Utilization of a Femoral and Sciatic Nerve Block For Total Knee Arthroplasty

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- Speaker's Bureau for On-Q
- No funding for the study from any drug or device company
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Purpose

- The purpose of this presentation is:
  - Provide the anesthesia provider with background on the benefits of FSNB analgesia for TKA (an EBP approach)
  - Describe the procedure of femoral and sciatic nerve blocks
  - Discuss local anesthetic selection
  - Understand ultrasound guided technique vs. nerve stimulation technique
  - Describe financial benefits of a femoral and sciatic nerve block program
  - Discuss the improved patient rehabilitation when a femoral and sciatic nerve block program is utilized.

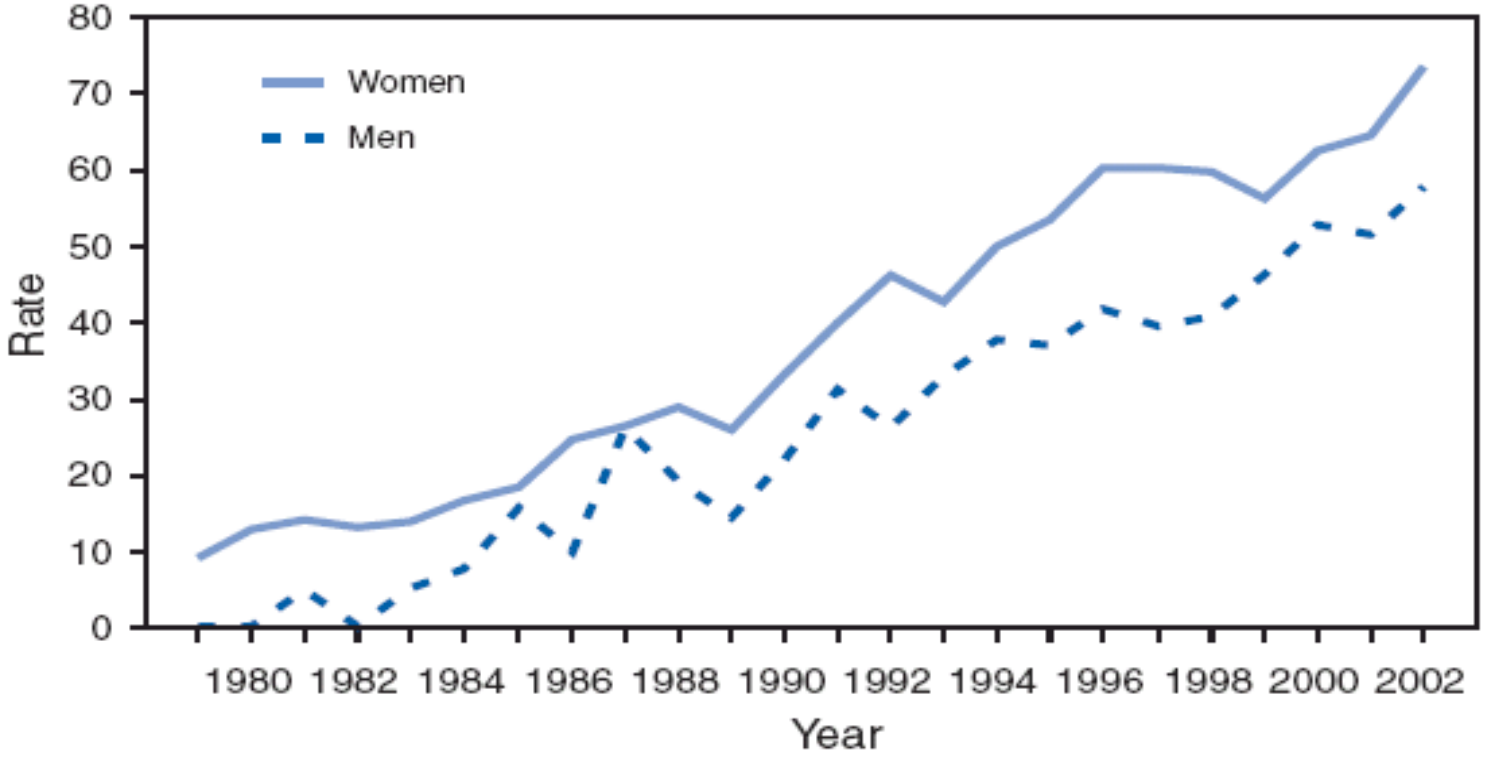
Total Knee Arthroplasty (TKA)

- TKA one of the most common **orthopedic** procedures in older adults (CDC, 2005)
  - Rates tripled 1999-2002 & quadrupled 2005-2009
- Factors leading to higher incidence of TKA
  - Age >50, **osteoarthritis**, RA, obesity
    - Daily life is affected

QuickStats

FROM THE NATIONAL CENTER FOR HEALTH STATISTICS

Rate* of Total Knee Replacement for Persons Aged ≥65 Years, by Sex — United States, 1979–2002



*Per 10,000 population.

TKA

- TKA generates **severe** postoperative pain in 60% of patients and **moderat**e pain in 30% (Leach &Bonafe, 2009)

- #1 reason for patients delaying needed TKA is the known post operative PAIN…

TKA Analgesia

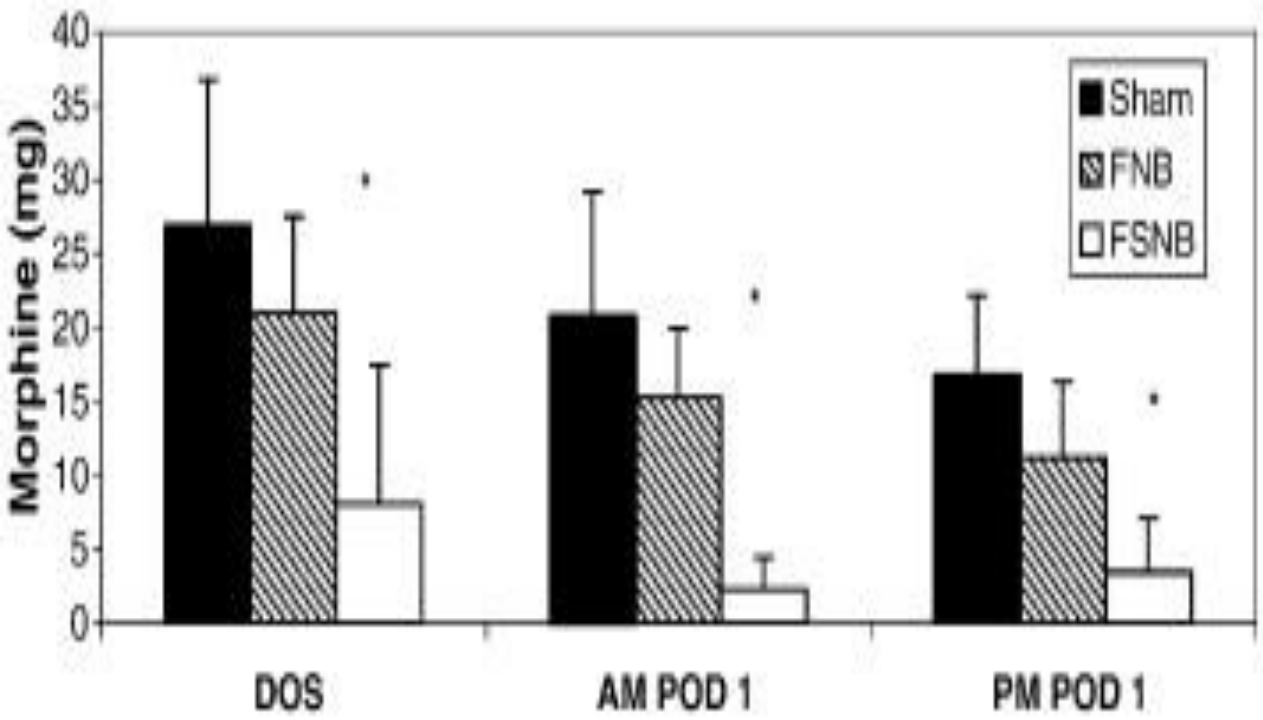
- Varying techniques of analgesia are utililized
  - Opioid analgesia: PCA and/or nursing administered
  - Intrathecal opioids
  - Epidural infusions vs. single shot injections (local, opioid)
  - SAB + PCA
  - PNB/CPNB

Benefits of Femoral-Sciatic Nerve Block

- Review of Literature Demonstrates:
- Significant improvement in analgesia
- Significant improvement in patient satisfaction
- Potential for decreased length of stay
  - 0.4 day reduction in large meta-analysis
- Improved patient satisfaction
- Decrease in opioid requirements by up to >50% (Dang et al., 2005)
  - Result continues to be replicated in the literature

Comparison of PNBs

Dang et al, 2005



	FNB	SNB	FSNB	Epidural	Spinal	Sham/Obturator
Fritze	↓			↓		
Hunt	↓		↓↓			↓
Morin	↓		↓↓			↓
Dang	↓		↓↓			
Davies			↓	↓		
Cook	↓	↓	↓↓			
McNamee			↓↓			↓
Allen	↓↓	±				
Leach			↓↓		±	
Del Fresno			↓↓			
Barrington	↓					
Hakkalamani	↓		↓			

Opioid Consumption Table
↓- shows decrease in opioid consumption
↓↓- Greatest decrease in opioid consumption
±- Shows that if this technique was used it did not improve or worsen opioid

PNB for TKA

- Why do we care about decreased opioid requirements??
- Directly relates to a decrease in:
  - PONV
  - Intestinal illeus
  - Respiratory depression
  - Hypotension
  - Bradycardia
  - Lethargy
  - Confusion/delirium
  - Allergic reactions.

Antiplatelet/Anticoagulation

- The use of antiplatelet therapy and/or anticoagulation therapy is not a contraindication for lower extremity peripheral nerve blocks.
- Ultrasound guided technique strongly encouraged
- Stopping or holding antiplatelet or anticoagulation therapy before or after TKA has shown to greatly increase morbidity and mortality.

Contraindications

- Burn or infection at the injection site
- Coagulopathy
- Vascular graft (aorto-bifem, ax-fem, ect..)
- Neurological disease (relative contraindication)
- Patient refusal
- Local anesthetic allergy

Lower Extremity Block Techniques: Femoral/Sciatic Nerve

- Continuous Femoral Nerve Block (CFNB)
- Continuous Sciatic Nerve Block (CSNB)
- Continuous Femoral & Sciatic Nerve Block (CFSNB)
- Single Shot Femoral Nerve Block
- Single Shot Sciatic Nerve Block

- Any Combo of the above

Continuous Catheter vs. Single Shot???

- Minimal evidence supporting one technique over the other.
- Outcomes variance is not significant
  - No change in LOS

- Higher patient satisfaction with CFNB
- Care teams typically have higher approval with CFNB

Continuous vs. Single Shot

- Potentially less technically demanding for single shot
- Single shot is typically cheaper in material

- BUT….

- Single shot is limited it its duration (12-16hrs)
- Does not have an option for cont. infusion
- Daily billing for management likely not available

The Procedure (video)

Ultrasound Guided Nerve Block

- Sterile procedure
- Femoral Crease
  - Locate the anterior superior iliac spine and the pubic tubercle. A line between these two structures is where the inguinal ligament is located.
- Just below this line is the femoral nerve.
- NAVY
  - Lateral - medial
- Palpate artery

Technique

- Can use nerve stimulation with ultrasound
  - Allows for secondary confirmation when gaining skills with ultrasound.
  - No greater than 1.0 mA required
- Distinct “Double Pop” through Fascia Latta and then Illiaca
- Initial block followed by catheter threading (allows for tissue spreading and ease of catheter threading

Alert!!!

- It is strongly recommended that a procedural TIME OUT be performed

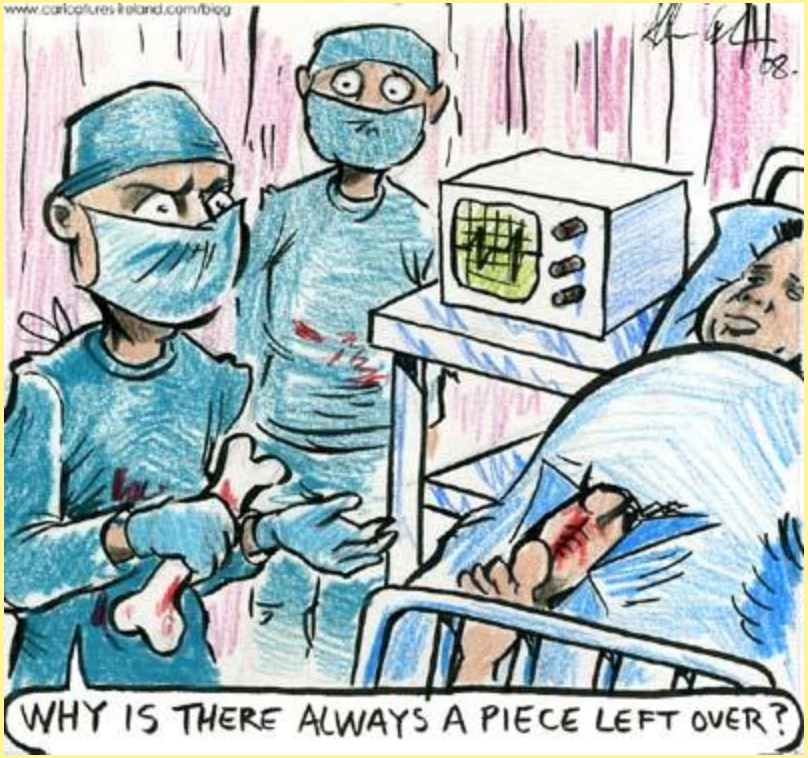
- This is to verify correct patient, correct surgical site, correct procedure, and full review of preoperative data (labs, physical exam, H&P, appropriate consults)

What Local Anesthetic Should I Use?

- Data strongly supports the use of Ropivacaine over other local anesthetic agents
  - Amide local anesthetic
  - Has intrinsic vasoconstrictive properties (epi not likely beneficial)
  - Equal or improved analgesia
  - Decreased toxicity threshold
  - Improved motor function
  - Identical onset time and duration to Bupivacaine
  - Similar in cost

Local Anesthetics

- Mepivacaine:
  - Shorter duration
  - Motor block
- Bupivacaine:
  - Toxicity
  - Heavy motor block
- Lidocaine:
  - Short duration
  - Heavy motor block



Epinephrine??

- Strong clinical evidence warns of use of epinephrine:
  - Nerve Ischemia
  - Surrounding tissue ischemia
  - Hypertensive reaction

Clonidine

- Strong evidence displaying benefit of addition of Clonidine to peripheral nerve blocks
  - Alpha-2 agonist
  - Improves duration up to 30% in single shot injections
  - Improved analgesia
  - Typical dosage: 1mcg/kg
    - 50mcg commonly used for single shot injection

Is Ultrasound Really Necessary??

- Wellllllllllllll……
- Lack of extensive data comparing the techniques
- Some literature to support decreased incidence of local anesthetic toxicity, decrease in the time needed to place the block, and improved block success rates.
- Definite learning curve exist.
  - -Easily conquered with training and practice

Ultrasound

Point To Ponder……

- How would the courts rule if an injury occurred and ultrasound was not utilized if it was available?

Recent Outcomes With Implementation Of PNB Program For TKA

- -An education intervention made on the benefits of FSNB for TKA
- Facility: Small Rural hospital in N. Washington
  - Approx. 8-12 TKA per week
- - Prior to PNB program anesthesia management was usually SAB +/- intrathecal Duramorph with intraop sedation or General with heavy opioid technique.

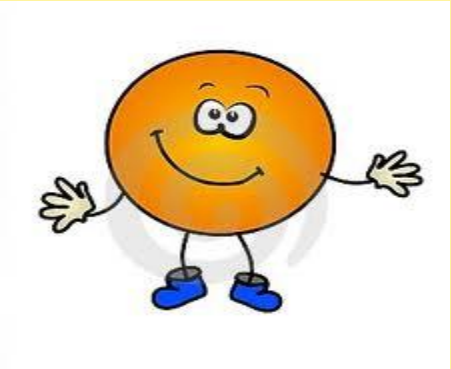
Outcomes Continued

- Prior to educational intervention
  - Last 20 patients for TKA reviewed:
  - Average LOS for TKA 3.4 days
  - Average opioid consumption in Morphine equivalents (Nurse administered opioid delivery): 54.2 mg/day
  - Patient satisfaction of pain control on exit survey (1= poor and 5= Excellant): 3.1

Outcomes
After Educational Intervention on FSNB for TKA

- 17 patient charts who received FSNB for TKA reviewed.
  - LOS: 3.1 days (little to no statistical difference)
  - Patient satisfaction rating: **4.3
  - Opioid Consumption in Morphine Equivalents: 21.9 mg (highest dosing on POD #2… Sciatic block worn off??)

    (Percocet was a heavy contributor to M.E.)
    - ***Very significant opioid sparing effect**



Financial Aspects of Femoral-Sciatic Nerve Block

- Covered by private and governmental insurance

- Billed as a pain management technique
  - (can be placed preop/postop. Requires postop follow up)

- Requires additional documentation for reimbursement

- Separate charting needed

- Minimal startup cost/materials

Gaining Revenue

- Billable CPT codes:
- Daily Catheter Management for POP:
  - Daily management CPT code:
- Sciatic Nerve Block for POP:
  - Continuous Catheter CPT code:
  - Single Shot CPT code:
- Femoral Nerve Block for POP:
  - Cont. Catheter CPT code:
  - Single Shot CPT code:

T INFORMATION

ng chart provides payment information that is based on the national unadjusted Medicare physician fee schedu
inuous peripheral nerve blocks discussed in this guide. Effective January 1, 2010, Medicare has revised paymen
sicians and facilities for performing continuous peripheral nerve blocks.

rence the amounts below for national physician Medicare fee schedule and facility payment rates for the CPT code
CPNB and ultrasound guidance. These are national rates, unadjusted for locality.

CONTINUOUS PERIPHERAL NERVE BLOCKS

HCPCS Code	INPATIENT/OUTPATIENT Physician				OUTPATIENT Facility	
s Peripheral Nerve Blocks	Reimbursement Component	Medicare Fee Schedule Amount	Commercial unit worth[1]	Medicare RVU	Hospital Outpatient (OPPS) APC Category & Payment	ASC Payment Amount
brachial plexus	Facility	**$81.91**	13	1.81	APC 0207 **$485.34**	**$288.44**
sciatic	Facility	**$84.08**	12	1.81		
femoral	Facility	**$74.33**	12	1.63		
lumbar plexus	Facility	**$84.80**	12	1.81		
uidance for needle naging supervision ation	Professional	**$33.92**	N/A	0.67	Packaged Service - no separate payment	Packaged Service - no separate payment

CHANGED:

e continuous nerve block codes will now be grouped C for the Medicare Hospital Outpatient Prospective tem (OPPS). This sets the facility fee payments to the

WHAT HAS STAYED THE SAME:

The physician work RVUs (relative value units) for the nerve bloc codes are the same as they were for 2009.

Medicare Reimbursement…

- Single Shot Femoral- $65-$72
- Continuous Femoral with Catheter- $77-$85
- ***Rounding on the catheter daily: $35-$42 per each day

Facility Benefits of a Femoral/Sciatic Nerve Block Program for TKA

- Improved patient satisfaction
- Decreased overall cost of hospitalization
- Decreased nursing demands

- **Provides a niche market in which to offer the "Pain Free Joint Replacement"
  - Increased patient interest
  - Increased surgical business (institution/surgeon)

Case Study

- 66 year old female for right TKA
- PMHX: Arthritis, HTN, Increaded BMI 35.
- PSHX: C-Section, right knee arthroscopy, bunnionectomy, cataract surgery.
- Consented for Cont. Femoral N. Block and Sciatic + General LMA intraoperatively.

Case Study Cont.

- Fentanyl 100mcg + Versed 2mg IV was given for sedation for block placement
- Full monitors
- Sterile procedure
- US Guided Block placement
- Femoral block: 20cc Ropivacaine 0.5%
- Sciatic Block: Single shot- 25ml Ropivicaine + 100mcg of Clonidine.

Case Study Cont.

- Intraoperative:
  - Induction with:
    - Fentanyl 50mcg, Lidocaine 50mg, Propofol 150 mg
    - Sevo at 1.5-2.1% for maintance during the duration of case.

    - IV Fluids: 1 liter
    - Length of Case 89minutes
    - In the PACU: Pain score of 2. No additional opioids received.
    - 5hrs postoperative 2 percocet administered with a light meal
    - 4mg of morphine and 30mg Ketoralac administed at 11hr postop
    - Pt remained on Q6 Percocet with Morphine for breakthrough
      - Only used on day 2 and 3 after P.T.
      - DC'd on AM of 3rd day.

Risks vs Benefits Ratio

- Risk of local anesthetic toxicity reactions nearly eliminated with use of ultrasound, proper dosing, and vigilant aspiration techniques.

- Documented falls postoperatively related to poor sensory and motor function of surgical leg
  - Easily avoided with vigilant nursing and physical therapy care and education

  Benefits easily out weigh risks when proper training and education are utilized.

How To Start A Block Program In Your Institution:

- Assess current practice climate
  - Do you have buy in from key stakeholders
  - What is your patient population
  - What is the philosophy of the department
  - Are you comfortable implementing change and dealing with resistance*

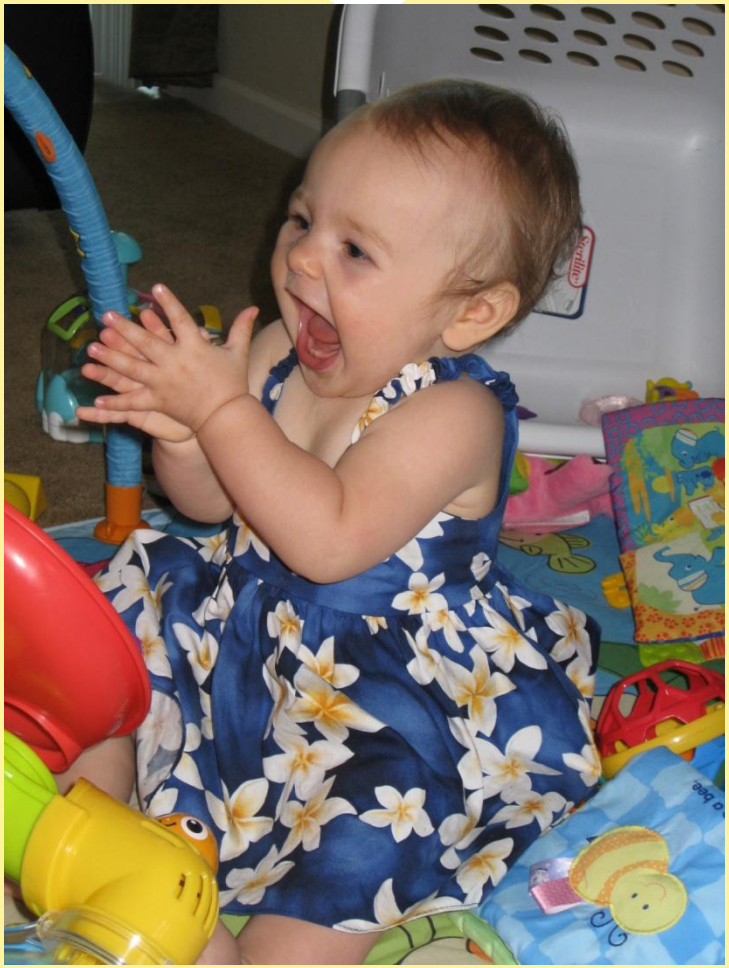
Implementing a Block Program Cont.

- Education/Training
  - Knowing what is in the literature
  - Formal training may be required
  - Educating all care team members (nursing, PT, OT, Surgeons, billers, and administration)
- Assess equipment and supply needs
  - Basics for regional anesthesia will be required: Simulating needles, PNS or US, Local anesthetics, PROPER FACILITIES and monitoring, rescue and emergency crash chart.

Implementing a PNB program

- Implementation of FSNB program
  - Evaluation of program success
  - Outcomes
  - Patient and facility satisfaction
  - Anesthesia and Surgeon satisfaction
  - Reimbursement
- Program modifications
  - Evaluate what is working in other institutions
  - Evaluate what did not work and what the road blocks were

Thank You



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