

Efficiency of Spinal Anaesthesia Versus General Anaesthesia for Single Level Lumbar Micro-Discectomy Prospective Analysis of 50 Patients: An Observational Study

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Abstract

Background: In most of the institutes Lumbar Microdiscectomy surgery is done under general anaesthesia. However it is not Uncommon to do these surgeries under spinal anaesthesia

Aims and objectives: To compare the analgesic effectiveness in postoperative pain, cost effectiveness and complications of spinal anaesthesia and general anaesthesia who underwent single level lumbar microdiscectomy under general anaesthesia vs who were administered spinal anaesthesia for the same

Materials and methods: A prospective observational study was conducted on patients undergoing lumbar micro-discectomy in the department of orthopaedics of a tertiary care hospital in Maharashtra, India. The study duration was two years (January 2020 to December 2020). The patients older than 18 years who were not responding to 6 weeks of conservative therapy, epidural steroid injection, physiotherapy, and having low back pain with radiculopathy with claudication with or without neurological deficit were included in the study. We included 25 cases each in the spinal anaesthesia (SA) and general anaesthesia (GA) group. Outcome variables like peri-operative complications (blood loss, urinary retention, PONV), surgery length, length of stay (LOS), time from entering OT to incision, time from bandaging to exit time, and time of stay in the recovery room were studied among both the groups. Chi-square or fishers exact test to test the difference between proportions and student t-test to test between the means were statistical tests used.

Results: The VAS score reduction immediately post operative among GA group was 79% and SA group was 75% and this difference was not significant. ($p>0.05$) The time from post anaesthesia care unit from operation theatre (GA Vs. SA; 60.44 minutes Vs. 20.45 minutes), time of surgery (time to enter in OT to incision) (GA Vs. SA; 30.22 minutes Vs. 15.55 minutes), time from bandaging to exit from OT (GA Vs. SA; 16.34 minutes Vs. 6.12 minutes) and average hospital stay (GA Vs. SA; 3.05 days Vs. 1.61 days) were significantly higher among GA group when compared to SA group. ($p<0.05$) The average cost of procedure among GA group was 26500 INR and among SA group was 18500 INR. ($p<0.05$)

Conclusions: In terms of VAS pain score reduction, SA was comparable with GA. Our study showed that SA was superior to GA in terms of time consumption, cost, and hospital stay while maintaining better perioperative hemodynamic stability without increasing adverse side effects.

Keywords: Lumbar micro-discectomy, Spinal anaesthesia, General anaesthesia, Cost effectiveness

Introduction

One of the most frequent spine operations is lumbar micro-discectomy. Under spinal anaesthesia, lower thoracic or lumbar discectomy procedures may be carried out. However, general anaesthesia is typically used during the procedure. General anaesthesia seems appropriate when lengthy surgery is anticipated. The prevention of airway compromise is another benefit of general anaesthesia. The viability of general anaesthesia in simple

discectomy, however, is called into question. On the other hand, regional anaesthesia appears to lessen postoperative hypoxia or other pulmonary events, intra-operative blood loss, and cardiovascular complications during surgery. Additionally, it was suggested that it would have low postoperative pain, better intra-operative neural and skin pressure control, and was unquestionably cost-effective. All of these benefits, though, are not properly addressed [1–3].

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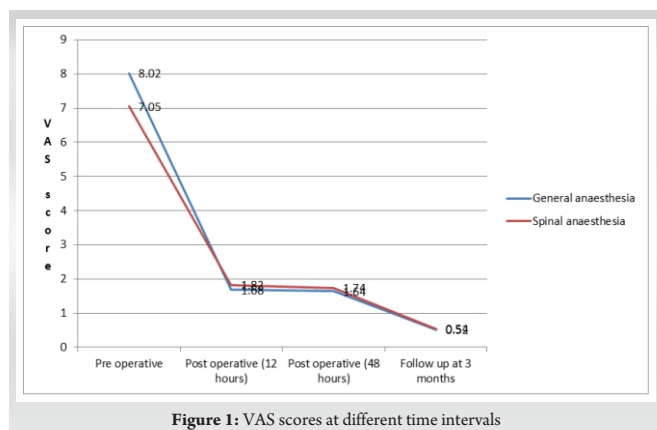


Figure 1: VAS scores at different time intervals

The proposed benefits of regional (spinal) anaesthesia over general anaesthesia were attributed to sympathectomy, which improves hemodynamic control and reduces the need for pharmacologic medications. Other studies, however, mentioned using vasoactive drugs but did not discuss their effects [4, 5]. There is still disagreement regarding the impact of anaesthesia technique on the postoperative course of surgery, despite prior studies comparing spinal to general anaesthesia during lumbar discectomy [4–6].

Our study's main objective is to contrast the analgesic effectiveness of SA and GA for managing postoperative pain in adult patients having lumbar vertebral surgery. The secondary goal is to compare and contrast the two techniques' peri-operative complications (blood loss, urinary retention, PONV), surgery length, length of stay (LOS), time from entering OT to incision, time from bandaging to exit time and time of stay in recovery room.

Materials and methods

A prospective observational study was conducted in the patients undergoing lumbar micro-discectomy in the department of orthopaedics of a tertiary care hospital in Maharashtra, India. The duration of the study was for 2 years (January 2020 to December 2020). The patients with age more than 18 years, who were not responding to 6 weeks of conservative therapy and epidural steroid injection, physiotherapy and having low back pain with radiculopathy with claudication with or without neurological deficit were included in the study. Those patients who underwent any revision surgery, malignancy, infections, extra spinal cause of back pain, multi-level surgery, upper lumbar spine levels (L1-L2 or L2-L3) and other pathological causes of back pain were excluded in the present study.

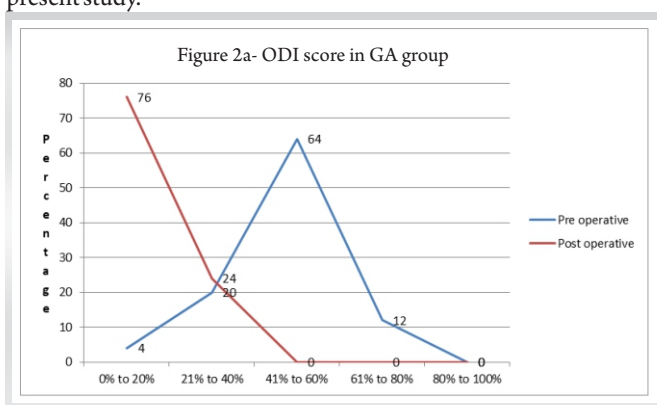


Figure 2a- ODI score in GA group

Sample size:

Considering a 40% difference in the number of complications among the spinal anaesthesia group and general anaesthesia group, with 95% confidence interval and 80% power the minimum sample size was found to be 20 in each group. Considering an attrition rate of 20%, we finalised our sample size in each group be 25.

Allocation of the study subjects:

We used random number tables generated by computer for allocation of the patients into two groups i.e. Spinal anaesthesia group and general anaesthesia group.

We used a pretested and designed case record form to collect our data. The case record form had details of demographic particulars like age, gender etc., detailed clinical history and examination findings and relevant investigations. Various factors like peri-operative complications (blood loss, urinary retention, Post operative nausea and vomiting), surgery length, length of stay (LOS), time from entering OT to incision, time from bandaging to exit time and time of stay in recovery room were studied among both the groups.

Statistical analysis:

The data were collected, assembled, and assessed using EPI information (version 7.2). The qualitative characteristics were expressed using percentages. The quantitative variables were expressed using both categories and percentages, also known as mean and standard deviation. The difference between the two proportions was looked at using either the chi-square test or the Fisher exact test. In order to determine whether quantitative data was normal, the Kolmogorov-Smirnov test was applied. To determine if the means of the normal data varied, the student t test was used. All analyses were carried out with two tails, and the significance threshold was set at 0.05.

Results

We have included 25 cases each in both the groups.

The patients in both the groups were comparable in terms of age, gender and level of surgery. ($p > 0.05$)

The average VAS score decreased significantly pre operatively to 3 months follow up among both the groups. The VAS reduction % in GA group was 79% and in SA group was 75%. ($p > 0.05$)

The post anaesthesia care unit from OT was 60.44 minutes and

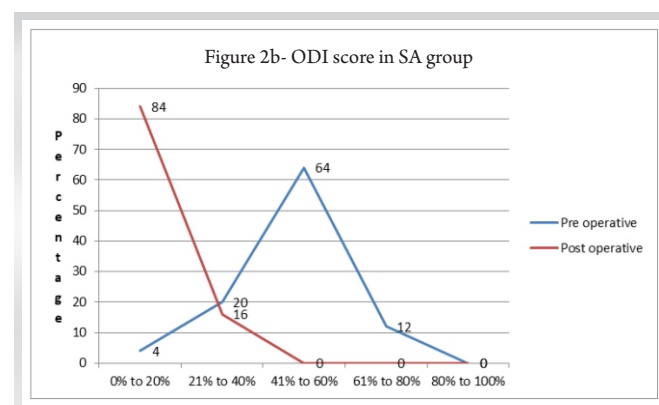


Figure 2b- ODI score in SA group

Table 1: Demographic particulars of the sample

Demographic particulars	General anaesthesia (n=25)		Spinal anaesthesia (n=25)		P value
	Number/ Mean	%/SD	Number/ Mean	%/SD	
Age	42.34	4.43	43.56	4.56	0.7832
Gender					
Female	17	68	15	60	0.4562
Male	8	32	10	40	
Level of surgery					
L3-L4	2	8	1	4	0.7832
L4-L5	20	80	18	72	
L5-S1	3	12	6	24	

Table 2: Intra operative parameters of the sample

Intra operative parameters	General anaesthesia (n=25)	Spinal anaesthesia (n=25)	P value
Incision to closure (Duration of surgery)	50.11 ± 10.23	45.34 ± 9.37	0.3421
Time of surgery (Time of entering OT to incision)	30.22 ± 8.21	15.55 ± 7.12	<0.001
Time from bandaging to exit	16.34 ± 5.10	6.12 ± 3.2	<0.001
Blood loss (ml)	40.23 ± 10.45	30.22 ± 11.21	0.5523
Post Anaesthesia Care unit (min)	60.44 ± 11.23	20.45 ± 5.67	<0.001
Hospital stay (days)	3.05 ± 0.67	1.61 ± 0.55	<0.001
Cost of procedure (INR)	26500 ± 1200	18500 ± 1100	<0.001

Table 3: Complications among both the groups

Complications	General anaesthesia (n=25)		Spinal anaesthesia (n=25)		P value
	Number	%	Number	%	
Dural tear	1	4	1	4	1
Nausea and vomiting	13	52	4	16	<0.001
Urinary retention	1	4	4	8	0.0234

20.45 minutes among general anaesthesia and spinal anaesthesia respectively ($p < 0.05$). The duration of surgery (incision to closure) was 50.11 minutes and 45.34 minutes among general anaesthesia and spinal anaesthesia respectively ($p > 0.05$). The time of surgery (time to enter in OT to incision) was 30.22 minutes and 15.55 minutes among general anaesthesia and spinal anaesthesia respectively ($p < 0.05$). The time from bandaging to exit from OT was 16.34 minutes and 6.12 minutes among general anaesthesia and spinal anaesthesia respectively ($p < 0.05$). The average blood loss was 40.23 ml and 30.22 ml among general anaesthesia and spinal anaesthesia respectively ($p > 0.05$). The average hospital stay from OT was 3.05 days and 1.61 days among general anaesthesia and spinal anaesthesia respectively ($p < 0.05$).

The proportions of Dural tear was 4% among both the groups ($p > 0.05$). The proportion of nausea and vomiting was 52% in general anaesthesia group and 16% among spinal anaesthesia group ($p < 0.001$). In contrast with urinary retention the proportion was 8% among spinal anaesthesia group and 4% among general anaesthesia group ($p < 0.001$).

Discussion

The general anesthetic group had a significantly longer surgery time, time from bandaging to OT exit, post-anesthesia care, and hospital stay than the spinal anesthesia group. Nonetheless, the average blood loss was similar across the two groups. Pierce JT et al. [8] examined spinal and general anesthesia use in a retrospective review of 544

patients who underwent lumbar spinal surgery. They concluded that SA was associated with a more extended stay in the PACU but a noticeably lower operating time, blood loss, total anesthesia time, time from entering the OR until incision, and bandaging until exiting the OR. In their investigation, Talukder MH et al. [6], Rangalakshmi S et al. [5], and Jonayed SA et al. [4] came to similar conclusions.

In a different study, Ragab ASM et al. [2] discovered that patients who receive spinal anesthesia stay in the hospital for significantly less time (2.410.49 days vs 2.660.52 days, respectively) or require significantly fewer patients to receive a continuous infusion of vasoactive medications (48.7% vs. 74.4%, respectively).

The spinal anesthesia group had considerably lower mean periods for entering the operating room to the incision, bandaging to the departure, mean PACU duration, and mean hospital stay, according to another retrospective review by Rangeekar A et al. [5] ($p < 0.05$).

While urinary retention was more frequent in the spinal anesthesia group, nausea and vomiting were far more prevalent in general anesthesia. According to the current analysis, there was no appreciable difference in blood loss between the two groups ($p > 0.05$). In a randomized controlled experiment by Attari MA et al. [9], participants receiving spinal anesthesia lost much less mean blood than those receiving general anesthesia.

In a study by Pierce JT et al. [8], no one died in either group. The SA group only experienced a spinal hematoma successfully removed without causing long-term neurological damage. The SA group did not experience paralysis, chronic postoperative paraesthesia, or headaches following Dural punctures. In a different study, Ragab ASM et al. [2] discovered that patients receiving general anesthesia experienced much more postoperative nausea and vomiting than patients receiving spinal anesthesia (59.0% vs. 30.8%, respectively). Rangeekar A et al. (2005) found that the spinal anesthesia group had considerably more urine retention ($p < 0.05$).

Conclusion

Patients who underwent single level Lumbar Microdiscectomy under Spinal Anaesthesia has less post operative pain, shorter hospital stays and fewer complications as compared to GA group also Lumbar microdiscectomy under spinal anaesthesia is more cost effective

Declaration of patient consent : The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient has given his/her consent for his/her images and other clinical information to be reported in the Journal. The patient understands that his/her name and initials will not be published, and due efforts will be made to conceal his/her identity, but anonymity cannot be guaranteed.

Conflict of Interest: None; **Source of Support:** None

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