Surgical and Post Operative Considerations
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Total Knee Arthroplasty-
Surgical Approach

Medial Parapatellar Approach
■ Technique
  - Incision through the quad tendon proximal to the patella
  - Patellar eversion
■ Advantage
  - Good exposure of all 3 compartments
■ Disadvantage
  - Disruption of the extensor mechanism

Subvastus Approach
■ Technique
  - Incision inferior to the VM
  - Muscle attachment to the quad tendon and upper patella is intact
  - Patellar eversion
■ Advantage
  - Extensor mechanism is undisturbed
  - Preserves patella and extensor mechanism vascularity
■ Disadvantage
  - Exposure is less predictable
  - ↑ difficulty everting patella

Midvastus Approach
■ Technique
  - VM split parallel to its fibers
  - Most of the insertion of the VM remains intact
  - Patellar eversion
■ Advantage
  - Exposure better then the Subvastus
  - Extensor mechanism undisturbed
■ Disadvantage
  - Disruption of the VM (midsubstance)
The Evidence-Subvasuts

- Subvastus Approach for TKA, Roysam GS, Oakley MJ
  - Prospective randomized blinded, 89 subjects
  - Subvatus and Med Parapatellar approach
  - Earlier unassisted SLR-subvastus
  - ↓ opiate use in 1st week-subvastus
  - ↑ flex at wk 1(no diff at 4 & 12)-subvastus
  - No diff in LOS

The Evidence-Midvastus

- Clinical Comparison of the midvastus and medial parapatellar surgical approaches, White et al
  - Blinded, prospective, 109 B TKA
  - Midvastus vs med parapatellar approach
  - No sign diff avg blood loss
  - ↓ pain 8 days, 6 wks (no diff at 6 mo)-midvastus
  - SLR at 8 days (no diff 6 wks & 6 mo)-midvastus
  - ROM not stat sig at 8 days, 6 wks or 6 mo

Minimally Invasive Surgery (MIS)

- Technique
  - All approaches
  - Smaller incision
  - Smaller instruments
  - No patellar eversion

- Advantages
  - Avoids patellar eversion

- Disadvantage
  - ↑ incidence malposition
  - ↑ stress skin/soft tissue
  - Intra-operative fx
  - Neurovascular injuries
  - Surgeon learning curve

The Evidence-Minimally Invasive TKA

- 28 studies
- Follow up 1.5-36 mo
- Advantages
  - ↓ post op pain
- Rapid recovery of quad function
- ↓ blood loss
- Improved early ROM

The Evidence—Minimally Invasive TKA

- Limitations
  - Only 4 prospective RCT
  - Limited follow up
  - Separate anesthesia protocols
  - Accelerated rehab protocols

Anesthesia

- General
  - Familiar
  - Induced rapidly
  - Appropriate for pts with significant spinal issues

- Regional
  - ↓ blood loss
  - ↓ DVT
  - Avoids CNS depression
  - Skilled staff
  - Gold standard

Regional Anesthesia

- Spinal (subarachnoid)
  - Rapid onset
  - Up to 3 hours of anesthesia

- Epidural (peridural)
  - Less intense but longer duration
  - Up to 72 hours for analgesia

- Combined Spinal Epidural
  - Epidural begins to work as Spinal wears off
  - Up to 72 hours for analgesia

Analgesia/ Pain Management

Patient Controlled Analgesia (PCA)

- IV PCA
  - Morphine, Dilaudid or other opioids
- Side effects
  - Nausea
  - Vomiting
  - Pruritis
  - Sedation

- Epidural PCA
  - Local anesthetic & opioid
  - Side effects
    - Hypotension
    - Urinary retention
    - Pruritus
    - Respiratory depression
  - Motor/Sensory Effects
    - Operative and non operative

Peripheral Nerve Blocks

- FNB
  - Single injection or continuous
  - Sensory distribution: ant/medial thigh, medial knee, calf and foot
    - Post knee
  - Motor block of quads, sartorius, pectineus
    - Poor motor control of the quad
    - Buckling ↔ immobilizer

Peripheral Nerve Blocks

- Sciatic Blocks
  - Rarely used alone
  - Sensory distribution: Post thigh, knee and distal LE, except med calf/ankle
  - Motor block of hamstrings, adductor magnus, gastrocnemius

The Evidence-Nerve Blocks

- 23 studies
  - 14 FNB with IV PCA
  - 4 FNB with Epi PCA
  - 3 comparing various FNB
  - 2 FNB with Epi and IV PCA

- Measured
  - Opioid use-all
  - Pain scores-all
  - Side effects-16
  - Knee ROM-14
The Evidence-Nerve Blocks

FNB Improves Analgesia Outcomes after TKA-A meta-analysis of RCT, Paul et al

- Results
  - SFNB or CFNB with PCA is superior to IV or Epi PCA alone
  - Sciatic blocks or CFNB in addition to a SFNB did not provide additional benefit
  - Motor blockade from nerve blocks did not result in quad weakness difference at 24 hours or effect LOS
    - The Effects of FNB in Conjunction with Epidural Analgesia After TKA, YaDeau, Cahill et al. Anesth Anag, Sept 2005

Peri-articular Injections

- Provide excellent pain relief
- Maximize muscle control
- Optimize mobility

Example

- Before insertion of liner & reduction
  - Postcapsule
  - Posteromedial and posterolateral structures
- After reduction
  - Extensor mechanism
  - Synovium
  - Pes anserinus, anteromedial capsule, periostium
  - ITB
  - Collateral ligaments

The Evidence-Periarticular Injections

- Efficacy of periarticular multimodal drug injection in TKA, Busch CA et al
  - Randomized trial, 64 pts
  - Group 1- periarticular injection + IV PCA
  - Group 2-no injection + IV PCA
  - Measured VAS rest/activity, pt satisfaction

- Results
  - ↓ PCA use at 6, 12 and 24 hrs-Gr 1
  - ↑ patient satisfaction & ↓ VAS in PACU and 4 hrs-Gr 1
  - No diff in ROM at 6 weeks
  - No diff in LOS
Current HSS Study
- RCT, 45 subjects per group
- Group 1- peri-articular injection protocol
- Group 2-standard epidural/FNB protocol
- Hypothesis 1-The peri-articular injection protocol will result in earlier readiness for D/C. A diff of 0.5 day considered clinically relevant.
- Hypothesis 2-The peri-articular injection protocol will result in lower opiod use and symptoms, improved quality of recovery and improved pt satisfaction

Post Surgical Treatment-Phase 0-1 week
- Clinical pathway
- Rapid recovery models
  - Aggressive pain management
  - Early PT
- Track outcomes

LOS with Clinical Pathway
- Pre-op phone call
  - Initiate D/C planning
  - Reinforce expectations set by MD
- Pre op Interdisciplinary Education Class
  - Nursing, PT, Case management
  - Pre-op book
  - 90% attendance
  - Reinforce discharge planning and LOS expectations

Clinical Pathway
- Holding Area
  - Administer Decadron & Mobic
    - ↓ pain and inflammation
- OR
  - Administer Zofran
    - ↓ nausea

Clinical Pathway
- Post op 0-24 hrs
  - Initiate PT
    - Dangle/stand/amb
- Jordan splint
- CPM
- Pt may dangle with nursing after PT examination

- Post op 24-48 hrs
  - D/C PCA by POD#2, 12 noon
  - PT
    - Ambulate 2x per day
    - Discontinue jordan splint

Clinical Pathway

- Post op 48-72 hrs
  - PT
    - Progress from walker as tolerate
    - Stairs
    - HEP

- Post op 72-96 hrs
  - Achievement of PT goals-Independence
    - Transfers
    - Ambulation
    - Stairs
    - HEP

A Multimodal Clinical Pathway Can Reduce Length of Stay After Total Knee Arthroplasty Cornell, Ayalon, Cahill, Flics, Juliano

- A multimodal clinical pathway can reduce LOS after TKA, Cornell, Ayalon, Cahill, Flics, Juliano
- Retrospective
- Group 1-TKA prior to 5/1/07
- Group 2-TKA 5/1/07-8/19/07
- Result: Group 2 – LOS ↓ by .26 day
- Not statistically significant
- ↑ pt throughput and hospital productivity

The Evidence-CPM

CPM following TKA in people with arthritis: Cochrane Review, Harvey LA et al

- 20 RCT
- 1335 participants
- CPM ↑’s passive & active knee flexion (mean difference 2° and 3 °)
- Effects are too small to be clinically meaningful
- No effect on LOS
Weak evidence for ↓ need for manipulation

**CPM at HSS**
- Applied DOS, 0-60°
- 4-6 hours daily
- AROM 90° - discontinue CPM
- Home CPM not standard

**HSS LOS Statistics**
- 3658 TKA in 2009
- 75-85 TKA per week

**Acute Care Service Staffing**
- 23.5 PT’s
- 1 PTA
- 2 OT’s
- 10 full time/13 part time aides
- Hours of operation 7am-8pm
- Traditional and flex shifts
- 6 Tues-Sat, 5 Sun-Thurs
- Additional weekend coverage
  - 19-21 PT’s on Sat and 9-11 PT’s on Sun

**Summary**
- Medial Parapatellar approach-gold standard
- Regional anesthesia-gold standard
- Analgesia-no gold standard
- Clinical pathways-efficient, quality care
- PT
  - No standard guidelines
  - CPM not clinically significant
- Track outcomes
References


http://www.cdc.gov/nchs/data/nhsr/nhsr029