

## Retrospective Comparison of Efficacy of Different Anesthetic Techniques in Subjects Undergoing Orthopedic Surgeries: An Observational Study

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### ABSTRACT

**Background:** Orthopedic surgery has a long and rich history. Some orthopedic surgical procedures are characterized by great perioperative disturbances including cardiovascular complications, high incidence of thromboembolic complications, possible significant perioperative blood loss, possible bone cement effect and high level of postoperative pain. Anesthetic assessment of patients includes preoperative preparations, intraoperative and postoperative care. Hence; we planned the present study to evaluate the efficacy of different anesthetic techniques in patients undergoing orthopedic surgery.

**Materials & Methods:** For the present study, 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: Patients who underwent orthopedic surgery under combined spinal epidural anesthesia, Group 3: Patients who underwent orthopedic surgery under spinal anesthesia, and Group 4: Patients who underwent orthopedic surgery under Lumbar plexus block. All the data records were analyzed for assessing the occurrence of postoperative complications in all the study groups.

**Results:** 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. While comparing the occurrence of anesthetic complication in between subjects of different study groups, non-significant results were obtained.

**Conclusion:** 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.

**Key words:** Anesthesia, Orthopedic, Surgery.

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### INTRODUCTION

Orthopedic surgery has a long and rich history. While the modern term orthopedics was coined in the 1700s, orthopedic principles were beginning to be developed and used during primitive times. Currently, orthopedic surgery is a rapidly developing field that has benefited from the works of numerous scholars and surgeon.<sup>1-3</sup> Spinal anaesthesia when compared to general anaesthesia has been shown to decrease postoperative morbidity in orthopaedic surgery.<sup>4</sup> Furthermore, various orthopedic surgeries have become very cost-effective.<sup>5</sup> Nevertheless, some orthopedic surgical procedures are characterized by great perioperative disturbances including

cardiovascular complications, high incidence of thromboembolic complications, possible significant perioperative blood loss, possible bone cement effect and high level of postoperative pain. Anesthetic assessment of patients includes preoperative preparations, intraoperative and postoperative care. Most important factors determining outcome of patients include preoperative assessment and planning in order to minimize potential anesthetic problems, optimize co-morbidity and provide the most appropriate anesthetic for the patient.<sup>6-8</sup> Hence; we planned the present study to evaluate the efficacy of different anesthetic techniques in patients undergoing orthopedic surgery.

**MATERIALS & METHODS**

For the present study, data records of a total of 160 patients were enrolled from the department of orthopedic surgery and Department of Anaesthesia and Critical Care, Saraswathi Institute of Medical Sciences, Hapur Road, Anwarpur, Uttar Pradesh, India. It involved evaluation and comparison of the efficacy of different anesthetic techniques in patients undergoing orthopedic surgery. Inclusion criteria for including the patients in the present study included:

- Patients with negative history of any known drug allergy,
- Patients with negative history of presence of any systemic illness

For the present study, from the ethical committee of the institution, ethical approval was obtained. From the data record files, detailed description of the patient's medical and clinical history, along with information in relation to the surgical procedure and postoperative

complications were recorded. All the patients were broadly divided into four study groups with 40 patients in each group as follows:

**Group 1:** Patients who underwent orthopedic surgery under General anesthesia,

**Group 2:** Patients who underwent orthopedic surgery under combined spinal epidural anesthesia,

**Group 3:** Patients who underwent orthopedic surgery under spinal anesthesia, and

**Group 4:** Patients who underwent orthopedic surgery under Lumbar plexus block.

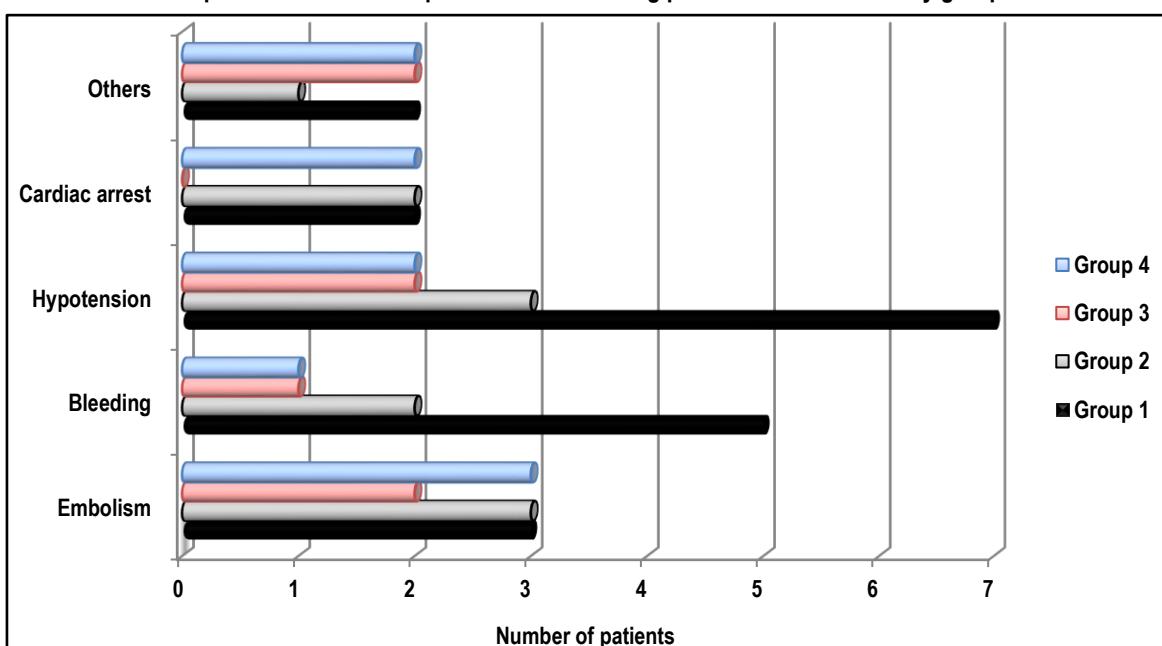
All the data records were analyzed for assessing the occurrence of postoperative complications in all the study groups. All the data was compiled in Microsoft excel sheet and were analyzed by SPSS software. Chi-square test was used for assessment of level of significance. P- value of less than 0.05 was taken as significant.

**Table 1: Demographic data**

Parameter	Groups			
	Group 1	Group 2	Group 3	Group 4
<b>Number of subjects</b>	40	40	40	40
<b>Mean age (years)</b>	69.5	65.4	67.8	63.9
<b>Gender</b>				
Males	23	22	16	25
Females	17	18	24	15

**Table 2: Anesthetic Comparison of complications seen among patients of all the study groups**

Anesthetic Complications	Groups				P-value
	Group 1	Group 2	Group 3	Group 4	
Embolism	3	3	2	3	0.12
Bleeding	5	2	1	1	
Hypotension	7	3	2	2	
Cardiac arrest	2	2	0	2	
Others	2	1	2	2	

**Graph 1: Anesthetic complications seen among patients of different study groups**

## RESULTS

The present retrospective study as carried out in the department of orthopedic surgery and Department of Anaesthesia and Critical Care, Saraswathi Institute of Medical Sciences, Hapur Road, Anwarpur, Uttar Pradesh, India.

It included analysis of data of patients undergoing orthopedic surgery under different anesthetic techniques. Data records of a total of 160 patients were evaluated in the present study and were broadly divided into 4 study groups, based on the type of anesthetic techniques used. 69.5 years, 65.4 years, 67.8 years and 63.9 years were the mean age of the subjects of study group 1, 2, 3 and 4 respectively.

There were 23, 22, 16 and 25 males among subjects of group 1, 2, 3 and 4 respectively. 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. While comparing the occurrence of anesthetic complication in between subjects of different study groups, non-significant results were obtained (P-value > 0.05).

## DISCUSSION

The discussion on the optimal anesthetic technique for most surgical procedures regarding the use of regional anesthetic versus general anesthetic techniques has been going on for decades.<sup>7,8</sup>

This is probably explained by the positive physiological effects of the provided afferent blockade with better initial pain relief, a reduced endocrine metabolic response, and sympathetic blockade with less blood loss and increased leg blood flow, all resulting in reduced cardiopulmonary and thromboembolic morbidity, but at the potential cost of reduced capability for early postoperative mobilization, urinary bladder dysfunction, and rare but potentially severe neurological complications.<sup>9</sup>

In recent years, several large epidemiological studies based on the large US databases (Premier and National Surgical Quality Improvement Program) have supported the old studies by demonstrating less postoperative morbidity when using regional anesthetic techniques.<sup>10</sup>

The present study included analysis of data of patients undergoing orthopedic surgery under different anesthetic techniques. Data records of a total of 160 patients were evaluated in the present study and were broadly divided into 4 study groups, based on the type of anesthetic techniques used. 69.5 years, 65.4 years, 67.8 years and 63.9 years were the mean age of the subjects of study group 1, 2, 3 and 4 respectively. There were 23, 22, 16 and 25 males among subjects of group 1, 2, 3 and 4 respectively. The immediate postoperative management needs to be done in the postanesthesia care unit (PACU). The PACU is expected to hold the patients for a limited period of time (usually 2 h). However, patients with moderate to high surgical risk, known cardiac or respiratory compromise, and those who have intraoperative complications, need a prolonged period of observation. These patients should be observed in an intensive care unit (ICU). This ensures close physical observation of the patient and monitoring of physiological parameters with early active management of complications.<sup>11</sup>

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. While comparing the occurrence of anesthetic complication in between subjects of different study groups, non-significant results were obtained (P-value > 0.05).

Park YB compared the occurrences of perioperative complications of two anesthetic techniques (general anesthesia [GA] and spinal anesthesia [SA] in patients undergoing primary unilateral total knee arthroplasty. The operation duration, length of perioperative stay in the operation room and occurrences of adverse events in postoperative 30 days (mean,  $29.7 \pm 3.1$  days) were compared. The GA group required longer preoperative room time, postoperative room time, and postoperative hospital stay and had more surgical site infections and blood transfusion. No differences in operative duration and other adverse events were identified. Anesthesiologist should cautiously consider that GA may be associated with slightly increased preoperative and postoperative room times, postoperative hospital stay, transfusion and surgical site infection rates in such orthopedic surgeries.<sup>12</sup>

## CONCLUSION

Under the light of above obtained data, the authors conclude that 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. However; further research in this field is recommended.

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