

**Original article:**

## **Assessment of Efficacy of Spinal, Epidural and General Anesthesia in Patients Undergoing Knee Arthroscopy: A Comparative Study**

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### **ABSTRACT**

**Background:** Knee arthroscopies are currently the most common performed orthopaedic procedure. In most orthopaedic centers, the preferential method of anaesthesia has been general and spinal anaesthesia. Hence; present study was planned to assess the efficacy of Spinal, Epidural, and General Anesthesia in patients undergoing Knee Arthroscopy.

**Materials & Methods:** The present study included assessment of efficacy of spinal, epidural and general anesthesia among patients undergoing knee arthroscopy. A total of 60 patients scheduled to undergo knee arthroscopy were included in the present study and were randomly divided into three study groups as follows: Group A: Subjects undergoing knee arthroscopy under epidural anesthesia, Group B: Subjects undergoing knee arthroscopy under spinal anesthesia, and Group C: Subjects undergoing knee arthroscopy under general anesthesia. Patient satisfaction score was recorded, as given by verbal response and compared it between all the three study groups. Complication of all the results was done in Microsoft excel sheet and were assessed by SPSS software.

**Results:** Mean time discharge among subjects of group A, group B and group C was 98.5 minutes, 145.8 minutes and 100.2 minutes respectively. Significant results were obtained while comparing the mean time to discharge among subjects of group A, group B and group C. While comparing the mean satisfaction score among subjects of different study groups, non- significant results were obtained.

**Conclusion:** Both epidural and general anesthetics were equally effective in patients undergoing knee arthroscopy. However; comparatively longer discharge rate was found to be associated in patients undergoing spinal anesthesia.

**Key words:** Anesthesia, Epidural, Knee arthroscopy, Spinal.

### **INTRODUCTION**

Knee arthroscopies are currently the most common performed orthopaedic procedure. In most orthopaedic centers, the preferential method of anaesthesia has been general and spinal anaesthesia. The use of local anaesthesia (LA), defined as injection of an anaesthetic agent at the site of operation, in knee arthroscopies has been mentioned in several orthopaedic publications over the past decades. However, there is a very moderate role of LA in knee arthroscopies compared to other forms of anaesthesia.<sup>1-3</sup>

The choice of anaesthesia in routine knee arthroscopy varies considerably. Concerns about local anaesthesia include the fear that it will take longer to perform surgery and that the anaesthesia will be inadequate, leading to patient

discomfort.<sup>4</sup> Recent data suggest that spinal and epidural anesthesia require longer discharge times than the newer shorter-acting general anesthetic drugs (propofol and sevoflurane).<sup>5,6</sup> Hence; present study was planned to assess the efficacy of Spinal, Epidural, and General Anesthesia in patients undergoing Knee Arthroscopy.

### **MATERIALS & METHODS**

The present study was conducted in the Department of Anaesthesia and Department of Orthopedics, Teerthanker Mahaveer Medical College & Research Centre, Moradabad, Uttar Pradesh (India) and it included assessment of efficacy of spinal, epidural and general anesthesia among patients undergoing knee arthroscopy. A total of 60 patients scheduled to undergo knee arthroscopy were included in the present study and were randomly divided into three study groups as follows:

Group A: Subjects undergoing knee arthroscopy under epidural anesthesia,

Group B: Subjects undergoing knee arthroscopy under spinal anesthesia, and

Group C: Subjects undergoing knee arthroscopy under general anesthesia.

Ethical approval was obtained from institutional ethical committee and written consent was obtained from all the subjects after explaining in detail the entire research protocol. Premedication was given in all the patients with midazolam and fentanyl. Propofol induction was used in patients undergoing general anesthesia. Intraoperative infusion of propofol was given in patients receiving spinal or epidural anesthesia. 50 mL of 0.25% bupivacaine was injected by the surgeons into the knee joint at the completion of the procedure. Complete demographic details of all the subjects were recorded. Patient satisfaction score was recorded, as given by verbal response was assessed as follows:

- Score 5: Very satisfied,
- Score 4: Satisfied,
- Score 3: Neutral,
- Score 2: Dissatisfied,
- Score 1: Very satisfied

Primary outcome variable and complications among patients of all the study groups was recorded. Complication of all the results was done in Microsoft excel sheet and were assessed by SPSS software. Chi-square test was used for assessment of level of significance.

### **RESULTS**

A total of 60 patients were included in the present study. Among these 60 patients random division was done into three study groups depending upon the type of anesthesia given. Mean age of the subjects of the present study was Group A, group B and group C was 41.2 years, 42.5 years and 44.8 years respectively as shown in Table 1. There were 12, 11 and 10 males in the group A, group B and group C respectively. Mean weight of the subjects of the group A, group B and group C was 75.6, 77.4 and 79.5 Kg respectively. Mean operative among subjects of group A, group B and group C was 30.9 minutes, 31.2 minutes and 32.5 minutes respectively. Mean time discharge among subjects of group A, group B and group C was 98.5 minutes, 145.8 minutes and 100.2 minutes respectively. Significant results were obtained while comparing the mean time to discharge among subjects of group A, group B

and group C (P- value < 0.05) as shown in Table 2. While comparing the mean satisfaction score among subjects of different study groups, non- significant results were obtained (P- value > 0.05).

**Table 1: Demographic and clinical data of the patients included in the present study**

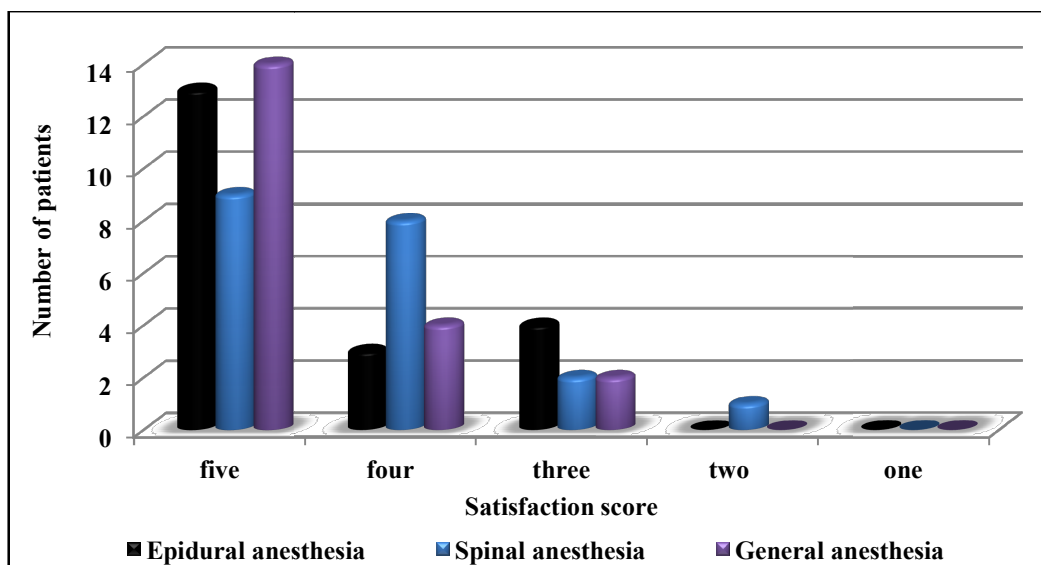
Parameter	Epidural anesthesia	Spinal anesthesia	General anesthesia
Number of subjects	20	20	20
Mean age (years)	41.2	42.5	44.8
Gender	Male	12	11
	Female	8	9
Mean weight (Kg)	75.6	77.4	79.5
Mean operative time (minutes)	30.9	31.2	32.5

**Table 2: Comparison of time to discharge and satisfaction score**

Parameter	Epidural anesthesia	Spinal anesthesia	General anesthesia	P- value
Time to discharge (minute)	98.5	145.8	100.2	0.02*
Satisfaction score (Number of subjects)	5	13	9	0.50
	4	3	8	
	3	4	2	
	2	0	1	
	1	0	0	

\*: Significant

**Graph 1: Distribution of subjects according to the satisfaction score**



## DISCUSSION

Knee arthroscopy is one of the most commonly performed orthopedic procedures. Various anesthesia methods have been successfully used in this procedure, such as local anesthesia, peripheral-neuroaxial blocks, and general anesthesia. Nonetheless, experts continue to debate which anesthesia method would increase patient satisfaction, best fit surgical conditions, and allow the most effective usage of the operating room.<sup>7,8</sup> Hence; present study was planned to assess the efficacy of Spinal, Epidural, and General Anesthesia in patients undergoing Knee Arthroscopy. In the present study, a total of 60 patients were included in the present study. Among these 60 patients random division was done into three study groups depending upon the type of anesthesia given. Mean age of the subjects of the present study was Group A, group B and group C was 41.2 years, 42.5 years and 44.8 years respectively. Forssblad M et al reviewed data from all patients (n = 6519) who had undergone a knee arthroscopy. Of these 6519 primary arthroscopies, 4101 were performed under local anaesthesia and 2418 under general anaesthesia. The purpose of the study was first to identify those arthroscopies that could not be successfully performed because the local anaesthesia was inadequate, and second, to investigate if arthroscopy under local anesthesia was associated with an increased number of rearthroscopies compared to general anaesthesia. The total number of rearthroscopies, performed within 180 days from the primary arthroscopy, was 214. Of these 214 rearthroscopies, 146 were due to a new indication for surgery and 30 were due to persisting clinical symptoms (true rearthroscopies). The remaining 38 rearthroscopies were due to an incomplete examination (because of patient discomfort) in a primary procedure where local anaesthesia was used. Of the 30 true rearthroscopies, 19 originated from the 4101 primary arthroscopies performed under local anaesthesia (0.46%) and 11 originated from the 2418 primary arthroscopies performed under general anaesthesia (0.45%). It is concluded that 0.9% of the primary arthroscopies performed under local anaesthesia could not be performed safely due to patient discomfort. There was no difference in the frequency of rearthroscopy between the arthroscopies performed under local anaesthesia compared to those performed under general anaesthesia.<sup>9</sup>

In the present study, mean operative among subjects of group A, group B and group C was 30.9 minutes, 31.2 minutes and 32.5 minutes respectively. Mean time discharge among subjects of group A, group B and group C was 98.5 minutes, 145.8 minutes and 100.2 minutes respectively. Significant results were obtained while comparing the mean time to discharge among subjects of group A, group B and group C (P- value < 0.05). While comparing the mean satisfaction score among subjects of different study groups, non- significant results were obtained.

Mulroy MF et al compared general, epidural, and spinal anesthesia for outpatient knee arthroscopy (excluding anterior cruciate ligament repairs). Forty-eight patients (ASA physical status I–III) were randomized to receive either propofol-nitrous oxide general anesthesia with a laryngeal mask airway with anesthetic depth titrated to a bispectral index level of 40–60, 15–20 mL of 3% 2-chloroprocaine epidural, or 75 mg of subarachnoid procaine with 20 mg fentanyl. All patients were premedicated with 0.035 mg/kg midazolam and 1 mg/kg fentanyl and received intraarticular bupivacaine and 15–30 mg of IV ketorolac during the procedure. Postanesthesia care unit discharge times for the general and epidural groups were similar, whereas the spinal group had a longer recovery time. Patient satisfaction was equally good in all three groups. Room turnover times did not differ among groups. There were no anesthetic failures or serious adverse events in any group. Pruritus was more frequent in the spinal group than in the

general or epidural groups. They conclude that epidural anesthesia with 2-chloroprocaine provides comparable recovery and discharge times to general anesthesia provided with propofol and nitrous oxide. Spinal anesthesia with procaine and fentanyl is an effective alternative and is associated with a longer discharge time and increased side effects.<sup>10</sup>

### CONCLUSION

Under the light of above obtained results, it can be concluded that both epidural and general anesthesia were equally effective in patients undergoing knee arthroscopy. However; comparatively longer discharge rate was found to be associated in patients undergoing spinal anesthesia. Further studies are, therefore, recommended.

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