



Spinal Anesthesia for Total Joint Replacement

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Abstract.

Total joint arthroplasty is one of the most performed surgical procedures in the developed world with millions of total hip and total knee replacements taking place each year.¹ It has long been debated whether general anesthesia or neuraxial anesthesia is the best choice for lower limb total joint arthroplasty. The purpose of this scientific poster is to explore and discuss the potential benefits of using spinal anesthesia rather than general anesthesia for total knee arthroplasty or total hip arthroplasty. A database search utilizing Embase, Medline complete, and PubMed was completed to obtain information for the poster. After data and resources were reviewed, several benefits were discovered related to the use of spinal anesthesia for total joint arthroplasty. Benefits included lower 30-day mortality rates, decreased odds for all-cause mortality and fewer complications in most cases, lower 90-day complication rate, decreased postoperative nausea and vomiting, and decreased medical costs.¹-6 According to the literature, a systematic review and meta-analysis, and a multinational expert group neuraxial anesthesia is the preferred anesthetic technique due to its reduction of most (but not all) complications.¹ Spinal anesthesia is the preferred method of anesthesia for total knee and total hip arthroplasty given the positive associated postoperative outcome benefits.¹





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Purpose

· Discuss the benefits of using spinal anesthesia for total knee arthroplasty (TKA) or total hip arthroplasty

Introduction

- . Total joint arthroplasty (TJA) is one of the most common performed surgical procedures in the developed world.1
- Globally, millions of patients receive TKR and THR every year with projected increase as the population ages.1
- · It has long been debated which anesthetic technique is better for a patient undergoing TJA, general anesthesia (GA) or neuraxial anesthesia (NA). This DNP-A project aims to uncover any benefits patients may experience from receiving NA for TKR or THR.

Case Description

Preanesthetic Evaluation

- A 57-year-old, 85.8 kg, 167.6 cm, female presented for a right anterior total hip replacement for osteoarthritis of the right
- Medical history: Essential hypertension, osteoarthritis, hereditary hemochromatosis, and insomnia
- Surgical history: cholecystectomy, carpal tunnel release, colonoscopy, EGD, C-section, TEE, Roux-en-Y gastric bypass, and bladder stimulator insertion
- Preoperative vital signs: HR 56, Blood pressure 137/90 mmHg, SpO2 99%, RR 16, temperature 97 °F
- Current mediations: lisinopril-hydrochlorothiazide 2-12.5 mg tablet, oxybutynin 10 mg 24 hr tablet, daily multivitamin
- Airway Assessment: Mallampati III, TMD> 3 finger breadths, full neck ROM, bilateral front incisors chipped
- Other: EKG-NSR, Ejection fraction 55%, not taking blood

Intraoperative Management

- Preoperative medications given, 2 mg midazolam, 100 mg hydrocortisone, 20 mg famotidine, and 4 mg ondansetron
- Standard monitors applied to patient and spinal anesthetic performed at L3-L4 interspace with 1.8ml of 0.75% hyperbaric bupivacaine
- Patient instructed to lay with operative hip down, density of block assessed prior to incision, sensory block noted up to
- MAC maintained with propofol at 55mcg/kg/min, 50 mg of ketamine. BP maintained with 250 mcg phenylephrine, fluids replaced with 1250 ml albumin, and 600 ml lactated ringers-
- Normothermia maintained at 98 degrees Fahrenheit, upon emergence patient rated pain 0/10 and was transported to the post anesthesia care unit on room air.

Postoperative Care

- · Patient had uneventful postoperative course, the patient required no opioid medications for pain control, as well as no medications for nausea or vomiting, no blood transfusion was required.
- A PENG block consisting of 5 mg of dexamethasone, 20 ml of 0.5% ropivacaine, 20 mcg of dexmedetomidine, and 300 mcg of buprenorphine was placed for post-operative pain control.
- Patient subsequently released to orthopedic care unit and discharged on post operative day one to her residence.

Table 1.0: Outcomes/complications compared between GA and NA for THA1

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Table 2.0: Outcomes/complications compared between GA and NA for TKA!

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Table 1.1: Outcomes/complications compared between GA and NA for THA continued1



Table 2.1: Outcomes/complications compared between GA and NA for TKA continued1



Literature Search

· Databases searched: Embase, Medline complete,

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- Keywords Used: total joint arthroplasty, total knee replacement, total hip replacement, general anesthesia, spinal anesthesia, nausea/vomiting, benefits, complications, and cost effectiveness
- Search terms were combined to yield the most results.
- Initial search revealed 144 results.
- · Narrowing of the results left 10 relevant articles, of which 6 were obtained and used in this case report.
- · A few articles were relevant to the the topic at hand but were removed due to them not being current and over 20 years old.
- Articles retrieved and used in the case report have dates ranging from 2006-2020.

Recommendations for Anesthesia Practice

- · As with all anesthesia, it is important as the provider to explore all options and patient characteristics to choose the best anesthetic plan on a case-by-case basis. If appropriate for the patient, NA for THA and TKA is the recommendation from the literature.
- According to the literature, the consensus from a multinational expert group(*ICAROS), based upon a systematic review and meta-analysis, is that neuraxial anesthesia is the preferred anesthetic technique due to its reduction of most (but not all) complications.1
- Primary NA is preferred for TKA, given several positive associated postoperative outcome benefits.1
- NA is preferred for THA given positive associated postoperative outcome benefits.1
- * International Consensus on Anesthesia-Related Outcomes after Surgery

Discussion

- . It has long been debated whether GA or NA is the best choice for anesthesia for lower limb TJA.1-4
- · GA and NA are both viable options for choice of anesthetic for TJA, with each having effects on outcomes after surgery.
- · A recent metanalysis and systematic review comparing outcomes after GA and NA for TJA showed decreased odds for all-cause mortality and fewer complications in most cases except for urinary retention when patients received NA anesthesia.1
- The use of NA anesthetic technique for TJA shows a strong association with lower 30-day mortality and a shorter length of stay (LOS).2
- · Although NA may not be suitable for every patient, patients who receive NA for TJA show a significantly lower 90-day complication rate than those who received GA as well as a shorter LOS.1-3
- One interest in TJA is reducing blood loss, NA has been associated with protection against blood transfusion in THA.4
- Post operative nausea and vomiting (PONV) is better reduced with NA and GA is more strongly associated with PONV in orthopedic surgery.1,5
- NA anesthesia has financial benefits compared to GA for TJA, 6 GA is more expensive than spinal anesthesia due to higher variable and fixed costs.6

Conclusion

- Anesthesia is a necessary component for almost every surgical procedure, and patients should be assessed individually so that care can be catered to their needs
- · In terms of THA or TKA, NA anesthesia is shown to have benefits for patients when compared to its counterparts of GA
- NA remains underutilized in many countries but could be instituted to improve perioperative outcomes for
- Benefits of NA include decreased complications post operatively, decreased mortality, decreased blood transfusion requirements, decreased LOS, decreased costs for anesthesia, and decreased PONV.1-6

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