

RETROSPECTIVE COMPARATIVE ANALYSIS OF EFFICACY OF VARIOUS ANESTHETIC TECHNIQUES IN PATIENTS UNDERGOING ORTHOPEDIC SURGERIES: AN INSTITUTIONAL BASED STUDY

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Abstract

Background: In recent decades, a significant debate has emerged among healthcare professionals regarding the influence of anesthesia type on perioperative results. The choice of regional anesthesia is a unanimous decision made by the surgeon, the anesthesiologist, and the patient based on a risk-benefit assessment. Hence, the present retrospective study was conducted for comparative analysis of efficacy of various anesthetic techniques in patients undergoing orthopedic surgeries. **Materials and Methods:** Data of a total of 150 patients was reviewed. Inclusion criteria for the present study included data of 150 pts who underwent orthopedics surgeries. The patients were categorized into three distinct study groups, each comprising 50 individuals: Group A included patients receiving general anesthesia, Group B consisted of those undergoing combined spinal epidural anesthesia and Group C encompassed patients treated with spinal anesthesia. The collected data was meticulously analysed to evaluate the incidence of postoperative complications across all groups. The information was organized in a Microsoft Excel spreadsheet and subsequently analysed using SPSS software. **Result:** Mean age of the patients of group A, group B, group C and group D was 45.3 years, 44.1 years, 40.9 years and 45.5 years respectively. Majority proportion of patients of all the study groups were males. 58 percent, 62 percent and 56 percent of the patients of Group A, group B and group C were of rural residence. Nonsignificant results were obtained while comparing the anaesthetic complications among patients of all the three study groups. **Conclusion:** Techniques of general anesthesia combined spinal epidural anesthesia and spinal anesthesia demonstrate comparable effectiveness regarding the incidence of complications in patients undergoing orthopedic surgical procedures.

INTRODUCTION

In recent decades, a significant debate has emerged among healthcare professionals regarding the influence of anesthesia type on perioperative results. This discussion has prominently featured patients undergoing hip and knee arthroplasties, specifically total hip arthroplasty (THA) and total knee arthroplasty (TKA). These procedures are particularly amenable to neuraxial anesthesia techniques, and the growing demographic of patients undergoing these surgeries has substantial implications for both the medical and economic

aspects of the healthcare system. The annual incidence of total hip and knee arthroplasties has been on an upward trajectory, with projections indicating that the number will exceed millions by 2030.^[1,2] However, generating robust data to inform evidence-based practices has proven challenging, as conducting large-scale randomized controlled trials is often impractical due to the extensive patient populations required to assess outcomes with relatively low incidence, alongside the external validity constraints inherent in such studies.^[3-5] The establishment of evidence-based practices in orthopaedic anaesthesia has been complicated by

earlier experimental and observational research that presents inconsistent findings regarding the variations in major morbidity and mortality outcomes associated with different types of anaesthesia.^[6-8]

The choice of regional anesthesia is a unanimous decision made by the surgeon, the anesthesiologist, and the patient based on a risk-benefit assessment. The choice of the regional block depends on patient cooperation, patient positing, operative structures, operative manipulation, tourniquet use and the impact of post-operative motor blockade on initiation of physical therapy. Regional anesthesia is safe but has an inherent risk of failure and a relatively low incidence of complications.^[5,6] Hence; the present retrospective study was conducted for comparative analysis of efficacy of various anesthetic techniques in patients undergoing orthopedic surgeries.

MATERIALS AND METHODS

Data of a total of 150 patients was reviewed. Inclusion criteria for the present study included data of 150 pts who underwent orthopedics surgeries. The study focused on assessing and comparing the effectiveness of various anaesthetic techniques utilized in patients undergoing orthopaedic surgical procedures. Comprehensive data was collected from patient records, which included detailed accounts of each patient's medical and clinical history, as well as pertinent information regarding the surgical interventions and any postoperative complications encountered. The patients were categorized into three distinct study groups, each comprising 50 individuals: Group A included patients receiving general anesthesia, Group B consisted of those

undergoing combined spinal epidural anesthesia and Group C encompassed patients treated with spinal anesthesia. The collected data was meticulously analysed to evaluate the incidence of postoperative complications across all groups. The information was organized in a Microsoft Excel spreadsheet and subsequently analysed using SPSS software. Univariate analysis was for evaluation of level of significance.

RESULTS

The mean age of the patients of group A, group B, group C and group D was 45.3 years, 44.1 years, 40.9 years and 45.5 years respectively. Majority proportion of patients of all the study groups were males. 58 percent, 62 percent and 56 percent of the patients of Group A, group B and group C were of rural residence. Mean duration of surgery among patients of Group A, group B, and group 3 was 115.3 minutes, 105.9 minutes, and 110.7 minutes respectively. Among patients of group A, embolism, bleeding and hypotension was seen in 4 percent, 6 percent, 4 percent and 4 percent of the patients respectively. Among patients of group B, embolism, bleeding and hypotension was seen in 6 percent, 4 percent, 6 percent and 4 percent of the patients respectively. Among patients of group C, embolism, bleeding and hypotension was seen in 4 percent, 6 percent and 4 percent of the patients respectively. Nonsignificant results were obtained while comparing the anaesthetic complications among patients of all the three study groups.

Table 1: Demographic data.

Variable	Group A	Group B	Group C
Mean age (years)	45.3	44.1	40.9
Males	31	28	30
Females	19	22	20
Rural residence	29	31	28
Urban residence	21	19	22

Table 2: Duration of surgery (mins).

Groups	Mean	p-value
Group A	115.3	0.225
Group B	105.9	
Group C	110.7	

Table 3: Comparison of anaesthetic complications

Anaesthetics complications	Group A	Group B	Group C	p-value
Embolism	2	3	2	0.225
Bleeding	3	2	3	
Hypotension	2	3	2	
Others	2	2	3	

DISCUSSION

A comprehensive assessment of patient-centered perioperative outcomes and economic factors is essential to guide both patients and healthcare providers in making informed choices regarding anaesthesia for significant orthopaedic procedures. The anticipated rise in the incidence of major hip and

knee surgeries over the next two decades underscores the necessity of this evaluation, as anaesthetic alternatives are becoming increasingly intricate and expensive. In contrast to major abdominal or cardiac surgeries that necessitate general anaesthesia, substantial lower extremity orthopaedic surgeries can be conducted using either neuraxial or general anaesthesia. Previous research examining the

potential variances in perioperative morbidity and mortality associated with neuraxial versus general anaesthesia. Mean duration of surgery among patients of Group A, group B, and group 3 was 115.3 minutes, 105.9 minutes, and 110.7 minutes respectively. Among patients of group A, embolism, bleeding and hypotension was seen in 4 percent, 6 percent, 4 percent and 4 percent of the patients respectively. Among patients of group B, embolism, bleeding and hypotension was seen in 6 percent, 4 percent, 6 percent and 4 percent of the patients respectively. Among patients of group C, embolism, bleeding and hypotension was seen in 4 percent, 6 percent and 4 percent of the patients respectively.

Tekye et al. conducted a comparative study on unilateral versus bilateral spinal anesthesia, focusing on the intraoperative and postoperative benefits and complications associated with each method. The induction of spinal anesthesia was achieved using 0.5% hyperbaric bupivacaine administered via a 25-G Quincke needle (Dr. J) in two cohorts of patients classified as ASA I–II, scheduled for orthopedic procedures. In group A, the dural puncture was executed with the patient seated, utilizing 2.5 cm³ of hyperbaric bupivacaine, after which the patients were positioned supine. Conversely, in group B, the dural puncture was performed with the patient in a lateral decubitus position, using 1.5 cm³ of hyperbaric bupivacaine, targeting the lower limb. The injection rate was set at 1 mL per 30 seconds, and patients remained in the lateral position for 20 minutes. Notably, the onset time for sensory and motor block was significantly reduced in group A ($p = 0.00$), while the duration of both motor and sensory block was shorter in group B ($p < 0.05$). The success rate for unilateral spinal anesthesia in group B reached 94.45%. Furthermore, the occurrence of complications, including nausea, headache, and hypotension, was significantly lower in group B ($p = 0.02$). The findings suggest that employing a low-dose, low-volume, and low-flow injection technique for unilateral spinal anesthesia can effectively provide sufficient sensory-motor block while maintaining stable hemodynamic conditions during lower limb orthopedic surgeries.^[11]

Subrata Dutta et al evaluated the efficacy of different anesthetic techniques in patients undergoing orthopedic surgery. Data records of a total of 160 patients were enrolled. All the patients were broadly divided into four study groups with 40 patients. Group 1: Patients who underwent orthopedic surgery under General anesthesia, Group 2: under combined spinal epidural anesthesia, Group 3: under spinal anesthesia, and Group 4: under Lumbar plexus block. Embolism formation as a postoperative anesthetic complication was seen in 3, 3, 2 and 3 patients of study group 1, 2, 3 and 4 respectively. Other complications found to be present were bleeding,

hypotension and cardiac arrest. General anesthesia, combined spinal epidural anesthesia, spinal anesthesia and Lumbar plexus block techniques are equally effective in terms of occurrence of complications among patients undergoing orthopedic surgeries..^[12]

CONCLUSION

Techniques of general anesthesia, combined spinal epidural anesthesia and spinal anesthesia, demonstrate comparable effectiveness regarding the incidence of complications in patients undergoing orthopedic surgical procedures.

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