2018 GSA Winter Forum

February 3 | Le Méridien Atlanta Perimeter
Atlanta, GA

CME Activity Co-Directors
Billy Thomas MD
Allyson Speaks MD

Jointly provided by...

GEORGIA SOCIETY OF ANESTHESIOLOGISTS GSA

American Society of Anesthesiologists

OVERVIEW

The 2018 GSA Winter Forum is jointly provided by the American Society of Anesthesiologists and the Georgia Society of Anesthesiologists. As a convenience to GSA members and guests, this continuing education conference is structured as a two-day event. The meeting offers up to 6.75 *AMA PRA Category 1 Credits™* with content derived from educational survey feedback and post-meeting evaluations over the last few years. The educational focus informs attendees on current issues in anesthesiology and updates across multiple disciplines.

The LeMerdien Atlanta Perimeter is an excellent venue for the conference. Enjoy the educational portion of the meeting and receive appropriate business and government affairs information during the GSA Goverance Assembly, which will be held Saturday, 4:45 p.m.

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GSA Officers

President
Matt Klopman, MD
mklopma@emory.edu
Emory University Hospital

President-Elect
Maurice B. Gilbert, MD
mauricebgilbertMD@msn.com
A & M Anesthesia Services, LLC

Vice-President
Steven L. Sween, MD
ssween@aol.com
Physician Specialists in Anesthesia

Secretary/Treasurer

Justin Ford, MD
jford@gaanes.com

Immediate Past-President

Heather Dozier, MD
heather.dozier@gmail.com
Northside Anesthesiology Consultants

ASA Director
Howard Odom, MD

ASA Alternate Director
Timothy N. Beeson, MD

GSA Mission Statement

It is the mission of the Georgia Society of Anesthesiologists, Inc. to associate and affiliate into one organization all physicians and others in Georgia who are engaged in the practice of, or otherwise especially interested in, anesthesiology and its subspecialties; to encourage specialization in this field; to raise the standards of the specialty; to safeguard the professional interests of its members; and in all ways to develop and further educate within the specialty of anesthesiology for the general elevation of the standards of medical practice and patient safety.

Adopted by Board of Directors,
Winter Meeting,
January 15, 1999

Ratified by
General Membership,
January 17, 1999

GSA Officers

Delegates to ASA
Mary Arthur, MD
Timothy N. Beeson, MD
Rickard Hawkins, MD
William R. "Bob" Lane, MD
Justin Scott, MD
Kathy Stack, MD
John H. Stephenson, MD
Matt Klopman, MD

Alternate Delegates to ASA
Heather Dozier, MD
Kirk Edwards, MD
Korrin Scott Ford, MD
Maurice B. Gilbert, MD
Julius Hamilton, MD
Edwin D. Johnston, Jr., MD
Steve Tosone, MD
Paul Turk, MD

Delegate to MAG
Gerry Moody, MD

GSA Committees

Nominating Committee
Maurice Gilbert, MD, Chair

Bylaws Committee
Steve Sween, MD, Chair

Judicial Committee
Heather Dozier, MD, Chair

Membership Committee
Keith Johnson, MD, Chair

Program And Education Committee
Gautam Sreeram, MD, Char

Vendor Relations Committee
Dale Mcmillon, MD, Chair

Anesthesia Care Team Committee
Howard Odom, MD, Chair

GSA Committees

Government Affairs Committee
Justin Scott, MD, Chair
Michele Sumler, MD, Vice Chair

Committee On Academic Anesthesia
Julie Williamson, MD, Emory Liaison
Mary Arthur, MD, Gru/Mcg Liaison
Gaurav Patel, MD, Emory Liaison

Representative To Mag Council On Legislation
Justin Scott, MD
Justin Ford, MD

Representative To Medicare & Medicaid
Raphael Gershon, MD, *Rep. To Carrier Advisory Committee*
David Gale, MD, *Rep. To Carrier Advisory Committee*

Crawford Long Museum Liaison
William Hallowes, M.D., Chair

Practice Management Committee
John Stephenson, MD, Co-Chair
Wyn Mortimer, MD, Co-Chair

Long Range Planning Committee
Kathy Stack, MD, Chair

Communication Committee
Tim Beeson, MD, Chair

Crawford W. Long Award Committee
Peggy Duke, MD, Chair

Committee For Responsible Health Care Policy (GSA-PAC)
Rick Hawkins, MD, Chair

Ad Hoc Committee On Practice Surveillance
Heather Dozier, MD, Chair

OVERVIEW

Registration Information

The GSA member rate is $450 for physicians, $175 for residents, $275 for AAs, $200 for retired physicians, and $50 for students. The non-member rate is $575 for physicians, $225 for residents, $375 for AAs, $200 for retired physicians, $50 for students, and $575 for CRNAs. Educational seminars, breakfasts and breaks are for the REGISTRANT ONLY. A $100 late fee will be applied to all registration forms received after Monday, January 29, 2018. This late fee applies to both on-site and online registration. Guests are welcome at both Friday and Saturday evening receptions.

Accreditation

This activity has been planned and implemented in accordance with the accreditation requirements and policies of the Accreditation Council for Continuing Medical Education (ACCME) through the joint providership of the American Society of Anesthesiologists and the Georgia Society of Anesthesiologists. The American Society of Anesthesiologists is accredited by the ACCME to provide continuing medical education for physicians.

Credit Designation

The American Society of Anesthesiologists designates this live activity for a maximum of 6.75 *AMA PRA Category 1 Credits™* . Physicians should claim only credit commensurate with the extent of their participation in the activity.

To access the course, claim your credits, complete the program evaluation and print your certificate, log in to the ASA Education Center at the following link: http://education.asahq.org/

Cancellation Policy

Cancellations and/or changes in registration or participation in all or any portion of the meeting must be received at GSA headquarters by Monday, January 29, 2018, to qualify for refund. Absolutely no refunds will be issued for changes received at GSA headquarters after Monday, January 29, 2018. The cancellation policy and late registration fee will be strictly enforced.

Evening Hospitality

All registrants, faculty, exhibitors and guests are invited to enjoy evening hospitality events offered Friday and Saturday. Badges are required for participation in all receptions. Please register your guests so that a badge can be produced.

Questions

Please visit the registration desk for more information or clarification on any of the meeting elements, schedule or CME verification.

Disclaimer

The information provided at this CME activity is for continuing education purposes only and is not meant to substitute for the independent medical judgment of a healthcare provider relative to diagnostic and treatment options of a specific patient's medical condition.

EDUCATIONAL & LEARNING OBJECTIVES

Learning Objectives

Opioids for Chronic Pain Patients - What's The Problem?
Anne Marie McKenzie-Brown, MD, Emory University Department of Anesthesiology

At the end of this session, participants will be able to:

1. Discuss the history of opioid use for chronic pain;
2. Explain the adverse effects associated with chronic opioid use;
3. Identify evidence for opioid effectiveness for chronic pain.

Anesthesia for Combat Trauma - Lessons Learned in Iraq and Afghanistan
Randy F. Rizor. MD, Colonel, Medical Corps, US Army Reserve

At the end of this session, participants will be able to:

1. Explain the role of the Joint Trauma Service in improving outcomes in combat trauma
2. Name the components of the lethal triad and specific strategies to prevent each of them
3. Employ the massive transfusion protocol that is associated with the highest rate of survival in combat trauma
4. Devise a plan to provide adequate perioperative analgesia in major trauma while minimizing the risk of opioid induced hyperalgesia

My Patient Is on Opioids - Now What?
Anne Marie McKenzie-Brown, MD, Emory University Department of Anesthesiology

At the end of this session, participants will be able to:

1. Employ risk assessment tools for chronic opioid usage
2. Identify requirements for patients for continuous opioid use.

Same Day Discharge Joint Replacement
Mark E. Hamilton, MD, Northside Hospital Department of Anesthesia

At the end of this session, participants will be able to:

1. Describe key principles and importance of Team Development
2. Describe key multi-modal analgesic agents
3. Recognize that Opiate Free Anesthesia is not only desirable but possible

Learning Objectives

Fast-track Pediatric Surgery, Fact or Foe?
Pankaj Chhatbar, MD, Children's Healthcare of Atlanta at Scottish Rite

At the end of this session, participants will be able to:

1. To demonstrate application of ERAS for pediatric patients
2. To create protocols for various fast track pediatric surgeries
3. To assess benefits and limitations of fast track infrastructure

Ultrasound-Guided Truncal Blocks
W. Michael Bullock, MD, PHD Duke University

At the end of this session, participants will be able to:

1. Identify indications for truncal blocks
2. Recognize limitations of truncal blocks
3. Prolong truncal blocks

FACULTY

WILLIAM MICHAEL BULLOCK, MD, PhD
Duke University Hospital, Durham, NC

EMPLOYMENT

2015-current	Assistant Professor Duke University Hospital, Durham, NC Division of Regional Anesthesiology and Acute Pain Medicine Department of Anesthesiology
2015-current Rotation	Director of Senior Anesthesia Resident Education for Regional Anesthesia
2017-current	Assistant Program Director for Regional Anesthesiology and Acute Pain Medicine Fellowship

MEDICAL TRAINING

2014-2015	Duke University Hospital, Durham, NC Fellowship in Regional and Ambulatory Anesthesiology Department of Anesthesiology
2011-2014	Duke University Hospital, Durham, NC Residency in Anesthesiology Department of Anesthesiology
2010-2011	University of New Mexico School of Medicine, Albuquerque, NM Preliminary/Intern Year in Internal Medicine Department of Internal Medicine

EDUCATION

2003-2010	University of New Mexico School of Medicine, Albuquerque, NM MD/PhD Program Doctor of Medicine Doctor of Philosophy, Biomedical Sciences

WILLIAM MICHAEL BULLOCK, MD, PhD (continued)

Dissertation Title:	"Alterations in Neuromodulators of GABAergic Transmission in the Cerebellar Cortex of Patients with Schizophrenia."
1996-2001	New Mexico State University, Las Cruces, NM University Honors Bachelor of Science in Biochemistry Bachelor of Science in Microbiology Bachelor of Arts in Chemistry

LICENSURE AND BOARD CERTIFICATION
North Carolina Medical Board (License #2017-00727)
Diplomate of the American Board of Anesthesiologists (Certificate #53275)

FACULTY

Pankaj Chhatbar, MD

Pediatric Anesthesiologist Children's Healthcare of Atlanta at Scottish Rite

Education:

07/2011 – 06/2012: Pediatric Anesthesia fellowship
Medical college of Wisconsin and Children's Hospital of Wisconsin, Milwaukee, WI

07/2008 --- 06/2011: Anesthesiology Residency
Medical college of Wisconsin, Milwaukee, WI

07/2007 – 06/2008: Preliminary Internal Medicine
Jersey Shore University Medical Center, Neptune, NJ

07/2001 – 06/2004: Anesthesiology Residency
M P Shah Medical College, Jamnagar, Gujarat, India

07/1995 – 02/2001: Medical school
M P Shah Medical College, Jamnagar, Gujarat, India

Board Certification:

10/2014: American Board of Anesthesiology – Pediatric Anesthesiology

10/2012: American Board of Anesthesiology --- Anesthesiology

06/2004: Gujarat Medical Council, India – MD Anesthesiology

Professional Appointments:

08/2017 – current: Pediatric Anesthesiologist,
Children's Healthcare of Atlanta at Scottish Rite, Atlanta, GA

08/2016 – 08/2017: Pediatric Anesthesiologist,
Pediatric Anesthesia Associates, PSC, Louisville, KY

10/2012 – 06/2016: Assistant Professor,
Augusta University, Augusta, GA

Pankaj Chhatbar, MD (continued)

07/2012 – 10/2012: Assistant Professor,
Children's Hospital of Wisconsin, Milwaukee, WI

08/2006 --- 06/2007: Research Associate, Obstetric Anesthesia Research,
Duke University Medical Center, Durham, NC

07/2004 --- 06/2005: Consultant Anesthesiologist,
Oshwal Hospital, Jamnagar, India

Awards/Honors:

Augusta University

2015 Teaching Award from Anesthesia Class of 2015 – received in 2015

2014 Recognized for "employee aspiring Greatness"

Medical College of Wisconsin

2011 Third place in case report at Midwest Anesthesia Resident Conference (MARC)

2010 Academic Excellence Award for top ITE score in the class

2010 First place in case report at MARC

Jersey Shore University Medical Center

2007 Intern of the Year Award

M P Shah Medical College

2004 Resident of the Year Award

Scientific and Professional Societies:

- American Society of Anesthesiology
- American Medical Association
- Society of Pediatric Anesthesia
- Georgia Society of Anesthesiology

Certification/Licensure

- Wisconsin State license – active
- Georgia State License – active
- Kentucky State License – active
- Drug Enforcement Administration certification – active
- BLS, ACLA, PALS – active

FACULTY

Mark E Hamilton, MD
Northside Anesthesia Consultants, Atlanta, Georgia

Professional Experience

1987 – Present	Anesthesiologist, Northside Anesthesia Consultants, Atlanta, Georgia
1985 – 1987	Anesthesiologist, Dekalb Medical Center, Atlanta, Georgia
1983 – 1985	Emergency Room Physician, Covington, Georgia

Education

1982 – 1985	Residency and Internship in Anesthesiology, Emory University School of Medicine, Atlanta, Georgia
1978 – 1985	MD from University of California at Davis, School of Medicine
1976 – 1978	Majored in Chemistry, Brigham Young University, Provo, Utah

Honors

- Elected member of Alpha Omega Alpha, Medical Honor Society, 1982 Valedictorian, Class of 1973, Colfax High School, Colfax, California Board Certifications
- Pain Management Certificate 1998
- American Board of Anesthesiology 1987
- Diplomat, National Board of Medical Examiners 1983

Mark E Hamilton, MD (continued)

Professional Activities

Director of Anesthesia Services for Fast Track Joint Replacement Chairman of Enhanced Recovery Committee

Lead and member of committee for PA/ CRNA Rotating Student Education Member of Hip Fracture Committee

Member of Joint Replacement CPG group Member of Clinical Excellence Committee Member of Orthopedic Anesthesia Committee

Licensure

Current Georgia Medical License

DEA certified

FACULTY

Anne Marie McKenzie-Brown, MD
Emory Pain Center, Atlanta, Georgia

Current Titles and Affiliations:

Academic Appointments:

i. Primary Appointments:
Associate Professor, Department of Anesthesiology
Emory University School of Medicine, 2014-present

ii. Joint and Secondary Appointments: None

Clinical Appointments:

I. Director, Division of Pain Management, Dept Anesthesiology. 2003-present

II. Director Emory Pain Center, Dept Anesthesiology. 2003-present

Other Administrative Appointments:

I. Emory Healthcare Board of Directors. 2017

Previous Academic and Professional Appointments:

Assistant Professor, Department of Anesthesiology

Emory University School of Medicine. 1992 - 2014

Previous Administrative and/or Clinical Appointments:

Program Director, Emory University ACGME Multidisciplinary Pain Fellowship Program. 2004- 2014

Director, Grady Pain Clinic. 1995-2003

Clinical Director, Emory Center for Pain Medicine. 2002-2003

Assistant, Department of Anesthesiology and Critical Care, Johns Hopkins School of Medicine. 1991-1992

Anne Marie McKenzie-Brown, M.D. (continued)

Licensures/Boards:

Georgia License 031979. 1992- present

Maryland license, expired. 1993

American Board of Anesthesiology 1992. Recertification. 2000. 2009 – voluntary

ATLS certification, last recertified. 2008

Certification in Georgia Medical Provider Class by the GA State Board of Worker's Compensation. 2010

ACLS certification, last recertification. 2017

Specialty Boards:

American Board of Anesthesiology. 1994

Pain Medicine added qualifications in Pain Management. 1994

ABA Recertification in added qualifications in Pain Management. 2003

American Board of Pain Medicine. 1995

American Board of Independent Medical Examiners. 2010

Certification in Georgia Medical Provider Class by the GA State Board of Worker's Compensation. 2010

Education:

B.A. Chemistry, University of Virginia. 1983

Doctor of Medicine, Johns Hopkins School of Medicine. 1987

Postgraduate Training:

Internal Medicine Internship, St. Luke's/Roosevelt Hospital, New York, 1987-1988

Residency, Department of Anesthesiology Emory University School of Medicine, John Waller, Department Chair. 1988-1991

Assistant/Staff Anesthesiologist, Division of Regional Anesthesia, Department of Anesthesiology, Johns Hopkins School of Medicine. Denis Bourke, Division Director,

Marc Rogers, Department Chair, 1991-1992

Non ACGME Pain Medicine Fellowship training combined (ACGME pain fellowships not yet available). Junior Faculty Position. Department of Anesthesiology Johns Hopkins School of Medicine. Marc Rogers, Department Chair, 1991-1992

Continuing Professional Development Activities:

Woodruff Leadership Academy. 2008

Sherpa Executive Coaching Program. 2017

FACULTY

Anne Marie McKenzie-Brown, M.D. (continued)

Committee Memberships:

National and International:

- Vice Chairman, American Society of Interventional Pain Physicians (ASIPP) Ethics Board. 2002-2004
- American Society for Regional Anesthesiology and Pain Medicine (ASRA) Task Force on Chronic Pain. I was a member of the task force that contributed to a patient information section of the web page on frequently asked questions about chronic pain. 2005
- American Board of Anesthesiology (ABA).
    - Question Writing Committee for the Part II Oral Board Exams
    - Provisional Oral Board Examiner, American Board of Anesthesiology. 2009-2010
    - present Associate Oral Board Examiner, American Board of Anesthesiology.
    - Pain Medicine Question Author for the ABA, American Board of Physical Medicine and Rehabilitation (ABPMR) and the American Board of Psychiatry and Neurology (ABPN). 2011-current
    - American Society of Regional Anesthesia and Pain Medicine (ASRA) Patient Information Taskforce – contributed to the writing of patient information regarding pain medicine for the ASRA website. 2005
    - Pain Medicine Examination Committee, American Board of Anesthesiology. 2012-present
    - Part 2 (written boards) American Board of Anesthesiology Test Writing Committee. 2014-present
- Self-Assessment Module for Pain Medicine (SAM-PM) Editorial Board. 2011-2012
- American Board of Anesthesiology Review Panel. Conducts hearings when a physician requests a review of certain ABA decisions. 2015-present
- National Academy of Sciences Committee on Pain Management and Regulatory Strategies to Address Prescription Opioid Abuse. 2016
- ACGME Review Committee for Anesthesiology. 2017

Anne Marie McKenzie-Brown, M.D. (continued)

Regional and State:

Founding Chairman, Georgia Cancer Pain Initiative. 1992-1995

Medical reviewer, State Board of Workers Compensation. 2005-present

Medical Association of Georgia (MAG) 'Think About It' Advisory Committee – 2017 - present

Institutional

Pain Research Task Force, Emory University Hospital. 1994-1995

Chair, Acute Pain Committee, Grady Memorial Hospital. 1996-2001

Chair, Pain Management Committee, Grady Memorial Hospital. 2001-2007

Residency Clinical Competency Committee, Department of Anesthesiology Emory University School of Medicine. 2001-2011

Emory Department of Anesthesiology Affirmative Action Committee, Chairman, (Chairman 2006-2008) 2001-2009

Residency Recruitment Committee, Emory Department of Anesthesiology. 2001-2009

Executive Committee, Emory Department of Anesthesiology. 2003-2011

Cultural Awareness Committee, Emory Department of Anesthesiology. 2008-2010

Quality Control committee, Emory Department of Anesthesiology. 2009-2012

Member Emory Clinic Ad Hoc Committee on Physician Satisfaction. 2011

Member of Emory Clinic Physician Executive Committee. 2011-present

Member of clinically integrated network committee (CIN) task force on generic Drugs. 2011-2012

Education Committee, Emory Department of Anesthesiology. 2014-present

Emory Department of Anesthesiology Promotions Committee. 2015-present

Emory Department of Anesthesiology Faculty Search Committee 2016-present

Emory Healthcare Clinical Claims Committee. 2016-present

Dean Larsen's Strategic Initiative on Physician Compensation. 2016

Participation in the Faculty/Physician Compensation Working Group. 2017

Formation of the Multidisciplinary Emory Opioid Initiative/Task Force. 2017

Board of Directors, Emory Healthcare. 2017

FACULTY

Randy F. Rizor, M.D.

The Physicians' Spine and Rehabilitation Specialists of Georgia , Sandy Springs, Georgia

Randy F. Rizor, M.D. is President of The Physicians' Spine and Rehabilitation Specialists of Georgia and practices in Sandy Springs. Dr. Rizor graduated Phi Beta Kappa from Bates College and received his Doctor of Medicine Degree from the Medical College of Ohio in 1976. He completed a residency in Anesthesiology at Dartmouth-Hitchcock Medical Center, serving as Chief Resident. He is certified in Anesthesiology and Pain Medicine by the American Board of Anesthesiology. He is a member of the Chairman's Advisory Council of the Georgia State Board of Workers' Compensation and the Board of Directors of the Medical Association of Atlanta.

In response to the events of September 11, 2001, Dr. Rizor volunteered to join the US Army Reserve. He currently holds the rank of Colonel in the Medical Corps. He has served on active duty in Kosovo in 2004, and in Iraq in 2007-08 and 2011.

AGENDA

Friday, February 2

3:00 - 6:00p **Registration**
Location: Salon Foyer

4:00 - 6:00p **Exhibit Assembly**
Location: Salon Foyer

4:30 - 6:30p **Board of Directors Meeting**
Location: Design & Discovery

6:30 - 7:30p **Welcome Hospitality with Exhibitors**
Location: Salon Foyer

7:45p **Group Dinner - Self Pay, RSVP required**
Location: Portico

Saturday, February 3

***Unless otherwise noted all activities will take place in Salon I-III**

6:00a **Exhibit Assembly**
Location: Salon Foyer

6:30 - 7:20a **Registration**
Location: Salon Foyer

Breakfast with Exhibitors
Location: Design + Discovery

7:25 – 7:30a *Welcome*
Matthew A. Klopman, MD, FASE, GSA President

Introductions
Dr. Billy Thomas & Dr. Allyson Speaks, GSA 2018 Winter Activity Directors

7:30 - 8:30a *Opioids for Chronic Pain Patients - What's The Problem?*
Anne Marie McKenzie-Brown, MD, *Emory University Dept. of Anesthesiology*

AGENDA

8:30 - 9:30a *Anesthesia for Combat Trauma - Lessons Learned in Iraq and Afghanistan*
Randy F. Rizor. MD, *Colonel, Medical Corps, US Army Reserve*

9:30 - 10:00a **Break with Exhibitors**
Location: Grand Salon Foyer

9:30 - 11:00a **Resident Section Board Meeting**
Location: Concept

10:00 - 11:00a *My Patient Is on Opioids - Now What?*
Anne Marie McKenzie-Brown, MD, *Emory University Dept. of Anesthesiology*

11:00 - 12:00p *Same Day Discharge Joint Replacement*
Mark E. Hamilton, MD, *Northside Hospital Department of Anesthesia*

12:00 - 12:30p **Lunch**
Location: Design + Discovery
Sponsored by American Anesthesiology / MEDNAX

12:30 - 1:30p *Fast-track Pediatric Surgery, Fact or Foe?*
Pankaj Chhatbar, MD, *Children's Healthcare of Atlanta at Scottish Rite*

1:30 – 2:00p **Break with Exhibitors**
Location: Salon Foyer

2:00 - 3:00p *Ultrasound-Guided Truncal Blocks*
W. Michael Bullock, MD, PHD *Duke University*

3:00 - 3:45p *Poster Presentations of Top Scoring Trainee Research Projects*

1. **Kevin Luu & Thomas Cheriyan: "**Efficacy of Bispectral Index in reducing intraoperative awareness: A meta-analysis of randomized controlled studies"
2. **Melat Gebre**: "Feasibility Study: fMRI Evaluation of Auricular Percutaneous Electrical Neural Field Stimulation for Fibromyalgia "
3. **Deepak Padmanabha: "**Continuous TAP Block as Primary Anesthetic for Open Right Inguinal Herniorraphy in a Patient with Severe Hypertension and Thrombocytopenia"

Saturday, February 3 (contd.)

3:45 – 4:45p **Committee Meetings**

- *Government Affairs* – Creative Room
- *Practice Management* – Innovation
- *Membership* – Concept Room
- *Program and Education* - Design + Discovery

4:45p **General Business Meeting**
Governance Assembly (Committee Reports)

5:00 - 6:30p **Evening Reception**
Sponsored by MAG Mutual

Sunday, February 4

8:30 - 10:30a **Panel Discussion on Billing**
Hosted by GA-AAAA
Sponsored by Anesthesia Associates of Gainesville
Location: Salon I/II

AGENDA

DISCLOSURE

Program & Education Committee

A special thanks to the Program and Education Committee for reviewing lecture materials to ensure lectures meet learning objectives and do not exhibit biased content. Members of the Program and Education Committee are as follows:

Gautam Sreeram	Alex Papangelou
Heather Dozier	Vikas Kumar
Kirk Edwards	Stephen Anderson
Korrin Scott Ford	Allyson Speaks
Gina Scarboro	Kris Tindol

Disclosure & Resolution of Conflicts of Interest

The American Society of Anesthesiologists remains strongly committed to providing the best available evidence-based clinical information to participants of this educational activity and requires an open disclosure of any potential conflict of interest identified by our faculty members. It is not the intent of the American Society of Anesthesiologists to eliminate all situations of potential conflict of interest, but rather to enable those who are working with the American Society of Anesthesiologists to recognize situations that may be subject to question by others. All disclosed conflicts of interest are reviewed by the educational activity course director/chair to ensure that such situations are properly evaluated and, if necessary, resolved. The American Society of Anesthesiologists educational standards pertaining to conflict of interest are intended to maintain the professional autonomy of the clinical experts inherent in promoting a balanced presentation of science. Through our review process, all American Society of Anesthesiologists CME activities are ensured of independent, objective, scientifically balanced presentations of information. Disclosure of any or no relationships will be made available for all educational activities.

Planner, Faculty and Staff Disclosure

In accordance with ACCME Standards for Commercial Support of CME, the ASA and the GSA implemented mechanisms, prior to the planning and implementation of this CME activity, to identify and resolve conflicts of interest for all persons in a position to control content of this CME activity. All other faculty, planners and staff have reported no relevant financial relationships with commercial interests.

Name	Commercial Interest Disclosed	Nature of Relationship w/ the Commercial Interest
Mark E. Hamilton	Mallinkrodt	Consulting Fees
	Medtronic	Consulting Fees
W. Michael Bullock	Pacira Pharmaceuticals	Consulting Fees

Commercial Support Acknowledgment

The Georgia Society of Anesthesiology gratefully acknowledges the following companies for commercial support for the 2018 GSA Winter Forum.

American Anesthesiology / MEDNAX
Unrestricted Educational Grant

MAG Mutual
Unrestricted Educational Grant

Exhibitors

AMBU

American Anesthesiology / MEDNAX

Eagle Pharmaceuticals

Emory GYN-OB Research Study

Lidco

MAG Mutual

Mallinckrodt Pharmaceuticals

MERCK

Nanosonics

Pacira

PharMEDium Services, LLC

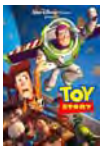
Preferred Physicians Medical

Respiratory Motion

US Army Health Care Recruiting

Opioids for Chronic Pain Patients- What's The Problem?

Anne Marie McKenzie-Brown, M.D.
Associate Professor, Emory School of Medicine
Pain Division Chief, Emory Department of Anesthesiology



A Brief Overview

1995

The Culture in the '90's

- Prior to 1995
  - Physicians hesitant to prescribe opioids
  - 1992 AHCPR (now AHRQ)
    - Patient self report – most reliable indicator of 'existence and intensity of acute pain'
    - 'Need for Aggressive Post Op Pain Control
    - Quoted Porter 1980 article, addiction

NEJM Porter 1980 Letter to Editor

- Looked at their files of 39,946 consecutive hospitalized patients. Boston Univ
- 11,882 patient received at least one 'narcotic'
- Only 4 cases of addiction in patients w/o addiction history, only 1 was 'major'
- Drugs:
  - Meperidine (2 patients)
  - Percodan (1 patient)
  - Hydromorphone (1 patient)
- Conclusion:
  - Addiction is rare in medical patients with no history of addiction

Porter, et al. NEJM 1980; 302:123

Pain as 5th vital sign

Oxycontin introduced - 12 hour opioid
- Not just for severe pain

1995

Physician Messaging:

Pain undertreated (post op, cancer patients,….chronic pain)

1997 Consensus Statement

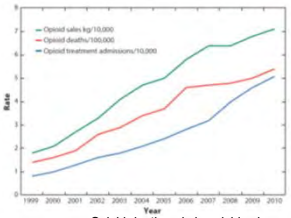
" The Use of Opioids for the Treatment of Chronic Pain"

- American Academy of Pain Medicine and the American Pain Society
  - '*The undertreatment of pain in today's society is not justified*'
  - Misunderstanding of – addiction, tolerance, fear of respiratory depression
    - 'respiratory depression induced by opioids tends to be a ***short-lived phenomenon***, generally occurs only in the opioid-naïve patient, and is antagonized by pain. **Therefore withholding the appropriate use of opioids from a patient who is experiencing pain on the basis of respiratory concerns is unwarranted.**'….'Sedation and nausea, possibly early side effects, usually dissipate with continued use'.
- Editorial
  - 'much of the conventional wisdom surrounding opioids is unfounded folklore'
  - Call for more data

The Rise of Opioids

- 1996-2002 Campaign to educate physicians on opioid prescribing
  - Differentiation between physical and psychological dependence
  - Addiction risk cited at < 1% if for chronic pain
  - Exaggerated benefits/expanded indications of long term opioids
- Result
  - Oxycontin sales went from $48million in 1996 to > $1 billion in 2000
    - Marketed as less addictive
  - No parallel increase in pain

Ann Rev Pub Health 2015

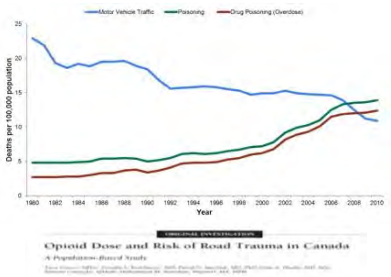


Opioid deaths mimic opioid sales

CDC Infographic

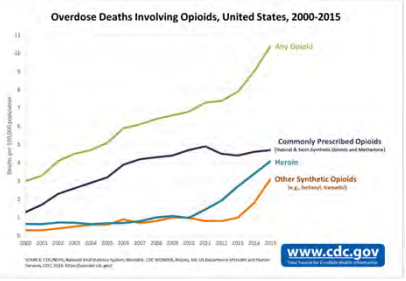
2000-2010

- Congress declares 2001-2011 the 'Decade of Pain Control and Research'
- 2007 Criminal charges against Purdue Pharma by Federal Govt. Pay $634.5 million fine for claiming Oxycontin was safer, less addictive than other opioids
- 2010 abuse deterrent formulation of Oxycontin



- More people die from drug overdose than from MVA's
- How many MVA deaths are related to drugs?
  - 2013 Canadian Study – 100-199MMED – 42% increased risk road trauma

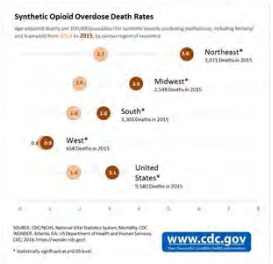
Leading Cause of Death due to Unintentional Injury



- 52,000 Drug O.D. deaths in the U.S.
  - 33,000 due to opioids
- Annual prescription opioid deaths stable from 2011-2015

Synthetic Opioids

- Fentanyl is > 30X more potent than heroin
  - Fentanyl laced heroin; often looks the same as heroin
- Carfentanil – synthetic variant, 100X more potent
- DEA has recommended officers not field test drugs if fentanyl is suspected but send off for analysis – risk of inhalation or skin exposure
- Death from synthetic opioids, e.g. fentanyl increased 72% from 2014-2015

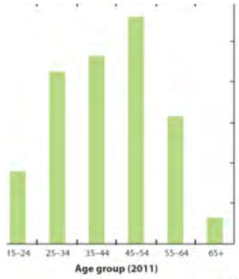


www.cdc.gov

Mortality Statistics

Opioid mortality
- Opioid deaths highest in adults 45-54
- Greatest increase in opioid mortality age 55-64

Ann Rev Pub Health 2015; MMWR/CDC 2016

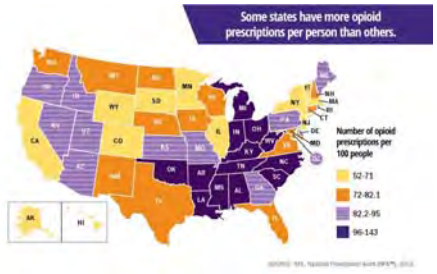


Opioid mortality by age group

"We know of no other medication routinely used for a nonfatal condition that kills patients so frequently"

NEJM 2016 374;16:1501 Editorial RE: CDC Guidelines

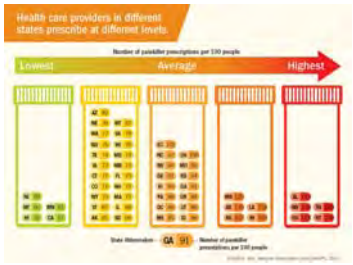
Opioid Prescriptions Vary by State

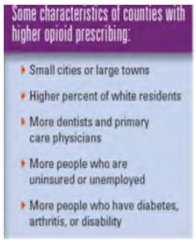


Five states with highest opioid related death rate` in 2015:

- West Virginia 41.5/100K
- New Hampshire 34.3/100K
- Kentucky 29.9/100K
- Ohio 29.9/100K
- Rhode Island 28.2/100K

CHARACTERISTICS



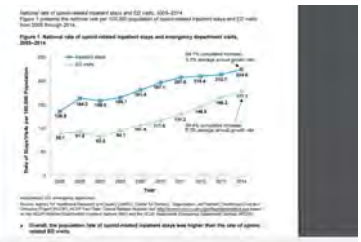


HHS

- 2015 HHS launched Opioid Initiative – reverse trend of opioid O.D.
- 2000-2014 200% increase opioid O.D. death
- 2000-2012 double rate of adult inpatient related to opioid dependence/misuse
- HCUP Statistical Brief- data from 40 states and D.C.
  - Opioid related stays includes prescription or illicit opioids

Healthcare Cost and Utilization Project (HCUP) Dec 2016 – Database AHRQ

National Rate Opioid Inpatient and E.D Visits 2005-2014



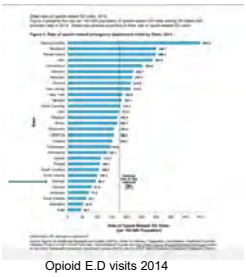
- Population rate Opioid Inpatient stays from 2005-2014:
  - 25-90% higher than E.D. visits
  - Increased 64%
  - 5.7% annual growth rate
- Population rate Opioid E.D. visits
  - Increased 99.4%
  - 8% annual growth rate

Large Variety in Opioid Inpatient Stay Relative to other States

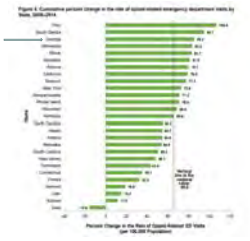
Rate of Inpatient Stays 2014

Percent Change Inpatient Stays 2009-2014

Opioid Related Emergency Visits 2009-2014



Opioid E.D visits 2014



Rate of Change Opioid E.D. visits 2009-2014

How Do Patients Get Started?

- Post op surgical patients
- Dental patients (wisdom teeth, root canals, etc)
- Access through unused medications
- Chronic pain

How Do Chronic Opioid Patients Get Started?

TRICARE data (2006-2014)

- Tricare adults (18-64) w/ Schedule II or III opioid x 6 months also opioid naïve 6 mths prior
- Looked at ***primary diagnosis*** ICD-9 code for ***initial opioid prescription***
- Cancer diagnoses excluded
- Top diagnoses related to some form of Spine Pain, most often Low Back Pain

JAMA Surgery 2017; E1

RANK	COHORT TOTL	Civilian Military Centers	Military Medical Centers
1	Other	Other	**742.2 lumbago**
2	**742.2 lumbago**	**742.2 lumbago**	Administrative encounter
3	Administrative encounter	**724.4 lumbar radiculitis**	Administrative encounter
4	**724.4 Lumbar radiculitis**	**722.52 lumbar DDD**	Other chronic pain
5	**722.52 lumbar DDD**	**721.3 lumbar spondylosis**	Health Exam
6	**723.1 Cervicalgia**	**723.1 Cervicalgia**	Other
7	Other chronic pain	729.1 Myalgia, fibromyalgia	Chronic pain syndrome
8	Administrative encounter	Medication Use	HTN
9	**721.3 lumbar spondylosis**	**722.1 Lumbar Disc herniation**	**723.1 Cervicalgia**
10	**722.1 Lumbar Disc herniation**	**724.5 backache**	rehab

Opioid Dose Escalation and Mortality NEW Noncancer Opioid Patients

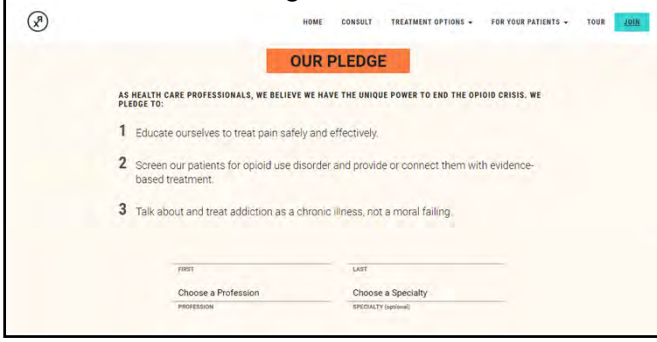
- Population based cohort study Ontario (Universal Coverage) 4/1/97-12/31/2010 (8 YEARS)
  - 285,520 started opioid Rx
  - 32,449 > 3 months
  - Hydrocodone (antitussive in CA), methadone excluded (SUDx) – neither used for pain
  - No opioids past year – followed until 2010

RESULTS

- > 10% of patients progressed to chronic opioids
  - 1/55 patients escalated to high dose opioids
  - 1/550 died of opioid related causes
- Men 50% more likely to escalate to **high dose (> 200MMED)**
- Those who escalated to high dose opioid, almost **24x more likely to die**

PLOS One 2015 10(8):e0134550

Surgeon General



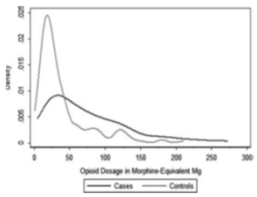
Opioid Prescribing as Risk Factor

- Association between **new** opioid exposure (opioid naïve) and incident opioid use disorders (OUD) in chronic noncancer pain (2000-2005)
- 568,640 patients from HealthCore claims database, ICD -9, opioids
- 497 (0.1%) new ICD 9 diagnosis OUD vs. 0.004% nonopioids
- Effect varied by:
  - ***Dose*** :low dose (≤ 36MED) less risk vs. high dose (> 120MED)
  - ***Duration:*** acute less risk vs. chronic (> 3 months)
  - High dose chronic opioids ***higher risk vs. known risk factors*** (youth, Hx substance abuse)

Clin J Pain 2014; 30(7):557-564

Opioid O.D. and Mortality Risk

- VA patients unintentional opioid death (CASES) vs controls on opioids
- RESULTS:
  - MMED CASES
    - Mean 98 MMED vs 48 (large S.D.)
    - Median 60 MMED vs. 25
  - Conclusion: Opioid dosage (MMED) was a good 'predictor' of opioid death. Dose was 71% higher.



e.g. Oxycodone 10mg QID = 60 MMED

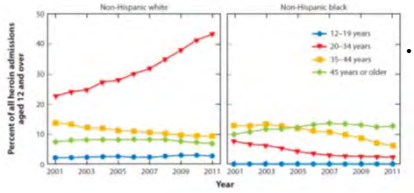
Bohnert, et al. Med Care 2016;54:435-441

Prescription Opioid Use

- 2015 National Survey on Drug Use and Health (NSDUH) by SAMHSA
- Surveyed lifetime and past year use and misuse of prescription opioids
- Misuse defined as not as prescribed
- RESULTS:
  - 37.8% (91.8 million) noninstitutionalized US adults used prescription opioids over the prior year
  - 4.7% misused prescription opioids
    - Main stated motivation – relieve physical pain
  - 0.8% (1.9 million) had opioid use disorder

Annals Int Med 2017 167(5):293

Opioid Use Disorder



- 2 million Americans ≥ age 12 had opioid use disorder (OUD) involving prescription opioids
- 600,000 Americans had OUD involving heroin
  - 4/5 on heroin previously used prescription opioids
  - Heroin cheaper, easier to get

Substance (Opioid) Use Disorder

American Psychiatric Association

- DSM-5 substance use disorder combines DSM-IV categories of substance abuse and substance dependence into a single disorder measured on a continuum from mild to severe. Drug of abuse as specified, e.g. opioid use disorder.
- Mild: 2-3 criteria
- Moderate: 4-5 criteria
- Severe: 6-7 criteria

1. Taking opioid in large amounts and for longer than intended
2. Wanting to cut down or quit but not being able to do it
3. Spending a lot of time obtaining the opioid
4. Craving or strong desire to use opioids
5. Repeatedly unable to carry out major obligations at work, school or home due to opioid use
6. Continued use despite persistent or recurrent social or interpersonal problems caused by or made worse by opioid use
7. Stopping or reducing important social, occupational, or recreational activities due to opioid use
8. Recurrent use of opioids in physically hazardous situations
9. Consistent use of opioid despite acknowledgment of persistent or recurrent physical or psychological difficulties from using opioid
10. *tolerance as defined by either and need for markedly increased amounts to achieve intoxication or desired effect or markedly diminished effect when continued to use by the same amount. (Does not apply for diminished effect when used appropriately under medical supervision)
11. *withdrawal manifesting as either characteristic syndrome or the substance is use to avoid withdrawal (does not apply when used appropriately on the medical symptoms supervision)
12. *this criterion is not considered to be met for those individuals taking opioid solely under appropriate medical supervision

Opioid Adverse Effects

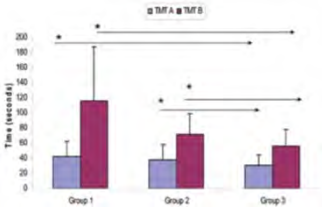
Opioids and Your Brain

- 2ble blind placebo controlled trial – placebo vs. morphine Rx for 1 MONTH. High resolution imaging
- 21 participants with mod-severe chronic axial LBP
  - Previous opioid, ETOH, drug use, psych Hx excluded
- Morphine ER 15mg BID start
  - then increased by 15 mg every 2days until analgesia vs. side effects
- Max 120MMED
- Gray matter changes:
  - Volume loss (3%) in regions (e.g. amygdala, pain processing regions, e.g. cingulate) of the gray matter and increases in other variable areas

Pain Medicine 2016;17:1497-1504, NIDA funded

Effects of Chronic Opioids

- Chronic opioids may impair cognition patient w/ chronic LBP
  - Prospective cross over design
    - **Gp 1 - 37 LBP patients on chronic opioids**
    - Gp 2 - 33 LBP patients on no opioids
    - Gp 3 - 25 healthy controls, no medications
  - There are some cognitive changes seen with low back pain alone – Group 2



- Group 1 pts needed significantly more time to complete the mental tracking, working memory tests
- (TMTB). Visual motor skills tests (TMTA) Groups 1 and 2 were the same.

Schiltenwolf M, et al. Pain Physician 2014; 17:9-19

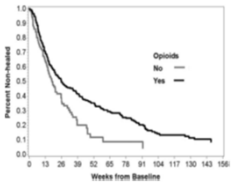
Opioids and Immune Function

- It's Complicated – immunosuppression, immunostimulatory, both
  - Poorly understood
- Opioid receptors on immune cells
- T cells express opioid receptors
- Morphine can regulate aspects of T cell function
- Fentanyl, methadone can modulate IL-4 effects

Transl Perioper Pain Med 2016

Opioids and Delayed Wound Healing

- Prospective Longitudinal Observational Study 450 patients from repository chronic wounds at tertiary referral center
  - Acute and chronic wounds – decreased mu receptors on keratinocytes at margins of chronic vs. acute wounds
- Looked at opioid exposure(MMED) and total wound surface area (tWSA) in visits to wound clinic
- Controlled for baseline tWSA, medical comorbidities, pain score
  - Patients who never had opioids healed faster
    - MMED < 10mg also healed faster
  - Those with MMED > 10mg significantly LESS likely to heal than nonopioid users
  - Opioid dose *did not* predict final healing (hydradenitis, sickle cell, lymphedema)



Wound Rep Reg 2017;25:120-130

Rheumatoid Arthritis

- Retrospective cohort 13,796 Medicaid patients with RA 1995-2009
- RA associated with increased infection risk
- 1790 RA patients with ≥ 1 hospitalization for serious infection
  - All MED ≥ 15 mg associated with increased infection risk, worse with MED> 60

Wiese AD, et al. Arthritis & Rheumatology 2016 (68):323-331

Serotonin Syndrome

- The phenylpiperidines (fentanyl, methadone, tramadol) are weak serotonin reuptake inhibitors
- Caution when combined with other drugs with serotonergic properties, e.g. TCA, SNRI, SSRI, MAOI, triptans. Less evidence for caution with fentanyl
- Consider advising patient of signs/symptoms of serotonin syndrome if considering

Opioid/APAP and Coronary Heart Disease

- REGARDS prospective national cohort of 30,239 adults examining regional/racial differences on stroke mortality (2003-07)
  - Prior reports increased acute coronary heart disease (CHD) in patient on chronic opioids compared with NSAID
    - 2x risk MI, 5x risk coronary a revascularizations, 2x risk cardiac death (Arch Int Med 2010;170:1979-86)
- Compared with nonopioid users (after adjustment for NSAID, COX2):
  - Increased acute CHD, CVD and death (overall and with baseline CHD)
    - Increased with acetaminophen containing opioids
    - No increase with opioid or acetaminophen only
  - No increased risk of stroke
  - Higher risk in females (not males)
    - ? Decreased HPA axis with reduced estrogen as a factor?
    - ** no information on opioid dose/duration

Khodneva Y, et al. Pain Med 2016;17:444-455

Differential Opioid Tolerance

- Tolerance most rapid for analgesia
- Less rapid for respiratory depression, GI motility (constipation)
  - Increases risk for post op respiratory depression in opioid tolerant patients

Anesth 2016;124(2):483

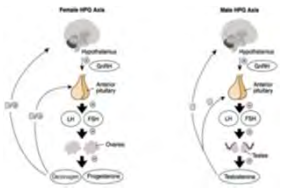
Opioid Induced Hyperalgesia (OIH)

- Defn: a state of sensitization caused by opioid exposure; paradoxical
- OIH is different from tolerance
- Increasing the dose worsens OIH; decreasing the dose improves symptoms

Clin J Pain 2008;24 (6): 479

Hormonal Disturbances

- Gonadal hormone production
  - Opioid suppression of gonadotropin releasing hormone (GnRH) in hypothalamus
  - Infertility and irregular menstruation
  - Decreased testosterone
  - Impotence
  - Loss of libido
  - Osteoporosis and fractures



Pain Medicine 2015;16:2235

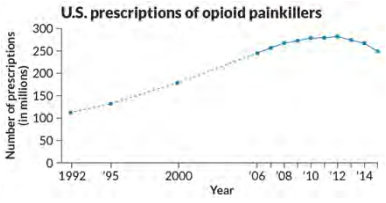
Narcotic Bowel Syndrome

- Progressive often paradoxical abdominal pain that worsens with continued or escalating opioid dose.
  - Thought to be hyperalgesic state
- Pain is predominant symptom. N/V, bloating, constipation common
- May be increased by eating
- Lab tests WNL, XRAYS - ileus
- Seen in:
  - Patients with no GI history with high MMED post op or acute pain
  - Patient with chronic GI problems on increasing opioid doses
  - Often inpatients, unclear diagnosis
- Rx: wean opioids

Clin Gastroenterol Hepatol 2007;5(10:1126-1122
UNC Center for Functional GI and Motility Disorders

Atlanta's Heroin Triangle

Bending the Curve



- Amount of opioids prescribed declined since 2010
- Still 3x as high as 1999
- Large disparities across the country
- Six fold difference across the U.S.A
- Opioid related deaths continue to increase.

CDC. IMS Health

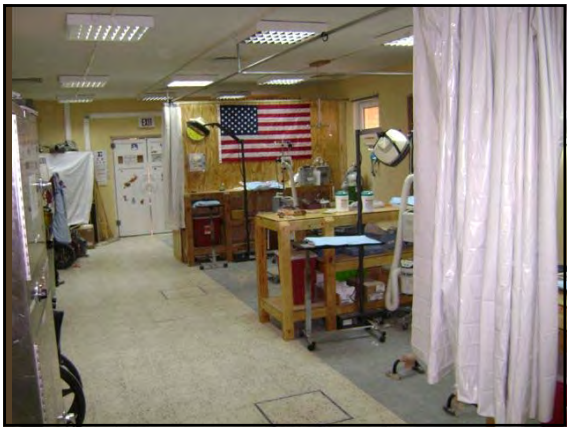
Time for a New Strategy

- Focus on ***prescription opioids*** vs. opioids for nonmedical use *"War on Drugs"*
- ***Prevent new cases of opioid addiction by decreasing medical exposure to opioids***
- Patient and physician education – risks of long term opioids
  - Education on other less commonly known side effects
  - Limit opioid dose for acute pain to what is necessary
  - Decrease opioid prescribing for acute and chronic pain
- Abuse deterrent formulations –
  - Not considered a primary addiction prevention strategy
  - Most take opioids via oral route to be effective

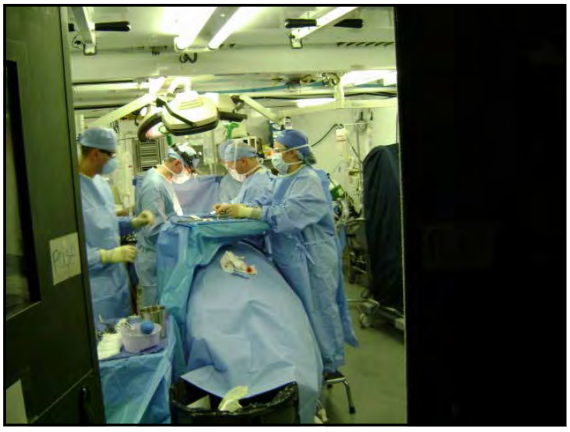
Ann Rev Pub Health 2015

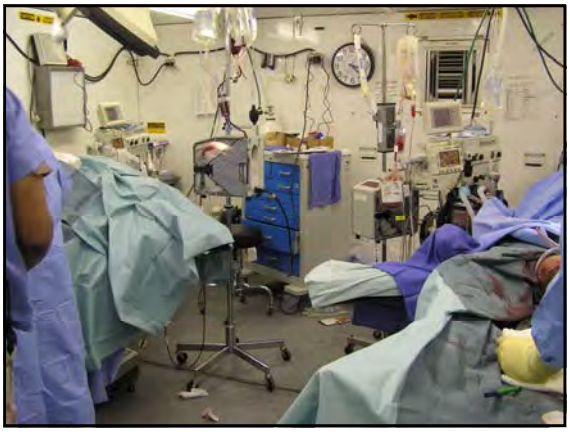
Anesthesia for Combat Trauma Surgery

Randy F. Rizor, COL, MC
United States Army Reserve



NO SMOKING
OXYGEN
IN USE





Combat Trauma Survival Rates

- WW II 65%
- Vietnam 75%
- OEF/OIF (initial) 88%
- OEF/OIF (2011) >95%

'The Golden Hour'

Medical Advances in OEF/OIF

- Battlefield Hemostasis
- Transportation
- Damage Control Surgery
- Damage Control Resuscitation

Damage Control Surgery

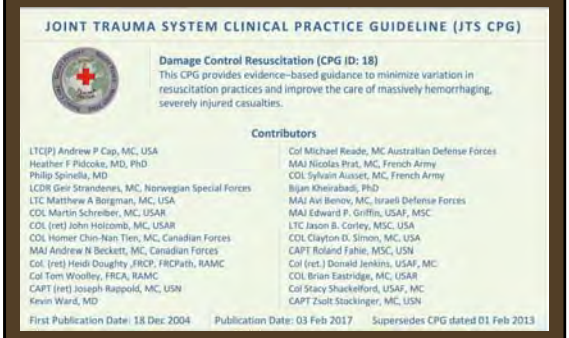
- Control Contamination and Bleeding
- Optimize tissue survival
- Evacuate to higher level for definitive treatment

Battlefield Hemostasis

- Combat Application Tourniquet
- Hemostatic Dressings

Damage Control Resuscitation

- Prevent or reverse the *lethal triad*
  - Hypothermia
  - Acidosis
  - Coagulopathy



JOINT TRAUMA SYSTEM CLINICAL PRACTICE GUIDELINE (JTS CPG)

Damage Control Resuscitation (CPG ID: 18)

This CPG provides evidence–based guidance to minimize variation in resuscitation practices and improve the care of massively hemorrhaging, severely injured casualties.

Contributors

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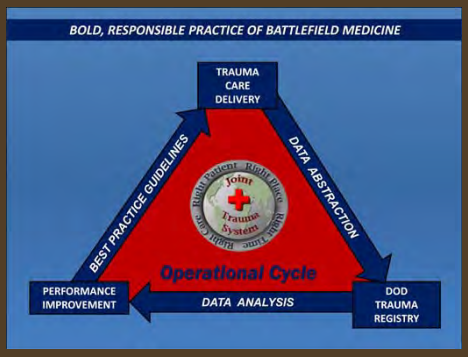
First Publication Date: 18 Dec 2004 Publication Date: 03 Feb 2017 Supersedes CPG dated 01 Feb 2013

Legacy ATLS Protocol

- Aggressive crystalloid infusion
- Plasma expanders
- PRBC
- Late administration of FFP and platelets



Damage Control Resuscitation

- Minimize crystalloid
  - Permissive hypotension – SBP 80-90
  - Treat shock with blood products in the field
- Maintain core temperature
  - Trauma bay /operating room temps >30deg C
- Massive transfusion protocol

  Initiate if uncrossmatched blood required or anticipated blood loss >10 u

Bilateral traumatic A-K amputation
BP = 65/30
P= 130
HCT = 30

What do you do?

a. 2000 ml LR
b. 1000 ml LR and 500 ml 5% albumin
c. 2u PRBC and 500 ml 5% albumin
d. 2u type O whole blood

Massive Transfusion Protocol

- Fresh Whole Blood or
- PC:FFP:Plats:Cryo = 1:1:1:1

Transfusion Protocol Packs

- Pack #1
  - 4 u PRBC
  - 4 u FFP
  - 1 u Platelets (6pk)
  - 10 u Cryo
- Pack #2
  - 4 u PRBC
  - 4 u FFP

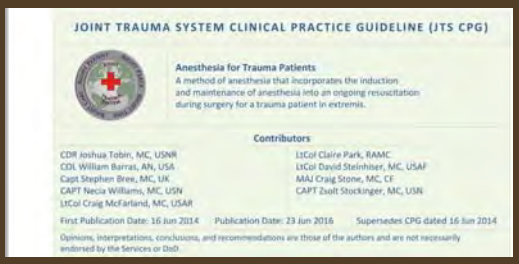
Airway

- Video Laryngoscopy
- Etomidate or ketamine preferred to propofol for emergency intubation

Additional Interventions

- Tranexamic Acid (TXA)
- CaCl2
- Hydrocortisone 100 mg IV
- rF-VIIa
- Vasopressors

Anesthesia for Combat Trauma Surgery



JOINT TRAUMA SYSTEM CLINICAL PRACTICE GUIDELINE (JTS CPG)

Anesthesia for Trauma Patients

A method of anesthesia that incorporates the induction and maintenance of anesthesia into an ongoing resuscitation during surgery for a trauma patient in extremis.

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LtCol David Steinhiser, MC, USAF
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Opinions, interpretations, conclusions, and recommendations are those of the authors and are not necessarily endorsed by the Services or DoD.

Induction and Maintenance

- Anesthesia care begins in trauma bay
- Ketamine
- Volatile agent or TIVA
- PKF
  - 40 ml propofol
  - 250 mg ketamine
  - 250 mcg fentanyl
  - Add to 100 ml NS

Pain Control and Sedation

- Moderating use of opioids
- Multimodal Approach
  - Regional and peripheral blocks
  - Ketamine
  - Propofol
  - Dexmedetomidine/clonidine

These are the times in which a genius would wish to live. It is not in the still calm of life that great characters are formed. The habits of a vigorous mind are formed in contending with difficulties. Great necessities call out great virtues.

Abigail Adams

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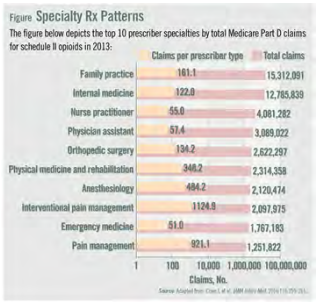
My Patient is on Opioids – Now What?

Anne Marie McKenzie-Brown, M.D.
Associate Professor, Emory School of Medicine
Pain Division Chief, Emory Department of Anesthesiology

Opioid Prescribing by Specialty

- Primary Care accounts for most opioid prescribing due to volume
- Interventional pain and pain management have higher #prescriptions/provider



Centers for Disease Control and Prevention
National Center for Health Statistics

2016 GUIDELINES FOR PRESCRIBING OPIOIDS FOR CHRONIC PAIN – PRIMARY CARE

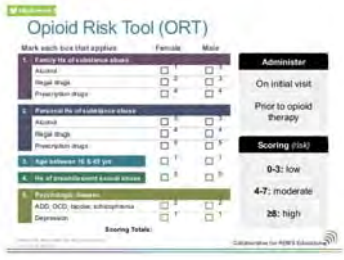
1. When to Start or Continue Opioids for Chronic Pain
2. Opioid Selection, dose, duration, follow up, discontinue
3. Assess risk and address harms of opioid use

When to Initiate?

- Opioid benefit must outweigh risks
  - Do risk assessment
    - Screening tools – to start (opioid risk tool (ORT)
    - Assessment tools for chronic use (COMM), Opioid Compliance Checklist (OCC)
  - Discuss risks with patients (CDC infographics)
- Try nonpharmacologic, nonopioid pharmacologic first.
- Avoid giving opioids alone – combine with other adjuvant therapies

Opioid Risk Tool

Webster LR, et al 2005



INITIAL VISIT ASSESSEMENT

Current Opioid Misuse Measure

Butler, et al. 2007

COMM™

Please answer each question as honestly as possible. Keep in mind that we are only asking about the **past 30 days**. There are no right or wrong answers. If you are unsure about how to answer the question, please give the best answer you can.

Please answer the questions using the following scale:	Never	Seldom	Sometimes	Often	Very Often
	0	1	2	3	4
1. In the past 30 days, how often have you had trouble with thinking clearly or had memory problems?	○	○	○	○	○
2. In the past 30 days, how often do people complain that you are not completing necessary tasks? (i.e., doing things that need to be done, such as going to class, work or appointments)	○	○	○	○	○
3. In the past 30 days, how often have you had to go to someone other than your prescribing physician to get sufficient pain relief from medications? (i.e., another doctor, the Emergency Room, friends, street sources)	○	○	○	○	○
4. In the past 30 days, how often have you taken your medications differently from how they are prescribed?	○	○	○	○	○

Please answer the questions using the following scale:	Never	Seldom	Sometimes	Often	Very Often
	0	1	2	3	4
7. In the past 30 days, how often have you been in an argument?	○	○	○	○	○
8. In the past 30 days, how often have you had trouble controlling your anger (e.g., road rage, screaming, etc.)?	○	○	○	○	○
9. In the past 30 days, how often have you needed to take pain medications belonging to someone else?	○	○	○	○	○
10. In the past 30 days, how often have you been worried about how you're handling your medications?	○	○	○	○	○
11. In the past 30 days, how often have others been worried about how you're handling your medications?	○	○	○	○	○
12. In the past 30 days, how often have you had to make an emergency phone call or show up at the clinic without an appointment?	○	○	○	○	○
13. In the past 30 days, how often have you gotten angry with people?	○	○	○	○	○
14. In the past 30 days, how often have you had to take more of your medication than prescribed?	○	○	○	○	○
15. In the past 30 days, how often have you borrowed pain medication from someone else?	○	○	○	○	○

Opioid Compliance Checklist (OCC)

Jamison RN, et al 2014

- Brief Opioid OCC for patients on long term opioid therapy
- 5 of the 12 questions with best predictive score. Any positive response is predictive of future opioid misuse
- Over the past month:
  - Lost or misplace your opioid medications?
  - Run out of your pain medication early?
  - Missed any scheduled medical appointments?
  - Used any illegal or unauthorized substances?
  - Been completely honest about your personal drug use?

J Pain 2014;15:1092-1101

Rule 360-3-06 Pain Management
Composite Board Medical Examiners
2012

Initial controlled substance prescribing for pain or chronic pain (unless emergency then can give 3 days without P.E.):

- Must do history and physical exam
- Informed consent
- Make every effort to get prior pain Rx records for at least 10 years

GA Rule 360-3-06

- If writing for Schedule II or III opioids for > 90 days
  - Must have written treatment agreement
  - Evaluate patient every 3 months
  - Monitor patient every 3 months – record abnormal results in record
- If determine patients is 'abusing the medication'
  - Make 'appropriate referral' for substance abuse treatment

Ga Law CME Requirements

- Jan 1, 2018 all physicians with active DEA certificate have to at least once ≥ 3 hours category 1 CME designed to address controlled substance prescribing practices
- FREE online courses:
  - CDC
  - American College of Physicians

GA House Bill 249

Georgia Department of Public Health

- Jan 1, 2018
  - All prescribers (with DEA) must register in PDMP
  - georgia.pmpaware.net/login
  - Being administered by DPH
  - New prescribers must register with PDMP within 30 days of obtaining a DEA permit
- July 1, 2018
  - Prescribers must check PDMP when 1st prescribing Schedule II opioid or benzodiazepines and ≤ 90 days
  - Must document time, date and who made inquiry in record
  - May document results in record
  - Inform patients of addictive opioid risk and safe disposal

PDMP EXCEPTIONS

- Prescription is for no more than a three-day supply of such substance and no more than 26 pills
- Patient is in a hospital or health care facility, including, but not limited to:
  - a nursing home, an intermediate care home, a personal care home, or a hospice program, which provides patient care and prescriptions to be administered and used by a patient on the premises of the facility
- Patient has had outpatient surgery at a hospital or ambulatory surgical center and the prescription is for no more than a ten-day supply of such substance and no more than 40 pills;
- Patient is terminally ill or under the supervised care of an outpatient hospice program; or
- Patient is receiving treatment for cancer.

Prescription Drug Monitoring Program (PDMP)

- 2002 Laximaiah Manchikanti (ASIPP) testified Congress
- 2005 President GW Bush signs National All Schedule Prescription Electronic Reporting (NASPER) into law – unfunded
  - Required states to collect information for Schedule II,III,IV drugs and have capacity to share the info with other states
- PDMP in all 50 states

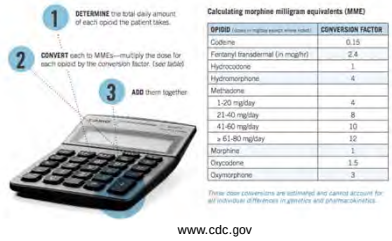
CDC

- Opioids are NOT first line therapy for chronic pain
- Nonpharmacologic, nonopioid therapies prior to starting opioids
- Doses > 50MME/day ≥ doubles risk of overdose compared with < 20 MME/day

CDC app

Calculating Morphine Milligram Equivalents (MME)

- If converting to another opioid, start lower to account for incomplete cross tolerance
- Fentanyl dose approx BID morphine dose



www.cdc.gov

Nonpharmacologic Therapies

- Mindfulness
- Cognitive Behavioural therapy
- Interventional therapies
- Exercise therapy/P.T.
- Tai chi, yoga, pilates
- Massage
- Acupuncture
- Manipulation

Mindfulness Meditation

- Mindfulness meditation (acceptance based interventions)
  - Purposeful, 'nonjudgmental awareness of present moment experiences'
  - Focused Attention (FA) and Open Monitoring (OM)
    - FA – focusing on a specific object, constantly bringing back focus
    - OM – acknowledgement of sensory, cognitive, emotional events arising in the mind w/o preference
  - May cause neuroplastic changes in areas of brain involved in emotion, self-awareness – may affect pain perception
  - Meta-analysis of 38 RCT's – mindfulness improved pain and QOL compared with 'Rx as usual'
  - Free mindfulness apps available

Neurosci Lett 2012;520(2):165-173

Cognitive Behavioural Therapy
CBT

- Concept: patient's thoughts and beliefs about pain can affect their pain experience
  - Reframe negative thoughts, maximize function, improve sleep
- Knoerl, et al. Review of 35 studies on CBT and chronic pain.
  - CBT reduced pain intensity in 43% of trials. Similar efficacy in-person vs online.
- Boschen, et al. 10 years of combined CBT and physical exercise program chronic pain (≥ 6mths) 2002-2011
  - Had to complete ≥ 13/20 sessions (65%)
  - Decreases in SF-MPQ subscales, pain scores, depression, anxiety
  - Increases in active coping, improvement in all subscales of SF-36

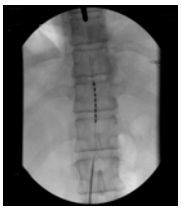
Knoerl, Western J Nursing Res 2016;38(5):596-628. Boschen Pain Res Management 2016

Interventional Therapies

- Joint interventions (sacroiliac joint, facets, knee, shoulder)
  - intraarticular injections
  - medial branch blocks then denervation
- Interventions for radicular pain (epidural steroid injections)
- Neuromodulation (spinal cord and peripheral nerve stimulation)

Neuromodulation

- **Standard (tonic) Spinal Cord Stimulation (SCS)**
  - Up to 60 Hz
  - Paresthesia mapping essential
  - May affect central pain perception
- **High-frequency (10,000 Hz) stimulation**
  - Superior relief of low back and leg pain vs. standard tonic SCS
- **Burst Stimulation**
  - 5 spikes at 40Hz, ?physiologic
  - Medial and lateral pathways affected
- **Dorsal Root Ganglion (DRG) Stimulation**
  - Selective stimulation of DRG – targeted SCS



Indications:
- Failed Back Surgery Syndrome
- Neuropathic Extremity Pain
- Ischemic Pain
- Other – visceral pain

Nonopioid Therapies – Topical/Transdermal

- Lidocaine 5% (4% over the counter (OTC))
- Capsaicin 1%
- NSAID's
- Compounded products (anticonvulsants, ketamine, local anesthetics)
- TENS - OTC

Nonopioid Therapies - Oral

- NSAID's, acetaminophen, COX 2 inhibitors – caution renal dx
- Alpha 2 agonists –tizanidine, clonidine
- Sodium and Calcium Channel Modulators
  - Antidepressants
    - Tricyclic antidepressants (TCA)
    - Serotonin and Norepinephrine Uptake Inhibitors (SNRI)
      - Duloxetine FDA approved chronic musculoskeletal pain, fibromyalgia, diabetic peripheral neuropathic pain (hepatic, platelet effects)
  - Anticonvulsants
    - Gabapentinioids (gabapentin, pregabalin) – renal precautions
      - Gabapentin FDA approved to treat postherpetic neuralgia
      - Pregabalin FDA approved to treat neuropathic pain, fibromyalgia

Over-the-counter/Herbal medications

- Turmeric
  - Antiinflammatory (blocks NF-kB)
    - Nuclear Factor-kB - proinflammatory
  - Increases BDNF (brain derived neurotrophic factor)
    - BDNF – role in neural development, central sensitization
  - Black pepper increases absorption
- Alpha lipoic acid
  - Made in body, powerful antioxidant
  - Approved in Germany to treat diabetic neuropathy
- Magnesium
  - NMDA receptor antagonist
  - Painful migraines

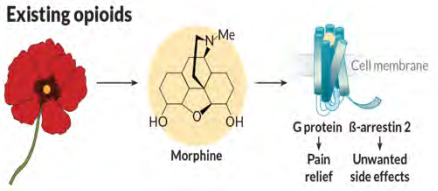
Patient Education

- Patient self reliance
  - Lifestyle changes (smoking, diet, etc)
  - Increase daily activity
  - Mindset
- Most 'pain medications' are non opioids

Lifestyle adjustments

- Weight loss – (obesity and joint/knee pain)
- Exercise – strengthens core
- Smoking – increased risk of DDD and low back pain
- Sleep hygiene – insomnia risk factor for pain
- Alcohol abuse – risk factor for opioid abuse; disrupts cycle
- Healthy Diet
- Mindset – outlook on your pain; what you can do

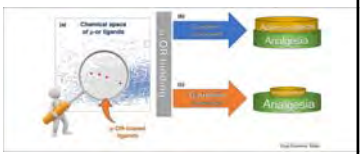
On the Horizon…..



Biased Opioid Ligands

Biased G protein coupled receptor agonists

- Opioids – G protein coupled receptor super family (GCPR)
  - MOR, KOR, DOR
- Mu Receptor (MOR) – produces analgesia via G protein pathways, while triggering β arrestin pathway (side effects)
- Biased MOR agonists:
  - Oliceridine (TRV130)
  - PZM21
  - Mytragynine



Biased Mu agonists(ligands) - bind MOR and selectively activate the G protein over the β arrestin pathway may provide analgesia with minimal side GI/respiratory effects

Drug Discovery today 2017;22(11):1719

Trends in Endocrinology & Metabolism 2017;28(4):247; Drug Discovery today 2017;22(11):1719

Opioid Prescribing

- Preferentially use short acting/IR vs. sustained release opioids
  - Avoid extended release opioids for acute pain
- Start low go slow
- Frequent follow up; especially in the beginning
- Avoid opioid and benzodiazepine combination
- Acute pain – only give amount that is needed

www.cdc.gov

Starting Opioids

- Understand there is *no good data* for efficacy of chronic long term opioids for chronic pain
  - Neither pain relief nor improved function
  - Substantial evidence of harm
- PRIOR TO STARTING
  - Risk assessment – medical conditions (e.g. OSA) and risk of SUD
  - Check PDMP; urine drug screen
  - Establish treatment goals – functional and pain goals
  - Discuss known risks and realistic benefits of opioid therapy
  - Consider ahead of time how opioid prescription will be discontinued the benefits do not outweigh the risk

www.cdc.org

Opioid Patients

- Hard to predict who will go on to develop opioid use disorder
- Time and dose are predictors
- Opioids involve the brain's reward system
- ' Starting is easy, stopping becomes increasingly difficult with time. The reward system is involved from the first dose; tapering and stopping inappropriate opioid treatment may be difficult already after a few months'

Pain 2014;155:2441-3

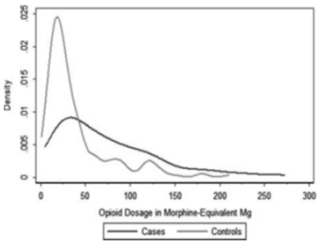
Dose and Duration

- Association between **new** opioid exposure (opioid naïve) and incident opioid use disorders (OUD) in chronic noncancer pain (2000-2005)
  - *Dose* :low dose (≤ 36MED) less risk vs. high dose (> 120MED)
  - *Duration:* acute less risk vs. chronic (> 3 months)
  - High dose chronic opioids *higher risk than known risk factors* (youth, Hx substance abuse)

Clin J Pain 2014; 30(7):557-564

Opioid Dose and Mortality

- VA patients unintentional opioid death (CASES) vs controls on opioids
- RESULTS:
  - MMED CASES
    - Mean 98 MMED vs 48 (large S.D.)
    - Median 60 MMED vs. 25
  - Conclusion: Opioid dosage (MMED) was a good 'predictor' of opioid death. Dose was 71% higher.



e.g. Oxycodone 10mg QID = 60 MMED

Bohnert, et al. Med Care 2016;54:435-441

Patient Red Flags

* No single item by itself necessarily speaks to patient intent

- Out of state patient
- Requests a specific drug
- Nothing else works
- No records
- Prior MD closed practice
- Text book symptoms
- Noncompliant
- Prescriptions routinely lost, stolen
- Abnormal UDS

Georgia Office of Attorney General

What Should You Tell Your Patients

- Focus is as much on improved function as it is on relief of pain
- This is not necessarily permanent and will be reevaluated at periods
- Importance of safe storage – particularly if they have children
- Signs of opioid side effects and when to call the clinic
- Involve family members, naloxone

Naloxone Standing Order

- January 2017 Brenda Fitzgerald, Georgia Public Health Commissioner, should a standing order for naloxone
- What this means:
  - Naloxone is now widely available to Georgia residents
  - Services a prescription to get blocks on from a license pharmacy
  - Prior to getting the naloxone, eligible persons are strongly advised to:
    - complete training on the administration of opioid antagonists, available on the Georgia Department of Public Health website:
      - *http://dph.georgia.gov/approved-training-opioid-antagonist*
    - Become familiar with signs/symptoms of O.D. : abuse history, nearby a drug paraphernalia, unresponsiveness or shallow breathing, signs of hypoxia, pinpoint pupils, clammy skin.

CDC Recommendations for Opioid Taper

- When the patient asks for reduced dose
- No meaningful improvement (> 30%) in pain and function
- Dose ≥ 50MME/day w/o benefit or combined with benzo
- signs of SUD
- Experiences OD or serious adverse event
- Early signs OD risk, e.g sedation, confusion, slurred speech

CDC Recommended Taper

- Individualized and minimize opioid withdrawal symptoms
- 10% decrease per week or slower for those on chronic long term opioids
- Make sure patient has enough psychological support
- Let patient know most have improved function, even decreased pain after taper
- Adjust rate of taper based on patient's response – avoid reversing, may slow down
- Once at lowest dose, decrease the frequency

More on Tapering

- The longer the patient has been on opioids, the longer the taper should take
- If patients has symptoms of withdrawal, slow taper
- Don't allow patient to come in early for prescriptions refills
- Often the last phase of the taper is the most difficult
- Clonidine may attenuate withdrawal symptoms

Adv Pharm Pharm 2013; 1 (2):42-57

On the Horizon

FDA approved Nov 2017 electro auricular device for acute opioid withdrawal symptoms

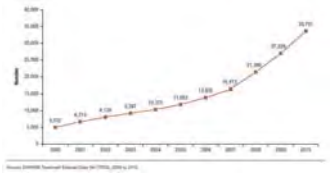
- Approved in 2014 for use as acupuncture device
- Can be used for up to 5 days

Abuse Deterrant (ADF) Formulations

- 2010 FDA approved first ADF - AD Oxycontin
- Discourages crushing, etc opioids for alternate delivery
- Most abuse is oral, ADF will not change that
- Expensive
- Some add naltrexone

Medication Assisted Therapy (MAT)

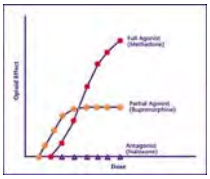
Methadone clinic: daily dosing



MAT in office

Buprenorphine

- Semi synthetic partial agonist
  - Very high binding affinity mu and kappa receptor
    - Not easily reversible by naloxone
  - Partial mu agonist (low efficacy)
    - Bell shaped dose response curve
  - High receptor affinity makes it perform like a kappa antagonist



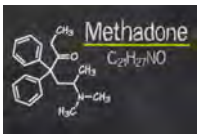
Buprenorphine for Medication Assisted Therapy (MAT)

- Suboxone
  - Buprenorphine and naloxone
  - Approved for opioid addiction, not chronic pain, not opioid naïve patients
  - Dose 8-16mg daily
- Transdermal buprenorphine (5ug, 10ug, 20ug) is used for chronic pain, not MAT

Patient for surgery on Suboxone

- Ideally d/c suboxone 24-48 hours preop
- Post op – high affinity opioid, e.g. fentanyl, hydromorphone
- Restart suboxone after acute period has passed
- Periop period is not time for detox

Methadone



- Mu agonist
- NMDA receptor antagonist
- Inhibits reuptake of serotonin and NE
- Metabolized via N-demethylation by CYP3A4, 2B6, 2C8, 2C19, 2D6 to inactive metabolite EDDP eliminated in feces and urine
- Known to have increased potency with prior exposure to high dose opioids; nonlinear model of conversion
- Possible ability to delay or reverse opioid tolerance

Methadone conversion models

MODEL						
Ripamonti Model MMED/day	30-90 mg	90-300mg	>300 mg			
MsO4:Methadone	4:1	8:1	8:1			
Ayonrinde Model MMED/day (most aggressive)	<100	101-300	301-600	601-800	801-1000	>1001
MsO4:methadone	3:1	5:1	10:1	12:1	15:1	20:1
Mercadante model						
MMED/day	30-90	90-300	>300			
MsO4:methadone	4:1	8:1	12:1			

Friedman Method
(most conservative)

1. Discontinue previous opioid
2. Patient's receiving <1000 MMED and **<** 65 years old: 10%
3. Patient's receiving <1000 MMED and **>** 65 years old: 5%
4. Patient's receiving <1000 MMED- 2000 : 5%
5. Patient's receiving > 2000 MMED: 3%

Patient comes to the OR on high dose opioids

- Maximize multimodal therapy
  - Maximize nonopioid analgesia – regional anesthesia
  - Preop acetaminophen, gabapentin, ? Celecoxib
  - Intraop ketamine infusions, consider IV lidocaine, dexmedetomidine infusions
  - Titrate to respiratory rate at end of case
- Fentanyl patch
  - Consider keeping
  - Prolonged surgery, changes in body temp may affect absorption

Post Op

- Check PDMP to verify history
- Consider IV PCA with ketamine/opioid combination
  - Clonidine
  - Maximize adjuvants
- Avoid large opioid boluses
- Be aware of opioid induced hyperalgesia

Differential Opioid Tolerance

- Tolerance most rapid for analgesia
- Less rapid for respiratory depression, GI motility (constipation)
  - Increases risk for post op respiratory depression in opioid tolerant patients

Anesth 2016;124(2):483

Opioid Induced Hyperalgesia (OIH)

- Defn: a state of sensitization caused by opioid exposure; paradoxical
- OIH is different from tolerance
- Increasing the dose worsens OIH; decreasing the dose improves symptoms

Clin J Pain 2008;24 (6): 479

KEY POINTS

- Opioids are never first line solo therapy for chronic noncancer pain
- Try nonopioid nonpharmacologic therapies first
- Risk assessment is important
- Start low, go slow
- Minimize dose and duration

Multi-Modal Analgesia and Fast Track Joint Replacements

Mark Hamilton, MD

Anesthesia Section Leader for
Total Joints
Northside Forsyth Hospital

Northside Hospital System- Atlanta, Georgia

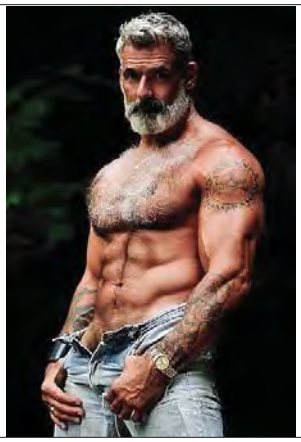
Disclosures

- Consultant for:
  - Mallinckrodt Pharmaceuticals
  - Pacira Pharmaceuticals
  - DePuy
  - Medtronic
- Advisory Board- Opiate Free Analgesia

Learning Objectives for a Fast Track Joint Protocol

- Understand the essential nature of cooperating **teams**
- Understand how effective **pain relief** is critical
- Appreciate concepts of the **MMAP**
  - Multi-Modal Analgesia Protocol

Our Fast Track Program



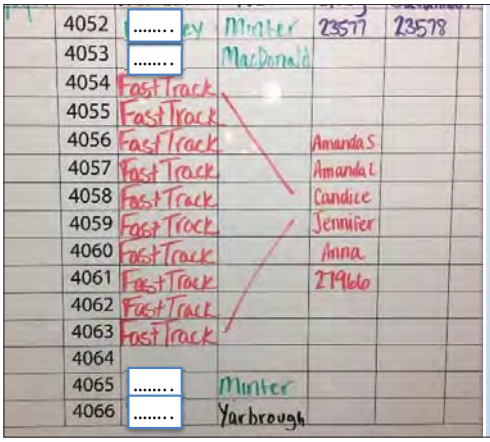
First case of the day
(July, 2017)

Not a "cherry picked" ASA 2

83 year old
Chronic pain
Oxycontin 15 QID
HTN
Smoker

Anterior THR
Cleared PT and
Ready for discharge

(This is permission From pt to use Picture)



Actual Fast Track Day May, 2017

1 surgeon
10 patients

First pt out the door before 11 am
Last pt in PACU 2:30
All discharged before 7 pm

Fast Track Team

started - 2015

Primary Total Joints
1300 in 2016

92% discharged same day
Avg LOS < **2.75 hr**

97% discharged < **23 hr**

Readmission- 0.66%
Return to OR- 0

90 % discharged having received ZERO narcotics

Numbers and Data for 2017
Don't have them yet

J Bone Joint Surg Am. 2007 Apr;89(4):780-5.

Projections of primary and revision hip and knee arthroplasty in the United States from 2005 to 2030.

Kurtz S1, Ong K, Lau E, Mowat F, Halpern M.

By 2030, the demand for primary **total hip** arthroplasties is estimated to grow by **174%** to 572,000.

Current Annual Cost $65 billion

The demand for primary **total knee** arthroplasties is projected to grow by **673%** to 3.48 million procedures.

become more efficient, higher quality, lower cost

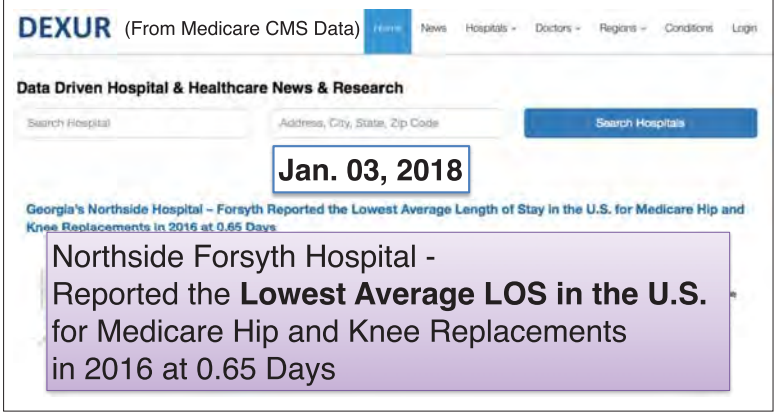
"If you are healthy enough to have Joint Replacement Surgery….."

"You are healthy enough to go home the same day!"

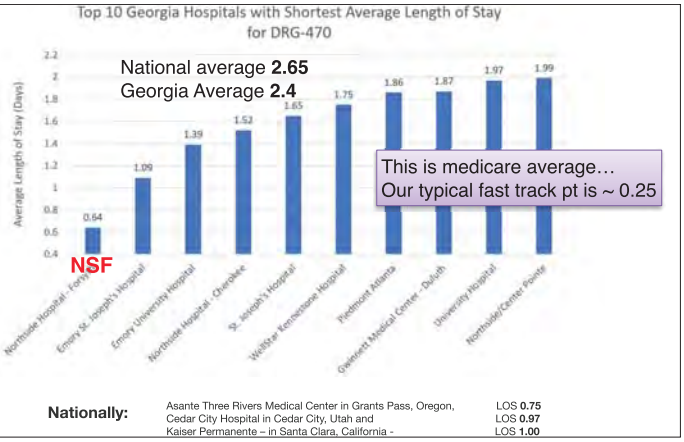
Charles DeCook, MD
Northside Forsyth Orthopedist

Preparation, Education, Preparation, Mindset - - - Key

DEXUR (From Medicare CMS Data)

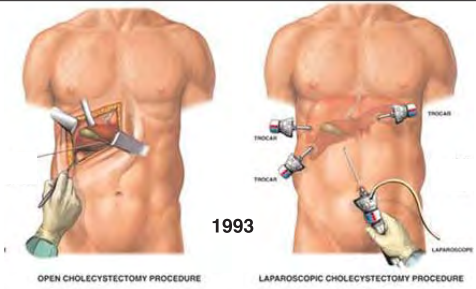


Northside Forsyth Hospital -
Reported the **Lowest Average LOS in the U.S.**
for Medicare Hip and Knee Replacements
in 2016 at 0.65 Days



Nationally: Asante Three Rivers Medical Center in Grants Pass, Oregon, LOS **0.75**
Cedar City Hospital in Cedar City, Utah and LOS **0.97**
Kaiser Permanente – in Santa Clara, California - LOS **1.00**

Gall Bladder Surgery



1993

In hospital 3-5 **days** In hospital 3-5 **hours**

What Changed?

Joint Replacement Surgery

In hospital 3-5 **days** In hospital 3-5 **hours**

What Changed?

What Changed?

Surgeons Credit:

Anesthesia and Analgesia Advances

In-patient joint program
(3-4 days in patient)

TRANSITIONING

Out-patient joint program
(23 hour discharge)

(only after successful 23 hour stay, move to same day)

Fast Track Joint Program
(same day discharge)

TRANSITIONING

Any flaw will be exposed

only perfection is tolerated

Fast Track Joint Program
(same day discharge)

"Failures"

↓ (gift)

\+ Analysis

= Breakthroughs

Protocol Evolves

(all tracks improve)

Atul Gawande, MD Professor of Surgery at Harvard Medical School

Anesthesia and **sterile environments**…the first two foundations of improved outcomes in surgery …but **teamwork** is establishing itself as an **equally important part of that foundation.**

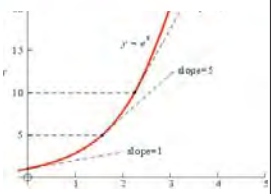
Ortho
- OR staff
- Floor staff

Anesthesia
- Pre-op
- PACU

PT
Pharmacy
Discharge
Financial
Administration

Multi-Disciplinary Team

Difficulty $\propto$ (Number of people involved)^3



Start with a small select group***

Perfect alignment

3 Key Teams

Patient
Surgical
Anesthesia

Key Partnership

Orthopedist ↔ Anesthesiologist

Key partnership

Who am I?

I'm just a regular guy.

Who and What are *we*?

Just one member of a TEAM

Anesthesia

Surgical Anesthesia
Post-op Analgesia

Consistent
Reliable
Reproducible

Principles:

KISS
Start small
Track
Analyze
Evolve
Simplify

Sell it!

PROTOCOLS

Major Roadblocks

#1 PAIN

Major Roadblocks

#1 PAIN

#2 Narcotic side effects

Side Effects of Narcotics

N/V
Respiratory Depression
Dizzy / Weak / Low BP
Sedation
Urinary Retention
→ **Inadequate pain relief**

Side Effects of Narcotics

N/V
Respiratory Depression
Dizzy / Weak / Low BP
Sedation
Urinary Retention
Inadequate pain relief

→ Addiction

June 2016

New Persistent Opioid Use After Minor and Major Surgical Procedures in US Adults

Chad M. Brummett, MD[1,2]; Jennifer F. Waljee, MD, MPH, MS[2,3]; Jenna Goesling, PhD[1]; et al
> Author Affiliations

JAMA Surg. 2017;152(6):e170504. doi:10.1001/jamasurg.2017.0504

New persistent opioid use
5.9% - 6.5%
Same for major or minor surgery
One of the most common surgical complications

Meaning New persistent opioid use is more common than previously reported and can be considered one of the most common complications after elective surgery.

Of all the narcotics prescribed in the WORLD, what percentage are prescribed in the US?

80%

What percentage of heroin users start with prescription narcotics?

NIH National Institute on Drug Abuse
Advancing Addiction Science

Search

Connect with NIDA:

Drugs of Abuse | Related Topics | Publications | Funding | News & Events | About NIDA

Home » Drugs of Abuse » Opioids » Opioid Crisis

Opioid Crisis

Drugs of Abuse

Revised June 2017

Every day > 90 Americans die from opiate overdose.

THE WALL STREET JOURNAL. Dec. 17, 2012

Home World U.S. Politics Economy Business Tech Markets Opinion Life & Arts Real Estate WSJ Magazine

A Pain-Drug Champion Has Second Thoughts

By Thomas Catan and Evan Perez

Clearly, if I had an inkling of what I know now, I wouldn't have spoken in the way that I spoke. It was clearly the wrong thing to do," Dr. Portenoy

Great article on how we got where we are.

The Joint Commission

JCAHO On Assessment

- Pain is a "fifth vital sign"
- Pain will be routinely measured
- Policies will define points of time when pain assessments are performed
- Policies will define actions to be taken if pain intensities reach specified levels
- Progress notes must reflect action taken

Pain the 5th vital sign™ American Pain Society

JCAHO Standards Effective 1/1/2001

PRESS GANEY

The Joint Commission

also framed pain management as a patient's rights issue,

inferring that inadequate control would lead to sanctions.

The Joint Commission

2001

"…clinicians have inaccurate and exaggerated concerns about addiction, tolerance and risk of death.

This attitude prevails **despite the fact there is no evidence that addiction is a significant issue** when persons are given opioids for pain control."

Funded by……

The Joint Commission

PURDUE

OXYCONTIN (II)
(OXYCODONE HCl) EXTENDED-RELEASE TABLETS

Charleston Gazette-Mail
A Pulitzer Prize-Winning Newspaper

Filed November 2, 2017
in US District Court

WV cities sue accreditation agency over opioid 'misinformation campaign'

"JCAHO's enforcement of its Pain Management Standards and its **widespread misinformation campaign** about the safety of opioids has also led to an over-prescribing of opioids"

KevinMD.com THOMAS D. GUASTAVINO, MD

Making pain a vital sign caused the opioid crisis. Here's how.

THOMAS D. GUASTAVINO, MD | PHYSICIAN | OCTOBER 6, 2016

While we're at it **get rid of pain scales, fifth vital signs**, and anonymous patient **satisfaction scores**….

these have caused more problems than they have solved…

Side Effects of Narcotics

N/V

Respiratory Depression

Dizzy / Weak / Low BP

Sedation

Urinary Retention

Inadequate pain relief

Addiction

Opiate Induced Hyperalgesia

Pain Physician

2011

Focused Review

A Comprehensive Review of Opioid-Induced Hyperalgesia

Marion Lee, MD[1], Sanford Silverman, MD[2], Hans Hansen, MD[3], Vikram Patel,MD[4], and Laxmaiah Manchikanti, MD[5]

Pain Physician 2011; 14:145-161 • ISSN 1533-3159

Pain Physician 2011

"Opioid-induced hyperalgesia (OIH)…
a state of **nociceptive sensitization** caused by exposure to opioids. … characterized by a **paradoxical response** whereby a patient receiving opioids…could actually **become more sensitive** to certain painful stimuli."

Chronic - Acute???

Pain Physician 2011; 14:145-161 • ISSN 1533-3159

Standard GA
Desflurane
Acetaminophen 1.3 (pr)
Ketoralac 30
Dexamethasone 8
Sub q local

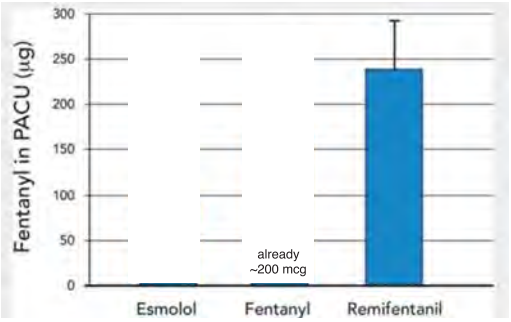
Laparoscopic Gall Bladder

Esmolol Infusion	**Fentanyl -Typical-**	**Remifentanil Infusion**
0 narcotics	~ 200 mcg	

PACU - who needed the most narcotics ???

Anesth Analg 2007; 105:1255–62.

The use of intra-operative opioids is associated with an increased postoperative opioid requirement



Esmolol group ~ 50% less N/V + faster discharge

Postoperative opiate requirements in patients receiving esmolol, fentanyl, and remifentanil intraoperatively. Amounts of fentanyl required in the postoperative care unit (PACU) to provide adequate analgesia in patients who underwent laparoscopic cholecystectomy. The use of intraoperative opioids is associated with an increased postoperative opioid requirement. Modified from Collard et al. Anesth Analg 2007; 105:1255–62.

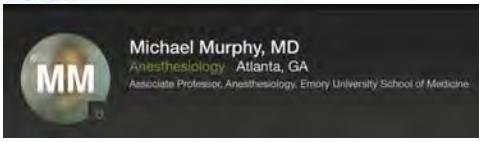
EMORY HEALTHCARE HEALTHCONNECTION℠

Cardiac fentanyl induction 100 - 200 ml

1 "Mike" of fentanyl

2 "Mikes" of fentanyl

Emory University Hospital



janssen

2002

ANESTHESIA & ANALGESIA

Articles & Issues | CME | Subjects | Collections | 中文翻译

The Role of Ketamine in Preventing Fentanyl-Induced Hyperalgesia and Subsequent Acute Morphine Tolerance

Laulin, Jean-Paul PhD*; Maurette, Pierre MD†; Corcuff, Jean-Benoît MD, PhD‡; Rivat, Cyril GS‡; Chauvin, Marcel MD§; Simonnet, Guy PhD‡

Anesthesia & Analgesia: May 2002 - Volume 94 - Issue 5 - p 1263-1269
doi: 10.1097/00000539-200205000-00040
PAIN MEDICINE: Research Report

ANESTHESIA & ANALGESIA

Articles & Issues | CME | Subjects | Collections | 中文翻译

2002

Fentanyl-induced analgesia is followed by
early hyperalgesia (hours),
acute tolerance*…
long-lasting hyperalgesia (days).

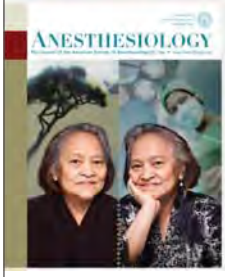
All these phenomena are totally prevented by …
NMDA-receptor antagonist, ketamine…

Anes & Anal May 2002,94,5

ANESTHESIOLOGY
The Journal of the American Society of Anesthesiologists, Inc.

Search...

Issues | ASA Practice Parameters | Online First | Topics | Multimedia | CME | Info



FREE

Education | February 2016

Differential Opioid Tolerance and Opioid-induced Hyperalgesia: A Clinical Reality

Christina J. Hayhurst, M.D.; Marcel E. Durieux, M.D., Ph.D.

+ Author Notes

Anesthesiology 2 2016, Vol.124, 483-488. doi:10.1097/ALN.0000000000000963

REVIEW

Current Opinion- Anesthesiology
August 2017

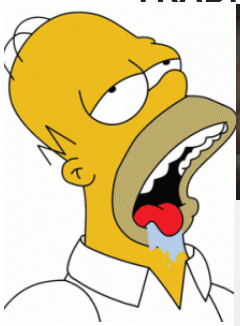
Opioid-induced hyperalgesia in clinical anesthesia practice: what has remained from theoretical concepts and experimental studies?

Lena Weber, Daryl C. Yeomans, and Alexander Tzabazis

Recommended
A Multi-Modal
Analgesic
Approach

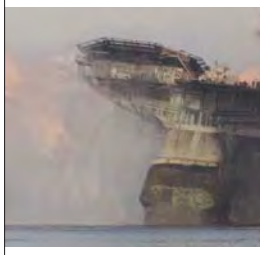
My Practice

TRADITIONAL TREATMENT



Pain still
a “10”

Reliance on Narcotics For Pain Is a Burning Platform



inadequate pain relief
multiple side effects
high risk for addiction
hyperalgesia

SOLUTION

NEW PARADIGM
Multi - Modal Analgesia

Rescue - *Titrate* Narcotics — Terrible

Maximize Non-Narcotic Meds — Tolerable

Education / Expectations
Joint Class — Reasonable

MMAP
Multi - Modal Analgesia Protocol

Multiple
Unique abilities
Complementary
Synergistic

A Team of Super-Heroes

Multimodal analgesia for controlling acute postoperative pain

Buvanendran, Asokumar; Kroin, Jeffrey S

Current Opinion in Anaesthesiology: October 2009 - Volume 22 - Issue 5 - p 588–593
doi: 10.1097/ACO.0b013e328330373a
Pain medicine: Edited by Raymond Sinatra

2009

Abstract | Author Information

Purpose of review: Multimodal analgesia is needed for acute postoperative pain management due to adverse effects of opioid analgesics, which can impede recovery; a problem that is of increasing concern with the rapid increase in the number of ambulatory surgeries. Yet, the literature on multimodal analgesia often shows variable degrees of success, even with studies utilizing the same adjuvant medication.

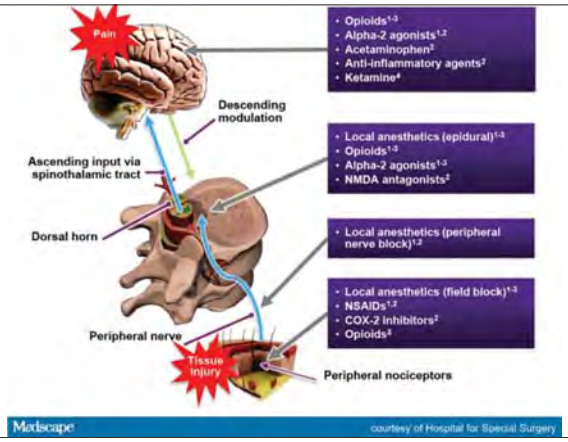
(potential agents reviewed)

Potential Multi-Modal Analgesics

NSAIDs /COX-2
Acetaminophen
Gaba-pentanoids
Dexamethasone
Ketamine
Clonidine

Magnesium
Lidocaine iv
Beta-Blockers
Dexmedetomidine
Nerve Blocks
Local Injection

Current opinion in anaesthesiology 22(5):588-93 · August 2009



Acetaminophen

33-55% reduction
in morphine use

Anesthesiology 2005; 102:822
Viscusi, et al. AAPM Annual meeting, 2008, Orlando, FL
J Healthc Qual 2014 [epub]Pain 2013; 154:677

NSAIDs

33-40% reduction
in morphine use

J Arthroplasty 2012;27:1033
BMC Musculoskelet Disord 2013;14:300
Anesth Analg 2008;107:2025

NMDA antagonists

30-40% reduction
in morphine use

Anesth Analg 2005;100:475
Anesth Analg 2009;109:1963

Gabapentanoids

49% reduction
in morphine use

Decreased neuropathic pain at 3 and 6 months for TKA

Br J Anesth 2008;101:535
Anesth Analg 2010;110:199
RAPM 2010;35:535

Dexamethasone

Reduced LOS
Decreased Pain
Decreased Nausea

J Arthroplasty 2013;28 Suppl 1:11-17

Feb 2012

"Whenever possible,
anesthesiologists **should** use…

multimodal pain management therapy
… around the-clock regimen of

NSAIDs, COXIBs, or **acetaminophen…**

Gabapentanoids should be considered

… consider **regional blockade**
… incisional infiltration"

Anesthesiology 2012; 116:248-73

MMA (multi-modal analgesia)
has been endorsed by
multiple professional organizations

American Pain Society
American Society of Pain Management Nursing
American Society of Anesthesia, ASA Taskforce
American Society of Regional Anesthesia
American Association of Hip and Knee Surgeons

January 2010

Despite available evidence showing the benefits of
multimodal analgesic techniques,
major surveys have reported
that these techniques are underused in clinical practice.

November 2017

**From recent large national studies,
it is estimated that only 25-50%
of all patients receive MMA therapies.**

Anesthesiology. 2016; 124(4):837-45

November 2017

Dr Beckman:
We focus on
reducing narcotics - MMA is essential…

"There is really no room for opiate monotherapy."

November 2017

Dr Soffin: "Do you think that MMA should be recommended as **the standard of care** for all surgical patients?"
Dr Beckman: **"Absolutely. I do"**

May 2017

Contents lists available at ScienceDirect

The Journal of Arthroplasty

journal homepage: www.arthroplastyjournal.org

AAHKS Symposium

Oral Multimodal Analgesia for Total Joint Arthroplasty

Gregory J. Golladay, MD [a,*], Karl R. Balch, MD [a], David F. Dalury, MD [b], Jibanananda Satpathy, MD [a], William A. Jiranek, MD [a,†]

"multimodal analgesia should be considered the new **standard of care** for pain management after hip and knee arthroplasties"

Oct 2017

Coverage from Anesthesiology 2017 from the American Society of Anesthesiologists

News > Reuters Health Information > Conference News

Opioid-Free General Anesthesia Works for ENT Surgery

By Megan Brooks

October 25, 2017

1,009 consecutive patients undergoing head and neck procedures
including laryngoscopy, complex facial plastic surgery, middle-ear surgery and nasal or sinus surgery.

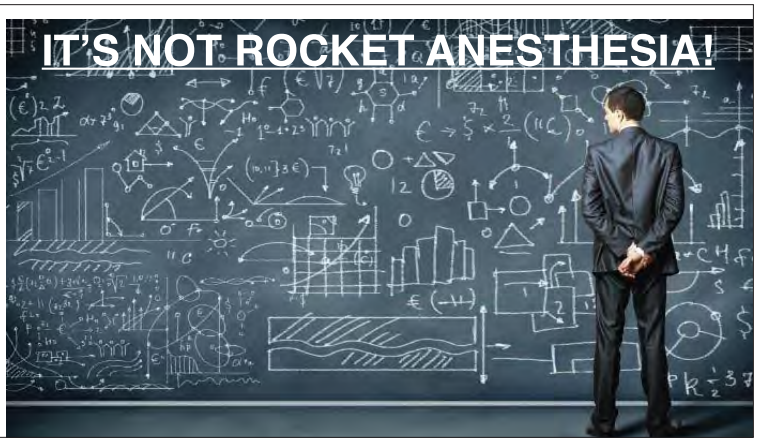
Instead of opioids, patients received **various combinations** of: magnesium, ketamine, lidocaine and ketorolac.

"less pain and dramatically less nausea and vomiting"

"I believe the technique can be utilized for nearly any surgery."

The Big Question???

Not:
Do these Work?
Is: Why are we not using them?



Our Multi-modal Protocol

9 ingredient "recipe"

1. Acetaminophen
2. NSAIDs
3. Pregabalin
4. Dexamethasone
5. Ketamine
6. ACB- block*
7,8,9. Infiltration x 3

Goal:

Eliminate need for narcotics

(OFA)

PAIN

Our Multi-modal Protocol

9 ingredient "recipe"

1. Acetaminophen
2. NSAIDs
3. Pregabalin
4. Dexamethasone
5. Ketamine
6. ACB- block*
7,8,9. Infiltration x 3

Goal:

PAIN

Eliminate need for narcotics

(OFA)

Our MMAP- *Analgesia Protocol*

Pre-op:

Education
- **Preparation**
- **Expectation**
- **Mandatory Joint Class**
- **Same Messages**

#1 Multi-Modal Agent!

Our MMAP- *Analgesia Protocol*

Pre-op:

Night before surgery:
- Acetaminophen 1000 mg. po hs
- Sports drink 0.5 - 1 liter

Our MMAP- *Analgesia Protocol*

Pre-op:

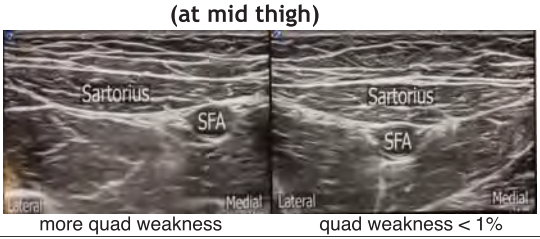
Night before surgery:
- Acetaminophen 1000 mg. po hs
- Sports drink 0.5 - 1 liter

Morning of surgery
- Sports drink 0.5 - 1 liter (2 hours pre-op)
- Pregabalin 150 mg po
- Scopolamine Transdermal*
- Urinate immediately pre-op

Our MMAP- *Analgesia Protocol*

Pre-op: **Sedation?**

Spinal
ACB (knees)- 15ml bupivacaine 0.5%
(at mid thigh)



more quad weakness quad weakness < 1%

Our MMAP- *Analgesia Protocol*

Pre-op:

Spinal
ACB (knees)- 15ml bupivacaine 0.5%
(at mid thigh)

In OR:
- Acetaminophen 1000 mg iv
- Ketamine 0.5 mg/kg iv (~ 50 mg)
- Dexamethasone 0.15 mg/kg iv (10-15 mg)
- Ketoralac 30 mg iv

Our MMAP- *Analgesia Protocol*

In OR:

Surgical infiltration:
- Bupivacaine 0.5% w epi 30 ml
- Ketoralac 30 mg
- Methylprednisolone 80 mg

(??? Exparel)

COST!

Lyrica $8
Ofirmev $35
- $43

Capsule Injection ~$35
Exparel $400
+ $365

LOS 3 hours vs 24 - 48 hours
saves $2000 - $4000

+ $3,000

Our MMAP- *Analgesia Protocol*

PACU:

When you wake up, you will notice pain:
- *Reasonable*
- *Tolerable*

Terrible - titrate fentanyl 25 mcg IV ~10%

Move in PACU

Discharge ASAP to fast track unit

Our MMAP- *Analgesia Protocol*

Floor:

Family, food and PT - ASAP!

Oxycodone 5 mg PO if needed (rare)

Tylenol 1000 mg IV prior to discharge

Our MMAP- *Analgesia Protocol*

At Home:

Acetaminophen 1000 mg po tid
Ibuprofen 800 mg PO tid

not prn

Salt and Pepper
morning-noon-night

Our MMAP- *Analgesia Protocol*

If pain "terrible"

Oxycodone 5 mg

"naked narcotic"

At Home:

Acetaminophen 1000 mg po tid
Ibuprofen 800 mg PO tid

Does this work ???

Oxycodone 5 mg 1-2 po q 4-6
(4-12 / day)

assume 6 / day
POD 0 - POD 7

#48

What would you call success?

20? 10?

What percentage of patients took 5 or less over 8 days?

Post-op MMAP Follow up

(Acetaminophen 1000 mg tid + Ibuprofen 800 mg tid)
From POD #0 through POD#7

# of Patients		total # Oxycodone taken
11/30	(37%)	ZERO
16/30	(53%)	3 or less
24/30	**(80%)**	5 or less
27/30	(90%)	10 or less

M Hamilton July 2017, personal series

2013

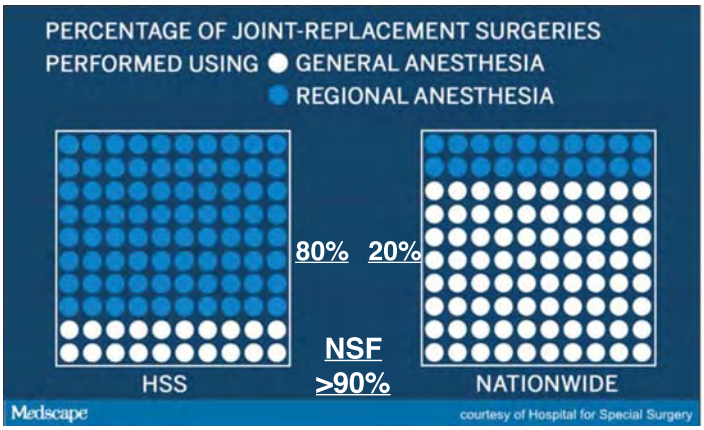
Neuraxial compared with GA:
83% lower mortality,
Similar reductions in pulmonary complications
Decreased LOS, Infections, Cost

> 500,000 cases 2006-2010, 400 hospitals

November 2017

Curiously, regional anesthesia, which is an important part of MMA, is even worse, with only about 20% of cases receiving regional anesthesia.

Br J Anaesth. 2015; 115 Suppl 2:ii57-67
Reg Anesth Pain Med. 2016; 41(1):43-9



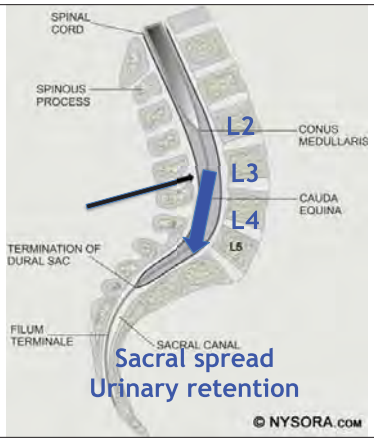
Our Anesthesia Protocol

Spinal-

- Strongly preferred
- Discussed as part of education
- Recommended by Surgical Team

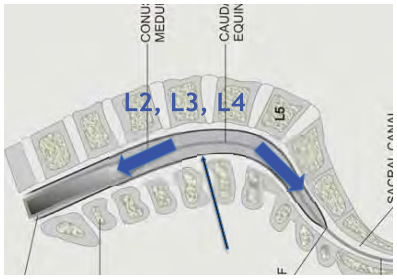
Typical
SPINAL

HYPER-baric



Typical
SPINAL

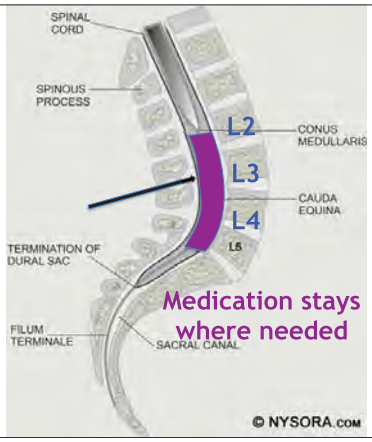
HYPER-baric



Thoracic spread
Hypotension

ISO-baric

"Perfect agent for lower extremity ortho"



ISO-baric Spinals

Only iso-baric local anesthetic with
FDA approved indications for spinal anesthesia is tetracaine.

The next slide reviews our clinical experience with **off label use.**

Our Anesthesia Protocol

Iso-Baric Spinal

Available Iso-Baric drugs we have used:

Mepivacaine	40-60 mg
Ropivacine	10-12 mg
Bupivacaine	7 -15 mg

Choice of Drug and dosage determine length

(incidence of known TNS - none in >2,000)

THE LANCET December 2017

Atraumatic versus conventional lumbar puncture needles: a systematic review and meta-analysis

Study, based on a total of 110 trials including more than **30,000 patients**-

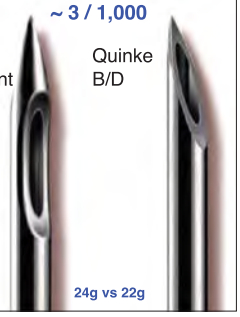
risk of **complications**, including **headaches** and patient **returning** to hospital

reduced by more than 50%.

Our PDHA rate ~ 3 / 1,000

Sprotte Pencil Point

Quinke B/D



24g vs 22g

Our Anesthesia Protocol

Spinal-

Strongly preferred
Discussed as part of education
Recommended by Surgical Team

General-

If spinal contra indicated
If spinal refused ***
If spinal inadequate

Our General Anesthesia Protocol

Induction:

Propofol
Lidocaine

No Narcotics !

Our General Anesthesia Protocol

Induction:

Propofol
Lidocaine

No Narcotics !

Maintenance

LMA:
N2O / O2 (70% N2O)
(analgesic)
Sevoflurane

Same - MMAP

No Narcotics !

KISS

Joint Replacement Protocol
NSH System - January 2018

Pre-operative

Anesthesia	ACB Knees	Surgery
Lyrica 150 mg po (consider 75 if frail)	15 ml Bupiv 0.5%- plain	Tylenol (1000 mg po hs)
Scop patch (remove prior to d/c)	(Versed +/- Ketamine for sedation No Narcotics)	Fluids (push fluids hs and until 2 hours preop)
Pepcid 20 mg po		

Spinal Dosage Iso - Baric Preservative Free!

Fast Track	Non Fast Track
Mepivacaine 40-45 mg, 50-60 mg	Bupivacaine 10 mg, 12 mg, 15 mg

Intra-operative

Anesthesia	Surgery
Ofirmev 1000 mg	TXA x 2 (by surgeon order)
Decadron 0.15 mg/kg	Capsule injection
Ketamine 0.5 mg/kg (25-30 mg if frail, elderly)	Bupiv 0.5% w, 30 ml
Robinal 0.2 mg	Toradol 30 mg
Propofol infusion - prn	(+/- Depomedrol 80 mg)
If requested, ↓SBP 20%	(+/- Exparel)
Toradol 15 - 30 mg @ end	(discourage Morphine)
No Zofran, Benadryl or Narcotics	

Joint Replacement Protocol
NSH System - January 2018

Pre-operative

Anesthesia
Lyrica 150 mg po
(consider 75 if frail)
Scop patch
(remove prior to d/c)
Pepcid 20 mg po

ACB Knees
15 ml Bupiv 0.5%- plain
(Versed +/- Ketamine for sedation No Narcotics)

Surgery
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Fluids
(push fluids hs and until 2 hours preop)

Spinal Dosage
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Mepivacaine 40-45 mg, 50-60 mg

Non Fast Track
Bupivacaine 10 mg, 12 mg, 15 mg

Intra-operative

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Propofol infusion - prn
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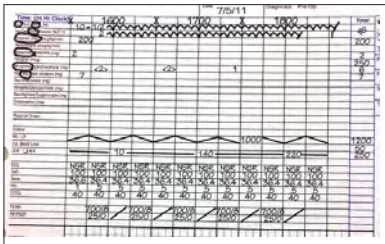
Surgery
TXA x 2
(by surgeon order)
Capsule injection
Bupiv 0.5% w, 30 ml
Toradol 30 mg
(+/- Depomedrol 80 mg)
(+/- Exparel)
(discourage Morphine)

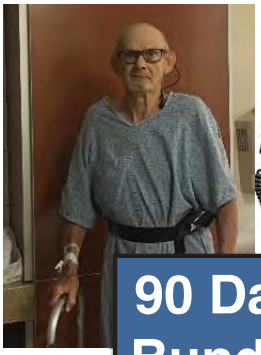
MMAP Considerations

General Anesthesia Protocol
Same MMAP items
Induction- Lido/ Prop
Maintenance- Sevo / N20 **(70%)** / O2
LMA - **Peep**
Narcotics:
Same day pts- No Narcotics
Overnight- avoid if possible

PACU:
Pain:
Fast Track / Same Day
fentanyl 25 mcg titrate for pain "not tolerable"
no demerol for shivering
Not Fast Track / Same Day
fentanyl 25 mcg or dilaudid 0.2 mg
N/V: Fast Track- avoid phenergan.

Concept of "recipe"
each ingredient is important
NSAIDs
Renal Function- for Cr >1.4 decrease or eliminate
Acetaminophen
Consider decrease only for significant liver disease, wt < 50kg
Decadron
Avoid in poorly controlled Diabetics- (shouldn't be fast track anyway)
If pts already on Gabapentin
May substitute a double dose for Lyrica
If EBL > 500
Consider Albumin 5% 500 ml
For pts on chronic narcotics
Methadone 10 mg iv in OR is extremely effective
Continue maintenance narcotics





90 Day Bundle

2018

Current costs $35-50K
Aggressive package $23K
Medicare $11k

BUNDLED PAYMENTS

How "valued" is our contribution???

January 2018 - Volume 43 - Issue 1

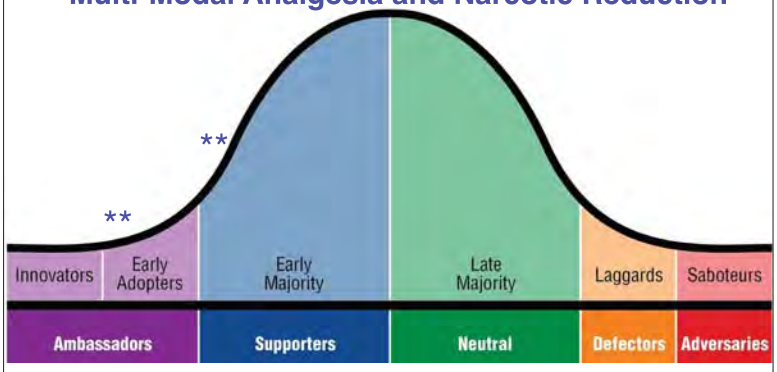
regional anesthesia & pain medicine

Daring Discourse

Should Hospitals Market Opioid-Sparing Analgesia to Patients?

Stone, Alexander B. MD; Wu, Christopher L. MD; Grant, Michael C. MD

Multi-Modal Analgesia and Narcotic Reduction



Innovation Adoption Lifecycle

Founder Kevin Plank on the 1 Thing That Will Get You Fired From Under Armour

The entrepreneur has no tolerance for living in the past.

The only thing that will
get you fired here is to say,

"But, that's the way we've always done it."

Celebrate the win for the entire team!

Celebrate the win for the entire team!

To do
Names of surgeons slide 17

Fast-track Pediatric Surgery: Current Implications

Pankaj Chhatbar, MD
Pediatric Anesthesiologist
Children's Healthcare of Atlanta at Scottish Rite
1001 Johnson Ferry Rd NE
Atlanta, GA 30042

Disclosure

- Presenter has NO affiliations with or involvement in any organization or entity with any financial interest or non-financial interest in the subject matter or material discussed in this lecture.

Learning Objectives

- To describe the enhanced recovery after surgery (ERAS) pathway for adult patients undergoing colorectal surgery.
- To demonstrate application of ERAS for pediatric patients.
- To create protocols for various fast track pediatric surgeries.
- To assess benefits and limitations of fast track infrastructure.

Opioid Crisis

- Opioid crisis: Childhood friends die on same day, half a mile apart (CNN news Dec 1, 2017)
- In 2015, more than 33,000 Americans died as a result of an opioid overdose
- 2 million people in the United States suffered from substance use disorders related to opioid prescription

Brandal D, Cannesson M et al. Impact of Enhanced Recovery After Surgery and Opioid-Free Anesthesia on Opioid Prescription at Discharge from the hospital: A Historic-Prospective Study. Anesth Analg 2017;125:1784-92

ERAS pathway for major elective colorectal surgery in adults

Factors affecting the return of bowel function and so post operative recovery:

- Preoperative fasting and bowel preparation
- Analgesic and anesthetic technique
- Magnitude and complications of surgery
- Fluid overload
- Patient co-morbidities

The enhanced recovery after surgery (ERAS) pathway for patients undergoing major elective open Colorectal surgery: A meta-analysis of randomized controlled trial. Varadhan KK, Lobe DN et al. Clinical Nutrition 2010;29; 434-440

Adult ERAS Elements

Preoperative

- Preoperative ERAS education
- Optimize medical comorbidities
- Avoid mechanical bowel preparation
- Avoid prolonged pre operative fasting
- Provision of clear carbohydrate enriched liquids
- Administer non-opioid analgesia

Adult ERAS Elements

Intraoperative

- Venous thromboembolism prophylaxis
- Pre-incision antibiotic prophylaxis
- Standard anesthetic protocol
- Minimally invasive technique
- Prevention of nausea/vomiting
- No nasogastric tubes
- Standardized hypothermia prevention
- Avoidance of perioperative fluid overload
- Regional analgesia

Adult ERAS Elements

Postoperative

- No intraperitoneal perianastomotic drains
- Goal-directed/near zero fluid therapy
- Early removal of urinary catheters
- Prevention of postoperative ileus
- Opioid-sparing pain regimen
- Insulin to control severe hyperglycemia
- Perioperative nutritional screening
- Early mobilization and feeding

Conclusion from meta-analysis

- Reduce hospital stay
- Reduce complication rate
- Better patient satisfaction

The enhanced recovery after surgery (ERAS) pathway for patients undergoing major elective open Colorectal surgery: A meta-analysis of randomized controlled trial. Varadhan KK, Lobe DN et al. Clinical Nutrition 2010;29; 434-440

What is the role of enhanced recovery after surgery in children?

- Not prevalent in pediatric surgical literature
- Children do not have prolonged periods of recovery and rehabilitation
- Minimal comorbidities
- Better physiology

Characteristics of included studies

Sangkhathat et al. [19]	Thailand	34 early feeding 30 traditional feeding	Colostomy closure in anorectal malformation	Determine benefits and adverse effects of protocolised early post-operative feeding	Case versus historical control
Grewal [20]	Philadelphia USA	79	Laparoscopic appendicectomy	Assess feasibility of <24 h stay for laparoscopic appendicectomy	Retrospective chart review
Reismann et al. [23]	Hanover Germany	159 total 113 fast track	Abdominal/urological procedures	Assess feasibility of fast-track concepts for paediatric surgical procedures	Prospective study. Clinical and qualitative outcomes
Reismann et al. [22]	Hanover Germany	436 total 115 fast track	Abdominal, thoracic, urological procedures, 4 weeks to 16 years	Assess use of fast-track concepts in university clinic	Prospective; clinical and qualitative outcomes, comparison with national dataset
Mattioli [25]	Genoa Italy	46	Laparoscopic colonic resection	Present paediatric fast-track experience	Prospective cohort study, no comparison group
Reismann et al. [21]	Hanover Germany	203	Abdominal, thoracic, urological procedures, 4 weeks to 16 years	Assess applicability and impact of single fast-track elements	Prospective evaluation
West et al. [17]	Liverpool UK	34 non-ERAS 34 ERAS	Paediatric (9–16 years) non enhanced recovery versus young adult (18-23 years) enhanced recovery	Compare surgical outcomes	Retrospective review

Pearson KL, Hall NJ. What is the role of enhanced recovery after surgery in children? A scoping review. Pediatr Surg Int (2017)33:43-51

Elements of individual fast-track programs

2 carbohydrate 'preload' drinks
For left-sided resections—2 × phosphate enemas, no other routine bowel prep
Anti-thromboembolic prophylaxis
Antibiotic prophylaxis 30 min before incision
Close temperature control of theatre and patient
Anaesthesia protocols standardised
Analgesia—Thoracic epidural or PCA, then paracetamol, ibuprofen with tramadol or Oramorph for break through pain, avoidance of strong opiates where possible
Surgical drains only in rectal surgery
NGTs avoided
Early feeding—water and Ensure drinks Day 0, normal diet Day 1
Early mobilisation—sit out of bed Day 0, walk Day 1

Pearson KL, Hall NJ. What is the role of enhanced recovery after surgery in children? A scoping review. Pediatr Surg Int (2017)33:43-51

Outcomes and results of included studies

Reduced	No difference
Length of Stay	Time to bowel function
Time to solid diet	30 day readmission
Time to mobilization	In hospital morbidity

Pearson KL, Hall NJ. What is the role of enhanced recovery after surgery in Children? A scoping review. Pediatr Surg Int (2017) 33;43-51

Conclusion

- Benefits are likely less in children compared to adults
- Potentially, application of ERAS in pediatric surgery could accelerate recovery and reduce length of post-operative stay

West MA, Rooney PS et al. Potential benefits of fast-track concepts in paediatric colorectal Surgery. J of Pediatric Surg (2013) 48, 1924-1930

Surgeries suitable for fast-track

General Surgery	Urology	Plastic
Appendectomy	Pyeloplasty	Cleft palate
Bowel anastomosis	Full/partial nephrectomy	
Ileocolectomy	Hypospadias repair	
Fundoplication		
Nuss procedure		

Reismann M, Ure BM et al. Fast-track surgery in infants and children. J of Ped Surg (2007) 42, 234-238

Common exclusion criteria

- Previous prematurity
- Chronic lung disease
- Concomitant major cardiac disease
- Perforated appendix
- Cerebral palsy
- Nephroblastoma
- Additional gastrointestinal disorder

Reismann M, Ure BM et al. Fast-track surgery in infants and children. J of Ped Surg (2007) 42, 234-238

What adult ERAS elements can be used in pediatric patients?

Appropriateness of a pediatric-specific enhanced recovery protocol using a modified Delphi process and multidisciplinary expert panel☆,☆☆

Heather L. Short [a], Natalie Taylor [b], Kaitlin Piper [b], Mehul V. Raval [a,*]

[a] Division of Pediatric Surgery, Department of Surgery, Emory University School of Medicine, Children's Healthcare of Atlanta, Atlanta, GA, USA
[b] Rollins School of Public Health, Emory University, Atlanta, GA, USA

J Pediatr Surg (2017), http://doi.org/10.1016/j.jpedsurg.2017.09.008

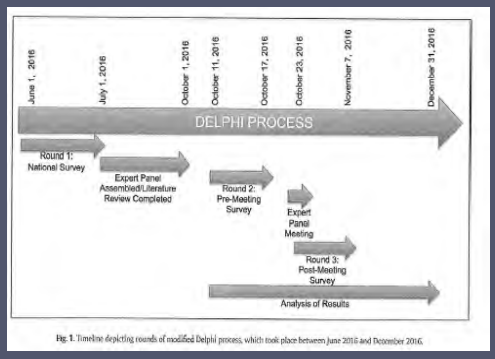


Fig. 1. Timeline depicting rounds of modified Delphi process, which took place between June 2016 and December 2016.

J Pediatr Surg (2017), http://doi.org/10.1016/j.jpedsurg.2017.09.008

Final pediatric ERAS protocol

All adult ERAS elements except

- Avoid mechanical bowel preparation
- Insult to control severe hypoglycemia

J Pediatr Surg (2017), http://doi.org/10.1016/j.jpedsurg.2017.09.008

Is there any cost benefit to implement ERAS?

Implementation Costs of an Enhanced Recovery After Surgery Program in the United States: A Financial Model and Sensitivity Analysis Based on Experiences at a Quaternary Academic Medical Center

Alexander B Stone, BA, Michael C Grant, MD, Clare Pei Ruda, MHS, Deborah Hobson, BSN, Timothy Pawlik, MD, PHD, FACS, Christopher L Wu, MD, Elizabeth C Wick, MD, FACS

http://dx.doi.org/10.1016/j.amjsurg.2015.11.021
ISSN 1072-7515/15

Table 1. Published Reduction in Length of Hospital Stay and Reduction of Costs with Enhanced Recovery After Surgery Program Implementation in the United States

	First author					
Variable	Wick 2015[10]	Thiele 2015[6]	Miller 2014[9]	Archibald 2011[13]	Kariv 2007[12]	Stephen 2003[13]
LOS pre-ERAS, d, mean (SD)	7.2 (5.7)	6.8 (4.7)	8.3 (8.1)	8.4*	6.8*	6.9 (4.1)
LOS with ERAS, d, mean (SD)	5.3 (5.0)	4.6 (3.6)	6.0 (4.2)	6.9*	6.1*	4.2 (2.8)
Reduction in LOS, d	1.9	2.3	2.3	1.5	0.7	2.7
Reduction LOS, %	26.4	32.4	27.7	17.9	10.3	39.1
Direct variable cost pre-ERAS, $	10,933	20,435	20,537	18,741	6,672	9,310
Direct variable cost with ERAS, $	9,036	13,306	18,377	16,978	5,692	7,070
Direct variable cost reduction, $	1,897	7,129	2,160	1,763	980	2,240
Direct variable cost savings per day of LOS reduced, $	998.42	3,099.57	939.13	1,175.34	1,400	829.63

*No SD reported.
ERAS, Enhanced Recovery After Surgery; LOS, length of stay.

Stone AB, Wick EC et al. Implementation costs of an Enhanced Recovery After Surgery Program in the United States: A financial model and sensitivity analysis based on experiences at a quaternary academic medical center. J Am Coll Surg 2016;222:219-225

Table 3. Example Calculation of Annual Net Savings Using Example Data

Row	Description	Data	Calculation
A	LOS, d, pre-ERAS	7.2	From Wick et al[10]
B	LOS, d, with ERAS	5.3	From Wick et al[10]
C	Percent reduction in LOS	26.4	
D	Average reduction in LOS	1.9	A − B
E	Direct variable cost pre-ERAS, $	10,933	From Wick et al[10]
F	Direct variable cost with ERAS, $	9,036	From Wick et al[10]
G	Total cost savings per patient, $	1,897	E − F
H	Annual ERAS cases, n	500	
I	Total cost savings of ERAS program, $	948,500	G × H
J	Costs of ERAS program, $	552,783	(See Table 2)
K	Net savings of ERAS program, $	395,717	I − J

Data derived from: Wick EC, Galante DJ, Hobson DB, et al. Organizational culture changes result in improvement in patient-centered outcomes: implementation of an integrated recovery pathway for surgical patients. J Am Coll Surg 2015;221:669–677.
ERAS, Enhanced Recovery After Surgery; LOS, length of stay.

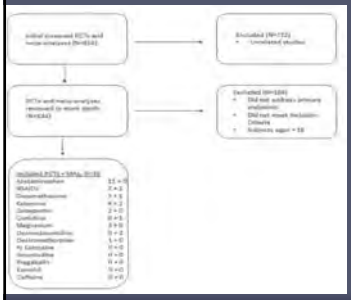
Stone AB, Wick EC et al. Implementation costs of an Enhanced Recovery After Surgery Program in the United States: A financial model and sensitivity analysis based on experiences at a quaternary academic medical center. J Am Coll Surg 2016;222:219-225

How can we do opioid sparing anesthesia and analgesia?

Pre operative	Intra operative	Post operative
Gabapentin	Acetaminophen IV	Celebrex
Celecoxib	Ketamine gtt	Ketamine gtt
Pre op education	Lidocaine gtt	Lidocaine gtt
Peri-op pain expectation	Dexmedetomidine gtt	Clonidine patch
	Methadone	Acetaminophen
	Ketorolac	Gabapentin
	REGIONAL ANESTHESIA	Ketorolac
	Exparel	REGIONAL ANESTHESIA
		Diazepam

Evidence for the Efficacy of Systemic Opioid-Sparing Analgesics in Pediatric Surgical Populations: A Systematic Review

Alyssa Zhu, MD,* Hubert A. Benzon, MD, MPH,† and T. Anthony Anderson, MD, PhD*



Primary Outcomes:
- Postoperative analgesic need
- Pain scores

Secondary Outcomes:
- Time to first analgesic use
- PONV
- Sedation
- Respirator depression
- Emergence delirium
- Psychotomimetic effects
- Hemodynamic changes

Anesth Analg 2017;125:1569-87

Conclusion

Effective	Too limited data/inconclusive
Acetaminophen	Gabapentin
NSAIDS	Magnesium
Dexamethasone	Dextromethorphan
Ketamine	Lidocaine
Clonidine	Amantadine
Dexmedetomidine	Pregabalin
	Esmolol

- Rectal Acetaminophen 40 mg/kg
- Dexmedetomidine >0.5 mcg/kg

Zhu A, Anderson A et al.Evidence for the Efficacy of Systemic Opioid-Sparing Analgesics in Pediatric Surgical Population: A Systemic Review. Anesth Analg 2017;125:1569-87

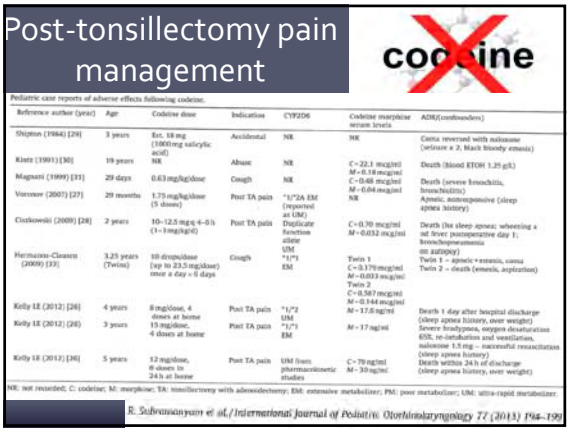
Tonsillectomy
(old surgery, new concepts)

- Second most commonly performed surgical procedure
- >97% of tonsillectomies as outpatient
- Wide variation in the management of patients

Fatal complications (41%)	Non Fatal Complications(59%)
Post tonsillectomy bleeding	Post tonsillectomy bleeding
Opioid toxicity	Impaired function
Anesthesia complications	Anoxic events
	Post operative opioid toxicity

LexisNexis "MEGA Jury Verdicts and Settlements"

Post-tonsillectomy pain management



Pediatric case reports of adverse effects following codeine.

Reference author (year)	Age	Codeine dose	Indication	CYP2D6	Codeine morphine serum levels	ADR(confounders)
Shipton (1964) [29]	3 years	Est. 18 mg (1000 mg salicylic acid)	Accidental	NR	NR	Coma reversed with naloxone (seizure x 2, black bloody emesis)
Kintz (1991) [30]	19 years	NR	Abuse	NR	C = 22.1 mcg/ml M = 0.18 mcg/ml	Death (blood ETOH 1.25 g/L)
Magnani (1999) [31]	29 days	0.63 mg/kg/dose	Cough	NR	C = 0.48 mcg/ml M = 0.04 mcg/ml	Death (severe bronchitis, bronchiolitis)
Voronov (2007) [27]	29 months	1.75 mg/kg/dose (5 doses)	Post TA pain	*1/*2A EM (reported as UM)	NR	Apneic, unresponsive (sleep apnea history)
Ciszkowski (2009) [28]	2 years	10–12.5 mg q 4–6 h (1–3 mg/kg/d)	Post TA pain	Duplicate function allele UM	C = 0.70 mcg/ml M = 0.032 mcg/ml	Death (by sleep apnea; wheezing a nd liver postoperative day 1; bronchopneumonia on autopsy)
Hermanns-Clausen (2009) [32]	3.25 years (Twins)	10 drops/dose (up to 23.5 mg/dose) once a day × 6 days	Cough	*1/*1 EM	Twin 1 C = 0.179 mcg/ml M = 0.033 mcg/ml Twin 2 C = 0.567 mcg/ml M = 0.144 mcg/ml	Twin 1 = apneic + emesis, coma Twin 2 = death (emesis, aspiration)
Kelly LE (2012) [26]	4 years	8 mg/dose, 4 doses at home	Post TA pain	*1/*2 UM	M = 17.6 ng/ml	Death 1 day after hospital discharge (sleep apnea history, over weight)
Kelly LE (2012) [26]	3 years	15 mg/dose, 4 doses at home	Post TA pain	*1/*1 EM	M = 17 ng/ml	Severe bradypnea, oxygen desaturation 65%, re-intubation and ventilation, naloxone 1.5 mg – successful resuscitation (sleep apnea history)
Kelly LE (2012) [26]	5 years	12 mg/dose, 6 doses in 24 h at home	Post TA pain	UM from pharmacokinetic studies	C = 79 ng/ml M = 30 ng/ml	Death within 24 h of discharge (sleep apnea history, over weight)

NR: not recorded; C: codeine; M: morphine; TA: tonsillectomy with adenoidectomy; EM: extensive metabolizer; PM: poor metabolizer; UM: ultra-rapid metabolizer.

R. Subramanyam et al./International Journal of Pediatric Otorhinolaryngology 77 (2013) 194–199

Post-tonsillectomy pain management

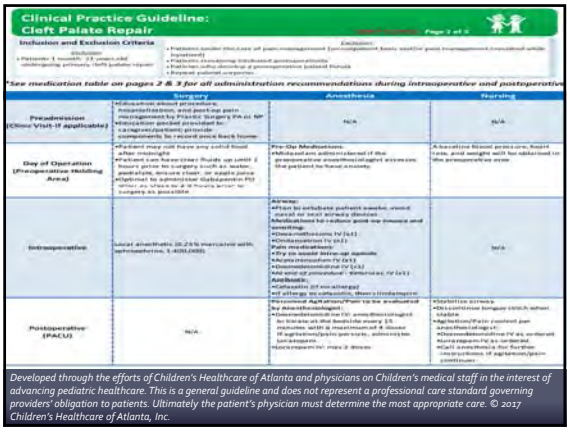
- What about hydrocodone and oxycodone?
- CYP2D6 metabolism to hydromorphone and oxymorphone
- Pharmacogenomics testing < 6 years of age
- Safer approach – Acetaminophen, dexamethasone and Ibuprofen

R. Subramanyam et al./International Journal of Pediatric Otorhinolaryngology 77 (2013) 194–199

Primary Cleft Palate Repair

- "short stay" (23 hours) observation
- **Causes of delayed discharge**
  - ➢ Longer time to post operative oral intake
  - ➢ IV fluid therapy
  - ➢ Supplemental oxygen
  - ➢ Need for post operative IV narcotics

Wood BC, Oh AK et al. Evaluating the need for routine admission following primary cleft palate repair: An analysis of 100 consecutive cases. Plastic and Reconstructive Surgery. 136(4):502e-510e



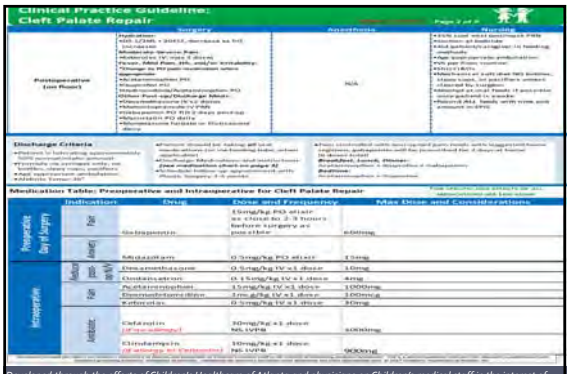
Clinical Practice Guideline: Cleft Palate Repair

Inclusion and Exclusion Criteria

See medication table on pages 2 & 3 for all administration recommendations during intraoperative and postoperative

	Surgery	Anesthesia	Nursing
Preadmission (Clinic Visit if applicable)		N/A	N/A
Day of Operation (Preoperative Holding Area)		Pre-Op Medications:	
Intraoperative		Airway: Pain medications: Antibiotic:	
Postoperative (PACU)	N/A	Recovered Agitation/Pain to be evaluated by Anesthesiologist:	

Developed through the efforts of Children's Healthcare of Atlanta and physicians on Children's medical staff in the interest of advancing pediatric healthcare. This is a general guideline and does not represent a professional care standard governing providers' obligation to patients. Ultimately the patient's physician must determine the most appropriate care. © 2017 Children's Healthcare of Atlanta, Inc.



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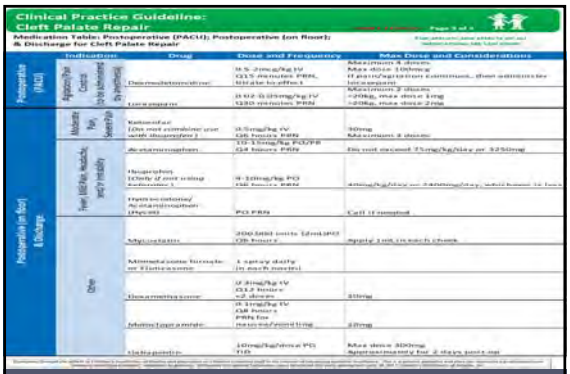

Developed through the efforts of Children's Healthcare of Atlanta and physicians on Children's medical staff in the interest of advancing pediatric healthcare. This is a general guideline and does not represent a professional care standard governing providers' obligation to patients. Ultimately the patient's physician must determine the most appropriate care. © 2017 Children's Healthcare of Atlanta, Inc.

Methadone

- **Particularly useful for patients undergoing posterior spinal fusion and Nuss procedure**
- Unique mu and delta opioid agonist and NMDA antagonist
- Serotonin and NE reuptake inhibitor
- Rapid onset of effect (~5 min) and a long duration of effect (~19-21 hours) after a large dose (0.2mg/kg)
- Antihyperagesic and antiallodynic properties

Murphy GS, Newmark RL. Clinical Effectiveness and Safety of Intraoperative Methadone in Patients Undergoing Posterior Spinal Fusion Surgery. Anesthesiology 2017; 126:822-33
Singhat NR, Nguyen H. Multimodel anesthesia with the addition of methadone is superior to epidural analgesia: A retrospective comparison of intraoperative anesthetic techniques and Pain management for 124 pediatric patients undergoing Nuss procedure. J of Ped Surg 51(2016) 612-616

Opioid prescriptions at discharge from the hospital

- Although fast-track and ERAS intervention with opioid free anesthesia and multimodel analgesia, there is no impact on discharge opioid prescribing practices

Brandal D, Cannesson M et al. Impact of Enhanced Recovery After Surgery and Opioid-Free Anesthesia on Opioid Prescription at Discharge from the hospital: A Historic-Prospective Study. Anesth Analg 2017;125:1784-92

Impact of Enhanced Recovery After Surgery and Opioid-Free Anesthesia on Opioid Prescriptions at Discharge From the Hospital: A Historical-Prospective Study

Debra Brandal, MD,* Michelle S. Keller, MPH,† Carol Lee, RN-BC,* Tristan Grogan, MS,* Yohai Fujimoto, MD, PhD,*‡ Yann Gricourt, MD,*§ Takashige Yamada, MD, PhD,*‖ Siamak Rahman, MD,* Ira Hofer, MD,* Kevork Kazarjian, MD,¶ Jonathan Sack, MD,¶ Aman Mahajan, MD, PhD,* Anne Lin, MD,¶ and Maxime Cannesson, MD, PhD*

For opioid-free anesthesia and multimodel analgesia to influence the opioid epidemic, the dose and quantity of the opioids prescribed should be modified based on the information gathered by in-hospital pain scores and opoid use as well as pain history before admission.

Physician behavior

- Determines opioid prescribing practices
- Over utilization of discharge order sets to prescribe opioids to almost every patients

Brandal D, Cannesson M et al. Impact of Enhanced Recovery After Surgery and opioid-free anesthesia on opioid prescriptions at Discharge from the hospital: A Historic-Prospective study. Anesth Analg 2017;125:1784-92

Postoperative opioid prescriptions: How surgeons can alleviate the opioid crisis

- dispensation of outpatient narcotic prescriptions

Thank You

ULTRASOUND GUIDED FASCIAL PLANE BLOCKS

Managing pain at its source

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Duke University Hospital

Duke Anesthesiology
Duke University School of Medicine

Regional Anesthesia
and Acute Pain Medicine

OBJECTIVES

- Discuss challenges with traditional techniques for providing postoperative analgesia
- Outline several infiltration techniques that provide extended duration analgesia for procedures on the breast, chest wall, and abdomen
- Discuss techniques to prolong truncal blocks

DISCLOSURES

- I have received consulting fees from Pacira Pharmaceuticals

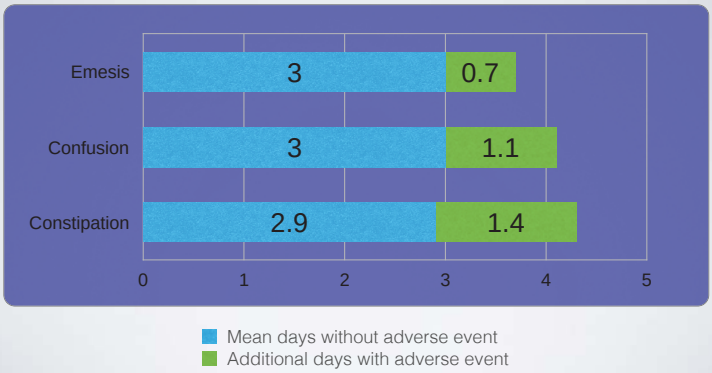
OPIOIDS…

Fine for pain*

Horrible for <u>everything</u> else.

OPIOID RELATED

- orthopedic surgical patients, n=402



Pizzi *et al. Pharmacotherapy* 2012;32:502

OTHER COSTS OF OPIOIDS

- Retrospective database, n=320,000
- ONE documented ORAE led to:
  - higher costs ($22,077 v $17,370, p<0.0001)
  - longer mean LOS (7.6 v 4.2 days, p<0.0001)
  - higher readmission rate (OR 1.06, 95% CI 1.02-1.09)

J Pain Palliat Care Pharmacother 2013; 27: 62-70.

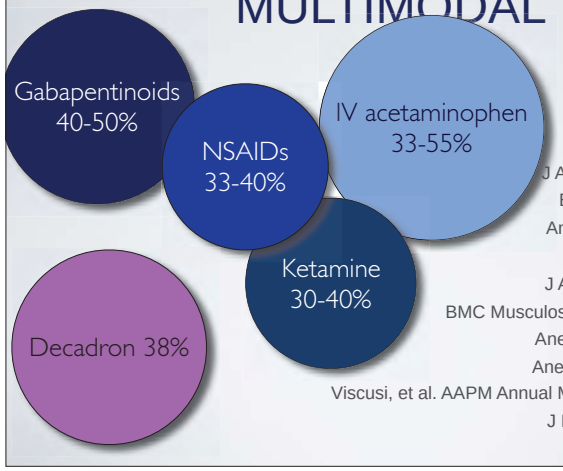
ORIGINAL INVESTIGATION

Long-term Analgesic Use After Low-Risk Surgery

A Retrospective Cohort Study

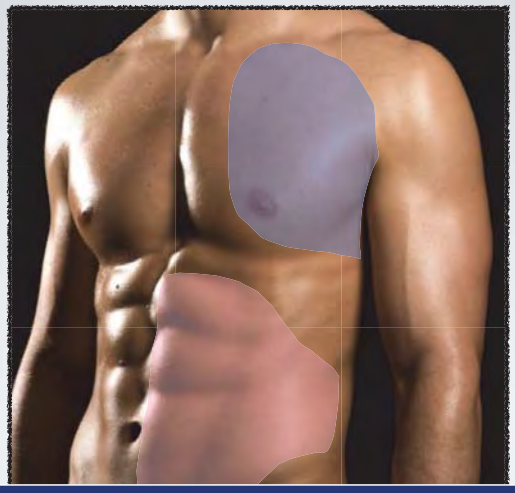
...patients receiving an opioid prescription within 7 days of surgery were 44% more likely to become long term users at 1 year compared to those receiving no such prescription.

OPIOID REDUCTION WITH MULTIMODAL



J Arthroplasty 2013;28:11-17
Br J Anesth 2008;101:535
Anesth Analg 2010;110:199
RAPM 2010;35:535
J Arthroplasty 2012;27:1033
BMC Musculoskelet Disord 2013;14:300
Anesth Analg 2008;107:2025
Anesthesiology 2005;102:822
Viscusi, et al. AAPM Annual Meeting, 2008, Orlando FL
J Healthc Qual 2014 [epub]
Pain 2013;154:677

TARGETED INFILTRATION TECHNIQUES



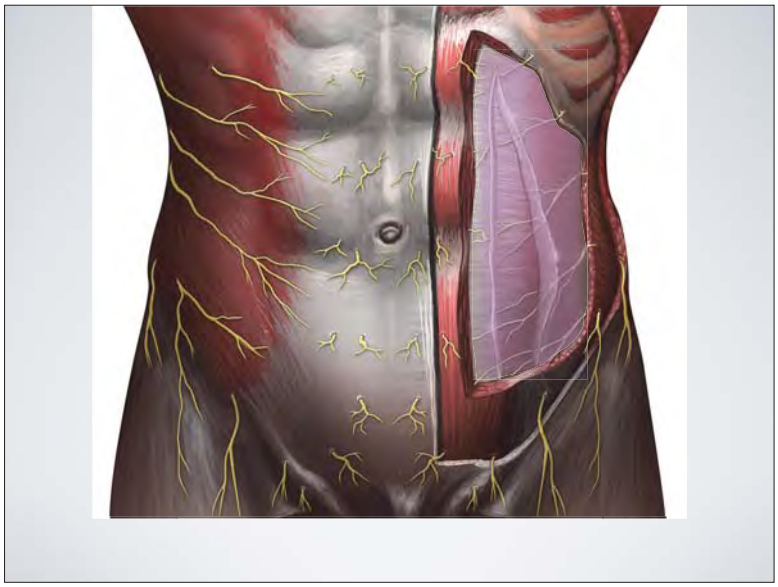
Dr. Bullock has given permission to use this image of him.

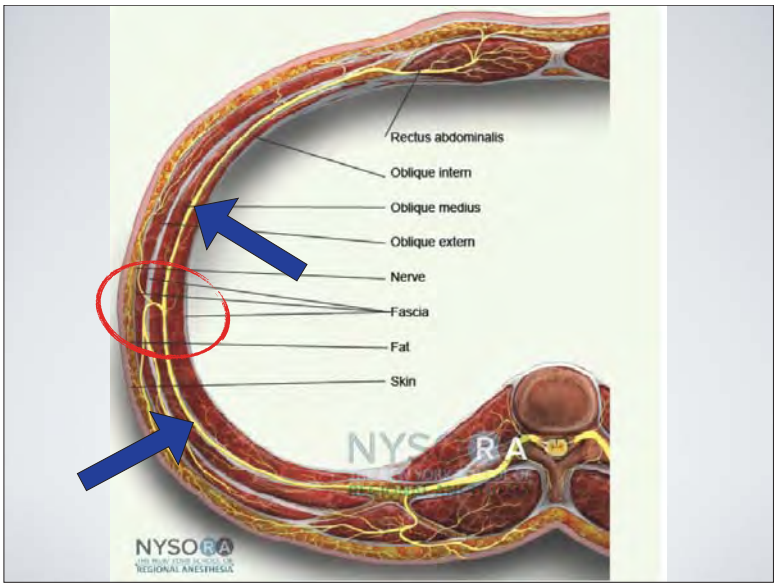
ADVANTAGES

- Reduced sympathectomy, urinary retention (vs. epidural)
- Fewer contraindications (e.g. anticoagulation)
- Easier to perform than nerve blocks (e.g. paravertebral)
- Safety?

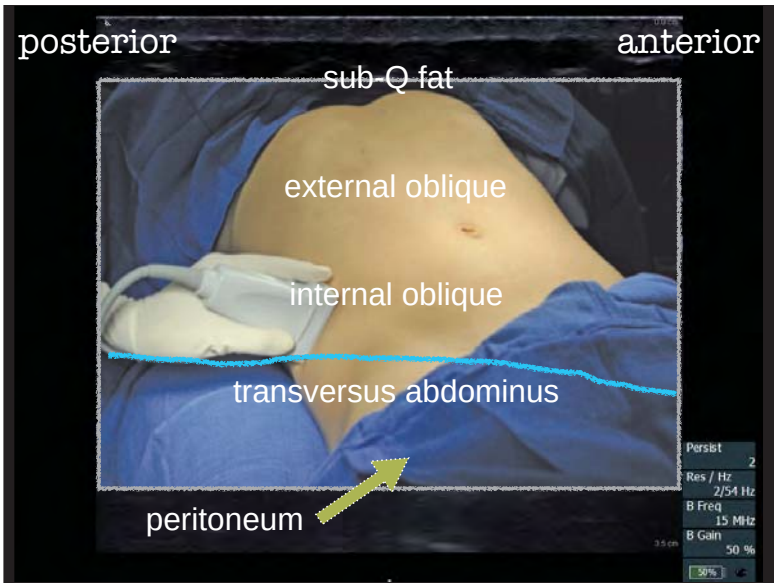
TRANSVERSUS ABDOMINIS

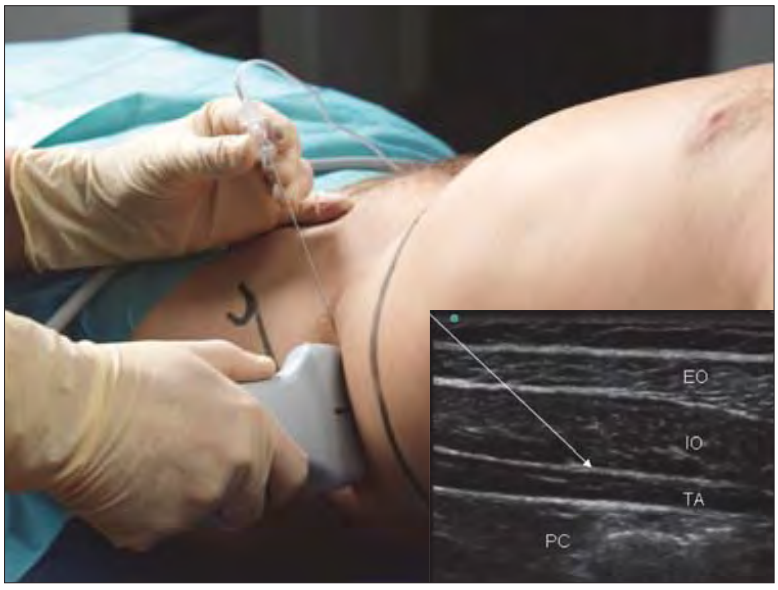
- Part of multimodal analgesia for abdominal wall procedures
  - *Midline laparotomy*
  - *Laparoscopic abdominal surgery*
  - *Ostomy creation/takedown*
  - *Hysterectomy/cesarean delivery*
  - *Inguinal/umbilical hernia repair*
  - *Abdominal microvascular flap donor site*

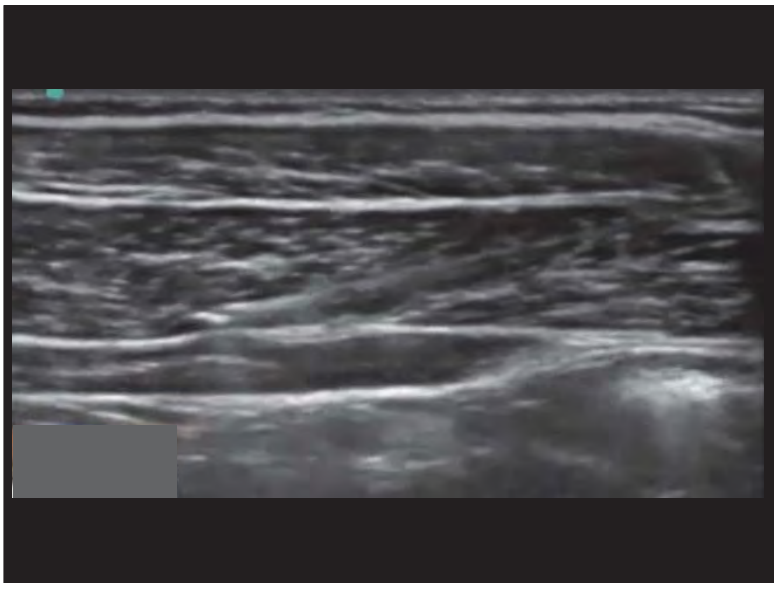


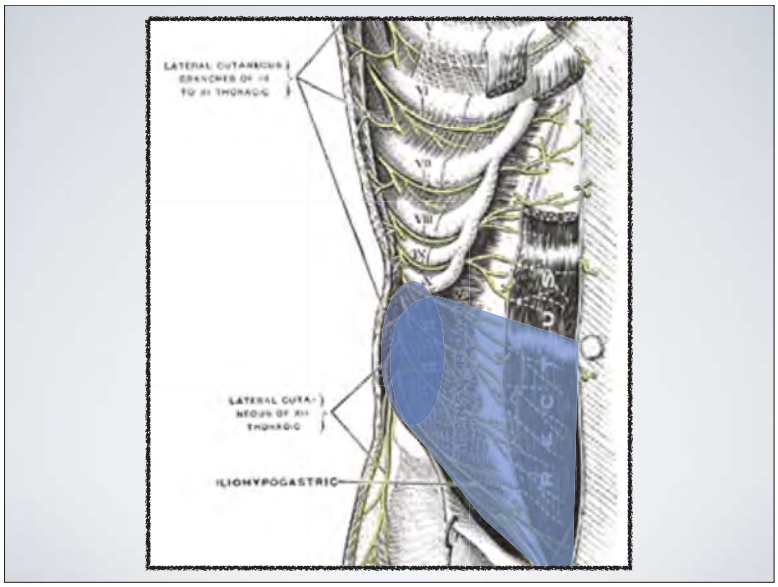

Rectus abdominalis
Oblique intern
Oblique medius
Oblique extern
Nerve
Fascia
Fat
Skin
NYSORA

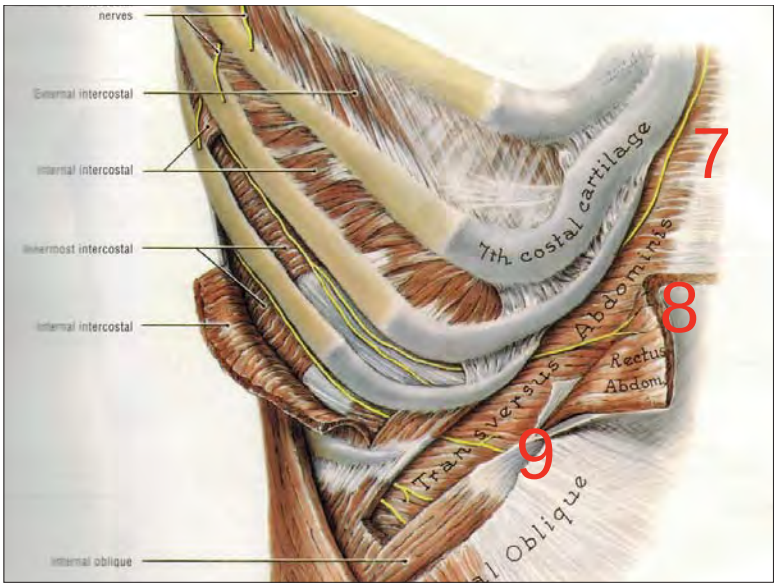
surgical site

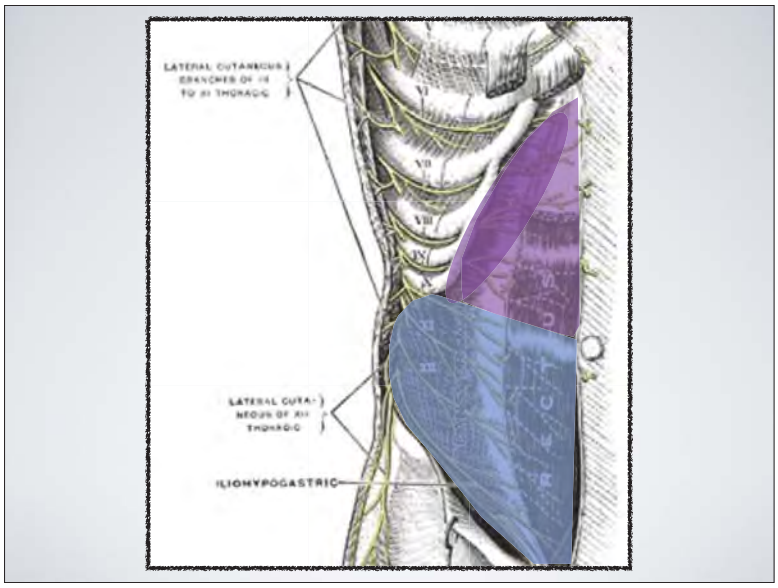

posterior
anterior
sub-Q fat
external oblique
internal oblique
transversus abdominus
peritoneum

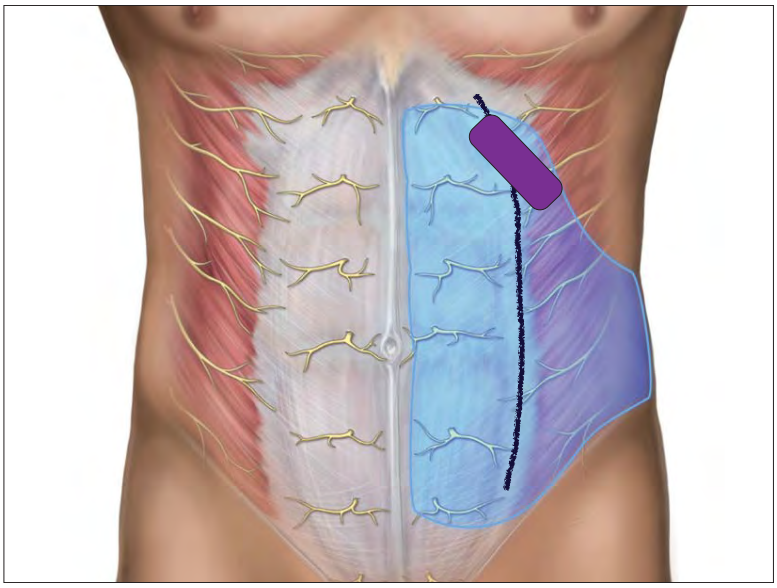

EO
IO
TA
PC



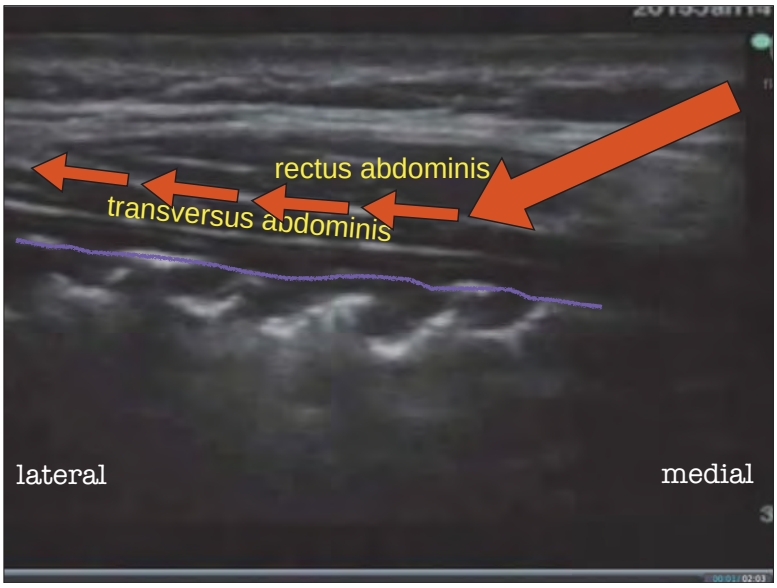

LATERAL CUTANEOUS
ILIOHYPOGASTRIC


nerves
External intercostal
Internal intercostal
Innermost intercostal
Internal intercostal
Internal oblique
7th costal cartilage
7
8
9
Abdominis
Rectus
Abdom
Transversus
Oblique


LATERAL CUTANEOUS
ILIOHYPOGASTRIC

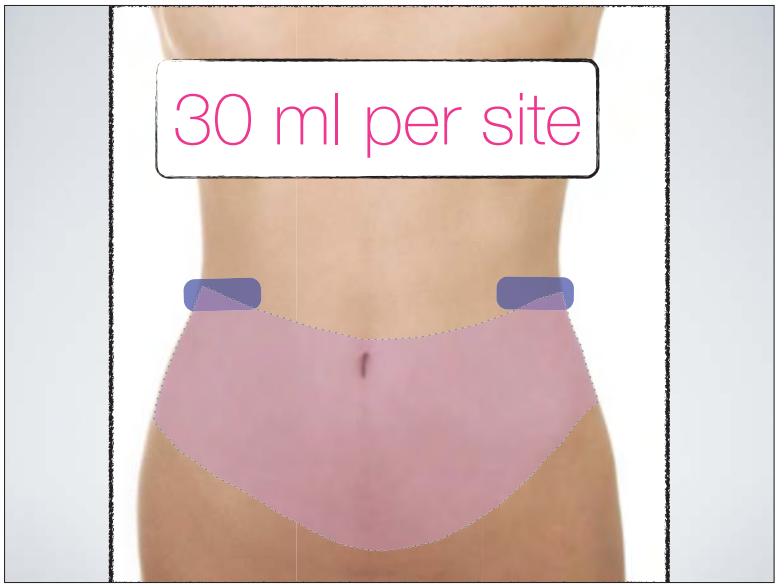


RA
TA
PC


rectus abdominis
transversus abdominis
lateral
medial

LAPAROSCOPIC APPROACH

SUCCESS = VOLUME



REGIONAL ANESTHESIA AND ACUTE PAIN
SPECIAL ARTICLE

Essentials of Our Current Understanding: Abdominal Wall Blocks

Ki Jinn Chin, FRCPC, John G. McDonnell, MD, FCARCSI,† Brendan Carvalho, MD,‡ Aidan Sharkey, FCAI,† Amit Pawa, FRCA,§ and Jeffrey Gadsden, MD, FRCPC, FANZCA||*

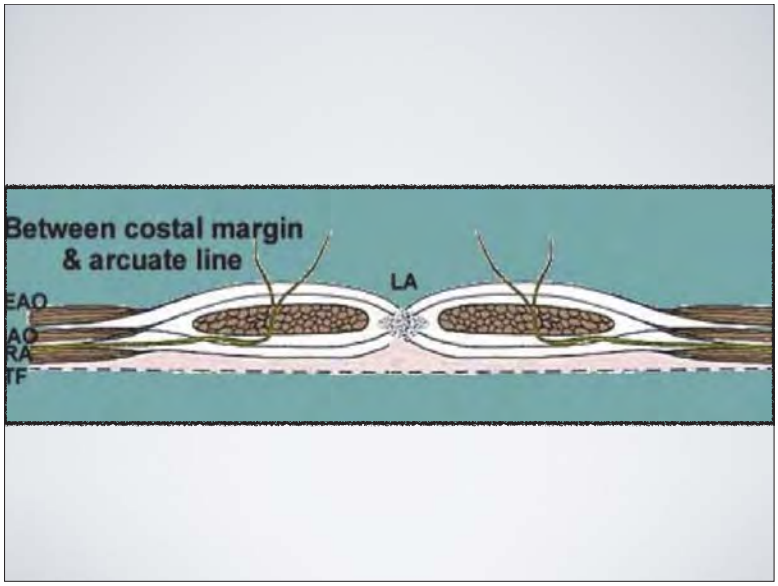
heterogenous data, but...

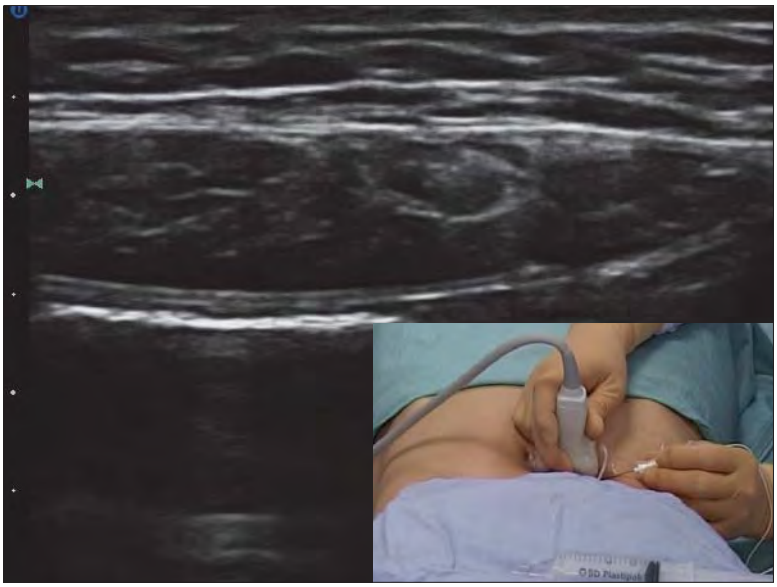
appears to be early analgesic benefit and opioid reduction

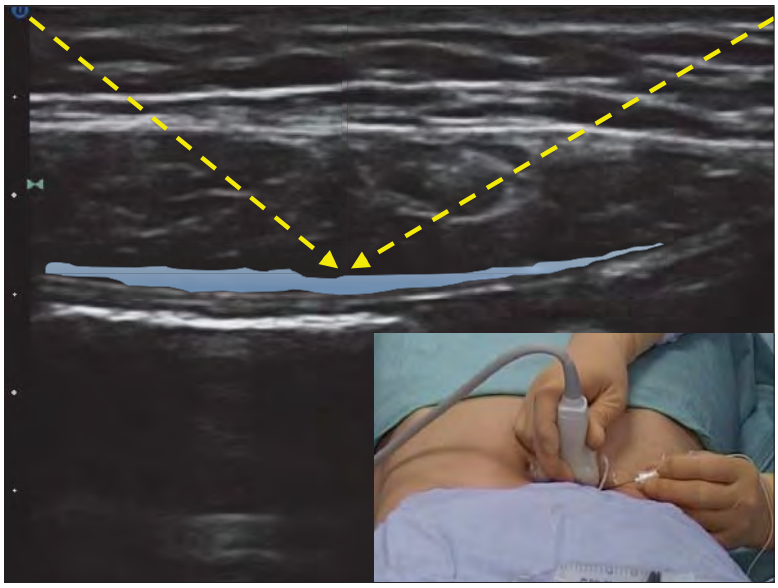
Reg Anesth Pain Med 2017; 42:133-183

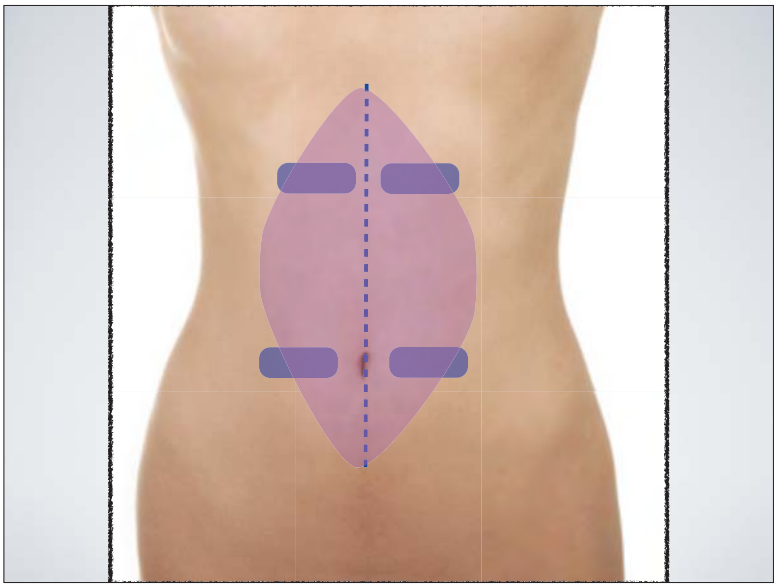
RECTUS SHEATH BLOCK

- Postop analgesia for:
  - Umbilical hernia repair
  - Single port laparoscopic surgery
  - Midline laparotomy





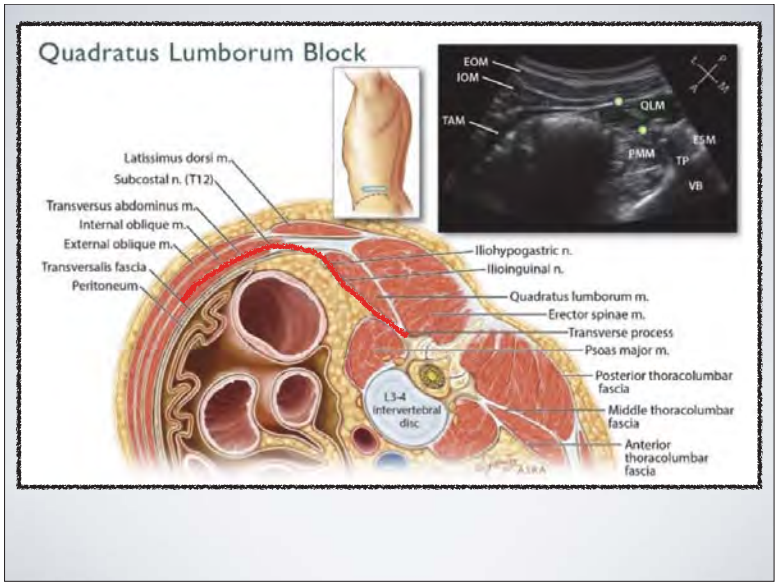


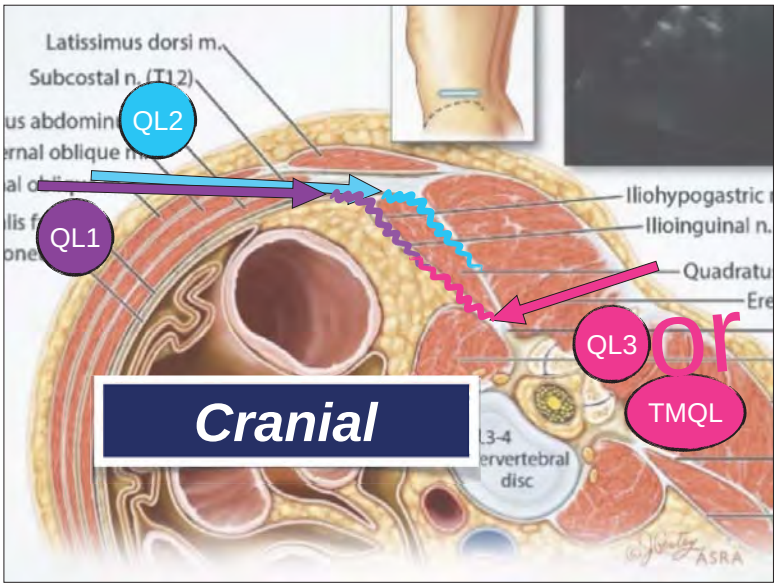


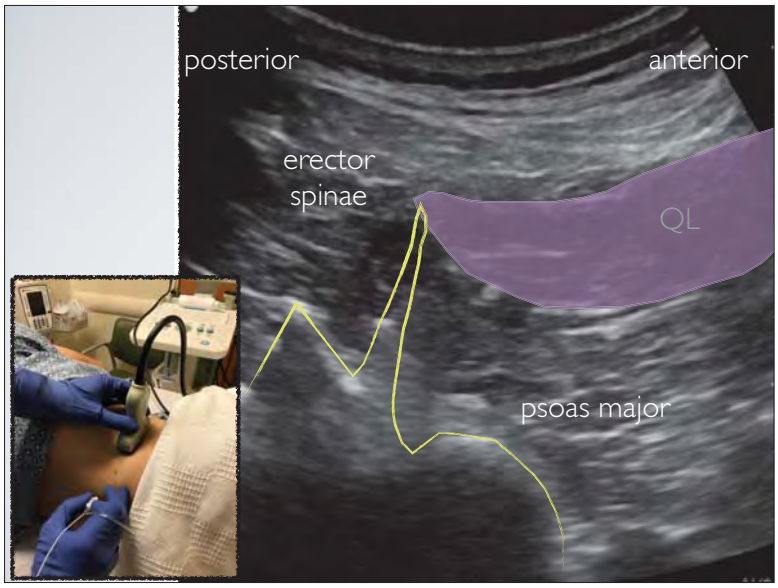
QUADRATUS LUMBORUM BLOCK

QL BLOCK

- Analgesia for
  - *Abdominal cases (laparoscopy, laparotomy, flank incisions, etc)*
  - *Hip surgery/fracture*
- Better "one-shot" coverage than TAP?
- Better visceral coverage than TAP

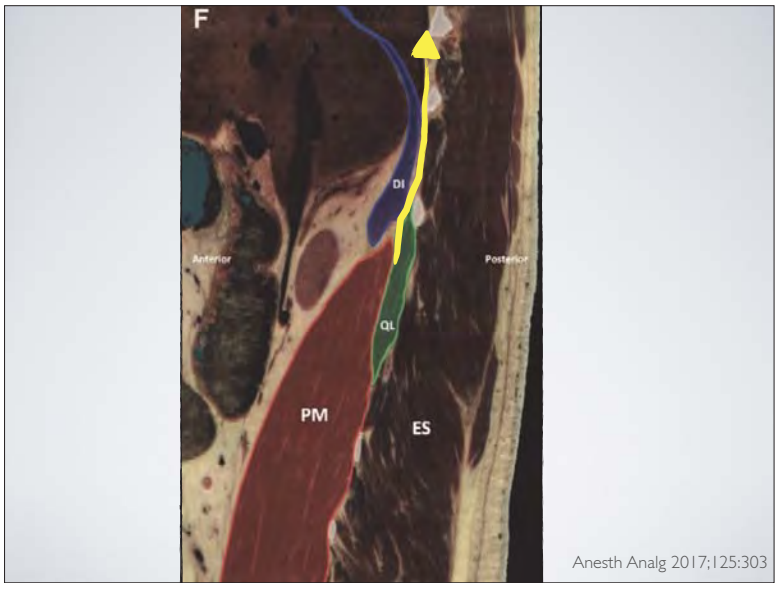






VOLUME!!

AT LEAST 30 ML

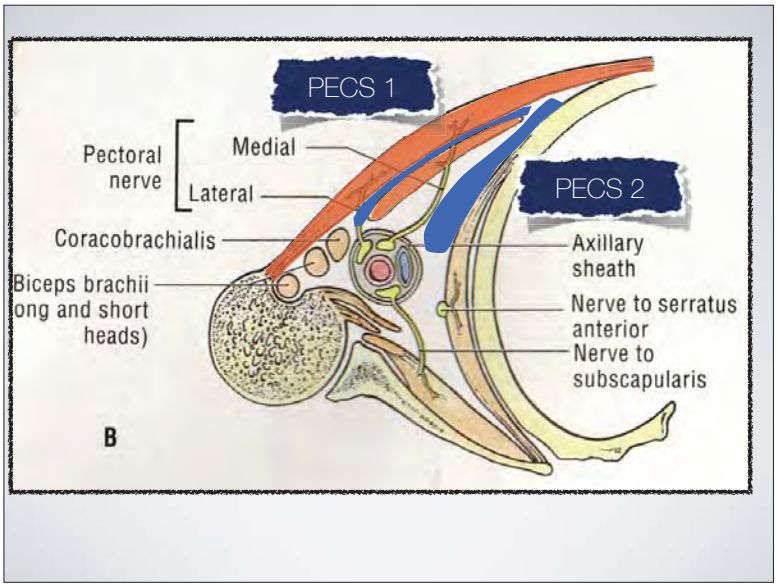


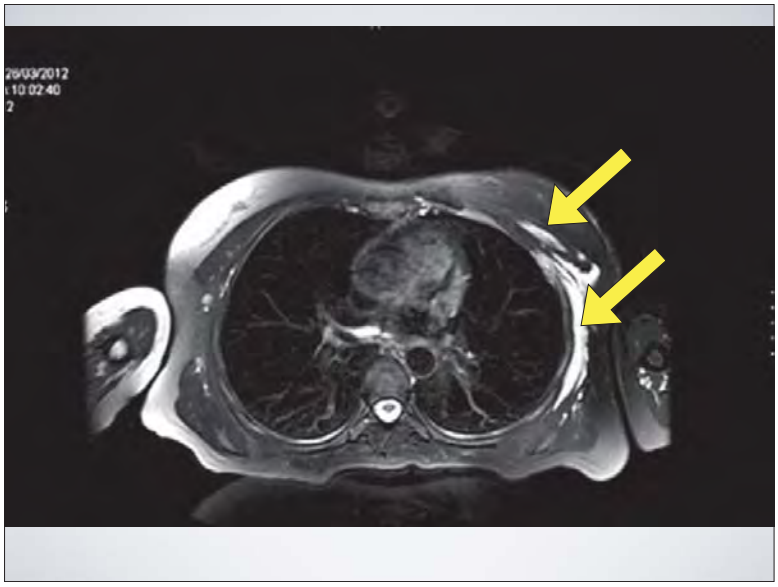
Anesth Analg 2017;125:303

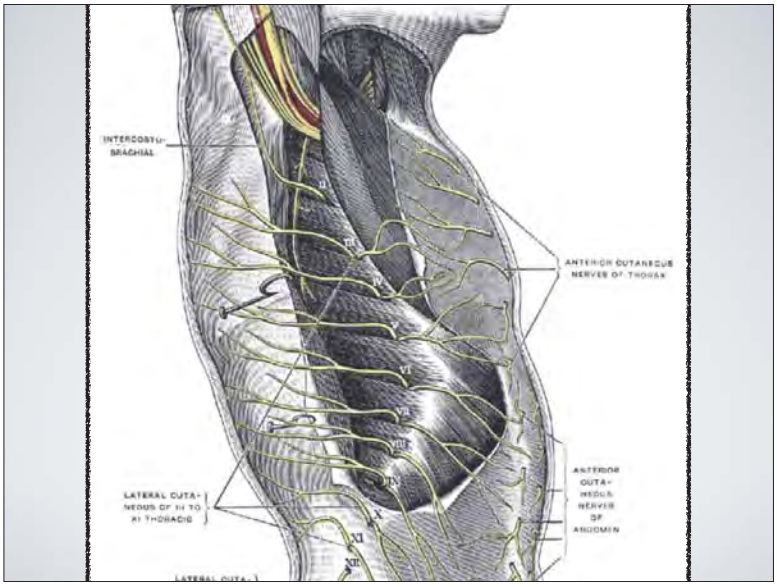
PECS INFILTRATION

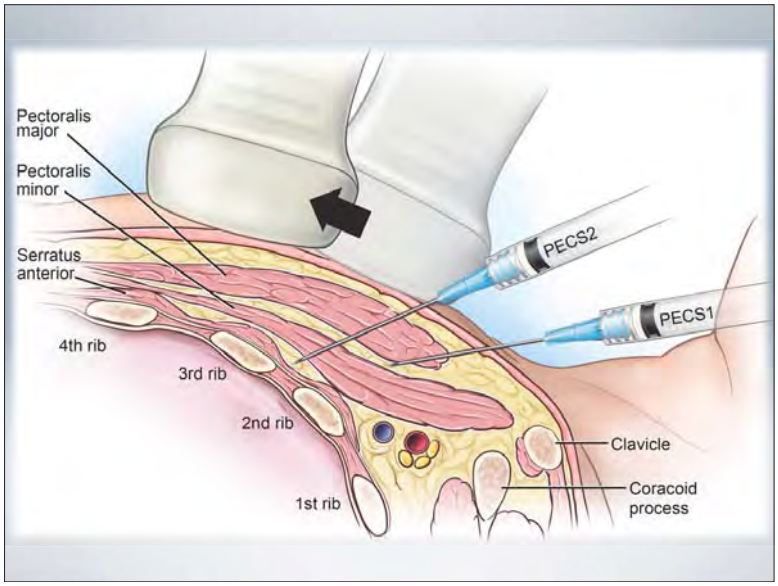
PECS I&II INFILTRATION

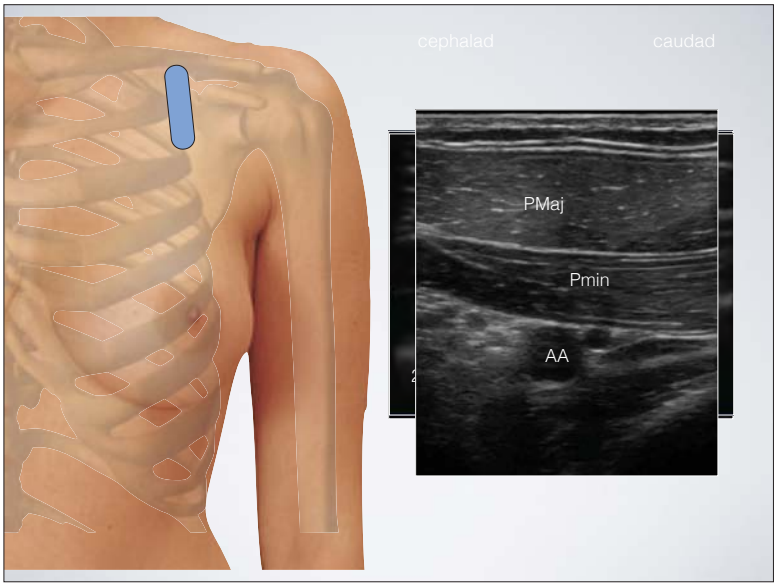
- Analgesia for
  - *Chest wall cases*
- Advantage over PVBs
- Disadvantage over PVBs



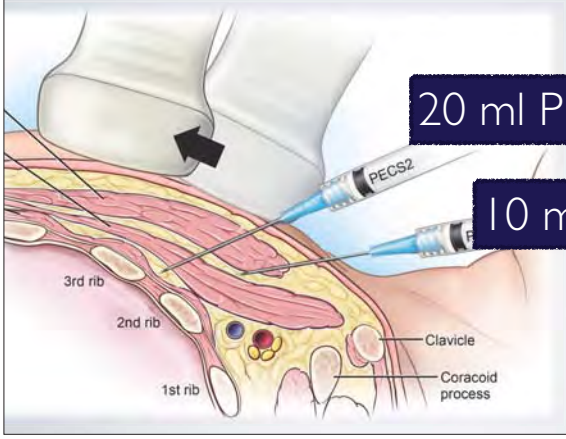


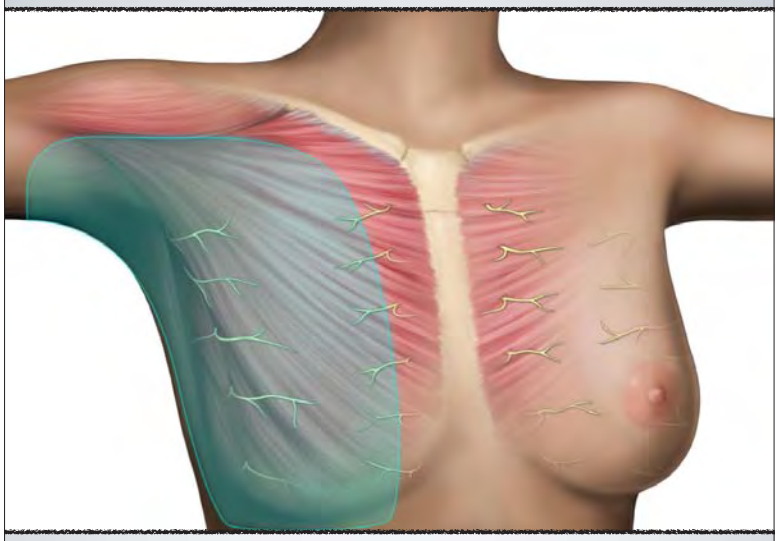




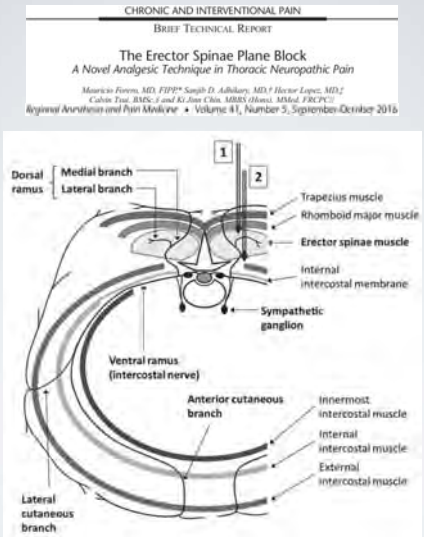


RECIPE





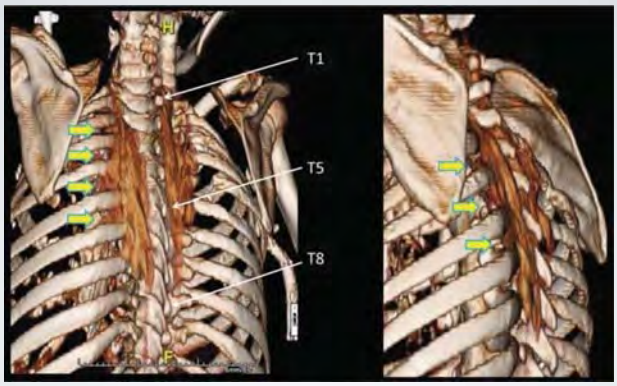
ERECTOR SPINAE PLANE (ESP) INFILTRATION


CHRONIC AND INTERVENTIONAL PAIN

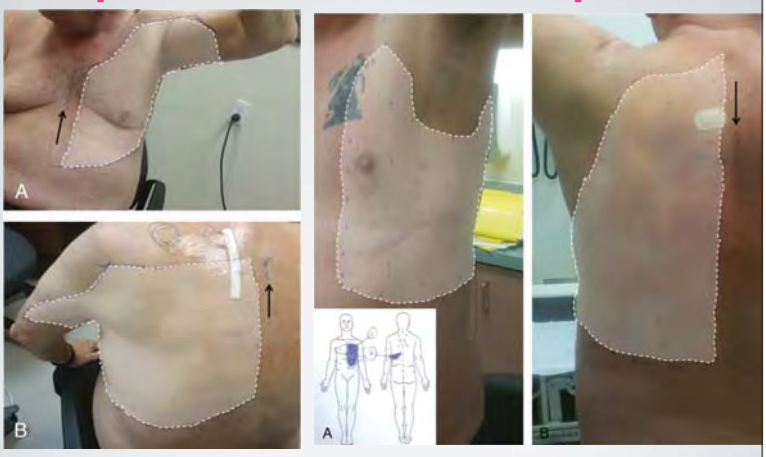
BRIEF TECHNICAL REPORT

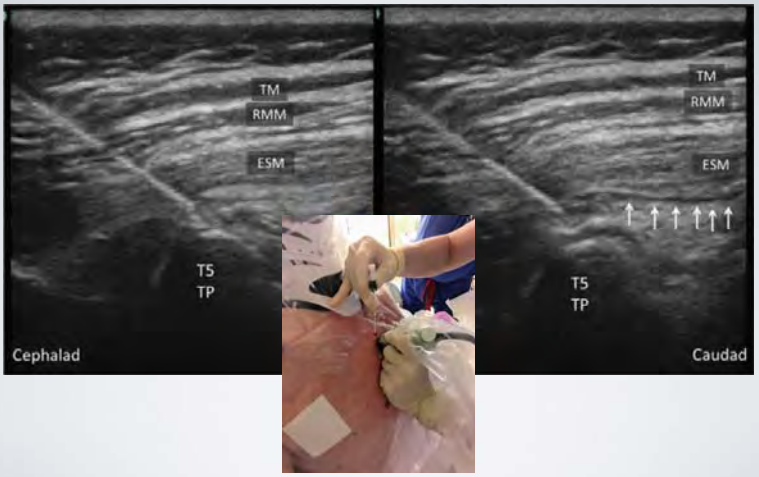
The Erector Spinae Plane Block

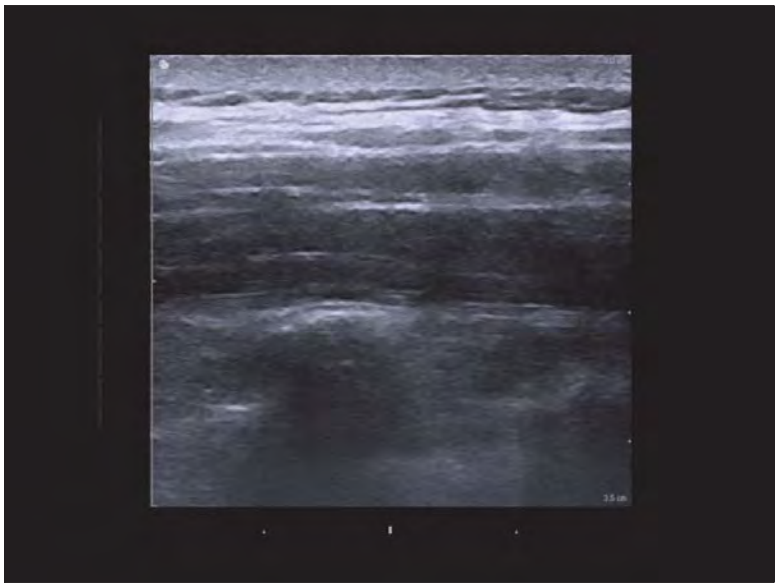
A Novel Analgesic Technique in Thoracic Neuropathic Pain



Superficial Deep







ESP BLOCK

- Analgesia for
  - *Chest wall cases - T2-T9*
  - *Abdominal cases?*
- Advantage over PECS, TAP, or QL? PVB?
- Visceral coverage?

VOLUME!!

AT LEAST 30 ML

HOW DO I MAKE MY BLOCKS LAST LONGER?

- Perineural catheter
- Long-acting local anesthetic
- Additives

CONTINUOUS PERINEURAL CATHETERS

- Longest lasting
- Most difficult placement
- Requires the most work - follow-up
- Best patient satisfaction

LONG-ACTING LOCAL ANESTHETIC

- Bupivacaine > Ropivacaine > Lidocaine/Mepivacaine > Chloroprocaine
- Liposomal bupivacaine

ADDITIVES

- Epinephrine
- Dexamethasone
- alpha-2 agonist
- Opioid
- Anything imaginable?

SUMMARY

- Lower risk than neuraxial
- Not as effective as neuraxial?
- Easy to perform
- Can easily be prolonged

CONCLUSIONS

ACKNOWLEDGEMENTS

- Jeff Gadsden
- Stuart Grant
- Joseph Mathew
- Duke Regional Anesthesia and Acute Pain Medicine colleagues

Duke Anesthesiology
Duke University School of Medicine

Regional Anesthesia and Acute Pain Medicine
#DukeRAP

Efficacy of Bispectral Index in reducing intraoperative awareness: A meta-analysis of randomized control studies

Thomas Cheriyan[1], Kevin Bai[1], Anterpreet Dua[1]and Vikas Kumar[1]

[1]Department of Anesthesiology and Perioperative Medicine, Medical College of Georgia at Augusta University, Augusta, GA

INTRODUCTION

- Bispectral index (BIS) monitoring has become a widely used modality to assess the depth of anesthesia and help reduce the incidence of intraoperative awareness (IOA).
- Randomized controlled trials (RCTs) investigating the efficacy of BIS to reduce IOA have reported conflicting results.
- The utility of BIS in reducing the amount of inhaled and intravenous anesthetics when compared to controls have reported contradictory results.

PURPOSE

- The purpose of this meta-analysis is to consolidate results from RCTs to assess the efficacy of BIS in reducing IOA and utilization of anesthetics when compared to controls.

D

METHODS

- RCTs which investigated the effectiveness of BIS compared with a control group were included in the meta-analysis.
- Meta-analysis was performed using RevMan 5. Pooled odd's ratio (OR) and mean difference (MD)/standardized mean difference(SMD) with 95% confidence interval (CI) was used for categorical data and continuous data, respectively.
- The Jadad scale was used for study quality assessment.

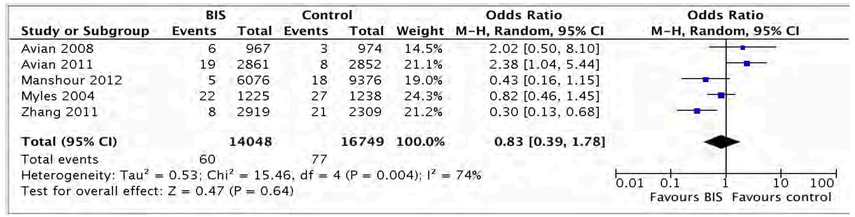
RESTULTS

- Twenty-six RCTs were included a total of 32,307 patients with 14,664 and 17, 643 in the BIS and control groups, respectively.
- Nineteen studies had low-risk of bias and 7 had medium risk of bias.

Definite awareness

- 18 of 14,062 patients (0.0012%) and 42 of 16,705(0.0025%) reported definite IOA in the BIS and control group, respectively.
- No statistically significant difference among the two groups (OR=0.50; 95% CI [0.19, 1.27]; p=0.06).

Possible and definite awareness



- No protective effect on BIS on definite and possible IOA. (OR = 0.83, 95% CI = [0.39, 1.78], p = 0.64).

RESULTS

Outcome	Effect size	P
Spontaneous eye opening	-1.30, 95% CI = [-2.28, -0.32]	0.010
Eye opening to verbal commands	-1.34, 95%CI = [-3.31, 0.64}	0.19
Extubation	-1.97, 95%CI = [-2.81, -1.11]	0.00001
Time to discharge from PACU	4.80, 95%CI = [-10.18, 0.58]	0.0001

Outcome	Effect size	P
Sevoflurane consumption	= -0.41, 95% CI = [-0.76, -0.07]	0.02
Desflurane consumption	-0.52, 95%CI = [-1.24, 0.19]	0.00001
Propofol consumption	-0.83, 95%CI = [-1.71, 0.04]	0.0001

CONCLUSIONS

- BIS group had decreased incidence of definite IOA, it was not statistically significant.
- BIS is efficacious in reducing time to extubation; time to spontaneous eye opening; reducing PACU time
- Utilization of BIS might reduce consumption of anesthetics compared to controls.

ACKNOWLEDEGEMENTS

- Department Of Anesthesiology and Perioperative Medicine, Medical College of Georgia, Augusta, GA

Feasibility Study: fMRI Evaluation of Auricular Percutaneous Electrical Neural Field Stimulation

Melat Gebre, B.S., Anna Woodbury, M.D., Vitaly Napadow, Ph.D., Venkatagiri Krishnamurthy, Ph.D., Lisa Krishnamurthy, Ph.D., Roman Sniecinski, M.D., Bruce Crosson, Ph.D.

Center for Visual and Neurocognitive Rehabilitation, Atlanta Veterans Affairs Medical Center. Emory University School of Medicine, Atlanta, GA.

Introduction:

- Current therapies for fibromyalgia often fall short.
- In light of the opioid epidemic, better treatment option is needed.
- Percutaneous electric neural field stimulation (PENFS) is electrical field stimulation applied to the ear with the intention of stimulating vagus nerve.
- Stimulation exerts a central effect on the autonomic nervous system, which may be efficacious in treating sympathetically or centrally mediated pain syndromes such as fibromyalgia [1,2,3].
- Study looks to evaluate whether PENFS leads to analgesia and functional improvements as compared to standard treatment in veterans with fibromyalgia.
- We hypothesize that patients in treatment group will have greater improvements in pain and function when compared to standard treatment control.

Materials and Methods:

Subjects: 16/20 veterans from the Atlanta VA have been recruited. 4 patients completed study.

Intervention: Patients randomized into 2 groups: standard therapy and PENFS subjects. Standard therapy includes anticonvulsants, NSAIDs, and physical therapy. All individualized to patient co-morbidities. PENFS group: Standard therapy + Neuro-Stim System (NSS) placed on the ear for 5 days then removed and replaced once per week for 4 weeks.

Imaging: MRI studies obtained within 2 weeks prior to initiation of treatment and repeated within 2 weeks after final treatment.

Assessments: Bio-behavioral and functional assessments occur 1x before treatment and repeated at 4, 8, and 12 weeks after final treatment.

Figure 1: Military Field Stimulator/Neuro-Stim System (MFS/NSS)

Figure 2: Auricle Innervation

Figure 3: DVPRS

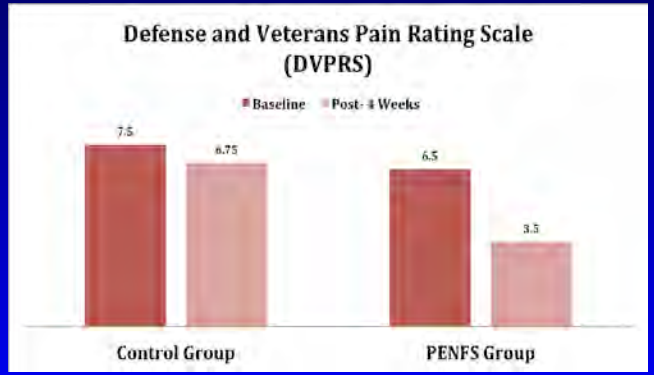
Preliminary Results:

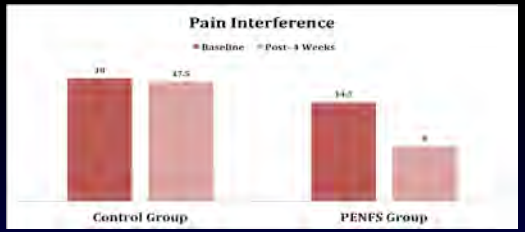
Clinical Characteristics

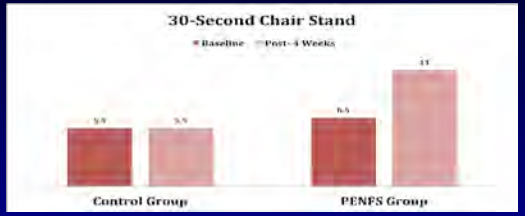
	Control Group (Standard Therapy)		PENFS Group	
	Patient 1	Patient 2	Patient 3	Patient 3
Age	43 years old	50 years old	57 years old	44 years old
Sex	Male	Male	Male	Female
Race	White	White	Black/African-American	Black/African-American

Bio-behavioral and Functional Assessments

	Control Group (Standard Therapy)				PENFS Group			
	Patient 1		Patient 2		Patient 3		Patient 4	
	Baseline	Post- 4 Weeks	Baseline	Post- 4 Weeks	Baseline	Post- 4 Weeks	Baseline	Post- 4 Weeks
DVPRS (10)	6	6.5	9	7	8	5	5	2
Pain Interference (20)	16	17	20	18	15	11	14	5
Physical Function (Worst: 8, Best: 40)	25	16	14	18	18	25	23	40
Depression (20)	10	10	5	6	6	6	12	4
Chair Stand	5	7	6	4	11	10	2	12
Hand Grip (mean), kg	Left: 38 Right: 34.7	Left: 38.7 Right: 38.7	Left: 31 Right: 28.3	Left: 18.3 Right: 18.7	Left: 39.3 Right: 43.7	Left: 34 Right: 35	Left: 7 Right: 1.7	Left: 17 Right: 18.7
Arm Curl	Left: 18 Right: 18	Left: 20 Right: 17	Left: 17 Right: 17	Left: 11 Right: 11	Left: 26 Right: 24	Left: 25 Right: 24	Left: 12 Right: 13	Left: 23 Right: 22







Conclusion:

Large improvement in DVPRS, pain interference score and physical function in the treatment group. PENFS could play an important role alongside standard therapy. Data set only shows preliminary results for 4/20 patients. Additional results and analysis warranted to further investigate efficacy of PENFS and determine significance. Future directions include analysis of MRI data to evaluate the feasibility of using fMRI as a biomarker to investigate changes in neural correlates of pain in patients undergoing PENFS.

Acknowledgments: Special thanks to Dr. Woodbury and Dr. Kalangara.

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Continuous TAP Block as Primary Anesthetic for Open Right Inguinal Herniorraphy in a Patient with Severe Pulmonary Hypertension and Thrombocytopenia

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INTRODUCTION

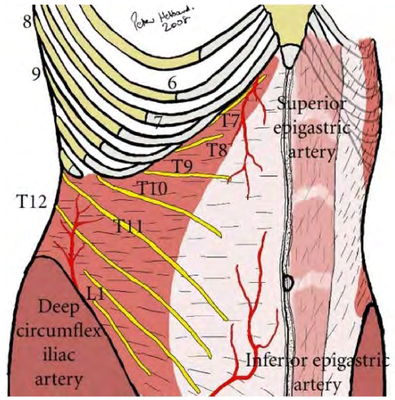
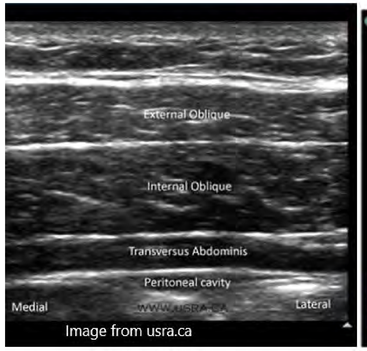
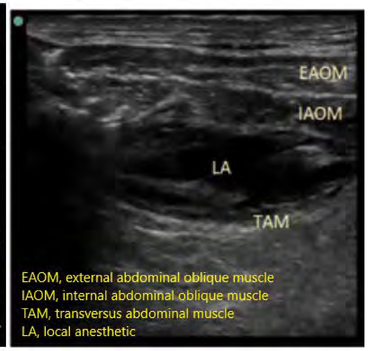


Figure 1: Anatomy of abdominal wall

- T7-T12 intercostal nerves, ilioinguinal and iliohypogastric nerves, and lateral cutaneous branches of the dorsal rami of L1-3

- Under ultrasound guidance, LA is injected between the internal abdominal oblique and transversus abdominis (see below image).





CASE DESCRIPTION

67-year-old male with severe pulmonary hypertension (RVSP 80-85), systemic hypertension, chronic thrombocytopenia (platelet 52,000) for open right inguinal hernia repair

- Preoperative:
  - Placement of right-sided TAP block in the left lateral decubitus position
  - 10 mL of 0.5% ropivacaine and 20 mL of 2% lidocaine were injected
  - 20G catheter was then inserted

- Intraoperative:
  - Standard ASA monitors with arterial line
  - 2 L/min of supplemental oxygen via nasal
  - Sedation with 0.7 mcg/kg/min dexmedetomidine and 50 mcg/kg/min propofol infusions
  - 2-hour surgery tolerated with above management

- Postoperative (SICU)
  - Complicated by right groin hematoma, unrelated to TAP catheter
  - TAP catheter infused 0.2% ropivacaine at 10 mL/hour
  - Tramadol 50 mg every 6 hours was administered for supplemental relief
  - Catheter was removed on post-operative day 3 without complications

DISCUSSION

- Hypercarbia and hypoxia are major concerns with severe pulmonary hypertension
  - Regional anesthesia for intraoperative management is preferred over general anesthesia
  - Minimizing opioids for postoperative management is important

- Interest in continuous TAP block for abdominal surgeries

- Continuous TAP blocks have been reported to reduce overall opioid use in PACU and two days postoperatively

- Reported to have no difference in pain or opioid consumption in comparison to epidural analgesia.

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