilateral 500cc hemothoraces were created by instilling autologous blood removed from a femoral arterial catheter. Blood was allowed to dwell in the chest for 4 hours. A 14 or 28 Fr chest tube was placed and the thoracic cavity was irrigated with 1 or 3 L of warmed saline using a CLR irrigator. Chest tubes were connected to Pleur-evac devices at -20 mmHg suction and allowed to drain for 2 hours after which the swine were euthanized. A thoracotomy was performed to quantify the volume of rHTX.

Results: The volume of rHTX after 1 L of irrigation was 169 +/- 13 mL vs 89 +/- 17 mL for the 14 and 28 Fr chest tubes, respectively ($p < 0.01$). With 3L of irrigation, the volume of rHTX was 195 +/- 18 mL vs 81 +/- 17 mL for the 14 and 28 Fr chest tube groups, respectively ($p < 0.001$). There was no significant difference in total volume suction irrigated or total Pleur-evac drainage between groups. There was no significant difference in rHTX between 1L and 3L groups. The total time required to suction/irrigate with 1 L was 456 +/- 43 seconds vs 237 +/- 16 seconds for 14 and 28 Fr chest tube, respectively ($p < 0.001$). In the 3L group the time was 1024 +/- 101 seconds and 644 +/- 77 seconds for 14 and 28 Fr, respectively ($p < 0.01$).

Conclusions: The use of 28 Fr chest tubes resulted in reduced volume of rHTX after thoracic irrigation when compared to 14 F pigtail chest tubes but irrigation volume > 1 L did not reduce the amount of rHTX. The time required to irrigate a pigtail chest tube is significantly longer than a large bore chest tube.


Kruskal-Wallis, p = 0.00018
0.0046
0.76
0.38
0.00021
0.0015
0.0028
Retained Hemothorax
500
400
300
200
100
0
14 Fr and 1 L
28 Fr and 1 L
14 Fr and 3 L
28 Fr and 3 L
Tube Size and Irrigation Volume

NOTES

Presentation # 2
Monday, March 3, 2025, 7:20am - 7:40am

EVALUATION OF EMERGENCY PULMONARY HILAR CONTROL FOR LETHAL VASCULAR INJURY IN SWINE

J Livezey, A Anklowitz, D Chow, T McKinley, T Williams, L Riddle, D Mendoza, C Spalding, M Aranda, J Kuckelman
Dwight D. Eisenhower Army Medical Center
Fort Eisenhower, Georgia

Presenter: Jonathan Livezey MD
WTA Sponsor: Chance Spalding

Introduction: Traumatic hilar injuries can be rapidly fatal requiring decisive control for survival. Maneuvers, such as the hilar twist, are often taught as the first line intervention for these injuries while clamping maneuvers may also be effective. There is currently insufficient data comparing the techniques of hilar control to make recommendations. The primary goal of hilar control is hemorrhage temporization. Secondary goals include bronchial isolation that minimizes destruction for definitive repair and pulmonary salvage. We sought to determine the optimal technique to control massive hemorrhage from the pulmonary hilum in a live swine model.

Methods: Sus Scrofa swine underwent a left anterolateral thoracotomy followed by a penetrating injury to the superior pulmonary vein. Animals were randomized to one of three groups: control (no intervention), hilar clamp (HC), or hilar twist (HT) maneuver. Animals were survived and monitored for one hour after intervention. Vitals, laboratory values, time from injury to hemostasis, blood loss, need for vasopressor support, need for additional interventions, and length of survival were recorded. Post-mortem bronchoscopy was performed in HC and HT animals (Figure). Biopsies of the left mainstem bronchus and bilateral pulmonary parenchyma were obtained to compare the effect of intervention and ischemia on the tissue.

Results: Twenty animals were randomized to control (N=5), HC (N=8) or HT (N=7). The model was fatal in 60% of control animals at an average of 37 minutes. Survival was significantly improved in the HC animals at 60 minutes ($p=0.01$) but not in the HT animals at 45 minutes. HT animals had a 72% survival to the full 60 minutes ($p=0.56$). Blood loss was significantly higher in control animals at an average of 1674 milliliters compared to 45 milliliters in the HC groups and 319 milliliters in the HT group ($p<0.001$). HC trended toward improved hemorrhage control in terms of blood loss compared to HT ($p=0.07$). HC took an average of 22 seconds from the time of injury whereas the HT was 85 seconds ($p=0.005$). No HC animals required vasopressors during the intervention compared to 43% in the HT group ($p=0.06$). Bronchoscopy revealed complete bronchial occlusion in HC animals compared to just lower lobe occlusion in HT animals. Histological differences in the lung parenchyma in terms of ischemia and bronchial inflammation can be seen in the Figure.

Conclusions: Pulmonary hilar control in trauma is a critical skill, where seconds have the potential to change outcomes. Both hilar twist and hilar clamping were effective for hemorrhage control. Hilar clamping was shown to have a survival benefit, was the faster technique to apply, and showed a trend toward improved hemorrhage control and hemodynamic stability over hilar twist. Hilar clamping may be a superior maneuver

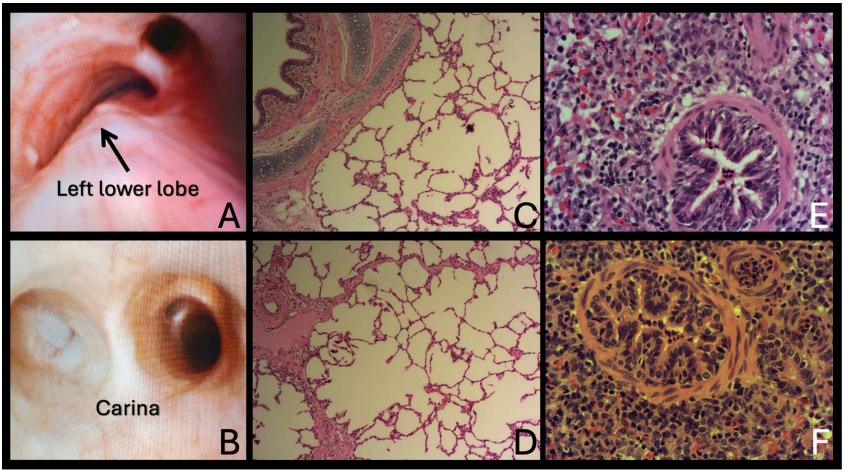


Figure: Partial bronchial occlusion post HT with patent left upper lobe (A). HC with complete occlusion of left mainstem bronchus (B). Normal lung in control animals (C) and contralateral right lung postmortem (D). Histologic image of neutrophilic consolidation and hemorrhage of ischemic left lung parenchyma after HT (E) and HC (F).

NOTES

Presentation # 3
Monday, March 3, 2025, 7:40am - 8:00am

ADVERSE PULMONARY OUTCOMES AFTER SURGICAL STABILIZATION OF RIB FRACTURES USING RIBSCORE

N Barmettler, M Cloonan, J Liu, A Wells, A Raposo-Hadley, A Kamien, O Sheppard, E Cantrell, N Kulvatunyou, Z Bauman
University of Nebraska Medical Center
Omaha, Nebraska

Presenter: Nicolle Barmettler MD
WTA Sponsor: Narong Kulvatunyou

Introduction: Surgical stabilization of rib fractures (SSRF) is currently an option for patients to improve pain scores, decrease ventilator days and risk of ventilator-associated pneumonia, decrease risk of tracheostomy need, and decrease hospitalization and mortality rates. RibScore is a 6-point scoring system developed in 2015 that assigns points to patients with chest wall trauma based on radiographic findings in order to predict adverse pulmonary outcomes. One point is assigned for each of the following variables: ≥6 rib fractures, bilateral rib fractures, flail chest, ≥3 bicortical displaced fractures, 1st rib fracture, and fractures in all three anatomical areas (anterior, lateral, posterior). This study examined patient outcomes after SSRF as predicted by their RibScore.

Methods: This was a single-institution retrospective cohort study of adult patients who underwent SSRF at our level 1 trauma center between 1/2017 and 4/2023. Patients under 18 years of age were excluded. CT imaging was reviewed, and each patient was given a score based on RibScore criteria. Adverse pulmonary outcomes including post-op pneumonia, respiratory failure (defined by need for mechanical ventilation >48 hours post-SSRF), and tracheostomy were collected. Our primary outcome was the incidence of adverse pulmonary outcomes stratified by each RibScore. A linear trend between the RibScore and each adverse pulmonary outcome was created using the Mantel-Haenszel test for trend. Rates of adverse pulmonary outcomes after SSRF were also compared to the original pulmonary outcomes in the RibScore using a Chi-Squared test.

Results: A total of 452 patients were included in the study. There was an increase in rate of tracheostomy from 2.4% at a RibScore of 1 to 12.1% with a RibScore of 5, which was statistically significant on linear by linear association ($p=0.003$). Similar results were demonstrated for rate of pneumonia with an increase from 3.7% at RibScore of 1 to 27.3% at RibScore of 5 ($p<0.001$) as well as rate of respiratory failure with an increase from 6.1% at RibScore of 1 to 33.3% at RibScore of 5 ($p<0.001$). When comparing our patients who underwent SSRF to the original RibScore adverse pulmonary outcomes, there was a significant decrease in incidence of tracheostomy ($p=0.003$), pneumonia ($p<0.001$), and respiratory failure ($p<0.001$)

Conclusions: This study demonstrated a statistically significant linear increase in adverse pulmonary outcomes with increasing RibScore. Furthermore, patients had significantly lower incidence of adverse pulmonary outcomes after SSRF when compared to the original pulmonary outcomes in the RibScore. These results suggest that RibScore can be used to predict risk of developing adverse pulmonary outcomes after chest wall injury, and SSRF can significantly reduce the risk of these adverse outcomes across all RibScore values.

Incidence of Outcomes After SSRF per RibScore

Rib Score	N	Trach. (N)	% with Trach.	Pneumonia (N)	% with Pneumonia	Resp. Failure (N)	% with Resp. Failure
0	71	0	0	1	1.4	3	4.2
1	82	2	2.4	3	3.7	5	6.1
2	87	1	1.1	2	2.3	4	4.6
3	109	4	3.7	8	7.3	21	19.3
4	49	3	6.1	6	12.2	10	20.4
5	33	4	12.1	9	27.3	11	33.3
6	20	1	4.8	3	14.3	8	38.1
Chi-Squared		P = 0.039		P < 0.001		P < 0.001	
Linear by Linear Association		P = 0.003		P < 0.001		P < 0.001	

NOTES

Presentation # 4
Monday, March 3, 2025, 8:00am - 8:20am

TRANEXAMIC ACID REDUCES SYSTEMIC COMPLEMENT ACTIVATION IN TRAUMATIC BRAIN INJURY PATIENTS

E Maginot, H Moore, E Moore, T Moody, C White, F Gawargi, I Bernhardt, J Chandler, R Henry, J Garay, M Schreiber, A Sauaia, C Barrett
University of Nebraska Medical Center
Omaha, Nebraska

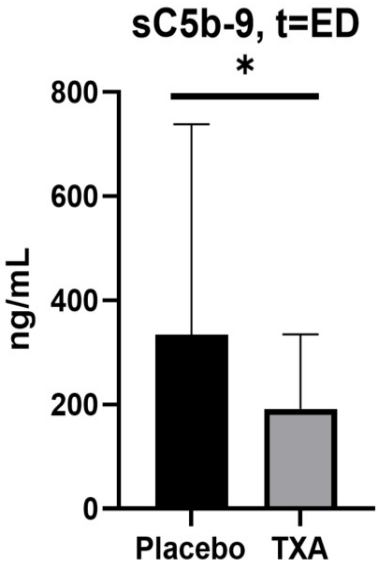
Presenter: Elizabeth Maginot MD
WTA Sponsor: Ernest Moore

Introduction: Traumatic brain injury (TBI) is a leading cause of death in trauma, and a pre-hospital 2g bolus of tranexamic acid (TXA) has demonstrated benefit. Interestingly, serial cross-sectional imaging has not demonstrated reductions in brain bleed size in patients who received TXA compared to placebo, raising the question of whether another mechanism may explain the observed benefit. Plasmin is known to activate complement proteins C3 and C5 directly, and complement activation is mechanistically linked to worse functional outcomes in animal TBI models. Since TXA is known to inhibit plasmin generation, we hypothesized that TBI patients randomized to 2g TXA would have lower complement levels early after injury than those randomized to placebo, which may explain the improved outcomes in TBI with TXA administration.

Methods: Plasma from adult trauma patients (N = 40) with confirmed TBI on cross-sectional imaging from a randomized controlled trial comparing pre-hospital TXA to placebo was obtained at initial presentation (ED), t=6hr, and t=24hr, with N=20 patients who received a 2g TXA bolus and N=20 who received placebo. Complement multiplex was performed for activation and regulatory markers. ELISA was performed for D-dimer levels to reflect overall plasmin activity. Linear mixed models were performed, and pairwise comparisons were made using ANOVA. Significance was set at $p<0.05$.

Results: Median age was 36.5 (27.0-54.5), with 85% being male and 72.5% white race. There was a significant reduction in sC5b-9 in the TXA group at the ED time point (333.9 +/-404.4ng/mL placebo versus 191.5+/-143.4ng/mL TXA, p=0.04) with significant modification in sC5b-9 levels over time by TXA on mixed modeling (Pr>F=0.011). Conversely, levels of the complement control protein Factor H were higher in the TXA group at the ED time point (186.0+/-38.0ng/mL placebo versus 226.2+/-103.6ng/mL TXA, p=0.03). Large absolute differences were also observed in D-dimer between TXA and placebo that reached significance at t=6hr (t=ED: placebo 7.7+/-7.5 versus TXA 5.2+/-5.0ug/mL, NS; t=6hr placebo 8.4+/-7.5 versus TXA 4.8+/-5.1ug/mL, p=0.04; t=24hr placebo 3.9+/-4.7 versus TXA 2.1+/-2.3ug/mL, NS).

Conclusions: Pre-hospital TXA appears to significantly reduce cytotoxic complement activation, where complement activation is known to contribute to worse outcomes in TBI models. A reduction in D-dimer was also observed in the TXA group, which reflects lower plasmin activity. Taken together, our findings suggest that TXA may generate its benefit through reductions in plasmin-mediated complement activation.



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Presentation # 5
Monday, March 3, 2025, 8:20am - 8:40am

POST-TBI TRANEXAMIC ACID BENEFITS DEMONSTRATE SEX DEPENDENCE

P Santos, M Coons, P Bele, M Culkin, A Kauffman, D Augustin, A Georges, G Bass, L Kaplan, V Johnson, D Smith, J Pascual
Perelman School of Medicine at the University of Pennsylvania
Philadelphia, Pennsylvania

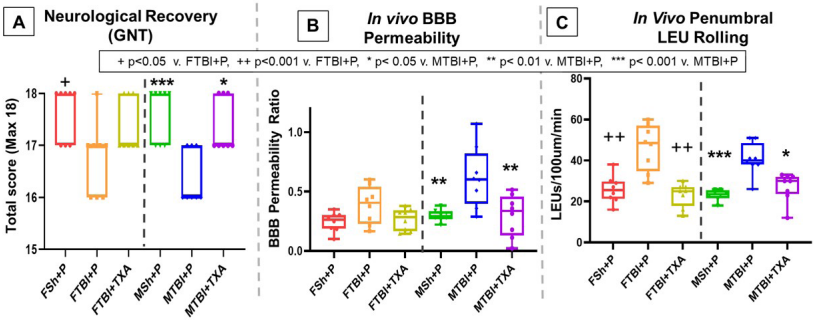
Presenter: Patricia Santos Carlin MD
WTA Sponsor: Mark Seamon

Introduction: Tranexamic acid (TXA) reduces mortality in traumatic brain injury (TBI) populations. Certain animal studies suggest that the mortality benefit is tied to TXA-related reductions in leukocyte-mediated, post-TBI penumbral blood-brain barrier (BBB) hyperpermeability. However, only male animals were studied and TBI outcomes have been shown to be different in males and females. We thus hypothesized that post-severe TBI TXA affects live penumbral BBB leukocyte mobilization, permeability, and neuroclinical recovery differently between sexes.

Methods: In a validated severe TBI murine model, Female (F) (n=24) and Male (M) (n=24) CD1 mice were randomized to 4 groups undergoing either sham craniotomy (Sh) or severe TBI (CCI: controlled cortical impact - 6m/s, 1mm depth, 3mm diameter, 0.1s dwell time). One hour later, animals were randomized to IV TXA (60mg/kg) or saline (placebo, P). In-vivo pial intravital microscopy at 48 hours allowed live visualization of penumbral BBB leukocyte (LEU)-endothelial interactions and FITC-albumin microvascular leakage. Neuroclinical recovery was assessed by the Garcia Neurological Test (GNT). ANOVA with Bonferroni correction assessed intergroup differences ($p<0.05$).

Results: TXA in males but not females significantly corrected TBI-related worsening in 48-hr GNT scores (Fig A). Similarly, only injured males demonstrated reduced BBB permeability after TXA (Fig B). However, TXA in both sexes significantly reduced post-TBI, in vivo penumbral LEU mobilization (FTBI + P: 46.4 +/- 4.0 v. FTBI + TXA: 23.3 +/- 2.1 v., $p<0.0001$; MTBI + P: 40.6 +/- 2.8 v. MTBI + TXA: 27.1 +/-2.5 LEUs/100um/min, $p=0.01$) (Fig C).

Conclusion: While TXA after TBI appears to similarly block penumbral LEU recruitment in both males and females, it restores BBB integrity preferentially in males, which correlates with improved neurological recovery only in males. Differential effects of post-injury therapeutics based on sex offer a potential pathway towards precision care. The specific mechanisms underpinning these differences should be specifically explored in human TBI.


A
Neurological Recovery (GNT)
B
In vivo BBB Permeability
C
In Vivo Penumbral LEU Rolling
+ p<0.05 v. FTBI+P, ++ p<0.001 v. FTBI+P, * p< 0.05 v. MTBI+P, ** p< 0.01 v. MTBI+P, *** p< 0.001 v. MTBI+P
Total score (Max 18)
BBB Permeability Ratio
LEUs/100um/min
FSh+P
FTBI+P
FTBI+TXA
MSh+P
MTBI+P
MTBI+TXA

NOTES

Presentation # 6
Monday, March 3, 2025, 8:40am - 9:00am

THE ROLE OF THE NEUROENDOTHELIAL AXIS IN TRAUMATIC BRAIN INJURY-INDUCED DISTANT ORGAN DAMAGE

M Liggett, B Wang, Z Dawood, M Zhang, G Jin, J Ho, B Liu, M Taylor, A Shaikh, D Couchenour, K Chtraklin, and H Alam
NORTHWESTERN UNIVERSITY FEINBERG SCHOOL OF MEDICINE
Chicago, Illinois

Presenter: Marjorie Liggett MD
WTA Sponsor: Hasan Alam

Introduction: Acute kidney injury (AKI) occurs in about 10-50% of patients with traumatic brain injury (TBI) and is associated with increased mortality and delayed recovery. Emerging evidence suggests that brain-organ "crosstalk" via inflammatory mechanisms plays a key role in the development of endotheliopathy. The precise mechanism behind this crosstalk, however, remains unknown. MG53, a TRIM family cell membrane repair protein, has been shown to reduce brain lesion size following TBI. In this study, we had two aims: 1) explore the renal protective effects of MG53 following TBI and 2) provide a mechanistic link between endothelial cell dysfunction and TBI-induced distant organ injury in a clinically relevant large animal model.

Methods: Female Yorkshire swine (40-45kg; n=5/group) were subjected to controlled cortical impact TBI and randomized to receive either: 1) recombinant human MG53 (rhMG53) protein (2mg/kg, intravenous) or 2) normal saline (control). Animals were monitored for 6 hours after injury. Serum and plasma samples were obtained at baseline and at various time points following TBI. Enzyme-linked immunosorbent assay (ELISA) was used to compare serum neutrophil gelatinase-associated lipocalin-2 (NGAL), a biomarker of AKI, between the two groups. Serum creatinine was also compared between the groups. Kidneys were analyzed for histologic evidence of acute injury. To determine the effect of TBI on endothelial cell (EC) injury, Interleukin (IL) 6 levels were measured after exposing murine coronary artery ECs to plasma from TBI swine in vitro.

Results: Animals in the control group had a statistically significant increase in creatinine from baseline by 6 hours post TBI (p=0.007), which was attenuated in the MG53 treated animals (p=0.089) (Figure, Panel A). RhMG53 treated animals had lower creatine values at 6 hours compared to the controls (p=0.012). Control animals had a statistically significant increase in serum NGAL from baseline at 4 hours (p=0.014) and 6 hours post-TBI (p=0.002). Animals treated with rhMG53 had no change in serum NGAL from baseline (p=0.163, p=0.789, 4 hours and 6 hours post-TBI, respectively). Histologic analysis showed proximal tubular epithelial cell damage in the control animals, which was not observed in the MG53 group (Figure, panels B-D). Murine coronary artery ECs released higher levels of IL-6 when exposed to plasma from TBI swine as compared to uninjured swine, however this was not statistically significant.

Conclusion: TBI can induce distant organ damage, most likely through EC dysfunction, and treatment with a cell membrane repair protein (MG53) can protect against this injury.

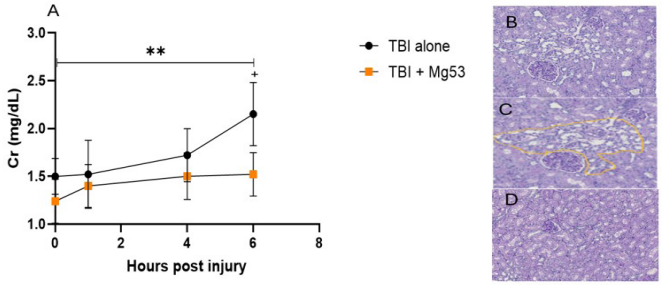


Figure: Post-TBI treatment with MG53 protects against TBI-induced proximal tubular epithelial damage. (A) *untreated TBI results in a significant increase in serum creatinine within 6 hours after injury (** p=0.002 between baseline and 6-hour post injury). In animals with TBI treated with MG53, there was no significant increase in creatinine. Creatinine in the untreated TBI group was significantly higher at hour 6 compared to animals treated with MG53 (+, p=0.012). Representative image of Periodic Acid-Schiff (PAS) stained kidney samples of swine euthanized 6 hours following sham control* ***(B)****, untreated TBI* ***(C),*** *or post-TBI treatment with Mg53* ***(D)****. Animals with untreated TBI had evidence of proximal tubular damage as highlighted in yellow* ***(C)****.*

NOTES

Presentation # 7
Monday, March 3, 2025, 4:00pm - 4:20pm

A MULTI-CENTER ANALYSIS OF HYPERTONIC SALINE VERSUS BUFFERED HYPERTONIC SOLUTION IN TRAUMATIC BRAIN INJURY

R Hicks, B Carter, J Briscoe, M Patel, N Froehling, E Levins, A Cascone, T Hentze, J Sorgenfrei, B Lauer, L Jurado, J Parker, D Hunt
University of Tennessee Health Science Center Chattanooga
Chattanooga, Tennessee

Presenter: Chace Hicks MD
WTA Sponsor: Darren Hunt

Introduction: Hypertonic saline (HTS) is used in traumatic brain injury (TBI) as pharmacologic therapy for elevated intracranial pressure and cerebral edema. High chloride-containing solutions have been associated with hyperchloremic metabolic acidosis (HMA) and acute kidney injury (AKI) in non-trauma populations leading some trauma centers to utilize a buffered hypertonic solution (BHTS). The objective of this study was to compare rates of AKI in patients receiving HTS compared to BHTS.

Methods: This was a multicenter, retrospective analysis of trauma patients ≥18 years old with TBI who were treated with either HTS, BHTS, or a combination of both. Patients with an intensive care unit stay of ≥72 hours who received at least 24 hours of either continuous hypertonic therapy or 500 milliliters of cumulative hypertonic boluses were included. The primary outcome was rate of AKI (KDIGO criteria) and secondary outcomes included incidence of HMA (arterial pH < 7.35, HCO3 < 20 mEq, serum chloride > 115 mEq/L, anion gap 3-14 mEq/L), hyperchloremia (serum chloride > 115 mEq/L), and mortality. Propensity score matching was utilized to account for differences in injury severity score (ISS) and presence of hemorrhagic shock.

Results: 315 patients from 7 centers were included in the analysis, with 179 receiving HTS and 136 receiving BHTS. One patient receiving HTS and 24 receiving BHTS were excluded from AKI analysis due to the AKI occurring on or before their first day receiving the drug. There was no difference in rate of AKI in the HTS group compared to the BHTS group (19.1% vs. 18.8%, p=0.94. This finding was upheld even after propensity score matching (18.5% vs. 23.3%, p=0.39). There were similar rates of hyperchloremia (HTS 75.4% vs. BHTS 71.3%, p=0.41) and HMA (HTS 17.8% vs. BHTS 26.8%, p=0.10) between the two groups. After propensity score matching, we found a statistically significant increase in mortality in those receiving HTS (33.6% vs. 20.8%, p=0.02). Of patients receiving BHTS, there was a statistically significant increase in mortality in those receiving only HTS in the first 24 hours of admission compared to those who received both HTS and BHTS initially (30.7% vs. 7.4%, p=0.01). It was also found that the group who received BHTS as their initial hypertonic therapy compared to those who received both had a significantly lower rate of AKI (14.3% vs. 48.1%, p=0.01).

Conclusion: While administration of a BHTS decreases the amount of chloride-containing solution that patients receive, this intervention did not result in decreased incidence of AKI, hyperchloremia, or HMA. Differences in mortality were noted between groups; however, the study was not powered to detect differences in this outcome. The findings of this study support the need for a prospective, double-blind study evaluating the clinical impact of utilizing BHTS over HTS.

Clinical outcomes when comparing HTS to BHTS

	HTS	BHTS*	p-value
AKI			
Before propensity score matching	35 (19.1)	21 (18.8)	0.9408
After propensity score matching	19 (18.5)	24 (23.3)	0.3913
In-hospital mortality			
Before propensity score matching	57 (31.8)	31 (22.8)	0.0762
After propensity score matching	42 (33.6)	26 (20.8)	0.0230
HCMA	24 (17.8)	26 (26.8)	0.0991
Hyperchloremia	135 (75.4)	97 (71.3)	0.4138

Values reported as n (%), *27 patients receiving both buffered and non-buffered, 21 receiving only buffered

NOTES

Presentation # 8
Monday, March 3, 2025, 4:20pm - 4:40pm

IS EMBOLIZATION A SAFE AND EFFECTIVE TREATMENT OPTION FOR CERTAIN TRAUMATIC SUBDURAL HEMATOMAS

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Wichita, Kansas

Presenter: James Haan, MD
WTA Sponsor: James Haan

Introduction: The classic treatment of subdural hematoma is either observation or surgical evacuation. The latter carries high risk of recurrence and high mortality rate, especially in patients with multiple comorbidities. Several studies have investigated the efficacy of middle meningeal artery (MMA) embolization on the management of chronic subdural hematoma. These studies have shown that the proposed technique offers a safer and effective non-invasive approach compared to surgical evacuation. So far, there has not been any study that evaluated the effectiveness of MMA embolization for the management of acute subdural hematoma. Our study aims to assess the safety and efficacy of MMA embolization on patients with acute subdural hematoma.

Methods: We conducted a retrospective chart review of adult patients who presented with subdural hematoma between July 1,2021 and July 1,2023. Hospital records were accessed to collect patients' demographics, Glascow Coma Scale, Vital signs, comorbidities, anticoagulation use, procedures performed, whether middle meningeal artery embolization was utilized, failure of the intervention done, ICU admission and length of stay, and any intervention-associated complication.

Results: Investigators reviewed records on 33 patients that presented with an acute subdural hematoma. Of those, 17 patients had MMA embolization and 16 did not. The median age of patients that were embolized was greater than those that were not embolized (71 years vs. 37.5 years, P=.025). Those that were embolized and not embolized were not statistically different with regard gender, race, and injury severity score. Median initial GCS was lower in patients that were not embolized (11.5 vs. 14, P=.015) compared to those that were embolized. Post-operative complications did not differ statistically for patients that were embolized and not embolized. Patients that had MMA embolization were less likely to use mechanical ventilation (23.5% vs. 62.5%, P=.037), had a longer median hospital stay (9 days vs. 4 days, P=.037), and had lower mortality (5.9% vs. 37.5%, P=.039). Of the 17 patients that had MMA embolization, 11 presented with only acute bleeding, and 6 presented with acute on chronic bleeding. Of the 11 patients with acute bleeding, 2 patients had a craniotomy. Of the 6 patients with acute on chronic bleeding, 2 patients had a craniotomy. Of the 4 patients that were managed non-operatively, 1 patient received a Burr hole 1 day after embolization and was discharged to hospice. There were no instances of a patient receiving a craniotomy after MMA embolization.

Conclusion: MMA embolization appears safe and may be an effective in decreasing the need for delayed craniotomy in the management of acute subdural hematoma; however, larger controlled studies will be needed to provide evidence for changes to the current standard of care.

NOTES

Presentation # 9
Monday, March 3, 2025, 4:40pm - 5:00pm

EXTERNAL FIXATION (EF) CLOSE TO POINT OF INJURY IS ASSOCIATED WITH DECREASED INFECTION RISK IN MILITARY COMBAT CASUALTIES

MD Cobler-Lichter, JM Delamater, TR Arcieri, AM Reyes, JD Stallings, VS Nelson, N Namias, KR Gross, SE Boomsma, MD Buzzelli, J Gurney, KG Proctor, PJ Wetstein
University of Miami Miller School of Medicine - DeWitt Daughtry Family Department of Surgery/Jackson Memorial Hospital's Ryder Trauma Center and US Army Trauma Training Center, Miami FL. Joint Trauma System, Defense Health Agency, Joint Base San Antonio-
Miami, Florida

Presenter: Michael Cobler-Lichter MD
WTA Sponsor: Nicholas Namias

Introduction: Role 2 (R2) U.S. military treatment facilities (MTFs) provide far forward damage control resuscitation and surgery. There are many configurations of R2 surgical teams, but each service defines external fixation (EF) as a requisite skill. Given the austere conditions at R2s, the potential for infection after placing even external hardware is a major concern. We aimed to evaluate the rate of infection after EF in military casualties based on where in the evacuation pathway the EF was performed, hypothesizing that early EF would be associated with decreased infection risk.

Methods: The Department of Defense Trauma Registry (DoDTR) was retrospectively reviewed from 2003 to 2024. U.S. Military combat casualties who underwent EF at U.S. MTFs were included. Patients who died at any point were excluded. Early EF was defined as first EF performed at R2, or Role 3 (R3) in cases of R2 bypass. Late EF was defined as EF placed at either R3 after stopping at R2, Role 4 (R4), or R4 Continental U.S. MTFs (R4C). Infection was defined as any one of seventeen infectious complications recorded in the DoDTR. Multiple logistic regression was performed to evaluate the association of early EF on both wound infection (WI) and the composite infection outcome while controlling for patient physiology and injury severity.

Results: 6,115 patients received 7,805 EFs, of whom 2,602 patients were U.S. military. 19.0% of all EFs were placed at R2, 67.7% at R3, 5.4% at R4, and 7.8% at R4C. 60 patients (2.3%) died after undergoing EF, leaving 2,542 for analysis. Overall infection rate after EF was 19.1% for R2, 26.6% for R3, 18.9% for R4, and 36.6% for R4C, for an overall infection rate of 25.5%. WI was the most common infectious complication at 9.1% (8.8% after EF at R2, 16.0% for R3, 13.6% for R4, and 23.5% for R4C). Multiple logistic regression showed delayed EF was independently associated with WI as well as infection of any type, with adjusted odds ratio of 1.674 [95% CI 1.335-2.098] and 1.490 [95% CI 1.232-1.803] respectively (Table 1).

Conclusion: For US military battlefield casualties, early EF is associated with decreased infection risk despite the austere setting of these MTFs. This suggests that early EF either inherently reduces infection risk or allows for earlier irrigation and debridement, though future work is needed to confirm these findings. Either way, EF expertise should be maintained as close to point-of-injury as possible.

	Wound Infection		Any Infection	
	aOR	**95% CI**	**aOR**	**95% CI**
Delayed EF	1.674*	1.335-2.098	1.490*	1.232-1.803
Minimum ED SBP (mm Hg)	1.001	0.996-1.006	1.000	0.996-1.004
Maximum ED Heart Rate	0.999	0.994-1.004	0.997	0.993-1.001
Minimum GCS	1.025	0.998-1.052	1.019	0.997-1.041
ISS	1.034*	1.024-1.043	1.053*	1.044-1.062
aOR: adjusted odds ratio; CI: confidence interval; EF: external fixation; ED: emergency department; GCS: Glasgow Coma Scale; SBP: systolic blood pressure; ISS: injury severity score; * represents statistical significance at $p<0.05$				

TABLE 1: Multiple Logistic Regression Results

NOTES

Presentation # 10
Monday, March 3, 2025, 5:00pm - 5:20pm

ANTIBIOTIC REGIMEN OPTIMIZATION FOR SEVERE EXSANGUINATION IN A SWINE MODEL

J Livezey, A Anklowitz, D Chow, T McKinley, T Williams, J Horton, J Kuckelman, M Aranda
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Fort Eisenhower, Georgia

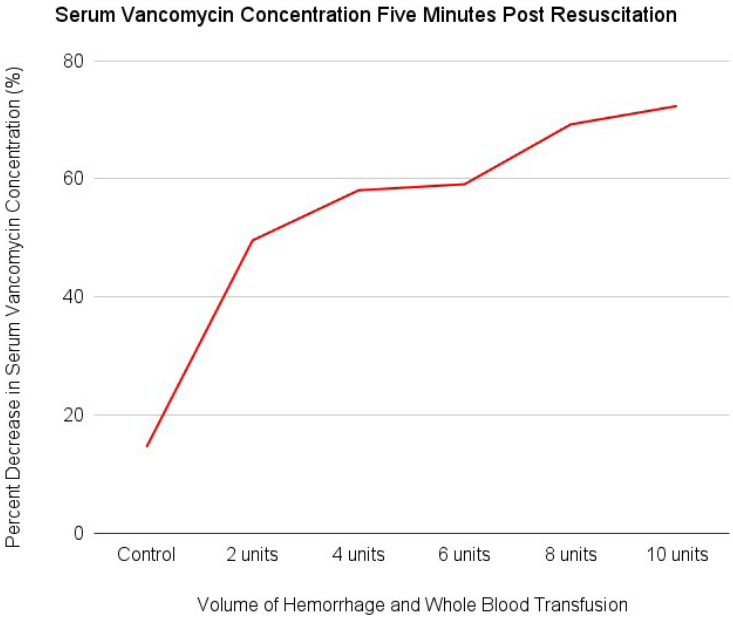
Presenter: Andrew Anklowitz MD
WTA Sponsor: John Horton

Introduction: Antibiotic prophylaxis given during a trauma activation, or preoperatively, decreases surgical site infections. Currently, there are not any specific guidelines to direct prophylactic antibiotic redosing during massive hemorrhage requiring blood product resuscitation. We sought to characterize the bioavailability of prophylactic antibiotics in the setting of severe hemorrhage and whole blood resuscitation in a swine model.

Methods: Sus Scrofa swine underwent an established controlled hemorrhage and whole blood resuscitation protocol. Control and experimental animals received weight-based vancomycin. Control animals did not undergo hemorrhage or transfusion. Experimental animals underwent a controlled hemorrhage followed by a whole blood resuscitation at a one-to-one ratio via the iliac vein. Experimental animals were randomized to five different groups of hemorrhage with consecutive whole blood transfusion starting at two units and increasing to ten units in two-unit increments. Serum vancomycin levels were collected at regular time intervals over a four-hour period. Hemodynamic data as well as serial laboratory data were monitored and recorded at regular time intervals as well.

Results: Control animals (N=6) demonstrated a gradual decrease in serum vancomycin concentration with the drug becoming sub-therapeutic (<15 ug/mL) at an average of 215 minutes. Vancomycin concentrations became sub-therapeutic significantly quicker in the hemorrhage group (N=16) at an average of 124 minutes ($p<0.001$). Animals had a relative decrease in serum vancomycin concentration that trended from 15% in control animals to 72% in the ten-unit animals at five minutes post-hemorrhage and transfusion (Figure 1).

Conclusions: Massive hemorrhage and resuscitation affects the bioavailability and efficacy of prophylactic antibiotics in trauma. Serum concentrations of vancomycin had an inverse correlation with increased hemorrhage and transfusion and sub-therapeutic levels were reached significantly earlier when compared to controls. This suggests that prophylactic antibiotics may need to be re-dosed at two hours for patients undergoing massive transfusion protocols.


Serum Vancomycin Concentration Five Minutes Post Resuscitation
Percent Decrease in Serum Vancomycin Concentration (%)
80
60
40
20
0
Control
2 units
4 units
6 units
8 units
10 units
Volume of Hemorrhage and Whole Blood Transfusion

NOTES

Presentation # 11
Monday, March 3, 2025, 5:20pm - 5:40pm

RANDOMIZED TRIAL ON LIMITED PERIOPERATIVE ANTIBIOTICS FOR FACIAL FRACTURES: ENOUGH IS ENOUGH

T Dee, A Desio, M Knight, M Mendiola, C Purnell, P Patel, G Chang
Mount Sinai Hospital Chicago
Chicago, Illinois

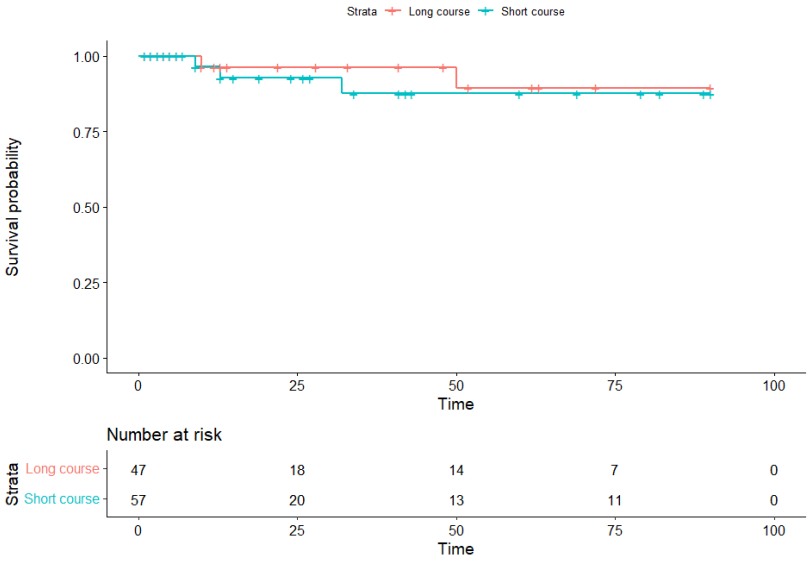
Presenter: Taryn Dee DO
WTA Sponsor: Carol Schermer

Introduction Surgical Infection Society guidelines recommend short courses of antibiotics for prophylaxis of infection in facial fractures, limiting their use to only the perioperative period. However, implementation of this practice may be difficult in settings where prolonged antibiotic courses are already common practice. The objective of this study was to determine what effect implementation of a short course of antibiotics for prophylaxis in patients with facial fractures has on the rate of head and neck infection (HNI) in this population.

Methods This study was conducted at a community level 1 trauma center. Patients seen by the plastic surgery service for facial fractures were randomized in alternating months to either a short course (SC, less than or equal to 24 hours of antibiotics in only the perioperative period, n = 57) or long course (LC, antibiotics administered upon presentation until postoperative, n = 47) of antibiotics. Patients with other indications for antibiotics were included and treated appropriately. Duration of antibiotics included both inpatient and outpatient courses. The primary outcome HNI at 90 days. A p value less than or equal to 0.05 was regarded statistically significant. Kaplan Meier survival analysis was performed to detect a difference in infection incidence over 90 days, followed by Cox proportional hazards analysis.

Results Baseline demographics between the two arms were similar. A majority of patients were managed non-operatively (70.2%, n = 73). At 90 days, 10.6% of the population in the LC arm experienced an infection versus 12.4% of the SC arm (p = 0.70). Univariate Cox Proportional Hazards Regression did not demonstrate a statistically significant difference in infection rate between the SC and LC arms (HR 1.46, 95% CI 0.24-8.73, p = 0.68).

Conclusions Patients randomized to a short course of antibiotics for prophylaxis of facial fractures did not have a significantly higher rate of HNI.


Strata
Long course
Short course
1.00
0.75
0.50
0.25
0.00
Survival probability
0
25
50
75
100
Time
Number at risk
Strata
Long course
Short course
47
18
14
7
0
57
20
13
11
0
0
25
50
75
100
Time

NOTES

Presentation # 12
Monday, March 3, 2025, 5:40pm - 6:00pm

DRUNK PLATELETS: ETHANOL INTOXICATION IS ASSOCIATED WITH PLATELET INHIBITION IN MALE TRAUMA PATIENTS.

B Stansbury, R Hall, A Vasquez-Loreto, R Easter, T Low, J Handschug, K Kupanoff, H Soe-Lin, B Czarkowski, D Huang, M Jones, J Weinberg, J Bogert
St. Joseph's Hospital and Medical Center
Phoenix, Arizona

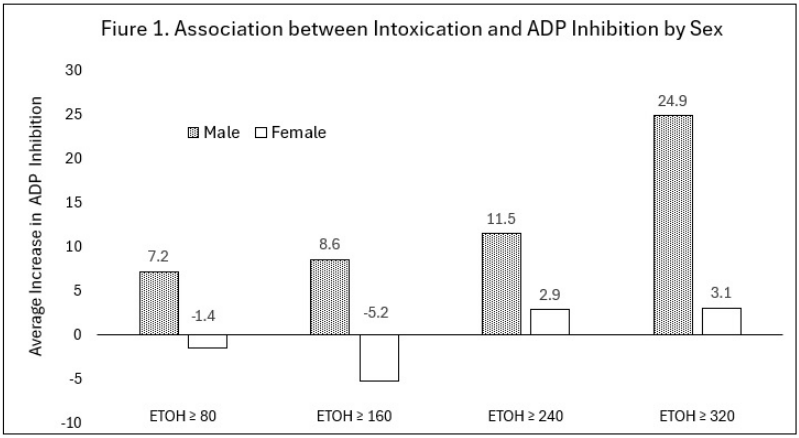
Presenter: Brittany Stansbury MD
WTA Sponsor: Jordan Weinberg

Introduction: Alcohol is well established to be a major risk factor for traumatic injury that and has metabolic and physiologic effects that complicate the care of intoxicated trauma patients. Alcohol consumption has been associated with a hypocoagulable state and inhibited fibrinolysis as measured by thromboelastography (TEG), and. Previous studies have suggested alcohol effects on coagulation to be greater in males than females. This study analyzed the relationship between blood alcohol levels, changes in coagulation seen on viscoelastic testing, and sex in trauma patients.

Methods: Patients admitted to a Level-1 trauma center and administered a TEG between December 2019 and January 2023 were included in the study. Patients missing data on blood alcohol level or with incomplete TEGs were excluded. Blood alcohol level was dichotomized into 4 variables: ≥ 80 mg/dL, ≥ 160 mg/dL, ≥ 240 mg/dL, and ≥ 320 mg/dL. A series of 4 multivariate linear regression models with adenosine diphosphate (ADP Percent Inhibition) regressed on each blood alcohol dichotomized variable were conducted. The following covariates were entered into the model: age, injury severity score, interfacility transfer status, toxicology results, Glasgow Coma Scale score, blood transfusion, and craniotomy.

Results: 1729 patients were included in the study and 165 were removed for missing data leaving 1514 patients in our analyses (1025 male, average age 53.3 ± 22.6 years, 1276 with GCS 13-15). Blood alcohol level stratification was ≥ 80 mg/dL: 260 (17.2%), ≥ 160 mg/dL: 179 (11.8%), ≥ 240 mg/dL: 97 (6.4%), and ≥ 320 mg/dL 27 (1.8%). Blood alcohol level was a significant predictor of increased ADP percent inhibition in all 4 models with a positive stepwise increase. The following unstandardized beta coefficients for blood alcohol level were observed: ≥ 80mg/dL, 5.3 (1.4 - 9.2); ≥ 160 mg/dL, 5.7 (1.2 - 10.2); ≥ 240mg/dL, 9.7 (3.9 - 15.6); ≥ 320 mg/dL, 17.1 (6.4 - 27.8) (Figure 1). When analyzed by sex, the associations between alcohol and ADP percent inhibition held in all 4 male models (Figure 1) and none of the female models [males: ≥ 80 mg/dL, 7.2 (2.9 - 11.4); ≥ 160 mg/dL, 8.6 (3.7 - 13.5); ≥ 240 mg/dL, 11.5 (5.1 - 17.9); ≥ 320 mg/dL, 24.9 (11.8 - 37.9)].

Conclusion: As determined by TEG Platelet Mapping, increased blood alcohol level was observed to be associated with increased ADP percent inhibition in male patients after trauma, suggesting that alcohol inhibits clot formation in male trauma patients. This reaffirms previous findings indicating that alcohol has a significant effect on coagulation in males but not females.


Fiure 1. Association between Intoxication and ADP Inhibition by Sex
Average Increase in ADP Inhibition
30
25
20
15
10
5
0
-5
-10
Male
Female
7.2
-1.4
8.6
-5.2
11.5
2.9
24.9
3.1
ETOH ≥ 80
ETOH ≥ 160
ETOH ≥ 240
ETOH ≥ 320

NOTES

Presentation # 13
Tuesday, March 4, 2025, 7:00am - 7:20am

UNIVERSAL COMPUTED TOMOGRAPHY FOR ABDOMINAL GUNSHOT WOUNDS: THE ROAD TO SELECTIVE MANAGEMENT AND FOCUSED OPERATIVE INTERVENTION

J Sumislawski, E Krebs, A Medvecz, B Dennis, O Gunter
Vanderbilt University Medical Center
Nashville, Tennessee

Presenter: Joshua Sumislawski MD
WTA Sponsor: Oliver Gunter

Introduction: Despite technological advances in radiology, it remains widely accepted that patients with abdominal gunshot wounds (AGSWs) should undergo immediate exploratory laparotomy without preoperative imaging. Our institutional practice is to obtain an initial computed tomography scan (CT) on all patients with AGSWs, except those who arrive in shock and do not improve with blood product resuscitation. We hypothesize that routine scanning for AGSWs yields a high rate of nonoperative management with few negative laparotomies and that CT predicts intraoperative findings in patients who warrant an abdominal operation.

Methods: We reviewed all patients with an AGSW who underwent CT in the emergency department (ED) at an urban Level I trauma center from January 2021 to March 2024. For those who subsequently had an abdominal operation, radiographic findings were compared with intraoperative findings to assess concordance.

Results: 369 patients were included (median Injury Severity Score 14, mortality 6%). Based on their CTs, 143 patients (39%) were initially managed nonoperatively, including 29 patients who had at least one episode of hypotension (systolic blood pressure <90 mm Hg) in the ED. The most common ballistic trajectories in this nonoperative cohort were flank/back (30%), anterior abdominal (17%), isolated right upper quadrant (16%), and multiple (16%). 45 patients were discharged from the ED, eight underwent angiography (seven therapeutic), and four failed nonoperative management and warranted surgical exploration. Among the 226 patients who were initially managed operatively, two underwent angioembolization of liver and pelvic vascular injuries before bowel injuries were addressed in the operating room (OR). A total of 230 patients had an abdominal operation (214 laparotomies, 3 laparoscopies converted to laparotomies, 13 laparoscopies alone), and the CT was concordant with intraoperative findings in 190 patients (83%). No differences were seen between organ-specific injuries identified on CT versus in the OR (Table). There were 13 negative laparotomies (6%).

Conclusions: Universal CT optimizes selective management of AGSWs. In this series, more than one-third of patients were managed nonoperatively, including some with admission hypotension, a classic indication for laparotomy. Among patients managed operatively, we saw a strong correlation between radiographic and intraoperative findings, suggesting that CT may be used as a guide for more focused surgical intervention. Promptly obtained CT should play a routine role in the initial evaluation of AGSWs.

	Patients with injury on CT (n=230)	Patients with injury in OR (n=230)	*p*
Bladder	14 (6%)	14 (6%)	1.00
Diaphragm	42 (18%)	42 (18%)	1.00
Hollow viscus	191 (83%)	181 (79%)	0.24
Kidney	47 (20%)	47 (20%)	1.00
Liver	58 (25%)	60 (26%)	0.83
Pancreas	25 (11%)	29 (13%)	0.56
Spleen	33 (14%)	29 (13%)	0.59
Ureter	14 (6%)	10 (4%)	0.40
Vascular	24 (10%)	22 (10%)	0.76

NOTES

Presentation # 14
Tuesday, March 4, 2025, 7:20am - 7:40am

TOURNIQUET USE IN PEDIATRIC TRAUMA: SAFE AND EFFECTIVE

E Feeney, K Morgan, J Sperry, C Leeper
Children's Hospital of Pittsburgh
Pittsburgh, Pennsylvania

Presenter: Erin Feeney MD
WTA Sponsor: Jason Sperry

Introduction: Traumatic limb injury is a serious and common presentation in pediatric trauma. Tourniquet use in children relies on expert consensus, as data are limited in children. We hypothesize that TK use in children is effective and safe.

Methods: This is a multicenter, observational study of injured children ages 5-17 in a statewide database (2016-2021) who sustained moderate or severe traumatic limb injury (AIS score ≥2). Subjects were categorized by tourniquet (TK) use. Primary outcome was shock (age-adjusted hypotension) on arrival. Data were analyzed utilizing a logistic regression model and propensity score matching adjusting for extremity abbreviated injury score (AIS) score, injury severity score, age, and sex.

Results: In total, 104/12,089 children with traumatic limb injury had a tourniquet applied; 79 (76%) were applied in the pre-hospital setting, 29 (37%) by EMS personnel. Median (IQR) age was 15 years (12-16), 62% penetrating mechanism, median (IQR) extremity AIS was 3 (2-3). TK use was associated with decreased odds of shock on trauma bay arrival after controlling for extremity AIS score, injury severity score, age, and sex (Odds Ratio 0.44 (95% Confidence Interval Y-Z, p=0.045). Propensity score matching showed an 8% decrease in incidence of shock (p=0.02) in the TK group. Incidence of adverse outcomes included 3 (4%) extremity compartment syndrome, 1 (1%) acute kidney injury, and 0 acute arterial occlusion or DVT. Relation to TK versus primary injury not available.

Conclusions: TK use in children with traumatic limb injury was associated with decreased shock and a reassuring safety profile. These findings can help inform evidence-based decision-making on tourniquet use in this vulnerable population.

NOTES

Presentation # 15
Tuesday, March 4, 2025, 7:40am - 8:00am

TRAUMATIC PNEUMOTHORAX IN CHILDREN: WHO NEEDS A CHEST TUBE PRIOR TO TRANSPORT?

I Ziogas, N Becher, B Bellen, G Kierulf, J Hills-Dunlap, M Mandt, S Moulton
University of Colorado
Aurora, Colorado

Presenter: Ioannis Ziogas MD, MPH
WTA Sponsor: Steven Moulton

Introduction: Tube thoracostomy is often performed to prevent sudden, unexpected decompensation during transport of intubated pediatric trauma patients with a traumatic pneumothorax. We sought to evaluate the outcomes of children with traumatic pneumothorax, who were intubated and received positive pressure ventilation (PPV) with or without tube thoracostomy prior to admission to a level one, regional pediatric trauma center.

Methods: The trauma registry at a quaternary children's hospital was queried for pediatric patients (<19 years) with traumatic pneumothorax, who were intubated and received PPV with or without tube thoracostomy prior to admission between 01/2010-05/2023. Descriptive statistics were used to report clinical characteristics and outcomes. Chi-square test was used to compare categorical variables and Mann-Whitney U test to compare continuous variables between children who underwent tube thoracostomy or not.

Results: A total of 561 children were diagnosed with traumatic pneumothorax, of whom 86 were intubated and transported on PPV. The median age was 11.8 years (interquartile range [IQR]: 6.1-15.8) and 54 (62.8%) were male. Thirty-two children (37.2%) had bilateral pneumothoraces. Tube thoracostomy was performed at the outside hospital (OSH) in 38 children (44.2%) and the indications are shown in Table 1. The mechanism of injury was blunt in 81 children (94.2%); all five patients with penetrating injuries underwent tube thoracostomy at the OSH (p=0.01). Children who underwent tube thoracostomy were more likely to be transported via air (60.4% vs. 84.2%, p=0.02). The median change in elevation was 1,754 ft (IQR: 600-3,500) without a statistically significant difference between the two groups (p=0.62). All children (100%) who did not undergo tube thoracostomy had small pneumothorax compared to 36.8% of the children who underwent tube thoracostomy (p<0.001). Upon arrival and reimaging at our facility, children who underwent tube thoracostomy were more likely to have a pneumothorax that decreased or remained stable in size, while children who did not undergo tube thoracostomy were more likely to have a pneumothorax that was radiographically absent (p<0.001). After arrival at our facility, nine children (10.5%) underwent tube thoracostomy without a statistically significant difference between the two groups (p=0.99). The re-admission rate was 9.3% and equivalent between the two groups (p=0.94); none were related to pneumothorax.

Conclusions: About one-third of the children with traumatic pneumothorax, who required intubation with PPV and underwent tube thoracostomy before admission, had no documented indication except the presence of a pneumothorax. Children with a traumatic pneumothorax, who did not undergo tube thoracostomy and were principally transported via air with significant elevation change, had complete resolution of pneumothorax on reimaging and none experienced decompensation, readmission, or post-discharge complications related to pneumothorax. Tube thoracostomy should only be performed in children with a large or symptomatic pneumothorax before transport to a trauma center.

Table 1. Clinical Characteristics

Variable		Total (n = 86)	No tube thoracostomy prior to admission (n = 48)	Tube thoracostomy prior to admission (n = 38)
Tube thoracostomy indications prior to admission	Undocumented indication	-	-	12 (31.6%)
	Respiratory distress	-	-	13 (34.2%)
	Hemothorax	-	-	10 (26.3%)
	Trip to the operating room for other procedure	-	-	3 (7.9%)
Change in pneumothorax upon reimaging on arrival	Increased	4 (4.6%)	3 (6.3%)	1 (2.6%)
	Decreased	21 (24.4%)	4 (8.3%)	17 (44.7%)
	Stable	22 (25.6%)	7 (14.6%)	15 (39.5%)
	Radiographically absent	39 (45.4%)	34 (70.8%)	5 (13.2%)

NOTES

Presentation # 16
Tuesday, March 4, 2025, 8:00am - 8:20am

THE INCIDENCE OF HYPERTENSION FOLLOWING PEDIATRIC BLUNT RENAL TRAUMA IN A POPULATION-BASED COHORT WITH LONG-TERM FOLLOW-UP

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Mayo Clinic
Rochester, Minnesota

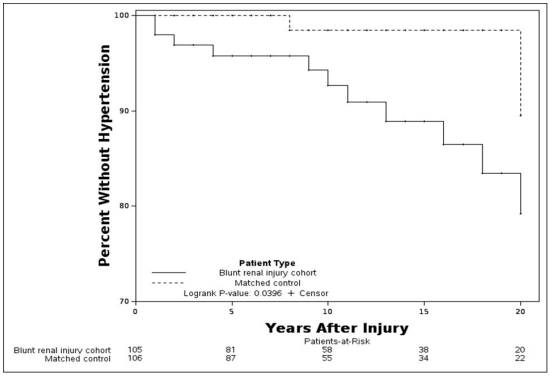
Presenter: Matthew Parrish MD
WTA Sponsor: Mubeen Jafri

Introduction: The risk of hypertension following childhood blunt renal trauma is poorly characterized due to limited, single-institution data with variable follow-up and results. Recognizing the importance of determining appropriate aftercare for injured children and facilitating their long-term health, this study aimed to establish the time-dependent incidence of hypertension following pediatric renal trauma in a population-based cohort. The hypothesis was that the incidence of hypertension is greater among individuals who sustained blunt renal injury than in uninjured controls.

Methods: Patients aged 0-21 years who sustained blunt renal trauma 1976-2020 and survived to discharge were identified from a validated, population-based registry of all healthcare that occurs within a 27-county area. For patients without AAST renal injury grade assigned in the medical record, imaging was reviewed by a radiologist and retrospectively graded. Hypertension was defined as a documented diagnosis or prescription of treatment including lifestyle modification or pharmacologic therapy. Characteristics of patients who developed hypertension were identified using chi-square and Fisher's exact test (categorical variables) and Kruskal-Wallis test (continuous variables). Incidence of hypertension was compared to a cohort of age and sex-matched uninjured controls using Kaplan Meier and log-rank analyses. $p<.05$ indicated significance.

Results: There were 106 patients with blunt renal injury identified with a median (IQR) age of 16 (14-18) years; 64% (n=68) were male and median follow-up was 12 (6-19) years. The majority sustained unilateral injuries (n=96, 91%) and were managed nonoperatively (n=95, 90%). Injuries ranged from AAST grades 1-5 (n=13 (12%), 24 (23%), 31 (29%), 26 (25%) and 12 (11%), respectively). Blood pressure was checked following discharge in 94% of patients at a median of 2(1-12) months. Incidence of hypertension increased from 4% at 5 years post-injury to 21% at 20 years post-injury and was greater than in uninjured matched controls ($p=.035$; Figure). There were no differences in hypertension risk based on age at injury, gender, injury grade, or unilateral vs bilateral renal injury (all $p>.05$).

Conclusion: Children who sustain blunt renal trauma are at increased risk of hypertension compared to healthy controls based on a population-based data set with long-term follow-up. This risk appears consistent over time and exceeds 20% at 20 years post-injury, which is greater than previously reported. These data highlight the value of long-term follow up for injured children. For blunt renal injury specifically, these findings support development of more specific guidelines and investigation of efforts to mitigate secondary hypertension risk in children who sustain blunt renal trauma.


Percent Without Hypertension
100
90
80
70
Patient Type
Blunt renal injury cohort
Matched control
Logrank P-value: 0.0396 + Censor
0
5
10
15
20
Years After Injury
Patients-at-Risk
Blunt renal injury cohort 105 81 58 38 20
Matched control 106 87 55 34 22

NOTES

Presentation # 17
Tuesday, March 4, 2025, 8:20am - 8:40am

UTILIZATION OF COMPUTED TOMOGRAPHY FOR PEDIATRIC CERVICAL SPINE CLEARANCE ACROSS A 24-HOSPITAL SYSTEM

K Russell, A Kahan, R Eldredge, R Swendiman, Z Kastenberg, A Kay, J Rampton, F Novoa, G De Vettori, H Wan, R Iyer, D Morris, D Brockmeyer
Univerisity of Utah
Salt Lake City, Utah

Presenter: Katie Russell MD
WTA Sponsor: David Notrica

Introduction: Efficient and accurate evaluation of the pediatric cervical spine for both injury identification and post-traumatic clearance remains a challenge. We aimed to determine the sensitivity and negative predicative value (NPV) of computed tomography (CT) for identification of cervical spine injuries (CSIs) in pediatric blunt trauma patients across a large health system.

Methods: A retrospective review of pediatric patients age <18 years with trauma diagnosis codes and a cervical spine CT within 1 day of presentation to an emergency department was conducted across a 24-hospital system from January 2012 through December 2023. A clinically significant injury was defined as an injury requiring cervical spine surgery including a halo placement within 2 weeks of presentation. Patients with a clinically significant CSI were compared to those without, and the sensitivity and NPV of CT was calculated.

Results: A total of 22,909 patients underwent cervical spine CT. The PTC used CT least frequently at 32% and the highest utilizer of CT was 89%. There were 97 (0.4%) patients with a clinically significant CSI that required surgery or a halo within 2 weeks of injury. In the CSI group, the median age was 15.3 years and 66% were male. When comparing the CSI group to the non-CSI group, the CSI patients were more likely to be intubated (47% vs 8%, P<0.001) and more likely to be transferred (16% vs 3%, p,0.001). The groups were similar in terms of age, sex, and GCS. Three patients had normal CTs and went on to require operative repair based on MRI findings (Table 1). They were all GCS 15 and clinically symptomatic with midline tenderness. Post hoc review by the spine team identifies all of these injuries on CT and none were grossly unstable. The overall sensitivity of CT for diagnosing a clinically significant injury was 97% and the negative predictive value was 100%.

Conclusion: CT appears to have a high sensitivity for detecting clinically significant CSIs in pediatric trauma patients, across a wide variety of hospitals. Consideration must be given to clearing the pediatric cervical spine based on a negative CT in the absence of symptoms. Forthcoming prospective data will be useful to confirm these results and inform recommendations for pediatric cervical spine clearance.

Table 1: Characteristics of patients with clinically significant CSI that had a normal CT

	Mechanism	Age	Sex	GCS	SX	CT	MRI	Surgery	NSG Review
1	Wrestling	15	M	15	Pain	NML	C5-C6 interspinous ligamentous injury	Anterior C5-C6 discectomy and fusion	Stable
2	Trampoline	13	M	15	Pain	NML	C5-C6 intervertebral disc, disruption ligamentum flavum, partial posterior longitudinal ligament	Anterior C5-C6 discectomy and fusion	Stable
3	Skiing backflip	15	M	15	Transient weakness	NML	C3-C4 intervertebral disc with spinal cord edema, posterior ligamentous injury	Anterior C3-C4 discectomy and fusion	Stable

NOTES

Presentation # 18
Tuesday, March 4, 2025, 8:40am - 9:00am

SAFETY NET: PROMOTING SAFETY AND PREVENTION FIREARM INJURIES IN SCHOOLS

C Colosimo, S Battan-Wraith, T Anand, M Douglas, A Nelson, C Stewart, A Spencer, L Magnotti, B. Joseph1;
University of Arizona
Tucson, Arizona

Presenter: Christina Colosimo DO MS
WTA Sponsor: Bellal Joseph

Introduction: K-12 students face an unprecedented level of vulnerability to gun violence, yet there is an absence of firearm violence prevention programs in school curriculums. We hypothesize that the Safety Net, a school-base comprehensive gun violence education intervention, will improve firearm safety knowledge among high-risk middle school and high school students.

Methods: This was a prospective, single-armed study over a seven-month period (November 2023- May 2024). Our Level 1 Trauma Center held focus groups two local middle schools and one local high school, meeting with school administration, teachers, nurses, and psychologists. With local stakeholder input, the Safety Net program was developed. The module-based intervention was then taught at these three schools, covering local and national firearm violence data, firearm safety, advanced first aid, and a case scenario to utilize the tools learned. The students' baseline and post-intervention knowledge, perceptions, attitudes, and stated behavior related to firearms were assessed via qualitative and quantitative surveys.

Results: Eighty-four students across three schools were enrolled in the pilot program (age 12-19) and 45 completed the post-intervention survey. Thirty percent of the students reported a firearm in their home, 29% of the students reported shooting a firearm, and 38% of the students personally knew someone who has a been a victim of firearm violence. After intervention, 84% of students (59% pre-intervention) were able to correctly articulate unintentional injury as the most common cause of firearm-related death in children and teens. Further, after intervention 77% (73% pre-intervention) felt gun safety should be taught in schools, 89% (82% pre-intervention) correctly described not touching a weapon and immediately leaving the situation as a safe course of action when encountering a firearm. Notably, pre-intervention, six out of six high school students stated they had not personally experienced gun violence, but post-intervention five out of six changed their response to acknowledge having personally experiencing gun violence, and one of six endorsed being unsure.

Conclusion: A school-based firearm violence intervention program can dispel misconceptions about the nature of gun-related deaths and increase understanding of safe behavior in response to firearms. High school and middle school students are receptive and positive to firearm safety instruction in schools. This Sonoran Safety Net provides a foundation for school-based firearm education, as part of a comprehensive firearm violence prevention strategy.

NOTES

Presentation # 19
Tuesday, March 4, 2025, 4:00pm - 4:50pm

PANEL: DO WE EVER RECOVER? WELLNESS, RECOVERY & HUMAN PERFORMANCE

Panelists: Mitchell Cohen, MD, Jamie Coleman, MD, Bellal Joseph, MD, Jack Sava, MD, Ben Zarzaur, MD

NOTES

Presentation # 20
Tuesday, March 4, 2025, 4:50pm - 5:00pm

WITS 2024 - ALASKA!

R Albrecht, K Brasel, E Bulger, C Burlew, C Cocanour, K Davis, R Dicker, K Kaups, R Kozar, D Stein
Yale School of Medicine
New Haven, Connecticut

Presenter: Kimberly Davis MD MBA
WTA Sponsor: Kimberly Davis

In February of 2020, while attending the Western Trauma Association meeting in Sun Valley, we heard rumor of a virus causing upticks in hospital admissions and mortalities. Little did we know that our world was about to change for all of us. Women in Trauma Surgery (WITS) was started as a way for friends to stay connected during trying times. It was a chance to commiserate and provide mutual support and empathy, laughingly, a way to "keep our wits about us". Along the way, we realized that we were more than just a group of friends providing support to one another. We became a family. As women of a "certain age", we all had bucket lists, and at the top of the list for most of us was a trip to explore Alaska. After weeks of back and forth trying to schedule around the commitments of ten busy trauma surgeons, our Alaska 2024 trip became a reality. We boarded the National Geographic Quest cruise ship in Juneau, comprising about 10% of the passengers. The very first morning we were called to the deck to see a pod of humpbacks "bubble net feeding" off the bow. The remainder of the trip was punctuated by hiking, kayaking, and amazing wildlife including eagles, puffins, sea lions, bears, otters, seals, minks, and mountain goats. In our zodiacs, wearing rain gear and often rubber boots, we explored the wonders of small icebergs ("growlers") and huge glaciers, some of which were calving while we watched from less than a half mile away, bobbing in the deep fiords of the Inner Passage of Southeast Alaska. Learning about the history of Alaska, the flora and fauna of the region was part and parcel of the trip. Our excursions were shepherded by naturalists who provided a wealth of information. Our trip ended in Sitka with a visit to the National Totem Park and The Raptor Refuge where we saw rehabilitating eagles, owls, peregrine falcons and hawks. Exhausted and exhilarated but re-energized, we boarded our flights home and sadly said goodbye. It was a journey of lifelong friends having the time of our lives, with plans for another adventure in the hopefully near future!

NOTES

Presentation # 21
Tuesday, March 4, 2025, 5:00pm - 6:00pm

PRESIDENTIAL ADDRESS: ITS ALL ABOUT THE JOURNEY: CONNECTIONS AND BELONGING
Richard Miller, MD

NOTES

Presentation # 22
Wednesday, March 5, 2025, 7:00am - 7:20am

COAGULATION FACTOR XIII: AN UNRECOGNIZED REGULATOR OF FIBRINOLYTIC PHENOTYPES IN TRAUMA

P Moore, E Moore, R Garner, K Hansen, C Barrett, A Sauaia, H Moore
University of Colorado Anschutz Medical Center & Denver Health Medical Center
Aurora, Colorado

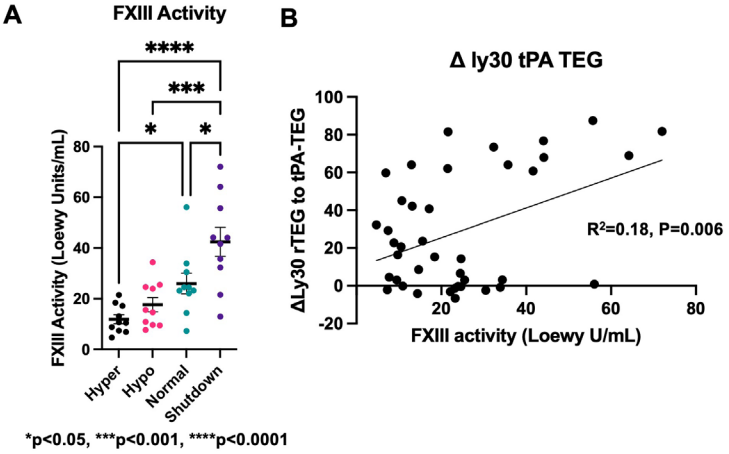
Presenter: Peter Moore MD
WTA Sponsor: Ernest Moore

Introduction: Trauma-induced coagulopathy (TIC) has three distinct pathologic phenotypes, hyperfibrinolysis, hypofibrinolysis, and fibrinolysis shutdown, based on results of rapid thromboelastography (rTEG) and tissue plasminogen activator TEG (tPA-TEG). Each phenotype has an increased mortality when compared to those with physiologic response to trauma. However, mechanisms underlying these phenotypes are not well understood. Coagulation factor XIII (FXIII) is a transglutaminase that crosslinks fibrin to itself and other proteins including α2-antiplasmin (α2AP), the primary inhibitor of plasmin. We hypothesized that FXIII crosslinking of fibrinolytic regulators contributes to differences between TIC phenotypes.

Methods: Citrated plasma obtained within 2 hours of injury from adult trauma patients that had rTEG and TPA-TEG to classify TIC phenotype was used in assays. 10 patients were included from each phenotype defined by Ly30 on rTEG and TPA-TEG (physiologic; 0.9-3%/0.3-35.5%, hypofibrinolysis <0.9%/<0.3%, hyperfibrinolysis >3%/>0.3%, shutdown <3%, >35.5%). FXIII activity was measured using biotinylated pentylamine incorporation assay on fibrinogen coated plates with addition of thrombin and 10 mM calcium chloride. FXIII-A antigen was evaluated via enzyme linked immunosorbent assay. Liquid chromatography-mass spectrometry was performed on plasma for proteomic evaluation.

Results: FXIII activity was significantly different between the four TIC phenotypes (Figure panel A, ANOVA P<0.0001). Patients with fibrinolysis shutdown had the highest FXIII activity (42.44 +/- 5.76 Loewy Units/mL) when compared to other phenotypes (physiologic 25.97 +/- 4.09, hypofibrinolysis 17.64 +/- 2.82, hyperfibrinolysis 11.93, +/- 1.74 Loewy units/mL). FXIII activity positively correlated with change in Ly30 from rTEG to TPA-TEG (Figure panel B, R2=0.18, P=0.006). FXIII antigen levels differed between groups (P=0.03) but with reduced sensitivity to distinguish between phenotypes (shutdown 10,170 +/-1149, physiologic 6,283 +/-516, hypofibrinolysis 7,035 +/- 826, hyperfibrinolysis 6,952 +/- 1126 ng/mL). Plasma proteomics demonstrated significant differences in the shutdown group when compared to other phenotypes. A number of these proteins can be cross-linked to fibrin by FXIII and change clot composition.

Conclusions: FXIII, a transglutaminase that regulates fibrin stability, structure, and composition, has substantially increased activity in patients with fibrinolysis shutdown. Additionally, patients with shutdown have notable differences in plasma proteins that can be cross-linked to fibrin by FXIII. These findings are suggestive of novel targetable regulators of fibrinolysis.



*p<0.05, ***p<0.001, ****p<0.0001

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Presentation # 23
Wednesday, March 5, 2025, 7:20am - 7:40am

THE EFFECT OF ELEVATION ON DEEP VEIN THROMBOSIS: A MULTICENTER COHORT STUDY

K Banton, S Jarvis, C Jungels, J Hovorka, D Acuna, D Bar-Or.
Injury Outcomes Network
Englewood, Colorado

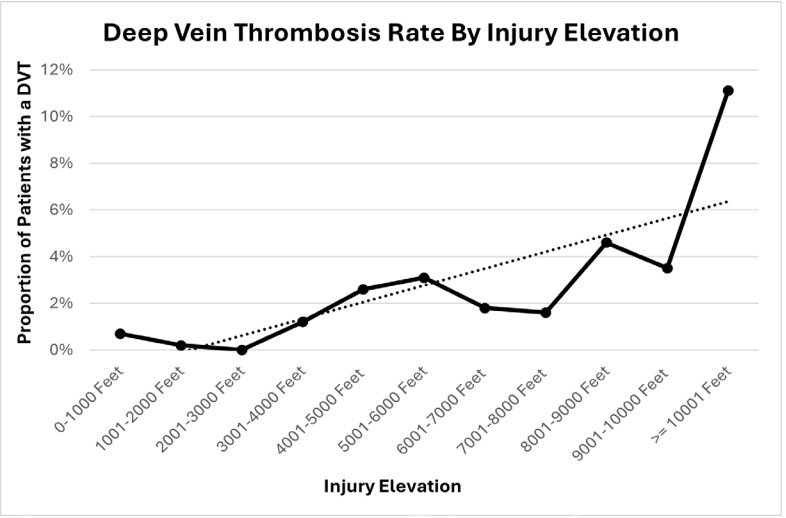
Presenter: Kaysie Banton
WTA Sponsor: Charles Mains

Introduction: Prior research has explored the impact of elevation on the risk of deep vein thrombosis (DVT), but primarily examined injuries at elevations < 1000 feet or > 4000 feet, excluding injuries at elevations in between. Additionally, there is a scarcity of studies with adjusted analyses. This study aimed to examine how increased elevation influences the prevalence of DVT and investigate confounding variables.

Methods: This retrospective cohort study at three Level I trauma centers, included adult trauma patients admitted between 10/1/2022-10/1/2023. The zip code where the injury occurred was used to define elevation. Injuries at high elevations (≥ 5000 feet) were compared to injuries occurring at low elevations (< 5000 feet). Multivariable logistic regression was used for adjusted modeling. Elevation was further categorized into 1000-foot increments, and the rate of DVT was plotted against elevation; r-squared and Pearson's correlation coefficient were used to evaluate the linear relationship. An alpha of < 0.0001 defined statistical significance.

Results: Of 6,821 patients, the median injury elevation was 1408 feet (IQR 912, 5371); 62% (4221) had injuries at low elevations, and 38% (2600) had injuries at high elevations. Compared to low elevation injuries, high elevation injured patients were significantly older, had lower oxygen saturation, suffered falls and sports injuries more often, motor vehicle collisions less often, and had a higher rate of comorbidities, including alcoholism and anticoagulant use. DVTs occurred significantly more often after high elevation injuries than low elevation injuries (3.1% vs. 0.5%, $p<0.0001$). Patients with a DVT had a median injury elevation of 5400 feet (IQR: 5228, 5519), compared to 1388 (IQR: 873, 5371) for patients without a DVT ($p<0.0001$). The change in elevation from home to injury location was not significantly associated with the rate of DVT ($p=0.17$). For each 1000-foot increase in elevation, there was an average corresponding 0.7% increase in the rate of DVT (moderate r-squared=0.6, p-corr<0.0001). There was a sharp increase in the rate of DVT after 8000 feet in elevation. In a logistic regression model adjusted for alcoholism and oxygen saturation, high elevation was associated with a 10.5-fold increase (95% CI: 4.8 to 22.9) in the risk for DVT when compared to low elevation. DVT was significantly associated with longer hospital stays and worsened discharge dispositions.

Conclusions: Even after adjustment, high elevation traumatic injuries were associated with an increased odds of developing a DVT than low elevation traumatic injuries. There was a significant linear association between DVT and injury elevation, with the rate of DVT increasing an average of 0.7% for every 1,000-foot rise in elevation. This finding may suggest the need for more stringent antithrombotic regimens, or enhanced screening for DVT at higher elevations trauma centers than lower elevations to improve outcomes.



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Presentation # 24
Wednesday, March 5, 2025, 7:40am - 8:00am

EARLY VTE PROPHYLAXIS IN BIG 1 AND BIG 2 TRAUMATIC BRAIN INJURY PATIENTS: A FIVE-YEAR ANALYSIS

S Villarin Ayala, O Hejazi, T Anand, MH Khurshid, A Nelson, F Castillo Diaz, AL Spencer, M Al Ma'ani, LJ Magnotti, B Joseph
University of Arizona
Tucson, Arizona

Presenter: Sigfredo Villarin Ayala MD
WTA Sponsor: Bellal Joseph

Introduction: Brain Injury Guidelines (BIG) was developed to reduce hospitalization of patients with mild traumatic brain injury (TBI). However, there is limited data on VTE prophylaxis for patients categorized as BIG 1 and BIG 2 hospitalized for non-TBI related trauma. The aim of this study is to assess the safety of early VTE prophylaxis among BIG 1 and BIG 2 patients. We hypothesis that early VTE prophylaxis is safe.

Methods: We performed a 5-year (2017 - 2021) retrospective analysis of a prospectively maintained TBI database at our level 1 trauma center and included all adult trauma patients with TBI categorized as BIG 1 or BIG 2 who received thromboprophylaxis. Patients were stratified into early (≤24 h) and late (>24 h) initiation of VTE prophylaxis.

Outcomes were rates of repeat head CT scan for neurological deterioration, DVT, PE, and mortality. Multivariable logistic regression was performed to identify the independent effect of timing of VTE prophylaxis on outcomes.

Results: 2,328 TBI patients were identified. Of these, 634 met inclusion criteria (BIG 1: 370, BIG 2: 264). Mean (SD) age was 42 (24), and 62% were male. Mean (SD) SBP and HR were 129 (20) and 90 (22), respectively. The median ISS was 13 [9-18]. The most common type of thromboprophylaxis was LMWH (91%). There were 393 (62%) patients in the early VTE prophylaxis group and 241 (38%) in the late group. Overall, only 20 patients underwent repeat Head CT with no difference between the two groups (p=0.398). All 20 head CT scans revealed no worsening from index head CT. Patients who received thromboprophylaxis within 24 hours had a lower incidence of clinically significant DVT (Early: 1% vs Late: 5%, p = 0.020), but no difference in pulmonary embolism (Early:0.5% vs Late:1%, p = 0.620) or mortality (Early: 1% vs Late: 2%, p = 0.265). On multivariable regression analysis, early VTE prophylaxis was associated with reducing risk of DVT (aOR 0.341, 95%CI [0.121-0.783], p=0.043). However, it was not associated with repeat head CT (aOR 0.766, 95%CI [0.243-3.605], p=0.219) or mortality (aOR 0.837, 95%CI [0.386-1.816], p=0.653). Conclusions Early administration of thromboprophylaxis for traumatic brain injury patients who fulfil BIG 1 or BIG 2 criteria and are admitted for non-TBI related trauma is safe and associated with reducing DVT risk without increasing risk of ICH progression or mortality. Future prospective studies are needed to further validate the thromboprophylaxis risk-benefit ratio among BIG 1 and BIG 2 patients.

NOTES

Presentation # 25
Wednesday, March 5, 2025, 8:00am - 8:20am

ANTI-XA LEVEL MONITORING IN ELDERLY TRAUMA PATIENTS RECEIVING ENOXAPARIN PROPHYLAXIS

L Bellfi, C Ramos, A Smith, L Stuke, P Greiffenstein, J Hunt, A Marr
LSU Health
New Orleans, Louisiana

Presenter: Lillian Bellfi PharmD, BCCCP
WTA Sponsor: Alan Marr

Introduction: Initiation of timely and appropriately dosed prophylaxis with enoxaparin, a low molecular weight heparin (LMWH), has been shown to reduce venous thromboembolism (VTE) in trauma patients. The Western Trauma Association (WTA) clinical decision algorithm on VTE prevention recommends a lower enoxaparin dose in neurotrauma, renal insufficiency, low weight, pregnancy, and geriatric trauma patients. This study evaluated the appropriateness of VTE prophylaxis using anti-Xa monitoring in elderly trauma patients with the recommended WTA enoxaparin dosing strategy.

Methods: This single-centered, retrospective study analyzed data from geriatric trauma patients (aged 65 or older) who presented at a Level I trauma center between January 2020 and July 2024. All patients meeting inclusion criteria received enoxaparin 30 mg subcutaneously (SQ) twice daily for VTE prophylaxis and had a peak anti-Xa level drawn after 3 consecutive doses. The primary outcome evaluated peak serum anti-Xa levels for therapeutic appropriateness of VTE prophylaxis in elderly trauma patients. Secondary outcomes evaluated the timing of VTE prophylaxis initiation, and the incidence of VTE prophylaxis complications, including clinically significant bleeding or VTE. Univariate analysis was performed.

Results: A total of 104 elderly patients met inclusion criteria. Baseline demographics found 59.6% male patients (62/104), with a mean age of 74.4 ± 7.3 years, mean ISS score of 18 ± 9.3, and a median BMI of 26.1 mg/m2 (23-31). One hundred two patients (98.1%) had a blunt mechanism of injury, and 76.9% of patients (80/104) presented with a traumatic brain or spinal cord injury. From admission, it took a median of 2 days (1-3) for VTE prophylaxis to be initiated. The mean anti-Xa peak level was 0.25 ± 0.12 IU/mL. Anti-Xa levels were therapeutic in 61 patients (58.7%), subtherapeutic in 37 patients (35.6%), and supratherapeutic in 6 patients (5.8%). Clinically significant bleeding after enoxaparin initiation was seen in 4 patients (3.8%) and VTE occurred in 7 patients (6.7%). Of the 7 patients who developed a VTE, 4 patients (57%) had subtherapeutic anti-Xa levels. The median hospital length of stay was 17 (11-25) days.

Conclusion: This study found that over one-third of elderly trauma patients had subtherapeutic anti-Xa levels when initiated on enoxaparin 30 mg SQ twice daily for VTE prophylaxis. Despite only 58.6% of patients with therapeutic levels, a small proportion of patients experienced complications of prophylactic therapy, including clinically significant bleeding or VTE. Initial enoxaparin doses greater than 30 mg SQ twice daily may be limited in elderly patients due to a higher rate of blunt trauma mechanism with brain or spinal cord injury. These findings further support the VTE prevention recommendations from the WTA. Further research is needed to evaluate dose adjustments using anti-Xa monitoring in geriatric trauma patients.

Table 1. Anti-Xa Monitoring in Elderly Trauma Patients

Outcomes	**n = 104**
Anti-Xa Therapeutic Appropriateness, n (%)	
Therapeutic (anti-Xa level 0.2-0.4 IU/mL)	61 (58.7)
Subtherapeutic (anti-Xa level < 0.2 IU/mL)	37 (35.6)
Supratherapeutic (anti-Xa level ≥ 0.5 IU/mL)	6 (5.8)
Time to VTE prophylaxis initiation (days), median (IQR)	2 (1-3)
Complications, n (%)	
DVT/PE	7 (6.7)
Bleeding	4 (3.8)

NOTES

Presentation # 26
Wednesday, March 5, 2025, 8:20am - 9:00am

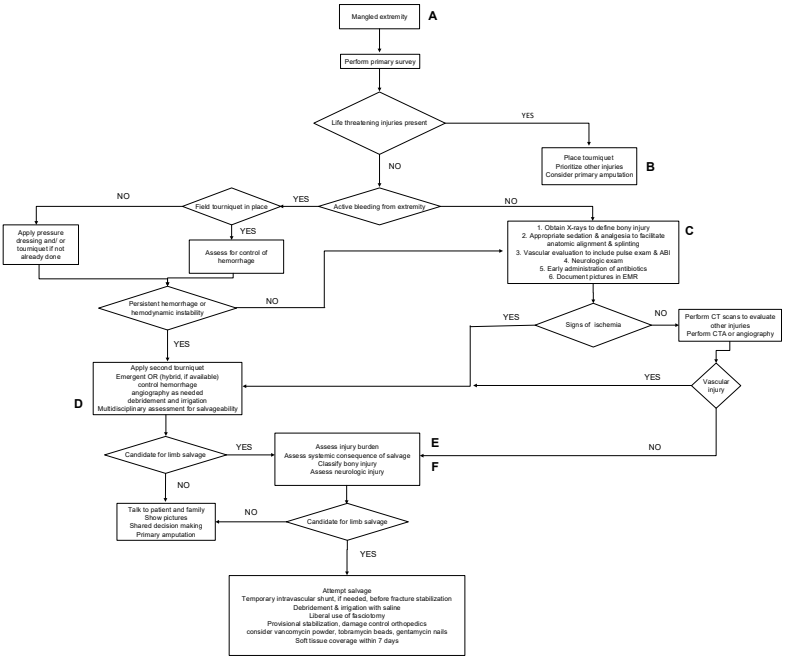
Founder's Basic Science Lecture: Neutrophils, Inflammation, and Wound Healing – What Trauma Surgery Teaches us about Cancer and Vice-Versa
Michael Yaffe MD, PhD

NOTES

Presentation # 27
Wednesday, March 5, 2025, 4:00pm - 4:20pm

ALGORITHM #1: CRITICAL DECISIONS IN TRAUMA: MANAGEMENT OF MANGLED EXTREMITY (2025 UPDATE)

Presenter: Andrew Kerwin MD

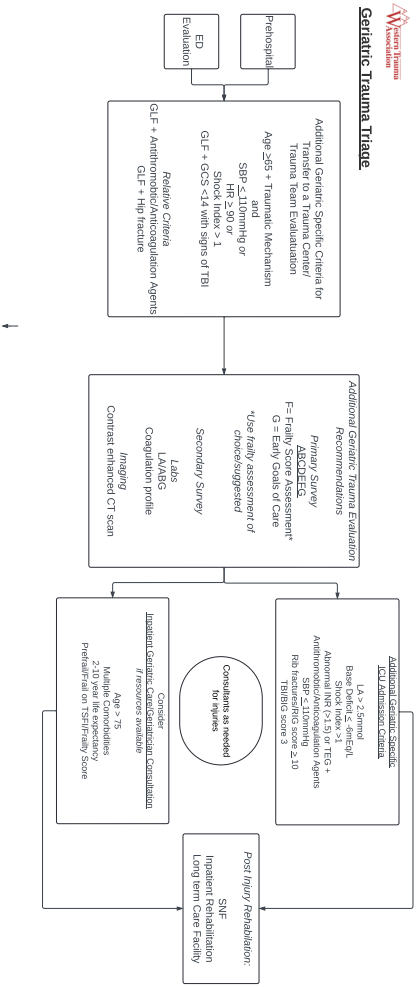


NOTES

Presentation # 28
Wednesday, March 5, 2025, 4:20pm - 4:40pm

ALGORITHM #2: GERIATRIC TRAUMA TRIAGE: A WESTERN TRAUMA ASSOCIATION CRITICAL DECISIONS ALGORITHM

Presenter: Natasha Keric MD



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Presentation # 29
Wednesday, Mar 5, 2025, 4:40pm - 4:50pm

SKEWERED ON A FENCE: A CASE REPORT

S Levy, P Sienko, R Wright, G Vercruysse
University of Michigan
Ann Arbor, Michigan

Presenter: Scott Levy MD
WTA Sponsor: Gary Vercruysse

A 31-year-old female received in transfer after MVC in which she was reportedly driving the wrong way while evading police, hit an oncoming car and was ejected. EMS reported she was found suspended on a fence post entering her right thigh and exiting her sacrum. The patient and pole were separated from the fence and brought to a local ED where she had a GCS of 14 but was reportedly hemodynamically unstable and massive transfusion was employed. The patient was intubated and once stabilized, transferred for further care. Upon arrival, GCS was 3T with stable vital signs. Blood gas was notable for a lactate of 5.0 mmol/L and hemoglobin of 14.9 g/dL. Exam revealed a large wooden post with metal wiring that appeared to enter her right medial thigh and exit her back just below L5 (Image 1A). She had a palpable dorsalis pedis pulse on the RLE and her urine was grossly bloody. Given her stability and complex injury pattern, CT angiography was pursued. This revealed a comminuted sacral fracture, complete obliteration of the R inferior pubic ramus and a right ureteral injury without obvious vascular injury (Image 1B-D). Given these findings, the decision was made to proceed to the operating room for further investigation and foreign body removal. To facilitate laparotomy we first cut the portion of the post and wire protruding from her sacrum so she could lay flat. At laparotomy we isolated the bilateral internal and external iliac arteries and veins and bilateral ureters with vessel loops. Distal control of the RLE vasculature was impossible due to the trajectory of the post displacing the vessels postero-laterally. At this point the post was successfully removed by pulling on the end protruding from the leg after which there was modest venous oozing from the groin and sacrum. We then packed the groin, abdomen and sacral wounds, placed an abdominal wound vac and obtained repeat CT angiography to evaluate the genito-urinary system and pelvic bleeding amenable to angio-embolization, of which there was none. She was then resuscitated in the ICU. After consultation with urology, orthopedics and neurosurgery, she returned to the OR where we found extensive injuries to the rectum, vagina, bladder trigone and right ureter as well as a torn thecal sac and obvious open sacral and pubic ramus fractures. Over the next 48 hours she underwent proctectomy with end sigmoid colostomy, vaginal, bladder and ureteral repairs, lumbar drain, and multiple soft tissue debridements. She continued on this trajectory and her wounds were eventually closed. She was discharged to rehab on post trauma day 36. This case highlights the complex injury pattern typical of trans-pelvic penetrating injury and the successes possible with coordinated multi-specialty care.

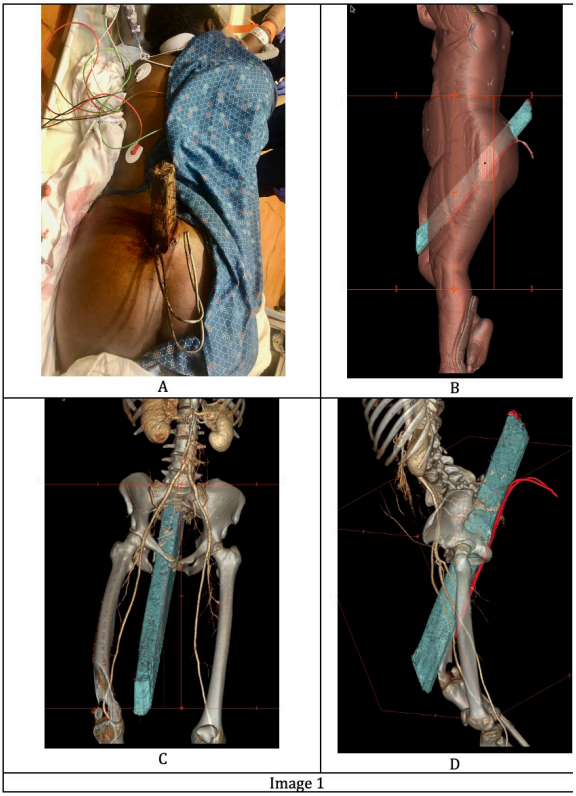


Image 1

NOTES

Presentation # 30
Wednesday, March 5, 2025, 4:50pm - 5:00pm

TRAUMATIC SUPRAHEPATIC INFERIOR VENA CAVA INJURY REPAIR

O Olutola, A Rushing, G Rushing, M Moorman
University Hospitals
Cleveland, Ohio

Presenter: Olatoye Olutola MD
WTA Sponsor: Matthew Moorman

Introduction: Traumatic injury to the supra-hepatic inferior vena cava (IVC) is uncommon and almost always fatal. We present a case with an exceptional outcome involving severe damage to the supra-hepatic IVC, successfully managed using cardiopulmonary bypass (CPB) without the need for hypothermic circulatory arrest.

Case Presentation: A 50-year-old male presented as a full trauma activation following a high-speed motor vehicle collision. While hemodynamically stable, his initial evaluation in the trauma bay was notable for bilateral pneumothoraces requiring tube thoracostomies, multiple rib fractures, and a left femur fracture. CT imaging revealed disruption of the intrathoracic IVC. During transfer to the ICU, the patient developed hypotension with systolic blood pressure in the 70s requiring blood product resuscitation. A multidisciplinary approach including trauma and cardiac surgery was initiated. The patient was taken to the operating room where concomitant sternotomy and laparotomy were performed. During exploration, circumferential disruption of the IVC atrial-caval junction was noted, with intact parietal pericardium (Figure 1). The diaphragm was divided, and the liver was mobilized. The patient was systemically heparinized; aortic and SVC cannulas were placed directly. A right atrial dual-stage cannula was placed percutaneously, via right femoral vein. Cardiopulmonary bypass was initiated. Retraction of the atrial cannula into the intrahepatic IVC facilitated a dry surgical field for interposition graft placement. An 18 mm dacron graft was measured, fashioned, and sewn between the intrahepatic IVC and right atrial junction, sparing the coronary sinus. The patient was weaned from CPB, decannulated, and heparin was reversed. The diaphragm and sternum were reapproximated; abdominal VAC placement was performed. Postoperative CT confirmed graft patency. Subsequent fixation of extremity fractures and abdominal closure was performed. Complications included acute kidney injury requiring dialysis, pneumonia needing tracheostomy, and bilateral iliofemoral DVTs treated with IVC filter. He was discharged to a long-term acute care hospital on day 30.

Conclusion Blunt traumatic injuries to the inferior vena cava (IVC) are exceptionally rare and often result in fatality, particularly when they occur above the liver or within the pericardium. Our success was due to early detection, prompt treatment, and effective multidisciplinary planning that included an optimal cardiopulmonary bypass strategy avoiding the need for hypothermic circulatory arrest.

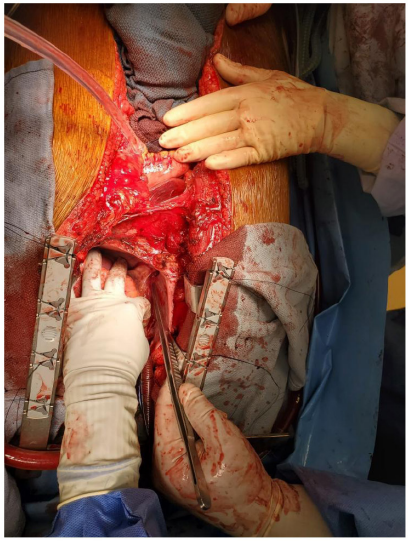


Figure 2a

NOTES

Presentation # 31
Wednesday, March 6, 2025, 7:00am - 7:20am

A WESTERN TRAUMA ASSOCIATION MULTI-CENTER PROSPECTIVE TRIAL OF PREHOSPITAL KETAMINE ADMINISTRATION AND ED DISPOSITION IN TRAUMA PATIENTS

N Taylor, C Cook, J Charles, L Bellfi, C Lemon, C Leonardi, A Marr, R Rodriguez, T Hightower, A McNickle, J Murry, B Pero, B Martinez, B Allen, M Muir, S DeMoor, T Vaughn, R Tseng, B Axtman, J Knudsvig, J Haan, K Lightwine, T Schroeppel, Z Stillman, P Bjordal, J Guido, M Charles, K Knoten, Z Amar, S Swint, A Cavalea, R Taylor, T Lian, M Schreiber, S Briggs, M Ahmeti, A Smith
WTA Multicenter Trial for Louisiana State University
New Orleans, Louisiana

Presenter: Carolyn Cook MD
WTA Sponsor: Alan Marr

Introduction: Ketamine, a versatile dissociative anesthetic, is effective for EMS pain management and sedation due to its rapid onset and multiple administration routes. However, inconsistent dosing and administration in prehospital trauma care have led to negative outcomes. Safe ketamine use by prehospital personnel requires evidence-based protocols. This study aimed to identify prehospital management patterns of ketamine use and outcomes following ED arrival in trauma patients across various prehospital environments.

Methods: This was a prospective, multi-center study involving trauma patients presenting to 15 Level 1 and Level 2 trauma centers over a 2-year period. The study population included all adult trauma patients who received ketamine by EMS prior to presentation. Prehospital data on trauma patients who received ketamine was obtained from EMS agencies and cross-referenced with information in the trauma registry. Trauma transfer patients were excluded. The primary outcome was the incidence of airway complications following ketamine administration. The data was analyzed using chi-square and logistic regression, with continuous variables compared via Student's t-test and Mann-Whitney U test, and categorical variables compared using Fisher's exact test.

Results: A total of 691 patients received prehospital ketamine with a median dose of 50 mg (IQR 25,170) administered. The IV route was the most common administration in 82.8% (n=572/691) of patients followed by 17.2% (n=119/691) who received ketamine IM. The most common indication for ketamine was pain 65.7% (n=453/689) followed by delirium/agitation 17.9% (123/689). One-hundred eighteen of 690 patients (17.1%) were intubated in the ED, with the most common reason for intubation being depressed GCS score/mental status in 82% (n=82/117). Univariate analysis showed that both the prehospital ketamine dose and its use for delirium/agitation significantly increased the odds of intubation. Specifically, each unit increase in ketamine dose raised the odds by a factor of 1.005, and ketamine given for delirium/agitation increased the odds by a factor of 9 ($p < 0.0001$). Patients receiving ketamine IM had a 1.62 higher odds of being intubated, but these results were not significant (p=0.06).

Further, with increasing ketamine doses by 100 mg increments there was 1.69 higher odds of being intubated (OR = 1.69, 95% CI: 1.44 - 1.97, $p < 0.0001$). The multivariable analysis demonstrated that the indication for prehospital ketamine administration significantly affected the likelihood of intubation, with delirium/agitation having a 3.8 higher odds ratio (OR 3.852, 95% CI: 1.694, 8.758, $p=0.02$) compared to other indications.

Conclusion: This is the largest, multi-center study to date on prehospital ketamine administration. The dose of prehospital ketamine, route of administration, and indication for use have an association with intubation risk. Further refinement of EMS protocols is needed to help ensure safe ketamine administration in trauma patients.

NOTES

Presentation # 32
Thursday, March 6, 2025, 7:20am - 7:40am

THROMBOCYTOSIS IS DESIRABLE IN POLYTRAUMA - NATURAL HISTORY AND CLINICAL OUTCOMES

AF Ramzee,A Thevathasan, KL King, M Hinwood, ZJ Balogh
University of Newcastle
Newcastle, Australia

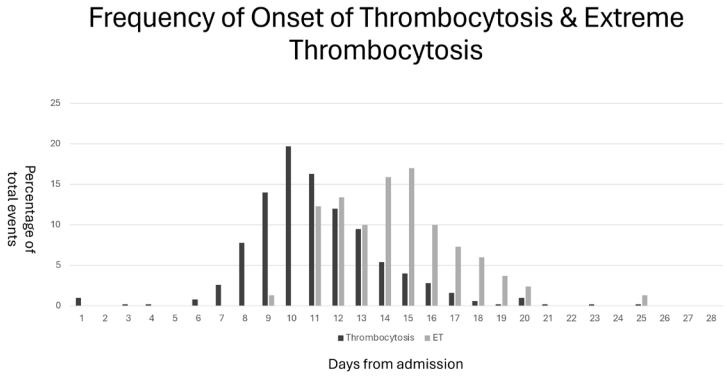
Presenter: Ahmed Faidh Ramzee MD
WTA Sponsor: Zsolt Balogh

Introduction: Thrombocytosis has been reported in 25% of major trauma patients with equivocal association to outcome and uncertainty of clinical relevance. We aimed to describe the incidence and natural history of thrombocytosis in ICU admitted polytrauma patients at risk of MOF.

Methods: 19-years retrospective study ending in December 2023 was performed on a Level-1 center's prospective institutional MOF database. All adult, ISS>15 patients ICU admitted patients who survived >48hrs were included. Non-mechanical trauma, isolated TBI or SCI, or without sequential platelet count monitoring were excluded. Platelet counts were collected until death, discharge or 28 days. Thrombocytosis was defined as >450,000/µl and extreme thrombocytosis(ET) as >1,000,000/µl. MOF was defined as a Denver score of 4 or more. Parametric and non-parametric uni- and multi-variate statistical test were applied to compare thrombocytosis and non-thrombocytosis patients' confounders and outcomes ($p<0.05$)

Results: 796 patients met inclusion criteria after exclusions (Age:48.8yrs[SD:20.3], 76% male, 96% blunt, median ISS:29 [IQR-14], headAIS>3: 12.6%), VTE:1.6%, mortality:7.6%) Incidence of thrombocytosis was 503/796(63%) with ET of 83/796(16.5%). The onset of thrombocytosis was between 7–20 days, most frequently on day 10-11. Thrombocytosis and no thrombocytosis patients did not differ in age, sex, ISS, TBI severity, initial shock parameters (blood pressure, base deficit) and platelet transfusion during the first 24 hours. Thrombocytosis patients had significantly longer median ICU and hospital length of stay (8 [IQR:9] vs 6 [IQR:5] and 27[IQR:28.75 vs 12[IQR-14.75]). The incidence of MOF and VTE was not different among groups. Mortality was significantly lower in the thrombocytosis group (1.6% vs 22.9%). Only one ET patient died. 177(22%) patients developed MOF (Age:54years [SD:19], 82% male, 97.2% blunt, ISS: 29 [IQR-17], headAIS>3: 13%), VTE:1.7%, mortality:20.3%) with incidence of thrombocytosis 101/177(57%) and ET 12/177 (6.8%). Mortality among thrombocytosis MOF patient was significantly lower than MOF patients without thrombocytosis (4% vs 42.1%).

Conclusions: The incidence of thrombocytosis and ET in polytrauma patients are more than twice higher than previously reported with a typical onset around 10 days. The onset of ET follows thrombocytosis by 4-5 days. Thrombocytosis is associated with favourable outcome without higher risk for VTE or MOF. Thrombocytosis as a surrogate marker for better chance to survive and its therapeutic potential warrants detailed exploration.



NOTES

Presentation # 33
Thursday, March 6, 2025, 7:40am - 8:00am

ROBO-REGISTRAR RISING: LARGE LANGUAGE MODELS FOR TRAUMA CARE QUALITY METRICS

S Perez, A Boussina, R Krishnamoorthy, A Kilty, L Perkins, A Berndtson, L Haines, S Nemati, J Santorelli
University of California San Diego Health
San Diego, California

Presenter: Sean Perez MD
WTA Sponsor: Allison Berndtson

Introduction: An effective surgical quality program relies heavily on maintaining a comprehensive patient registry to track outcomes and benchmark against national standards. The American College of Surgeons (ACS) Committee on Trauma (COT) requires trauma centers to maintain these registries for accreditation, which are critical for reporting trauma quality metrics. However, traditional registries are labor-intensive and costly, requiring the hiring and training of dedicated personnel to manage data. Artificial intelligence, particularly through Large Language Models (LLMs), offers a potential solution to streamline this process. We hypothesized that an LLM could be trained to review patient charts and rapidly identify complications as defined by the Trauma Quality Improvement Program (TQIP), offering a faster and more cost-effective alternative to manual chart reviews.

Methods: Trauma notes from a large academic level 1 trauma center were retrieved from the institution's electronic health record using the Fast Healthcare Interoperability Resources (FHIR) standard (Figure 1). The abstraction guidelines from the National Trauma Data Standards Dictionary informed the design of prompts for a large language model to identify 9 specific complications, including unplanned admission to ICU, unplanned intubation, severe sepsis and deep venous thromboembolisms (DVTs). We utilized the Llama 3.1 8B instruction-tuned LLM, coupled with Retrieval Augmented Generation to handle the extensive length of clinical notes. Each note was processed by the LLM against complication-specific prompts, with results outputted in JSON format. These results were then compared to manual reviews performed by the institution's trauma registrars, which served as baseline comparison.

Results: A total of 6,825 clinical notes from 41 patient encounters were queried. The LLM achieved 100% sensitivity in identifying the complications present in the baseline review within approximately 6 hours and 20 minutes or roughly 18 notes per minute. The LLM also identified 10 additional complications not originally reported by the institution's trauma registrars. These complications were confirmed by expert review and included unplanned intubations, DVTs, and pressure ulcers.

Conclusion: This study demonstrates that LLMs can achieve sensitivity comparable to that of trained trauma registrars in identifying complications from patient charts. While further optimization, including advanced prompt engineering, is necessary to enhance specificity, the potential for LLMs to revolutionize trauma data reporting is clear. The speed and efficiency of AI-driven analysis can serve as a powerful adjunct for traditional methods of reporting quality metrics, largely as a screening tool for registrars to significantly reduce the time it takes to review an encounter. By leveraging AI, we can move towards a future where data-driven insights enhance patient care, improve outcomes, and set new standards for trauma quality reporting globally.

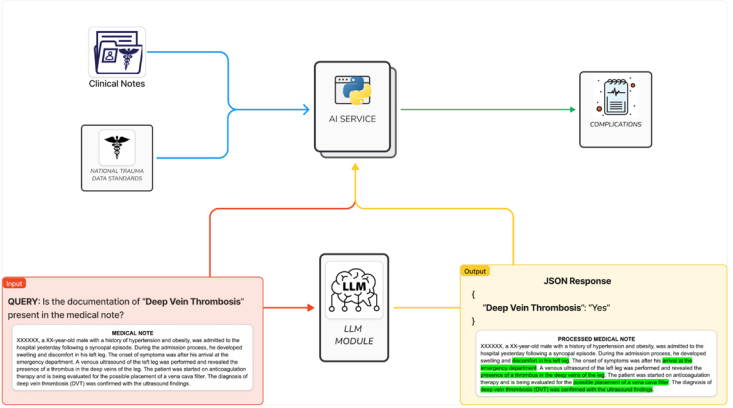


Figure 1. System diagram with example of LLM input and output.

NOTES

Presentation # 34
Thursday, March 6, 2025, 8:00am - 8:20am

PREDICTING FUTURE SUICIDE DEATH FOLLOWING TRAUMA CENTER TREATMENT OF SURVIVED SELF-INFLICTED INJURY: AN UNEXPECTED EFFECT OF INITIAL INJURY SEVERITY

AT Schramm, SA Kohlbeck, P Srivastava, JM Kant, DJ Milia, MA de Moya, TA deRoon-Cassini
Medical College of Wisconsin
Milwaukee, Wisconsin

Presenter: Andrew Schramm PhD
WTA Sponsor: Marc de Moya

Introduction: Trauma centers are uniquely positioned to support national suicide prevention efforts given the frequency with which they treat nearly lethal self-inflicted injuries. However, this opportunity is under-realized due to uncertainty in disciplines including trauma surgery and suicidology about long-term outcomes following self-inflicted injury. Our aims were (1) to describe rates of future suicide among patients who survive a self-inflicted injury treated at a trauma center; (2) to test for an association between initial injury severity and future suicide; and (3) to test differences in time from self-inflicted injury to death via suicide versus natural causes.

Methods: We obtained data on demographic and injury characteristics from our trauma registry on all self-inflicted injuries from 2004 to 2020 at an urban Level 1 Trauma Center. Patients who survived their initial self-inflicted injury were then searched for in our county medical examiner data and the CDC's National Death Index to determine who had since died and their manner of death. Given the data's non-parametric distribution we used the Mann-Whitney U Test to compare the median of the two groups. To account for small sample size, binomial variables were analyzed using Fisher's exact test.

Results: 614 of the 746 patients treated for self-inflicted injury survived (82.0%) their index injury. Of these, 33 (5.37%) went on to die from a future self-inflicted injury. The severity of initial self-inflicted injury was significantly lower for those who went on to die from suicide (Median = 4.0) than those who did not go on to die from suicide (Median = 9.0, $p = .034$). Time between index injury and eventual death was significantly shorter for patients who went on to die from suicide (Median = 0.85 years) than from natural causes (Median = 4.90 years, $p < .001$).

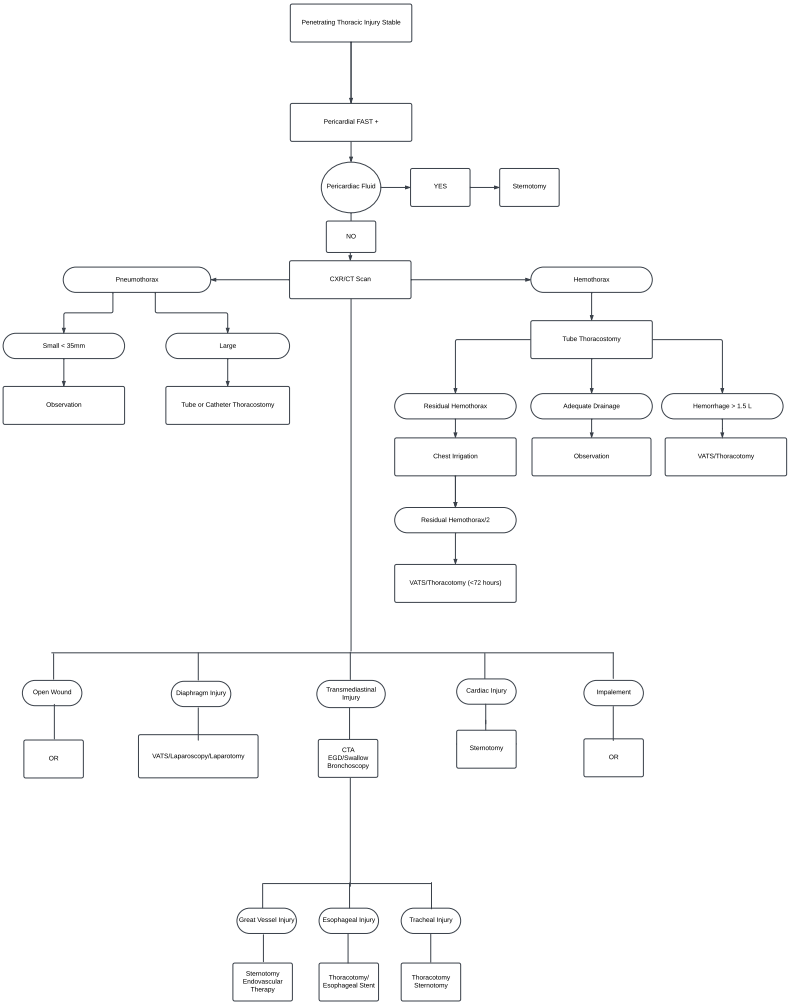
Conclusion: Contrary to conventional wisdom, greater severity of a survivable self-inflicted injury is not predictive of future death from suicide. In fact, we found the opposite effect – with lower injury severity among those who went on to suicide. Although additional research is needed to determine causal factors driving this finding, it runs contrary to common clinical practice, which prioritizes prevention resources on those with most severe self-inflicted injuries. The 12 months following a survived self-inflicted injury may be an especially high-risk period for suicide, a finding that – following replication – may be used to prioritize allocation of limited resources. This is the first study to our knowledge that has identified rates and correlates of suicide in this vulnerable patient population.

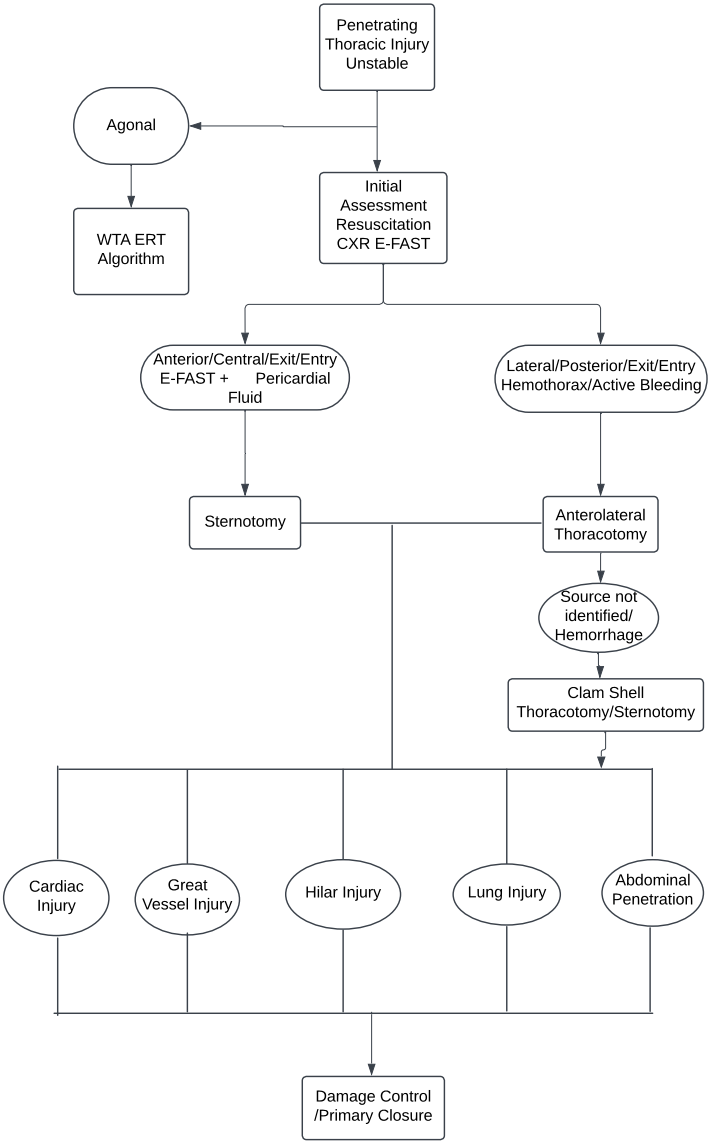
NOTES

Presentation # 35
Thursday, March 6, 2025, 8:20am - 8:40am

ALGORITHM #3: CRITICAL DECISIONS IN TRAUMA: PENETRATING CHEST TRAUMA

Presenter: Manny Lorenzo MD



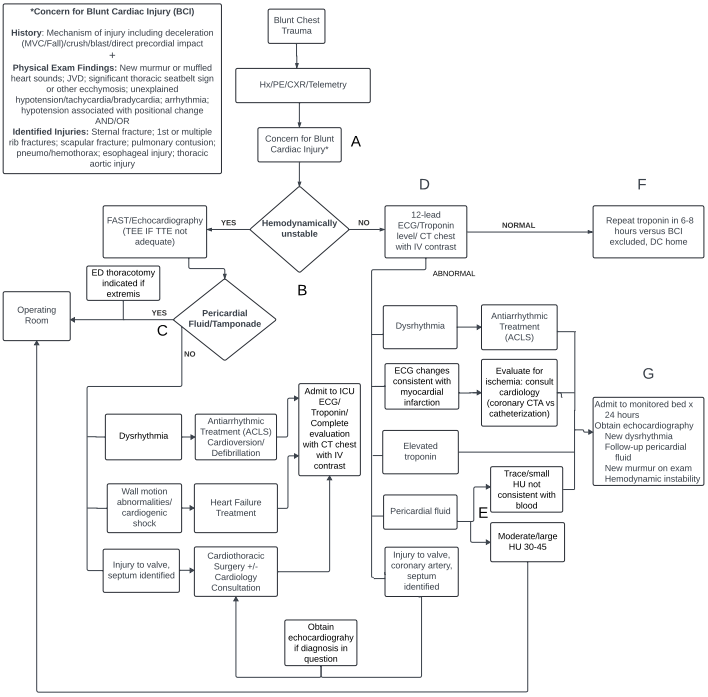

Penetrating Thoracic Injury Unstable
Agonal
WTA ERT Algorithm
Initial Assessment Resuscitation CXR E-FAST
Anterior/Central/Exit/Entry E-FAST + Pericardial Fluid
Lateral/Posterior/Exit/Entry Hemothorax/Active Bleeding
Sternotomy
Anterolateral Thoracotomy
Source not identified/ Hemorrhage
Clam Shell Thoracotomy/Sternotomy
Cardiac Injury
Great Vessel Injury
Hilar Injury
Lung Injury
Abdominal Penetration
Damage Control /Primary Closure

NOTES

Presentation # 36
Thursday, March 6, 2025, 8:40am - 9:00am

ALGORITHM #4: CRITICAL DECISIONS IN TRAUMA: BLUNT CARDIAC INJURY

Presenter: Tammy Kopelman MD



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SPECIAL SESSION
Thursday, March 6, 2025, 3:30pm -4:00pm

DANGEROUS GAMES: TRAUMA SURGERY AT THE 2010 VANCOUVER OLYMPICS

Dr Brown, K Khwaja, J Doucet
University of California San Diego Health
San Diego, California

Presenter: Jay DoucetMD
WTA Member Sponsor: Jay Doucet

Five athletes have died during a Winter Olympics: two in luge, two in alpine skiing, and one in speed skiing. Injuries are common due to the highly energetic speeds and unforgiving terrain of many winter sports.Large crowds, intense media coverage, remote locations and the threat of terrorism complicate the provision of Olympics emergency care. The sliding, alpine and nordic skiing venues at Whistler are 85 miles from the regional trauma centers in Vancouver.We will describe the planning and processes used to create trauma systems to deal with Olympics-related injuries for athletes, fans and workers. A temporary, licensed trauma, surgical and ICU facility called the "MMU" was built at the Whistler Athlete's Village for the Olympics and Paralympics and was heavily used. Trauma surgeons and allies from Canada and the US provided care and we will describe selection, training and deployment of Whistler's trauma surgical teams. Finally, we will illustrate unique aspects of trauma care of elite Olympic athletes, including a luge athlete who tragically succumbed to his injuries and the women's gold favorite nordic sprint skier who medaled despite suffering fractured ribs and a pneumothorax immediately before her event.

NOTES

Presentation # 37
Thursday, March 6, 2025, 4:00pm - 4:20pm

THE IMPACT OF PARTNERED ATTENDING IN HOUSE CALL ON NEUROPEPTIDE, IMMUNE, AND CARDIOVASCULAR BIOMARKERS IN TRAUMA SURGEONS: A PILOT STUDY

R Ryznar, K Harms, K Scott, A Rojas, D Skarupa, D Gubler
Rocky Vista University
Centennial, Colorado

Presenter: Rebecca Ryznar PhD
WTA Sponsor: Dean Gubler

Introduction: The demanding nature of trauma surgery often places surgeons under significant psychological and physiological stress. This study aimed to explore the effects of having a partner (buddy) during trauma in-house call (HC) on the well-being of trauma surgeons by measuring changes in neuropeptide, immune, and cardiovascular markers in saliva. The findings could provide critical evidence to support the implementation of partnered HCs in trauma settings.

Methods: This pilot study evaluated seven attending trauma surgeons who each completed two 24-hour HCs at a Level I trauma center, one solo and one with a partner. To assess perceived levels of depression and anxiety, participants completed the Patient Health Questionnaire (PHQ) and Generalized Anxiety Disorder (GAD) surveys after each HC. Saliva samples were collected at three critical time points: immediately before the HC (pre-call), immediately after the HC (post-call), and 24-48 hours later (recovery). These samples were analyzed for various cytokines, hormones, neuropeptides, and cardiovascular markers. A repeated measures ANOVA was utilized to examine the effects of working conditions (solo vs. partner) and time of sample collection (pre-call, post-call, recovery) on salivary biomarkers. Differences in PHQ and GAD scores between the solo and partnered HCs were evaluated using two-sided paired t-test.

Results: Several statistically significant differences were observed in average biomarker levels when comparing trauma surgeons working alone versus those working with a partner. MCP-1 levels showed significant decrease during recovery when surgeons worked with a partner ($p<0.01$), indicating improved stress recovery. Fibrinogen levels were notably lower during recovery compared to immediately after a 24-hour HC in surgeons who were partnered ($p=0.01$), suggesting a faster return to baseline for coagulation markers. L-selectin and SAP levels were significantly lower before surgeons began their partnered HCs compared to solo HCs ($p=0.04$, $p=0.05$), highlighting differences in immune and acute phase responses. Neurotensin levels were higher during recovery in partnered HCs ($p=0.03$), indicating a potential role in stress recovery when supported by a partner. Additionally, β-Endorphin levels were elevated during recovery in partnered HCs compared to solo HCs ($p=0.04$), further supporting the positive impact of having a partner. Although the PHQ and GAD scores did not achieve statistical significance, the mean PHQ score was lower during partnered HCs compared to solo HCs ($p = 0.07$), indicating a potential trend toward enhanced psychological well-being associated with the presence of partner support.

Conclusions: This study provides preliminary evidence that having a partner during in house trauma attending call may positively influence physiological stress markers in trauma surgeons, potentially benefiting their well-being. Additional research evaluating the relationship between psychological variables and partner HCs in on call surgeons is warranted. Future studies are to confirm the findings of this pilot study and assess implications for trauma surgery practices.

NOTES

Presentation # 38
Thursday, March 6, 2025, 4:20pm - 4:40pm

DISCORDANCE OF PERCEPTIONS AND EXPERIENCES OF TRAUMA SURGEONS AND THEIR FAMILIES

JL Hartwell, S Lassen, S Sharp, S Sachdeva, T Anand, L Tatebe, JR Hartwell, J Baker, P Chalise, S Berry
University of Kansas Medical Center
Kansas City, Kansas

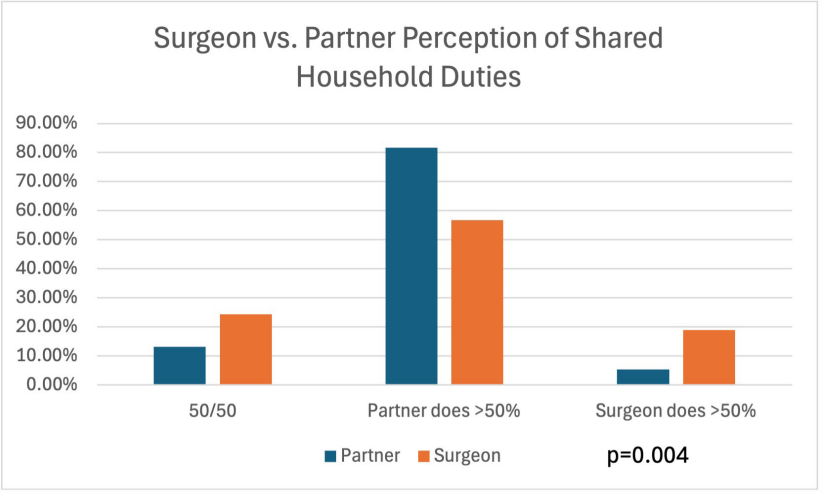
Presenter: Jennifer Hartwell MD FACS
WTA Sponsor: Jennifer Hartwell

Introduction: It is unclear how a career in trauma affects a surgeon and their family in terms of the structure and culture of life at home, perception of risk, and mental health for surgeons, their partners, and their children. Long hours and inflexible work schedules are associated with less time spent with their children and decreased emotional availability and warmth. While there are studies investigating the effect of working parents and the development of the child in such an environment, there are no studies examining the impact upon partners and children of surgeons who care for the traumatically injured patient.

Methods: A survey was sent to all members of the Western Trauma Association (n=339) querying surgeons (SUR) about their relationships, managing their household, childcare, and job stressors. Participants were also screened for depression and anxiety using the validated Patient Health Questionnaire-4 (PHQ-4). Surveys for their partners (PART) and children (CHILD) were similar with additional questions examining their perceptions of their partners'/parents' career, including their perceptions about firearms and risky behaviors. All surveys also included a free text question: "What else do you want us to know?"

Results: 133 SUR completed the survey (39% response rate) as well as 38 PART and 52 CHILD. 73.1% and 51.9% SUR agree/strongly agree their career is a source of stress for their PART and CHILD, respectively. 19.1% SURG, 13.2 % PART and 12.8% CHILD screened positive for anxiety; 9.1% SURG, 7.9% PART, and 2.6% CHILD screened positive for depression. 92.1% PART are supportive of the SURG career but 31.6% PART say they worry about their SURG mental health most/all the time and 29% report the SURG is less attentive to the needs of the partner. There is discordance in the perception of the sharing of household duties between SURG and PART with 56.8% SURG reporting PART does more than half of the household work but 81.6% PART report doing more than half the work (p=0.004). CHILD report feeling nervous (19.2%), angry (32.7%), and depressed (23.1%) when their SURG is at work. 52.1% CHILD report their opinion about firearms is somewhat/very much influenced by SURG. 44.2% CHILD report their SURG parent miss their milestone events rarely/never.

Conclusion: The PART and CHILD of trauma surgeons report stress and worry related to their partners'/parents' career. They have feelings of fear and resentment, but also report immense pride and gratitude. There is discordance in perception of the balance of household duties between SURG and PART. This survey demonstrates that increased attention to the experience of the PART and CHILD of trauma surgeons is warranted.



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Presentation # 39
Thursday, March 6, 2025, 4:40pm - 5:20pm

PANEL: WHAT'S YOUR EXIT STRATEGY?
Panelists: Roxie Albrecht, MD, Alex Eastman, MD, David Livingston, MD, Rick Miller, MD, Susan Rowell, MD

NOTES

Presentation # 40
Thursday, March 6, 2025, 5:20pm - 6:00pm

PAINT THE CEILING LECTURE: BURNING SHIELD
Jason Schechterle

NOTES

Presentation # 41
Thursday, March 7, 2025, 7:00am - 7:20am

EFFICACY OF A NOVEL SMARTPHONE BASED ULTRASONOGRAPHY CURRICULUM IN RAPIDLY TRAINING TRAUMA CARE PROVIDERS IN LOW-RESOURCE SETTINGS

SA Christie, A Emeh, L Rosenbloom, J Tambe, M Yost, R Oke, I Obeng-Gyasi, M Marpha, C Maffo, E Mbebi, C Juillard, AM Chichom
University of California, Los Angeles / University of Buea, Cameroon
Los Angeles, California

Presenter: S.Ariane Christie MD
WTA Sponsor: Rochelle Dicker

Introduction: Undiagnosed hemorrhage is the leading cause of preventable trauma death in Cameroon, yet only 4% of injured patients receive imaging capable of diagnosing hemorrhage. In developed settings, extended Focused Assessment of Sonography for Trauma (eFAST) decreases time to operating room and is traditionally taught through expert-supervised apprenticeship. Recently developed smartphone-based ultrasonography (SBU) may enable eFAST in resource-poor settings; however, logistical differences, including time constraints, lack of trauma training and paucity of eFAST-trained providers preclude direct application of existing curricula. An efficient, context-informed eFAST curriculum is needed to train Cameroonian providers to identify life-threatening injuries while minimizing time away from patient care. We hypothesized that Cameroonian trauma providers could gain eFAST competence following a novel SBU training.

Methods: Cameroonian and US-based trauma providers developed a novel 5-hour SBU eFAST curriculum. This prototype underwent iterative revision and testing on senior medical students until 80% of three consecutive cohorts achieved skill metrics. The resultant curriculum was then administered to all primary trauma providers at three Cameroonian hospitals and evaluated for educational efficacy, usability and acceptability. eFAST competence was defined as achieving usable images (a median minimum of 4 on a validated 8-point quality scale) and >80% concordance with image interpretation by board certified radiologists over 10 exams. Usability and acceptability were evaluated using the System Usability Scale (>68 = usable) and Likert surveys, respectively. Five Cameroonian providers went on to administer additional trainings; performance metrics were compared between Cameroonian and US trainer-led sessions using Chi2 and Kruskal-Wallis for categorical and numeric metrics respectively.

Results: Between April and August 2024, 26 medical students and 26 primary trauma care providers received SBU training. Overall, eFAST competence was achieved by 81% (n=21) of medical students after training. Educational efficacy improved from 60% to 100% over three curriculum iterations. Subsequently, 100% (n= 26) of trauma care providers undergoing training achieved competence and correctly interpreted eFAST images with 92 +/- 6% expert concordance. All trained providers generated interpretable images; however, quality ranged by ultrasound view from 6.8+/-1.4 for the left upper quadrant to 7.7+/-0.6 for the lung.

SBU usability (average SUS 77+/-11) and acceptability were extremely high, with all providers strongly agreeing that the program will improve diagnosis of hemorrhage in Cameroon (Likert IQR 4-5). Post-training, providers felt confident in their ability to perform eFAST (Likert IQR 4-5) and confident teaching eFAST to others (Likert IQR 4-5). There were no statistical differences in provider competence following trainings by Cameroonian trainers ($p = 0.5$).

Conclusion: Trauma care providers in Cameroon can attain competence in eFAST following one 5-hour SBU training. A multisite prospective clinical trial is currently underway to assess feasibility and effectiveness of this intervention in expanding diagnostic capacity and reducing preventable deaths in this setting.

NOTES

Presentation # 42
Friday, March 7, 2025, 7:20am - 7:40am

PROSPECTIVE OBSERVATIONAL STUDY OF SURGICAL RIB FIXATION IN SEVERE CHEST WALL INJURY PERFORMED IN PARALLEL WITH A RANDOMIZED CONTROLLED TRIAL

D Meyer, J Harvin, L Vincent, M Wandling, T Puzio, L Moore,
B Cotton, C Wade, L Kao
McGovern Medical School at UTHealth
Houston, Texas

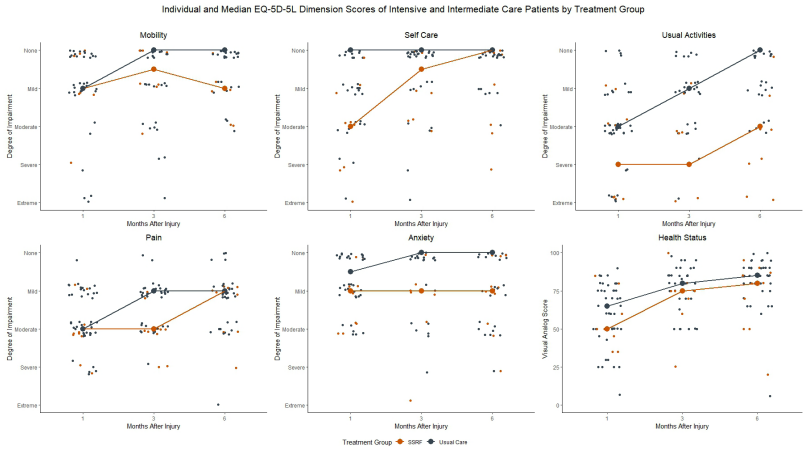
Presenter: David Meyer MD
WTA Sponsor: Laura Moore

Introduction: A recent randomized control trial (RCT) of surgical rib fixation (SSRF) did not show a benefit to SSRF in non-flail injuries. However, the rigid structure of an RCT may not accurately reflect real world clinical practice. Accordingly, patients otherwise eligible for the RCT who declined to be randomized were followed in a parallel observational study. We sought to determine if patients who chose their own treatment experienced a differential treatment effect.

Methods: Prospective observational study performed in parallel with the RCT comparing SSRF to non-operative management in patients with a non-flail chest wall injury. The treatment group (SSRF or Usual Care) was chosen by the patient. The primary outcome was hospital length of stay (LOS). Secondary outcomes included intensive care unit (ICU) LOS, mortality, opioid exposure, and the 30-day incidences of pneumonia (PNA), tracheostomy, venous thromboembolism (VTE), and opioid prescription at discharge. Quality of life (QoL) at 1, 3, and 6 months was measured with the EQ-5D-5L survey. Inverse probability of treatment weighted (IPTW) generalized linear models were used to balance baseline differences in the groups.

Results: Of 389 eligible patients not enrolled in the RCT, 126 were enrolled in the parallel observational study (Usual Care=110, SSRF=16). Baseline characteristics were similar between groups, as were the total numbers of fractured ribs, incidences of flail segments, and numbers of segmental rib fractures. Patients who chose SSRF were more likely to have displaced fractures (2 [1-4] vs. 0 [0-2], p=0.011) and/or be admitted to the ICU (7 [44%] vs. 15 [14%], p=0.021). Both unadjusted (5 [3-8] vs. 12 [7-15] days, p<0.001) and adjusted [RR 0.59, 95% CI 0.40-0.86, p=0.006] hospital LOS were decreased in the Usual Care group, as was total inpatient opioid exposure (RR 0.46, 95% CI 0.28-0.75, p<0.001). ICU LOS, daily non-anesthesia opioid exposure, and the incidences of tracheostomy, VTE, PNA, and opioid prescription at discharge were similar. There were no mortalities in either group. Compared to Usual Care, QoL measures were similar or worse in the SSRF group at each follow-up timepoint. A QoL comparison of all ICU and intermediate care patients is shown in the FIGURE. Surgical complications of hematoma (1 [6%]) and surgical site infection (1 [6%]) were rare but occurred only in the SSRF group.

Conclusion: Outcomes mirrored the RCT. Patients who chose SSRF did not experience improved clinical or QoL outcomes compared to Usual Care. The disproportionate number of patients choosing Usual Care may demonstrate a preference to avoid SSRF.



NOTES

Presentation # 43
Friday, March 7, 2025, 7:40am - 8:00am

AN ALARMING RISE IN ADOLESCENT GUN VIOLENCE - EXAMINING TRENDS AT REGIONAL LEVEL 1 TRAUMA CENTERS

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University of Tennessee - Memphis
Memphis, Tennessee

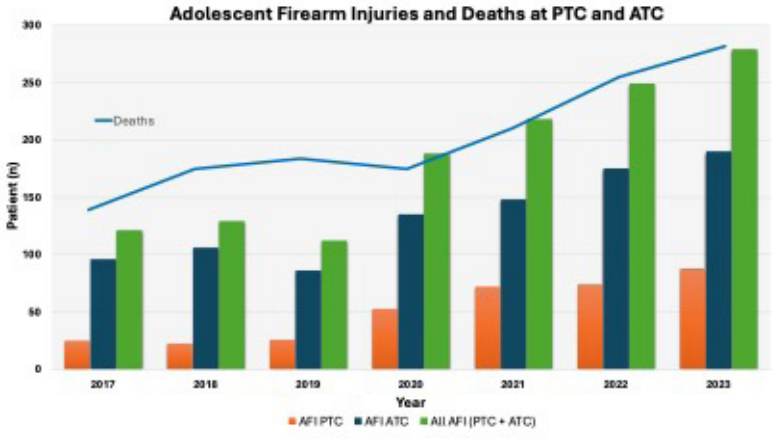
Presenter: Kevin Lang MD
WTA Sponsor: Andrew Kerwin

Introduction: Pediatric firearm injuries have increased across the US and since 2020 have been the leading cause of death in children. Decreased gun regulation correlate with a >300% increase in stolen firearms combined with a decrease in school attendance following the pandemic potentially increased the exposure of adolescents to firearms. We hypothesize that exposure to firearms correlates with a disproportionate increase in Adolescent Firearm Injury (AFI).

Methods: A retrospective study of firearm victims treated at a regional Adult (ATC) and Pediatric Trauma Center (PTC) in an urban setting was performed from 2017-2023. Adolescent (15-18 years) cohorts were identified at both centers over the study period, and demographics and outcomes were compared.

Results: There were 9,443 firearm victims treated at both trauma centers (8,559 treated at the ATC and 884 treated at the PTC). Most patients were male (85%) and overall mortality was 10%. 1297(13.7%) of the patients were adolescent. From 2017 to 2023, AFI patients doubled at the ATC (96 to 190), tripled at the PTC (25 to 88) and % AFI increased for the cohort from 11% to 16% (p=0.0005, figure). Adolescents treated at the ATC had a median injury severity score (ISS) = 9 with an overall mortality of 9%, which increased from 6% to 11% over the study period. Adolescents treated at the PTC were less severely injured with a median ISS=1 and mortality of 2%, which were steady across the study period. Operative intervention and ICU admission collectively increased from 79 to 129 (64%).

Conclusion: There has been a marked, steady rise in AFI victims from 2017 to 2023. This escalation may be related to an increase in exposure to firearms for adolescents and highlights the importance of ATCs being prepared to manage adolescent patients. Legislative efforts should aim to protect the vulnerable adolescent population.


Adolescent Firearm Injuries and Deaths at PTC and ATC
Deaths
Patient (n)
300
250
200
150
100
50
0
2017
2018
2019
2020
2021
2022
2023
Year
AFI PTC
AFI ATC
All AFI (PTC + ATC)

NOTES

Presentation # 44
Friday, March 7, 2025, 8:00am - 8:20am

ASSOCIATION OF STATE LEVEL CIVILIAN CONCEALED CARRY AND HANDGUN PURCHASE SAFETY TRAINING LEGISLATION WITH INJURIES, SUICIDE AND CRIME: AN ECOLOGICAL STUDY

M Hamill, M Hernandez, K Bailey, M Matos, C Cutherell, M Zielinski, D Naylor, D Jenkins, B Collier, H Schiller
University of Nebraska Medical Center
Omaha, Nebraska

Presenter: Mark Hamill MD
WTA Sponsor: Henry Schiller

Introduction: Firearm injuries represent a major concern throughout society. Over the past several decades many state level laws limiting civilian concealed carry of handguns have eased while some states have enacted laws requiring safety training prior to handgun purchases. Our goal was to examine the effects of these laws on crime, suicide and injury at the state level. A better understanding of these effects would help inform policy decisions.

Methods: State level firearm law data was obtained from the RAND State Firearm Law Database. State civilian concealed carry law restrictions (CCW) were considered as a scale variable ranging from no civilian concealed carry, may issue permits, shall issue permits to unrestricted or constitutional carry. The presence of state handgun purchase safety training laws (HST) was considered as a binary variable. State crime rates were obtained from the DOJ Uniform Crime Reporting system (UCR) from 1961-2020. Homicide, suicide, injury and accidental injury rates were obtained from the Center for Disease Control (CDC) from 1981-2020. Data imputation methods were used when able to fill in CDC data missing due to censoring. Log rates of outcome variables were used to normalize. Generalized Estimating Equation modeling was performed using an auto-recursive correlation structure considering each state as a repeated subject to account for year to year correlation of outcomes within a particular state. Statistical significance was set at $p<0.05$.

Results: Over the study period seven states adopted HST laws, and all states eased civilian CCW with 20 states adopting unrestricted concealed carry by then end of 2020. By univariate analysis, easing CCW was associated with increases in all suicides($p=0.0021$), firearm suicides($p=0.0014$), non-firearm suicides($p=<0.0001$), and non-firearm homicides($p=0.0059$). Enactment of HST laws were associated with decreases in firearm injuries($p=0.0003$), all suicides($p=0.0344$), firearm suicides($p<0.0001$), non-firearm suicides($p=0.0135$), CDC homicides (0.0060), CDC firearm homicides($p=0.0345$), CDC non-firearm homicides($p=0.0204$), and UCR burglary($p=0.0033$). Table 1 details the significant results from the multivariate analysis. On multivariate analysis HST laws were associated with significant decreases in firearm injuries, firearm suicides, CDC homicides, and UCR burglary. Patterns of association did not change for CCW on multivariate analysis. No significant associations were demonstrated for accidental injuries, total or non-firearm injuries or any UCR crime measures except burglary. Specifically, by UCR homicide definitions neither CCW nor HST laws carried any significant associations.

Conclusion: Laws easing concealed carry at a state level were associated with increases in firearm and non-firearm suicides, and CDC non-firearm homicides but not other crimes. State handgun purchase safety training requirements might help decrease suicides, especially firearm suicide, and overall firearm injuries. More study is clearly needed to help further define these associations and investigate if causation can be established.

Table 1 - Multivariate Analysis (significant results)

Domain	Estimate [95% CI]	Std Error	p
log CDC Firearm Injuries - Handgun Safety Training Laws	-0.1906 [-0.3044, -0.0767]	0.0581	0.0010
log CDC Suicides - Conceled Carry Restrictions	0.0304 [0.0083, 0.0525]	0.0113	0.0070
log CDC Firearm Suicides - Conceled Carry Restrictions	0.0362 [0.0085, 0.0639]	0.0141	0.0105
log CDC Firearm Suicides - Handgun Safety Training Laws	-0.2315 [-0.3068, -0.1561]	0.0384	<.0001
log CDC Non-Firearm Suicides - Conceled Carry Restrictions	0.0619 [0.0284, 0.0954]	0.0171	0.0003
log CDC Homicides - Handgun Safety Training Laws	-0.1607 [-0.2973, -0.0242]	0.0697	0.0211
log CDC Non-Firearm Homicides - Conceled Carry Restrictions	0.0494 [0.0051, 0.0936]	0.0226	0.0288
log UCR Burglary - Handgun Safety Training Laws	-0.0379 [-0.0641, -0.0118]	0.0133	0.0044

NOTES

Presentation # 45
Friday, March 7, 2025, 8:20am - 8:40am

THE EFFECT OF PREHOSPITAL BLOOD PRODUCTS ON UNEXPECTED SURVIVAL: A MULTI-INSTITUTION STUDY

T Clements, J Van Gent, A Krzyaniak, B Campbell, A Carroll, M Mericle, M Sise, K Peck, B Cotton
The University of Texas Health Science Center at Houston
Houston, Texas

Presenter: Thomas Clements MD
WTA Sponsor: Kim Peck

Introduction: Survival prediction models use vital signs to estimate expected survival of injured patients. These models are usually applied using arrival vitals, as opposed to prehospital (PH) values. Prehospital blood product (BP) transfusion has been associated with improvement in shock index(SI) during transport. The objective of this study was to examine the effect of PH resuscitation with BP on expected and observed survival.

Methods: Retrospective review of patients from two level 1 trauma centers between 7/2017-7/2021 was performed. Center A provided BP in the prehospital setting. Center B transfused BP upon arrival to the trauma bay. Patients were stratified by type of PH resuscitation (PH BP, No PH BP). Primary outcome of interest was expected survival compared to observed survival based on Trauma Injury Severity Score (TRISS). Secondary outcomes included changes in shock index from scene to arrival. Multivariate logistic regression was used to identify factors associated with unexpected survival.

Results: Of 1,090 patients included from the two centers (879 PH BP, 211 No PH BP), Patients receiving PH BP were more severely injured (ISS 27 vs 22), and demonstrated higher scene shock index (1.14 vs 1.00); $p<0.05$. On arrival, patients receiving PH BP demonstrated greater improvements in SI (0.10 vs 0.018, $p=0.019$). Those receiving PH BP had significantly more unexpected survivors calculated using PH (15% vs 6%, $p<0.001$), and arrival TRISS (17% vs 9%, $p<0.004$) compared to those receiving no PH BP. On multivariate regression, the use of PH BP was associated with increased odds of unexpected survival with both PH (OR=2.22, 95%CI 1.05-4.68, $p=0.036$) and arrival (OR=1.88, 95%CI 1.03-3.44, $p=0.039$) TRISS scores (Table)

Conclusions: In this multi-institution study, the use of PH BP resuscitation was associated with improved shock index at ED presentation, and an increase in unexpected survivors when compared to non-PH BP based resuscitation. The use of emergency department vital signs in mortality prediction models may not capture the benefits of prehospital blood resuscitation.

Logistic regression predicting unexpected survivors by prehospital and arrival TRISS

Logistic regression predicting unexpected survivors by prehospital TRISS			
	Odds ratio	**95% C.I.**	**p-value**
Prehospital blood products	**2.22**	**1.05-4.68**	**0.036**
Age in years	**1.00**	**0.98-1.01**	**0.729**
Male sex	**0.85**	**0.53-1.35**	**0.489**
Prehospital shock index	**1.66**	**1.15-2.41**	**0.008**
Injury severity score	**1.05**	**1.04-1.07**	**<0.001**
Arrival base excess	**0.97**	**0.92-1.02**	**0.206**
Logistic regression predicting unexpected survivors by arrival/ED TRISS			
	Odds ratio	**95% C.I.**	**p-value**
Prehospital blood products	**1.88**	**1.03-3.44**	**0.039**
Age in years	**0.99**	**0.98-1.01**	**0.369**
Male sex	**0.77**	**0.51-1.18**	**0.240**
Arrival shock index	**1.41**	**0.92-2.16**	**0.112**
Injury severity score	**1.05**	**1.03-1.06**	**<0.001**
Arrival base excess	**0.97**	**0.94-1.01**	**0.217**

NOTES

Presentation # 46
Friday, March 7, 2025, 8:40am - 9:00am

ATTENUATED INTERFERON-GAMMA FOLLOWING INJURY IS ASSOCIATED WITH CHRONIC CRITICAL ILLNESS

J Cuschieri, L Kornblith, S Pati, A Piliponsky
University of California San Francisco
San Francisco, California

Presenter: Joseph Cuschieri MD
WTA Sponsor: Robert Mackersie

Introduction: Early altered genomic expression of the interferon(INF)-γ pathway has previously been previously to be associated with early development of organ failure following severe injury. Altered expression and production of INF-γ on innate immunity and long-term outcomes have not been previously examined. The purpose of this study was to determine the role of early changes that INF-γ plays in altering long-term outcomes and development of chronic critical illness (CCI).

Methods: Severely injured patients were prospectively evaluated in a development cohort (n = 124). Blood was drawn within 12 hours of injury. Plasma INF-γ was determined by immune assay. Clinical and outcome data were prospectively obtained for 1 year. Within this development cohort, a plasma INF-γ level associated with CCI was determined using the Youden Index. This INF-γ level was analyzed within a separate prospectively followed validation cohort (n = 78). Blood samples in this validation cohort underwent analysis for monocyte activation and INF-γ expression. Measures and outcomes in the validation cohort were analyzed by Pearson's correlation and two-sided paired t-tests.

Results: The development cohort found INF-γ ≤ 50 pcg/ml had the highest sensitivity and specificity for the development of CCI. This lower INF-γ level group was independently associated with CCI in the developmental cohort after adjusting for age, ISS, male sex, lactate, and blood transfusions with an OR: 3.1 (1.3 – 9.7). An INF-γ ≤ 50 pcg/mL within the validation cohort was associated with a statistically increased risk of CCI, nosocomial infection, poor discharge disposition, and 1-year mortality (25% vs. 2%, p=0.01). Consistent with the clinical changes, attenuated INF-γ was associated with decreased monocyte activation and surface HLA-DR expression at both days 1 (48.7+14.8 vs. 62.4+19.8 %, $p < 0.01$) and 5 (56.7+20.4 vs. 71.6+14.7 %, $p< 0.01$) compared to patients with an INF-γ > 50 pg/ml. These altered changes in monocyte phenotypic differentiation were associated with sustained immune dysfunction and subsequent CCI.

Conclusion: Decreased INF-γ is associated with a reduction in HLA-DR and monocyte activation. This reduction in INF-γ and subsequent reduction in monocyte activation was associated with the development of CCI, increased nosocomial infections, and poor long-term outcomes. INF-γ levels early following injury may be useful as a biomarker for prognosis and to serve to identify patients that would benefit from INF-γ administration or other novel therapeutic interventions to prevent long-term complications. This study supports the genomic alterations previously demonstrated as a key pathway in long-term complications in patients with severe injury.

NOTES

Presentation # 47
Friday, March 7, 2025, 9:00am - 9:20am

THE EFFECT OF EXTRACRANIAL SURGERY ON 6-MONTH FUNCTIONAL RECOVERY IN PATIENTS WITH TRAUMATIC BRAIN INJURY: A CENTER-TBI SECONDARY ANALYSIS

S Lombardo, R Nirula, M McCrum, T Bell
University of Utah
Salt Lake City, Utah

Presenter: Sarah Lombardo MD MSc
WTA Sponsor: Raminder Nirula

Introduction: Multiply injured patients with traumatic brain injury (TBI) often require extracranial surgery (ECS) for management of concomitant injuries. ECS exposure may increase the risk for secondary insults, thus worsening functional recovery after TBI.

Methods: This was a retrospective, secondary analysis of the Collaborative European NeuroTrauma Effectiveness Research in Traumatic Bain Injury (CENTER-TBI) study. Patients 17 years and older with TBI that were admitted to the ward or intensive care unit (ICU) at a participating institution between December 9, 2014 and December 17, 2017 and with valid 6-month Glasgow Outcome Scale Extended (GOSE) scores were identified. The ECS cohort was defined as those undergoing non-neurological surgery within 14 days of admission. Multivariate logistic regression models were used to evaluate the effect of ECS on 6-month GOSE (range 1-8), controlling for patient demographics and injury patterns. Subgroup analysis evaluated the effect of ECS exposure and cumulative operative time in mild vs. moderate/severe TBI cohorts, both including and excluding all in-hospital deaths.

Results: Of 2025 patients that met inclusion criteria, 380 (18.8%) underwent ECS. The no-ECS cohort was older (54 ± 20 vs. 47 ±19 years) and less likely to be male (68.2% vs. 76.8%). ECS patients were more severely injured (median Injury Severity Score [ISS] 41 [26-50] vs. 18 [10-27]) and were more likely to have hypotension (33.9% vs. 15.7%) or hypoxia (25.0% vs. 13.2%) during the first 7 days of hospitalization. Severe head injury was more common among ECS patients (43.2% vs. 28.0%), though baseline pupillary exam and need for cranial surgery was similar between groups. Of the 380 ECS patients, 175 had mild TBI and 205 had moderate/severe TBI. Time to first ECS procedure and total operative time was similar regardless of TBI severity, though the mild TBI cohort had significantly greater first ECS operative times (mean 147 ± 108 vs. 124 ± 100 minutes). ECS exposure was associated with a significantly increased risk (odds ratio [OR] 1.81; 95% confidence interval [CI] 1.16, 2.83) of poor 6-month outcome (GOSE < 5), but a decreased odds of death at 6-months (OR 0.37; 95% CI 0.22,0.62). The protective effect of ECS disappeared when in-hospital deaths were excluded. When stratified by TBI severity, ECS remained a significant risk factor for poor outcome only for the mild TBI cohort (OR 2.30; 95% CI 1.11, 4.75), though this effect disappeared when in-hospital deaths were excluded. No clear dose effect of cumulative operative time was detected.

Conclusion: Exposure to ECS within 14 days of admission after TBI is associated with greater rates of in-hospital secondary insult, as well as increased risk of poor functional 6-month outcomes. Further work is needed to identify modifiable risk factors associated with early ECS in this vulnerable cohort.

NOTES

Presentation # 48
Friday, March 7, 2025, 9:20am - 9:40am

LOOK ME IN THE FACE AND TELL ME THAT I NEEDED TO BE TRANSFERRED: DEFINING THE CRITERIA FOR TRANSFERRING PATIENTS WITH ISOLATED FACIAL INJURIES

F Castillo Diaz, C Stewart, O Hejazi, A Nelson, MH Khurshid, C Colosimo, M Al Ma'ani, MR Matthews, LJ Magnotti, B Joseph
University of Arizona
Tucson, Arizona

Presenter: Francisco Castillo Diaz MD
WTA Sponsor: Bellal Joseph

Introduction: Despite the known burden of inappropriate over-triage of patients with facial injuries on the healthcare system, no comprehensive guidelines for the transfer of these patients exist. The aim of this study was to define guidelines regarding which patients with isolated craniomaxillofacial trauma require transfer to higher levels of care.

Methods: We performed a 5-year review at a level 1 trauma center (2017-2021). We included all transferred patients with isolated facial fractures. Patients were stratified into appropriate and inappropriate emergency transfers. Appropriate transfers were those admitted for facial injuries and/or received any emergency (taken directly to OR) or urgent (same admission) intervention for facial injuries and inappropriate transfers were those that did not require either emergent or urgent intervention or admission to the facial trauma service (FTS). In addition, those who required intervention after discharge were considered inappropriate transfers. Three independent experts reviewed the reason for the transfer and required interventions during the hospitalization and defined if the transfer was appropriate.

Results: We identified a total of 511 patients transferred to our level I trauma center with isolated facial fractures. The mean (SD) age was 46 (24) years and 67% were male. Orbital wall fractures (50%) were the most common injuries, followed by mandibular fractures (28%), nasal bone fractures (21%), maxillary sinus fractures (16%), and zygomatic arch fractures (10%). Overall, FTS was consulted for 457 (89%) patients, and the rest were discharged home without FTS consultation or any intervention by the trauma team. Among all patients, 252 (49%) were identified as appropriate transfers, of which 137 (54%) were admitted to the floor, 39 (15%) received emergency intervention, and 200 (79%) underwent urgent intervention. Of the inappropriate transfers (n=259), 82% received an FTS consultation, and 81% were discharged from the ED with a median [IQR] length of stay of 6 [4-8] hours. 7% required outpatient intervention by FTS without any admission or intervention on initial arrival. After review of each patient's hospitalization events, the Facial Injury Guidelines (FIG) were defined (Figure). Adhering to FIG could potentially prevent 252 transfers and $5,416,275 in hospital charges for these patients over the study period.

Conclusion: More than half of the patients with isolated facial fractures did not require any intervention or admission, which was associated with a substantial financial burden. The current proposed guidelines (FIG) could potentially prevent the inappropriate transfer of patients with isolated craniomaxillofacial trauma. Prospective validation of the FIG is warranted before its widespread implementation.

Facial Injury Guidelines

Type of Injury	Appropriate Transfer (%) *	Interpretation
Upper Facial Bones (n=9)		
Frontal Sinus Fracture	(9/9) 100%	**Transfer**
Middle Facial Bones (n=349)		
Orbital Fracture	(111/255) 43%	**Transfer if Alarming Signs Exist**
Decreased Visual Acuity/Diplopia	55/55 (100%)	
Restricted ocular motility	55/55 (100%)	
Retrobulbar Hemorrhage	12/12 (100%)	
Comminuted Fracture	20/20 (100%)	
Isolated Fracture with no Alarming Sign	0/156 (0%)	
Zygomatic Arch Fracture	0/49 (0%)	**Do Not Transfer**
Nasal Bone Fracture	0/111 (0%)	**Do Not Transfer**
Maxillary Sinus Fracture	0/81 (0%)	**Do Not Transfer**
Complex Fractures		
Zygomaticomaxillary Fracture	6/19 (30%)	**Transfer if Alarming Signs Exist**
Decreased Visual Acuity/ Diplopia	6/6 (100%)	
Naso-Orbito-Ethmoid Fracture	8/8 (100%)	**Transfer**
Decreased Visual Acuity/ Diplopia	2/2 (100%)	
Le Fort Fracture		
Type 1	0/15 (0%)	**Do Not Transfer**
Type II	27/27 (100%)	**Transfer**
Type III	9/9 (100%)	**Transfer**
Lower Facial Bones (n=153)		
Hard Palate Fracture	0/9 (0%)	**Do Not Transfer**
Maxillary Alveolus Fracture	0/22 (0%)	**Do Not Transfer**
Mandible Fracture	20/146 (16%)	**Transfer if Bilateral or Condyle Fracture**
Mandibular Condyle Fracture	10/10 (100%)	
Bilateral mandibular Fracture	14/14 (100%)	
Soft Tissue Injury (n=178)		
>2cm of missing tissue	12/12 (100%)	**Transfer**
Neurologic signs and symptoms	10/10 (100%)	**Transfer**
Eyelid/Globe laceration	40/40 (100%)	**Transfer**

***The denominator is every patient that had that type of injury, and the numerator is the number of patients that had an appropriate transfer based on that specific injury**

NOTES

Presentation # 49
Friday, March 7, 2025, 9:40am - 10:00am

WHO HAS TIME FOR FRAILTY SCORES? AUTOMATING FRAILTY DETECTION IN GERIATRIC TRAUMA PATIENTS UTILIZING MACHINE LEARNING

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Presenter: James Bardes MD
WTA Sponsor: David Kappel

Introduction: Frailty remains an area of interest in trauma research. Well-validated studies have shown utility in measuring psoas lumbar vertebral index (PLVI) to identify sarcopenia and, hence, frailty. The trauma specific frailty index (TSFI) has also demonstrated usefulness in predicting outcomes for geriatric trauma patients. Unfortunately, frailty screening techniques remain time and labor-intensive, and despite their utility, the overall implementation of these systems is limited. This study evaluates the role of machine learning (ML) in automating a system to evaluate geriatric trauma patients for increased frailty based on CT scans that are already routinely obtained.

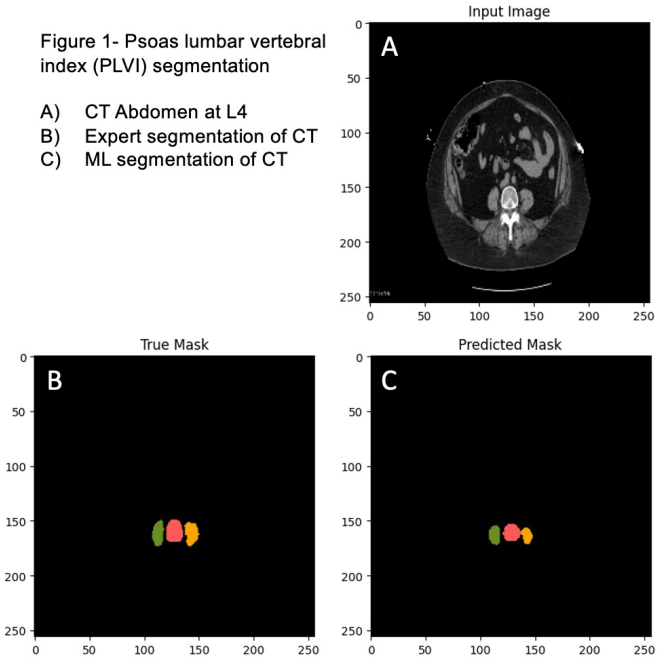
Methods: A previous prospective database of geriatric trauma patients was utilized to identify subjects and to provide TSFI data. The electronic medical record (EMR) was then queried to identify CT imaging from the day of their admission. Patients were included if they had a CT of the abdomen and pelvis from their trauma evaluation. Patients were excluded if they had only a CT lumbar spine or a psoas hematoma. Patients were classified as "frail" or "not frail" based on TSFI values of >0.25 and PLVI > 0.7. Each CT image was read and segmented by members of the study team. Four expert reviewers segmented bilateral psoas muscles and the L4 vertebrae utilizing 3D slicer software. The segmentations were performed one slice inferior to the posterior elements of the L4 vertebrae. These data were then read into a U-net convoluted neural network as the ground truth. The model was trained on 114 scans and validated on 29, with data resized to 256x256 pixels. Labels were preprocessed to focus on the regions of interest and standardized to four classes (Figure 1): right psoas, left psoas, L4 vertebrae, and background. The model was trained over 20 epochs using categorical cross-entropy loss and the Adam optimizer. Performance was evaluated using accuracy, Dice coefficient, and F1 score.

Results: Inter-reader correlation was excellent, mean standard deviation of the PLVI was 0.09. The model demonstrated solid performance, achieving a validation accuracy of 88.5%, a Dice coefficient of 0.86, and an F1 score of 0.87 after 20 epochs. Although the metrics indicate strong performance, visual inspection of the predicted masks suggests room for improvement in segmenting the psoas muscles and L4 vertebrae. Interclass correlation between PLVI and TSFI were moderately in agreement.

Conclusion: An ML approach can successfully evaluate geriatric frailty. Utilizing this approach, we demonstrated the ML model's high accuracy and correlation with the TSFI clinical scoring system. Larger datasets for training will be needed to refine the algorithmic approach, which may result in increased accuracy and correlation. Once validated, these algorithms could be built into an existing EMR to automate trauma patient frailty evaluations.

Figure 1- Psoas lumbar vertebral index (PLVI) segmentation

A) CT Abdomen at L4
B) Expert segmentation of CT
C) ML segmentation of CT



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