Nerve Blocks & Anesthesia: What Plastic Surgeons Can Do

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ASPS AESTHETICA SUPER SYMPOSIUM

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AMERICAN SOCIETY OF PLASTIC SURGEONS

PROGRAM CO-CHAIRS:
Amy Alderman, MD
Dennis Hammond, MD
James Zins, MD

Disclosures

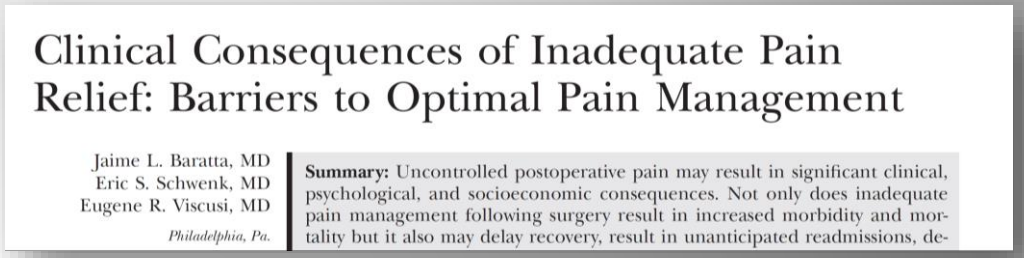
Merz

Syneron/Candela

May use brand names due to lack of distinguishing generic names

Why is Non-Opioid Analgesia Important

- Opioid epidemic
- Less opioid use
- Less PONV
- Faster transfer from PACU
- Faster discharge home
- Normalized physiology (RR, HR, BP)
- Decreased surgical stress response?
- Decreased risk of long-term pain & CRPS?



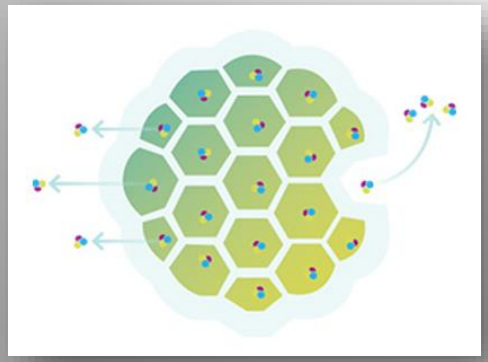
Clinical Consequences of Inadequate Pain Relief: Barriers to Optimal Pain Management

Jaime L. Baratta, MD
Eric S. Schwenk, MD
Eugene R. Viscusi, MD
Philadelphia, Pa.

Summary: Uncontrolled postoperative pain may result in significant clinical, psychological, and socioeconomic consequences. Not only does inadequate pain management following surgery result in increased morbidity and mortality but it also may delay recovery, result in unanticipated readmissions, de-

Liposomal Bupivacaine (Exparel)

- Controlled bupivacaine release
- Pain relief 2 to 3 days
- Can’t mix with lidocaine within 20 min
- May be an “add on” cost ($300/vial)
- Mixed results in breast augmentation
- Use in plastic surgery not standardized



Systematic Review of Liposomal Bupivacaine (Exparel) for Postoperative Analgesia

Krishna S. Vyas, M.D., M.H.S.
Sibi Rajendran, B.S.
Shane D. Morrison, M.D., M.S.
Afaaf Shakir, B.S.
Samir Mardini, M.D.
Valerie Lemaine, M.D., M.P.H.

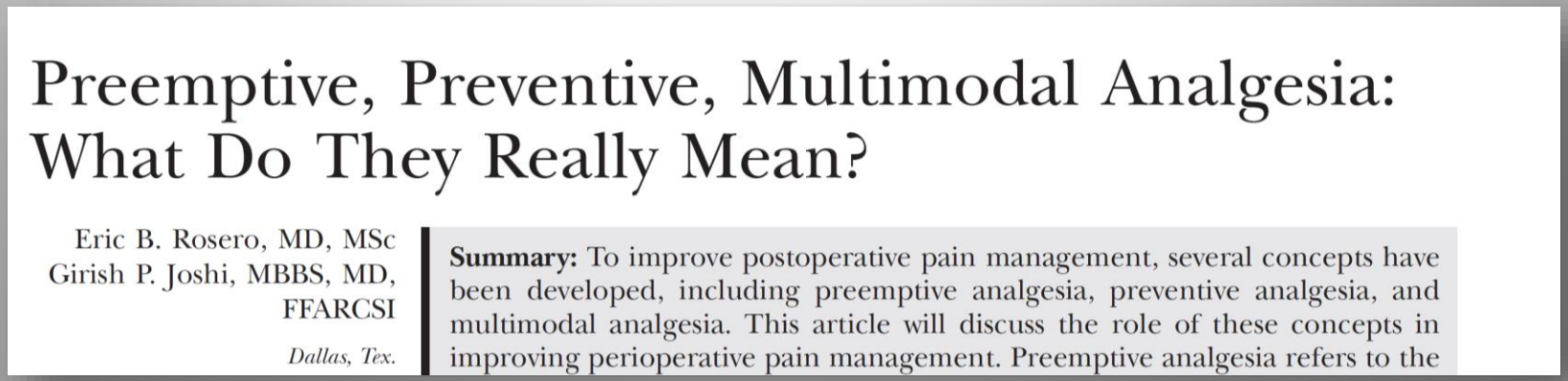
Background: Management of postoperative pain often requires multimodal approaches. Suboptimal dosages of current therapies can leave patients experiencing periods of insufficient analgesia, often requiring rescue therapy. With absence of a validated and standardized approach to pain management, further refinement of treatment protocols and targeted therapeutics is needed. Liposomal bupivacaine (Exparel) is a longer acting form of traditional bupivacaine that delivers the drug by means of a multivesicular liposomal system. The effectiveness of liposomal bupivacaine has not been systematically analyzed relative to conventional treatments in plastic surgery.

Liposomal Bupivacaine – Big Picture

- Lack of evidence prevents assessment of liposomal bupivacaine as a peripheral nerve block (2016)
- Liposomal bupivacaine at surgical site (2017)
  - Appears to reduce postop pain compared to placebo
  - Limited evidence does NOT demonstrate superiority to bupivacaine

Preemptive & Preventive Analgesia

- Preemptive analgesia (before incision) effectiveness is debatable
  - Local anesthetic at incision sites (mandatory in MAC cases)
  - Preoperative oral NSAIDs, acetaminophen (useful for short cases)
- Preventive analgesia (after incision) effectiveness is debatable
- Has to be part of ERAS protocol



Preemptive, Preventive, Multimodal Analgesia: What Do They Really Mean?

Eric B. Rosero, MD, MSc
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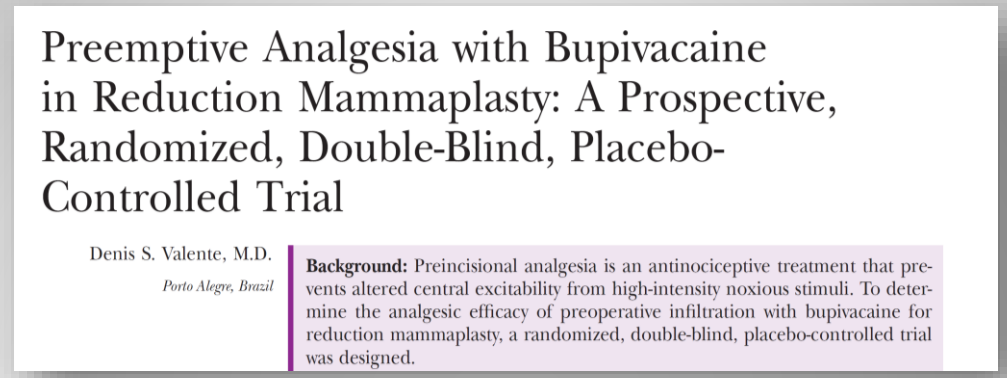
Dallas, Tex.

Summary: To improve postoperative pain management, several concepts have been developed, including preemptive analgesia, preventive analgesia, and multimodal analgesia. This article will discuss the role of these concepts in improving perioperative pain management. Preemptive analgesia refers to the

Preemptive Bupivacaine in Breast Reduction



Preemptive Analgesia with Bupivacaine in Reduction Mammaplasty: A Prospective, Randomized, Double-Blind, Placebo-Controlled Trial

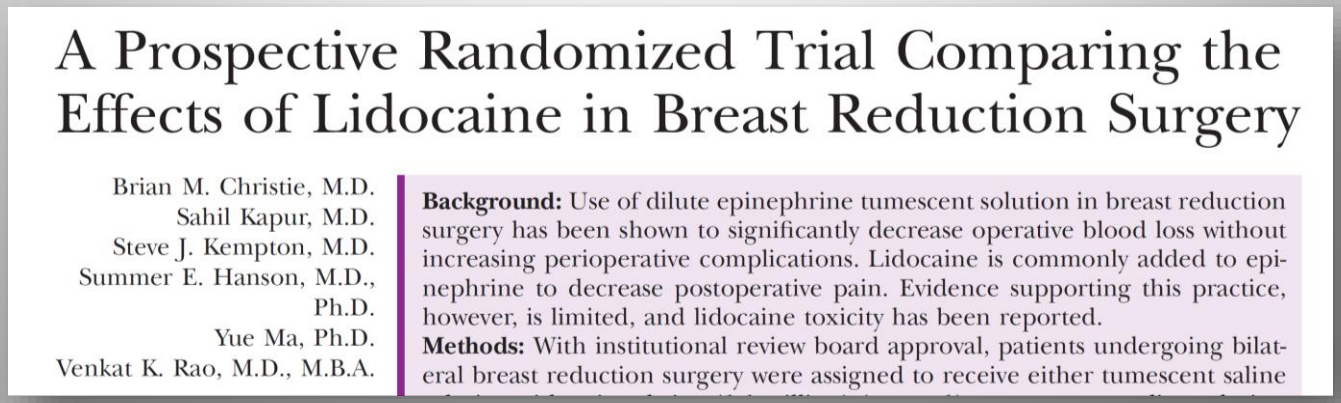
Denis S. Valente, M.D.
Porto Alegre, Brazil

Background: Preincisional analgesia is an antinociceptive treatment that prevents altered central excitability from high-intensity noxious stimuli. To determine the analgesic efficacy of preoperative infiltration with bupivacaine for reduction mammaplasty, a randomized, double-blind, placebo-controlled trial was designed.

- 110 mL dilute bupivacaine + epi per side
- Incisions and retroglandular
- Significant improvement in
  - Time from surgery to first analgesic
  - Number of analgesic doses
  - McGill Pain Questionnaire
  - Visual analogue pain scale
  - Verbal pain scale

Tumescent Lidocaine in Breast Reduction

- 250 mg lidocaine in 500 mL NS per breast
- No difference in pain, narcotic use, PONV in first 24 hrs
- Consider 750 to 1000 mg - it works!
- Need bupivacaine in incision sites



A Prospective Randomized Trial Comparing the Effects of Lidocaine in Breast Reduction Surgery

Brian M. Christie, M.D.
Sahil Kapur, M.D.
Steve J. Kempton, M.D.
Summer E. Hanson, M.D., Ph.D.
Yue Ma, Ph.D.
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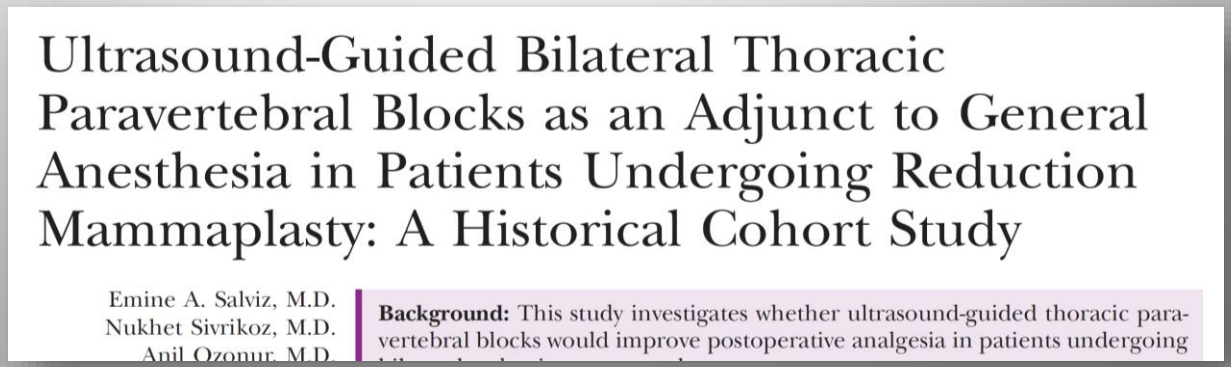
Background: Use of dilute epinephrine tumescent solution in breast reduction surgery has been shown to significantly decrease operative blood loss without increasing perioperative complications. Lidocaine is commonly added to epinephrine to decrease postoperative pain. Evidence supporting this practice, however, is limited, and lidocaine toxicity has been reported.
Methods: With institutional review board approval, patients undergoing bilateral breast reduction surgery were assigned to receive either tumescent saline

Paravertebral Block for Breast Reduction

- Reduction in
  - Time to first pain
  - Fentanyl requirement
  - Pain scale scores
  - Tramadol in PACU
- Not worth the effort?



Ultrasound-Guided Bilateral Thoracic Paravertebral Blocks as an Adjunct to General Anesthesia in Patients Undergoing Reduction Mammaplasty: A Historical Cohort Study

Emine A. Salviz, M.D.
Nukhet Sivrikoz, M.D.
Anil Ozonur, M.D.

Background: This study investigates whether ultrasound-guided thoracic paravertebral blocks would improve postoperative analgesia in patients undergoing

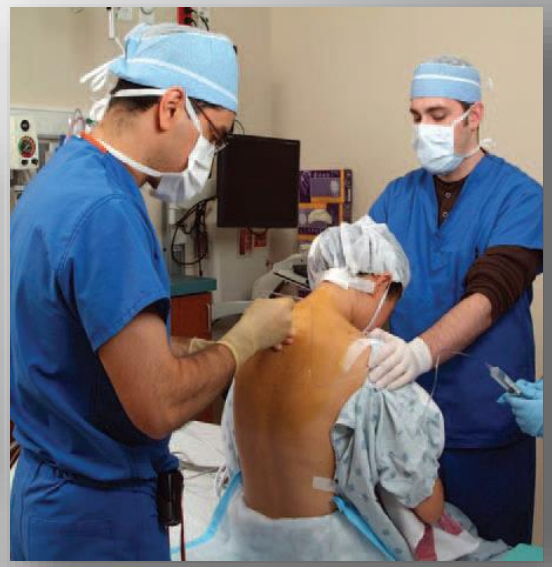
Paravertebral Block Implant Reconstruction

- RCT 74 patients PVB vs no block
  - Less opioid (109 vs 246 fentanyl units)
  - Lower pain scores
- Less PONV medication

A Prospective, Randomized, Controlled Trial of Paravertebral Block versus General Anesthesia Alone for Prosthetic Breast Reconstruction

Omer Wolf, M.D.
Mark W. Clemens, M.D.
Ronaldo V. Purugganan, M.D.

Background: Paravertebral blocks have gained popularity because of ease of implementation and a shift toward ambulatory breast surgery procedures. Previous retrospective studies have reported potential benefits of paravertebral blocks, including decreased narcotic and antiemetic use.



Liposomal Bupivacaine in Immediate Implant Breast Reconstruction

- Conventional (C) vs bupivacaine pump (BP) vs liposomal bupivacaine intercostal nerve block (LB)
- LB LOS 1.5 days vs 2.0 days for conventional protocol
- LB lower pain scores at from 4 to 24 hrs compared to BP & C

Postoperative Pain and Length of Stay Lowered by Use of Exparel in Immediate, Implant-Based Breast Reconstruction

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Deana S. Shenaq, MD*
Veronica L. M. Rundell, PhD†
Brittany Kepler†
Eric Liederbach, BS‡
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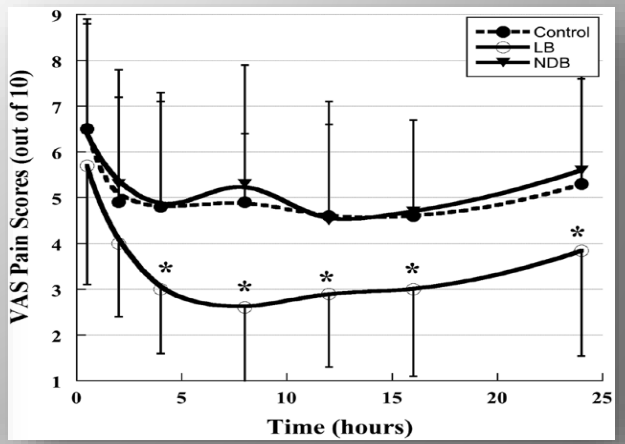
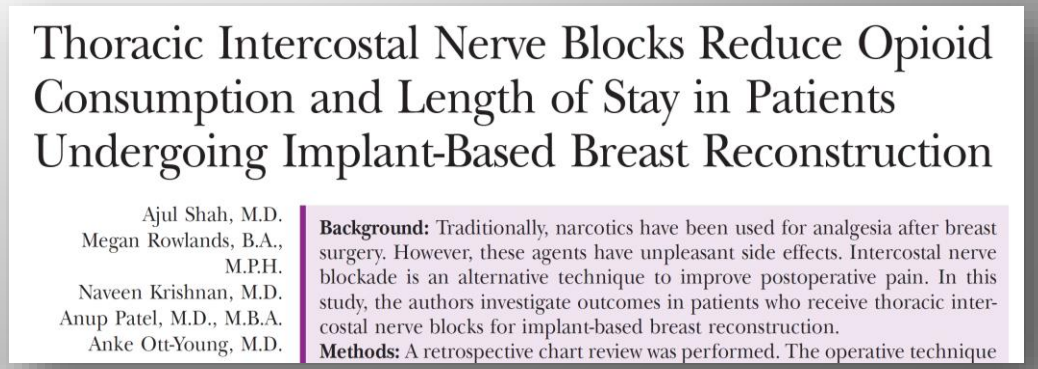
Catherine Pesce, MD‡

Background: Patients undergoing mastectomy and prosthetic breast reconstruction have significant acute postsurgical pain, routinely mandating inpatient hospitalization. Liposomal bupivacaine (LB) (Exparel; Pacira Pharmaceuticals, Inc., Parsippany, N.J.) has been shown to be a safe and effective pain reliever in the immediate postoperative period and may be advantageous for use in mastectomy and breast reconstruction patients.



Bupivacaine Intercostal Blocks & Implant Reconstruction

- Bilateral reconstruction, lower
  - Length of stay
  - IV morphine
  - Valium
- Unilateral reconstruction, lower
  - IV morphine
- Cost savings per patient
  - Bilateral $2873
  - Unilateral $1532



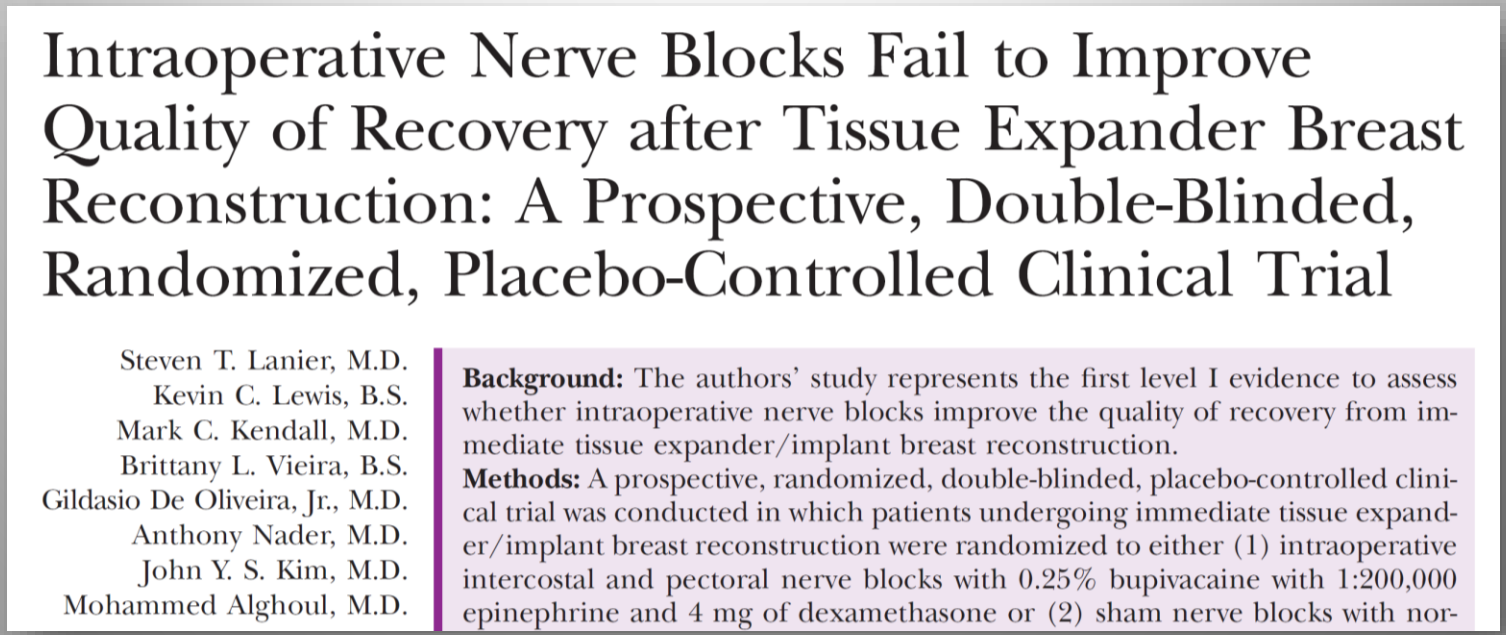
Thoracic Intercostal Nerve Blocks Reduce Opioid Consumption and Length of Stay in Patients Undergoing Implant-Based Breast Reconstruction

Ajul Shah, M.D.
Megan Rowlands, B.A., M.P.H.
Naveen Krishnan, M.D.
Anup Patel, M.D., M.B.A.
Anke Ott-Young, M.D.

Background: Traditionally, narcotics have been used for analgesia after breast surgery. However, these agents have unpleasant side effects. Intercostal nerve blockade is an alternative technique to improve postoperative pain. In this study, the authors investigate outcomes in patients who receive thoracic intercostal nerve blocks for implant-based breast reconstruction.
Methods: A retrospective chart review was performed. The operative technique

Nerve Blocks Alone Not Enough?

- No outcome difference between bupivacaine nerve blocks & placebo
- Not part of a robust postoperative multimodal analgesic regimen



Intraoperative Nerve Blocks Fail to Improve Quality of Recovery after Tissue Expander Breast Reconstruction: A Prospective, Double-Blinded, Randomized, Placebo-Controlled Clinical Trial

Steven T. Lanier, M.D.
Kevin C. Lewis, B.S.
Mark C. Kendall, M.D.
Brittany L. Vieira, B.S.
Gildasio De Oliveira, Jr., M.D.
Anthony Nader, M.D.
John Y. S. Kim, M.D.
Mohammed Alghoul, M.D.

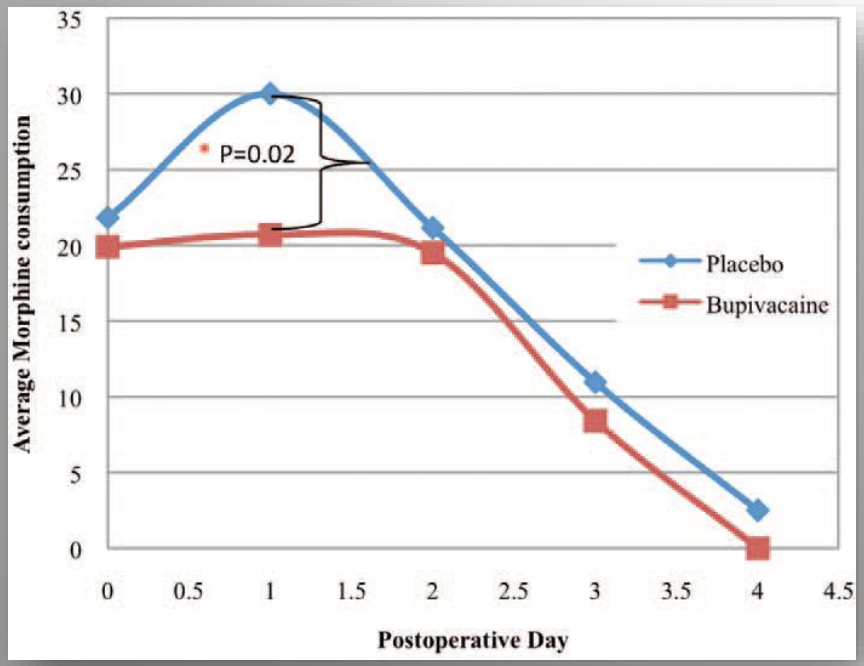
Background: The authors' study represents the first level I evidence to assess whether intraoperative nerve blocks improve the quality of recovery from immediate tissue expander/implant breast reconstruction.
Methods: A prospective, randomized, double-blinded, placebo-controlled clinical trial was conducted in which patients undergoing immediate tissue expander/implant breast reconstruction were randomized to either (1) intraoperative intercostal and pectoral nerve blocks with 0.25% bupivacaine with 1:200,000 epinephrine and 4 mg of dexamethasone or (2) sham nerve blocks with nor-

Transversus Abdominis Plane (TAP) Block

- **TRANSVERSUS ABDOMINIS PLANE (TAP)**
- Between transversus abdominis & internal oblique
- 30 mL 0.25% ropivacaine or bupivacaine (with Epi) per side
- Ultrasound guided by anesthesiologist preoperative
- Open access by surgeon intraoperative

Bupivacaine Catheter TAP Block

- Reduction in POD 1 morphine use (21 mg vs 30 mg)

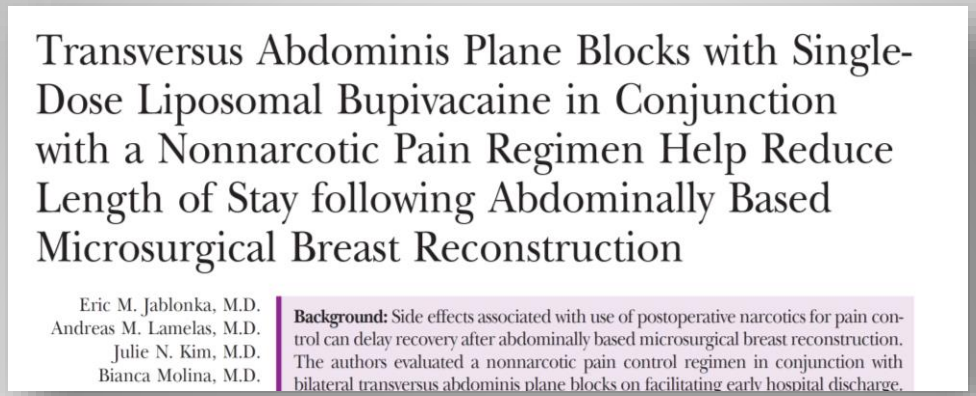


Transversus Abdominis Plane Block Reduces Morphine Consumption in the Early Postoperative Period following Microsurgical Abdominal Tissue Breast Reconstruction: A Double-Blind, Placebo-Controlled, Randomized Trial

Toni Zhong, M.D., M.H.S.
M. Ojha, M.N.
Shaghayegh Bagher, M.Sc.

Background: The analgesic efficacy of the transversus abdominis plane peripheral nerve block following abdominal tissue breast reconstruction has not been studied in a randomized controlled trial.

Liposomal Bupivacaine TAP Block



Transversus Abdominis Plane Blocks with Single-Dose Liposomal Bupivacaine in Conjunction with a Nonnarcotic Pain Regimen Help Reduce Length of Stay following Abdominally Based Microsurgical Breast Reconstruction

Eric M. Jablonka, M.D.
Andreas M. Lamelas, M.D.
Julie N. Kim, M.D.
Bianca Molina, M.D.

Background: Side effects associated with use of postoperative narcotics for pain control can delay recovery after abdominally based microsurgical breast reconstruction. The authors evaluated a nonnarcotic pain control regimen in conjunction with bilateral transversus abdominis plane blocks on facilitating early hospital discharge.

- Evolution from nothing (control), to continuous bupivacaine infusion TAP block with catheters, to single-dose TAP block with liposomal bupivacaine
- Reduction in length of stay
  - 2.7 days - liposomal bupivacaine
  - 3.5 days - bupivacaine catheter infusion
  - 4.1 days - control

Abdominoplasty Intraoperative TAP Block

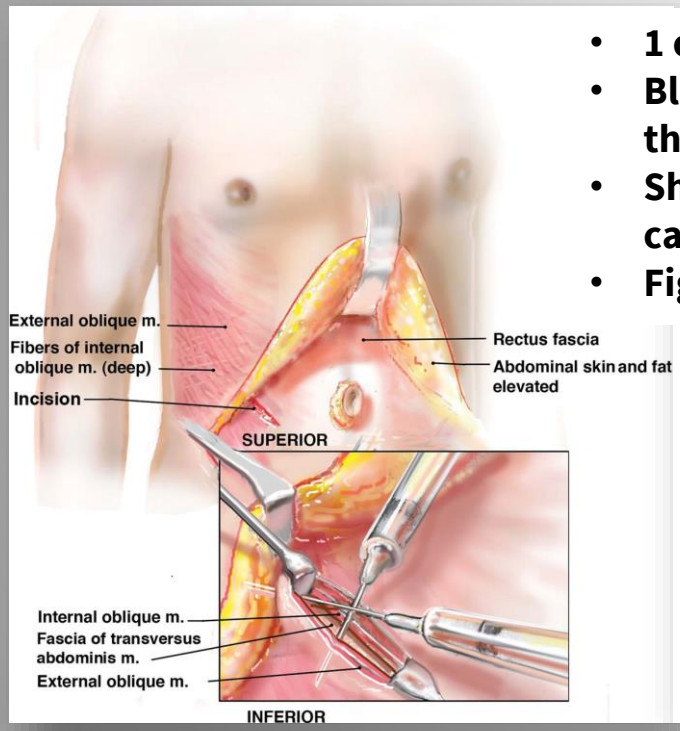
- 10 ml 0.5% bupivacaine 0.5% + 10 ml 1% lidocaine with Epi
- Reduced morphine requirement
- Earlier ambulation
- Lower pain scores

Transversus Abdominis Plane Block Anesthesia in Abdominoplasties

Marcos Sforza, M.D.
Katarina Andjelkov, M.D., M.S.
Renato Zaccheddu, M.D.
Hussein Nagi, M.D.
Miodrag Colic, M.D., Ph.D.

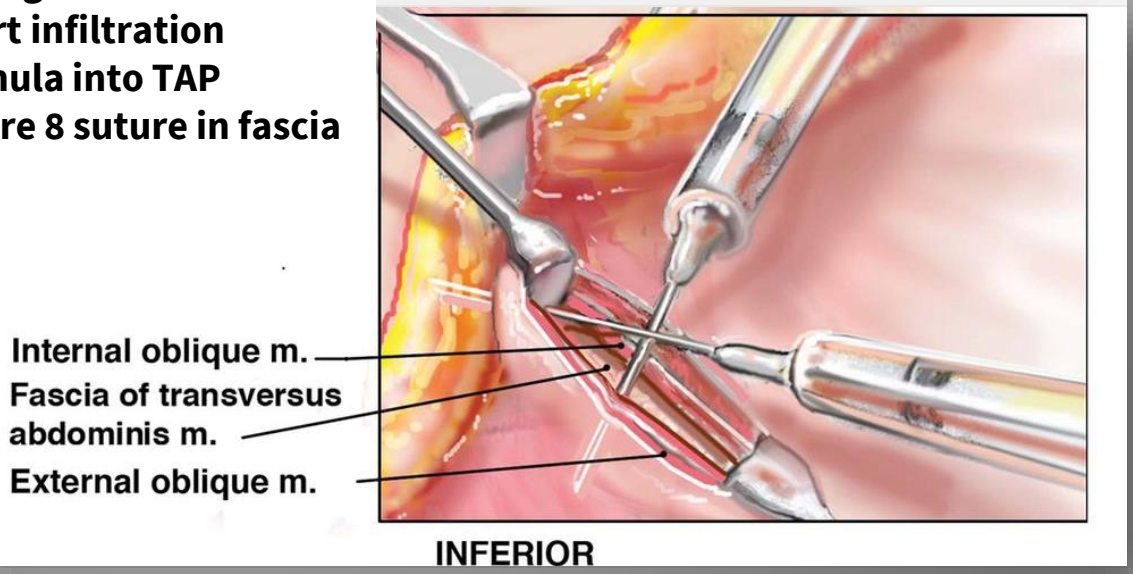
Background: The transversus abdominis plane block is a promising approach to the provision of postoperative analgesia following abdominal incision. This effective method blocks the sensory nerve supply to the anterior abdominal wall. The authors evaluated its analgesic efficacy over the first 12 postoperative hours after abdominoplasty with liposculpture in a randomized, controlled, double-blind clinical trial.

Transversus Abdominis Plane (TAP) Block

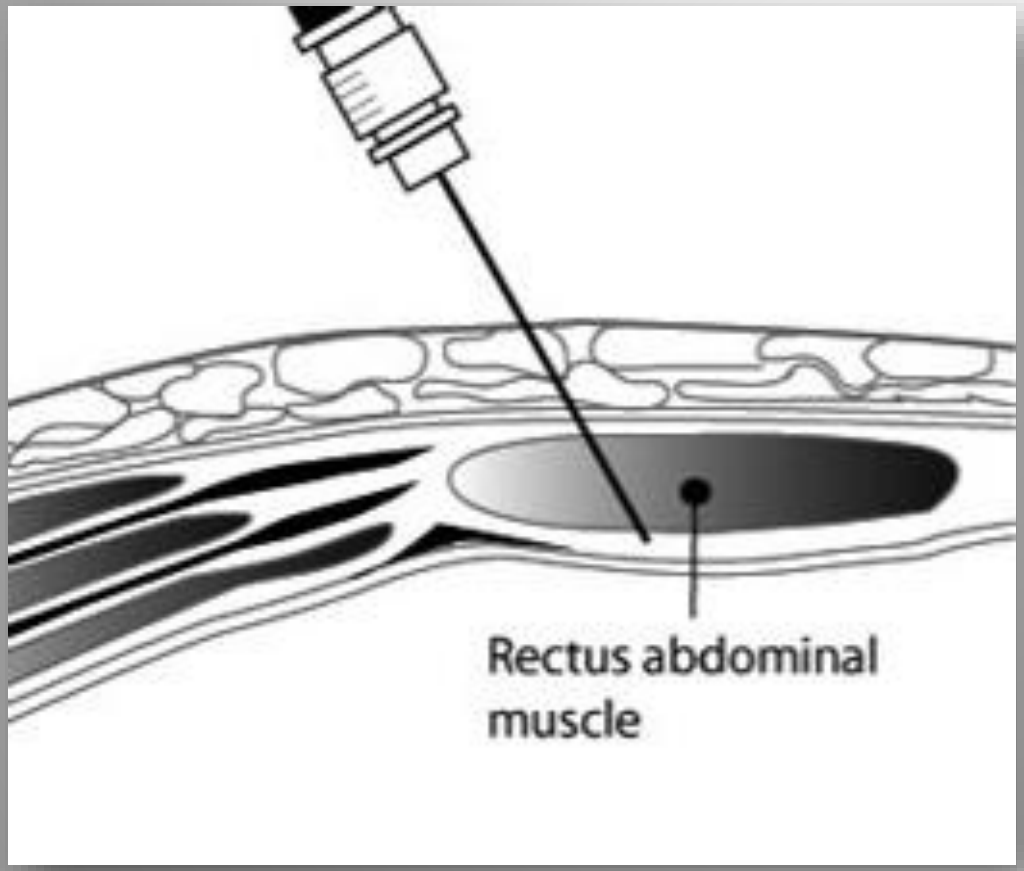


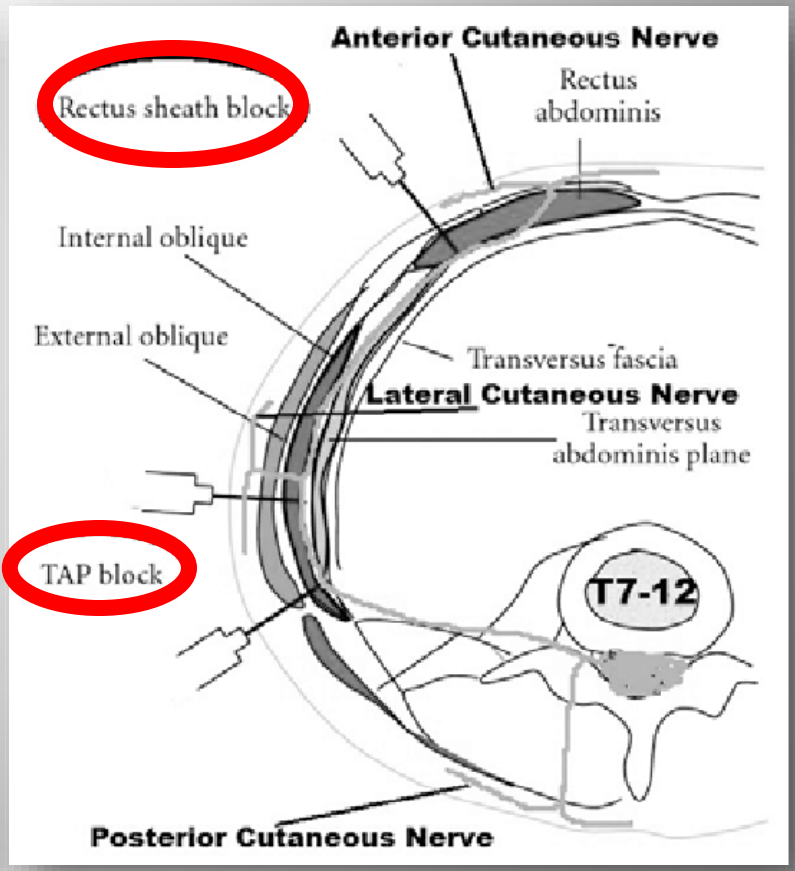
- **1 cm incision in facia**
- **Blunt dissection through EOM & IOM**
- **Short infiltration cannula into TAP**
- **Figure 8 suture in fascia**

Gutowski, PRS 2018



Rectus Sheath Block





NSAIDs Are Safe in Plastic Surgery

Time to dispel the myth of NSAIDs causing bleeding in breast & body cases

Ketorolac Does Not Increase Perioperative Bleeding: A Meta-Analysis of Randomized Controlled Trials

Ryan M. Gobble, M.D.
Han L. T. Hoang, M.D.
Bart Kachniarz, B.A.
Dennis P. Orgill, M.D., Ph.D.

Background: Postoperative pain control is essential for optimal patient outcomes. Ketorolac is an attractive alternative for achieving pain control postoperatively, but concerns over postoperative bleeding have limited its use.
Methods: Computer searches of the MEDLINE, EMBASE, and Cochrane Library databases were performed. Twenty-seven double-blind, randomized,

Ibuprofen May Not Increase Bleeding Risk in Plastic Surgery: A Systematic Review and Meta-Analysis

Brian P. Kelley, M.D.
Katelyn G. Bennett, M.D.
Kevin C. Chung, M.D., M.S.
Jeffrey H. Kozlow, M.D., M.S.

Background: Nonsteroidal antiinflammatory drugs such as ibuprofen are common medications with multiple useful effects, including pain relief and reduction of inflammation. However, surgeons commonly withhold all nonsteroidal antiinflammatory drugs perioperatively because of bleeding concerns. However, not all nonsteroidal antiinflammatory drugs irreversibly block platelet function. The authors hypothesized that the use of ibuprofen would have no

Team Effort with Anesthesiologist

- Seek out those who want to give a better patient experience
- Collaborate on ERAS protocols
- Give them patient feedback
- Learn from each other

Lipo-Abdominoplasty & Body Lift Protocol

- Gabapentin 300 mg PO (#40)
  - 600 mg at bedtime before surgery, then every 6 hrs x 3 to 5 days
- TAP or RS block
- SQ tumescent infiltration (500 mg lidocaine/L +epi)
- Ketorolac 30 mg IV during skin closure
- Acetaminophen 500 mg + NSAID of choice every 4 hr
- Oxycodone + acetaminophen (5/325 mg) #16
- Ondansetron 4 mg ODT prn #4

Breast Protocol

- Gabapentin 300 mg PO (#40)
  - 600 mg at bedtime before surgery, then every 6 hrs x 3 to 5 days
- Lidocaine + epi & bupivacaine in all incisions
- Breast reduction or Mastopexy
  - Breast tissue tumescent infiltration (500 mg lidocaine/L +epi)
- Breast Augmentation
  - 5 cc 0.5% bupivacaine in each breast pocket
- Ketorolac 30 mg IV during skin closure
- Acetaminophen 500 mg + NSAID of choice every 4 hr
- Oxycodone + acetaminophen (5/325 mg) #16
- Ondansetron 4 mg ODT prn #4

Tumescent Anesthesia Field Block

Tumescent infiltration as a field block

SPECIAL TOPIC

Tumescent Analgesia in Plastic Surgery

Karol A. Gutowski, MD

Columbus, Ohio

Background: Tumescent analgesia (TA) is commonly used for liposuction without needing sedation or general anesthesia.
Methods: A literature review of current use of TA in plastic surgery was done to determine other procedures where TA can be useful and present a standard protocol for use.
Results: TA is used for breast, body, face, and extremity procedures, both with and without supplemental anesthesia. The TA fluid commonly contains lidocaine as the anesthetic agent, but there is more recent experience with using bupivacaine. Despite concerns of high doses of local anesthetics, TA seems to be safe and effective.

Bupivacaine Tumescent Fluid

COSMETIC

Prospective Study of Lidocaine, Bupivacaine, and Epinephrine Levels and Blood Loss in Patients Undergoing Liposuction and Abdominoplasty

Eric Swanson, M.D.
Leawood, Kan.

Background: Bupivacaine levels have not been measured in cosmetic surgery patients to establish safety. Blood loss has been underestimated using the small

Physiologic Pain Pump

A Physiologic Pain Pump for Abdominoplasty: An Alternative to Regional Blocks and Liposomal Bupivacaine

Eric Swanson, M.D.
Leawood, Kan.

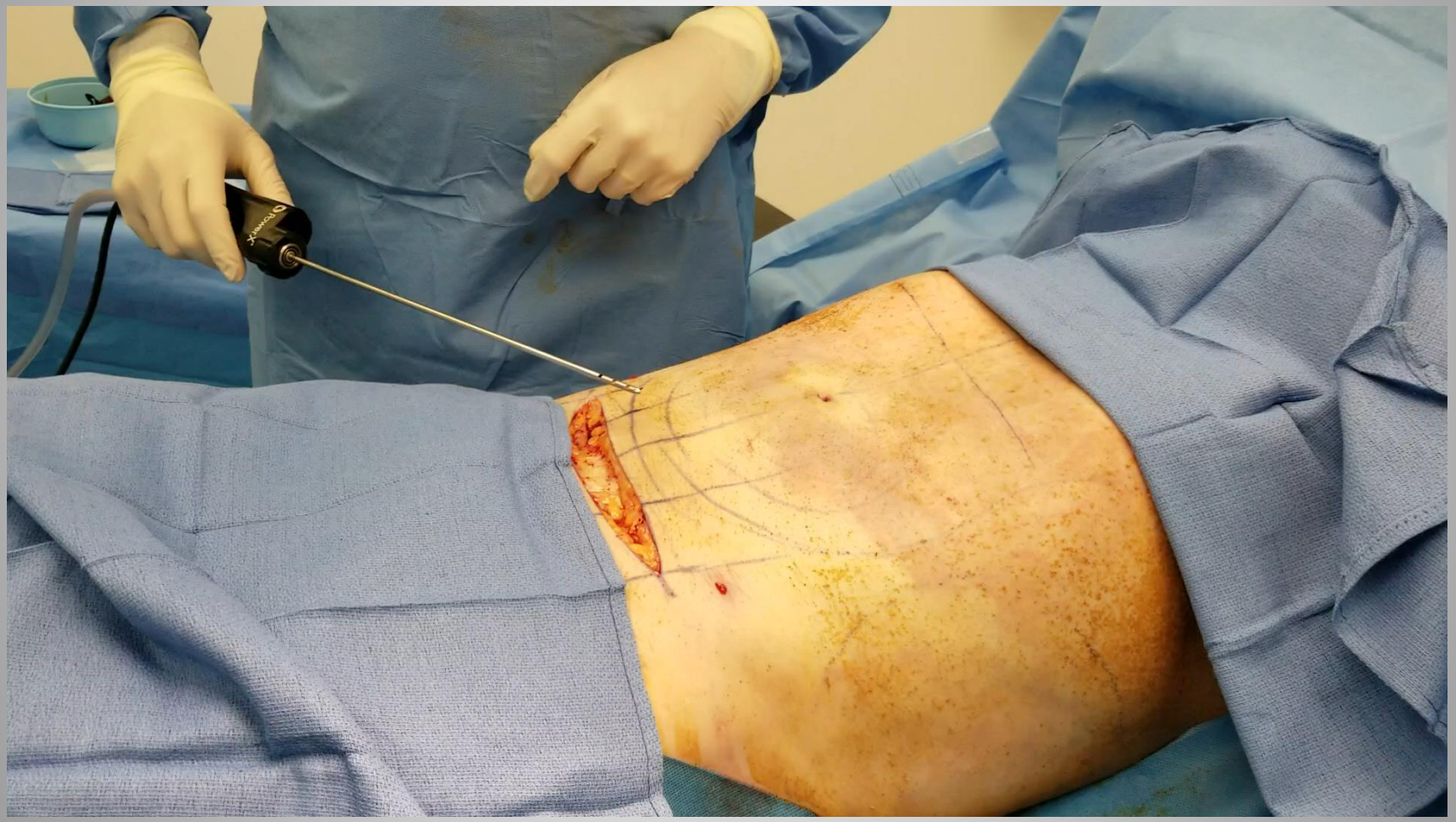
Bupivacaine Infusion vs Regional Blocks

	Superwet Infusion	Regional Blocks
Need for assistance from anesthesiologist (percutaneous)		✓
Additional expertise and expense		✓
Need for ultrasound (percutaneous)		✓
Need for separate rectus fascial injection		✓
Additional operating room time		✓
Liposomal bupivacaine		
Cannot coadminister lidocaine		✓
Limited diffusion into tissues		✓
Additional cost ($300)		✓
Risks		
Visceral (percutaneous) or intraperitoneal penetration		✓
Inadequate analgesia		✓

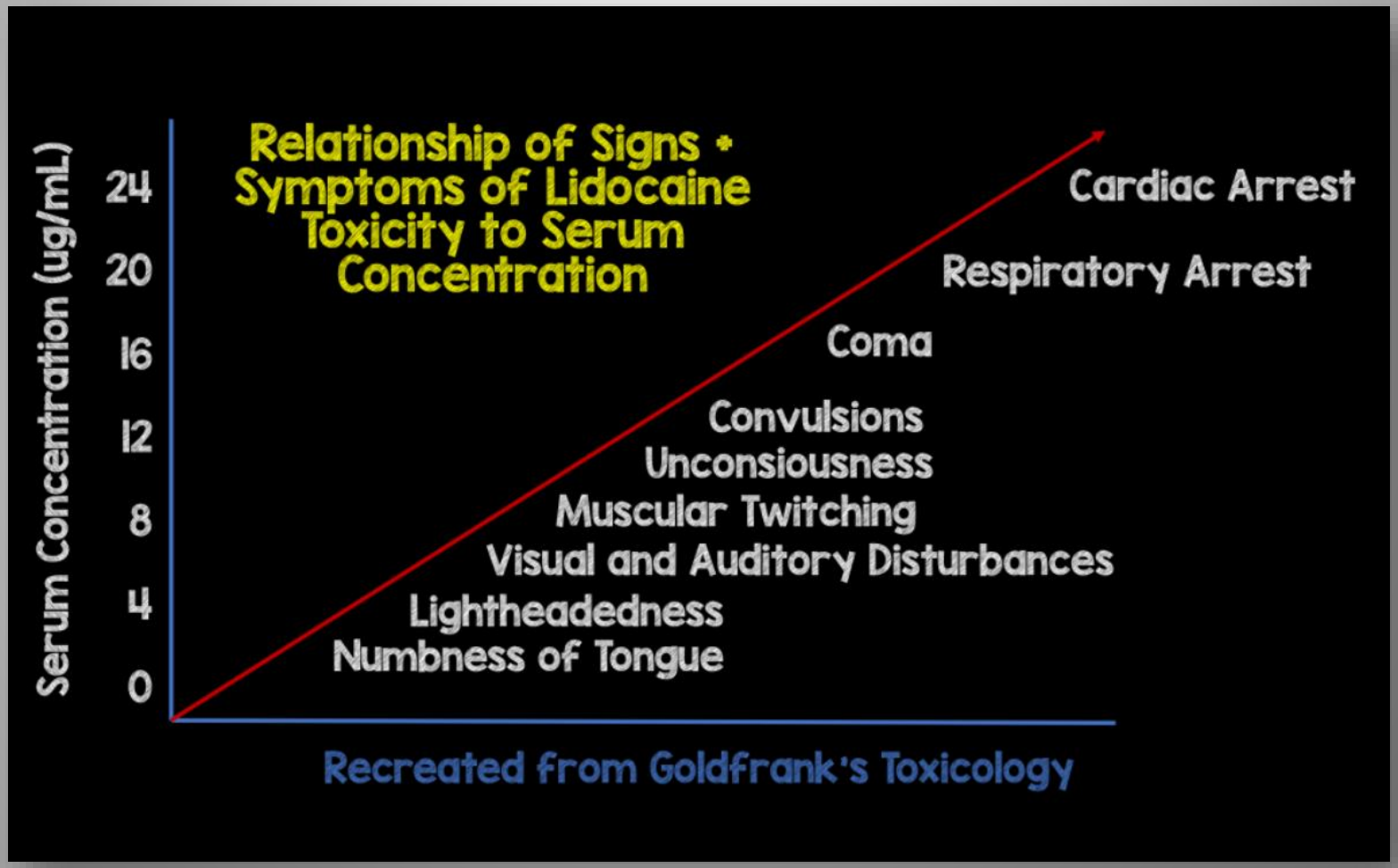
Expand Your Practice

- Proper use of tumescent anesthesia allows for more office based procedures
- Less cost
- Faster recovery
- Capture patients afraid of general anesthesia
  - More mini abdominoplasty + lipo in office
- Eliminate the hospital variables

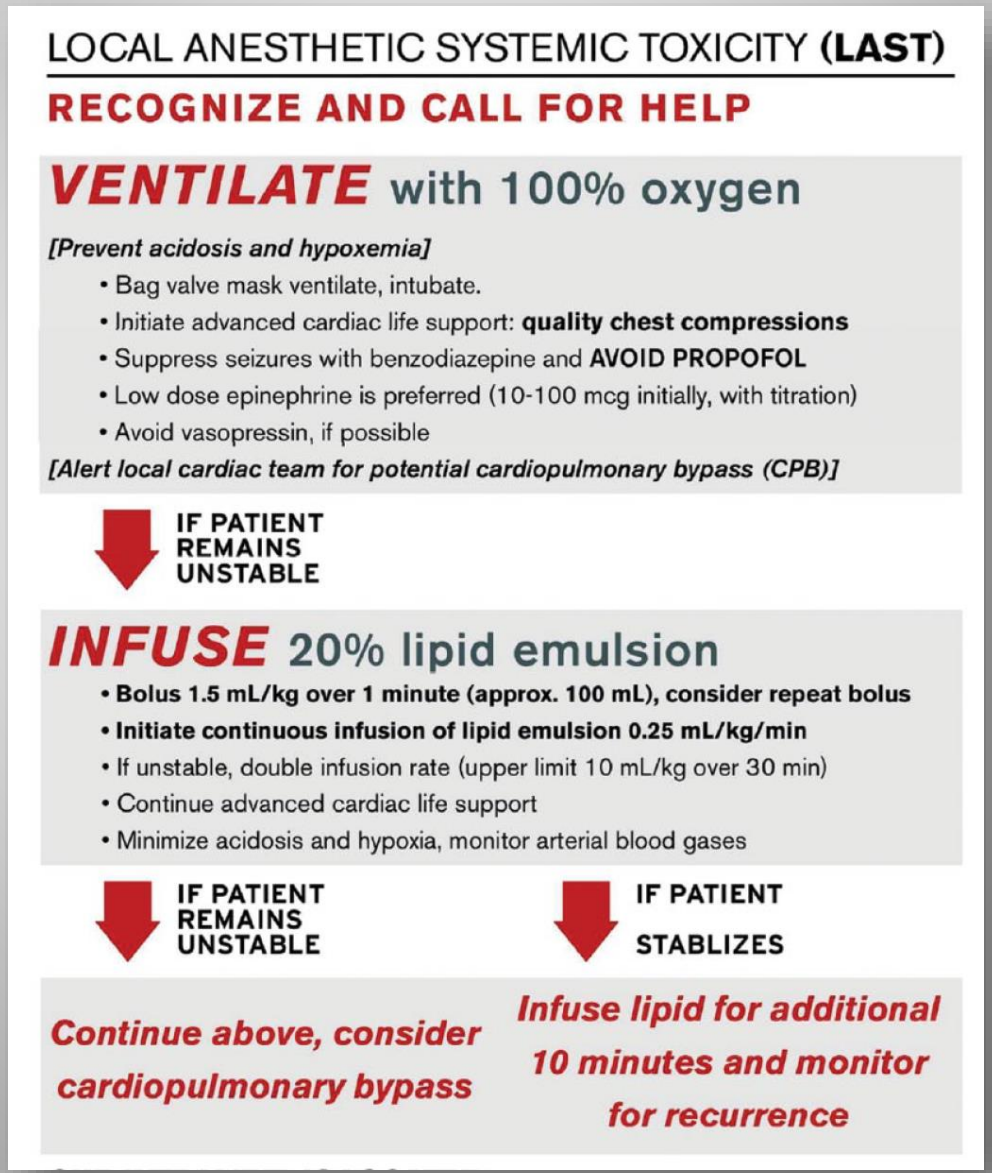
Awake Liposuction & Mini Abdominoplasty



Local Anesthetic Systemic Toxicity



Local Anesthetic Systemic Toxicity



LOCAL ANESTHETIC SYSTEMIC TOXICITY **(LAST)**

RECOGNIZE AND CALL FOR HELP

VENTILATE with 100% oxygen

[Prevent acidosis and hypoxemia]

- Bag valve mask ventilate, intubate.
- Initiate advanced cardiac life support: **quality chest compressions**
- Suppress seizures with benzodiazepine and **AVOID PROPOFOL**
- Low dose epinephrine is preferred (10-100 mcg initially, with titration)
- Avoid vasopressin, if possible

[Alert local cardiac team for potential cardiopulmonary bypass (CPB)]

IF PATIENT REMAINS UNSTABLE

INFUSE 20% lipid emulsion

- **Bolus 1.5 mL/kg over 1 minute (approx. 100 mL), consider repeat bolus**
- **Initiate continuous infusion of lipid emulsion 0.25 mL/kg/min**
- If unstable, double infusion rate (upper limit 10 mL/kg over 30 min)
- Continue advanced cardiac life support
- Minimize acidosis and hypoxia, monitor arterial blood gases

IF PATIENT REMAINS UNSTABLE

Continue above, consider cardiopulmonary bypass

IF PATIENT STABLIZES

Infuse lipid for additional 10 minutes and monitor for recurrence

Intralipid for LAST

- Have available if doing
  - Large volume local anesthetics
  - Blocks
- Especially with bupivacaine
- Rapid bolus then continuous infusion

Nitrous Oxide for Patient Analgesia

- Patient controlled
- Use for local anesthetic & tumescent infiltration
- Check your state regulations

Blocks & Anesthesia: What Plastic Surgeons Can Do

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Presentation Available Next Week

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