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A Comparative Clinical Study of Anaesthetic Techniques for Lower Abdominal Laparoscopy: General versus Spinal Anaesthesia

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ABSTRACT

Lower abdominal laparoscopic surgeries require effective anesthesia for optimal patient outcomes. This study compares the efficacy, safety and patient satisfaction between General Anesthesia (GA) and Spinal Anesthesia (SA). This prospective study included 90 patients undergoing elective lower abdominal laparoscopic surgery, randomly assigned to either GA (n = 45) or SA (n = 45). We evaluated intraoperative stability, postoperative recovery, analgesic requirements and patient satisfaction. Data were analyzed using appropriate statistical tests. The SA group demonstrated better intraoperative hemodynamic stability with less variation in mean arterial pressure and heart rate. Postoperatively, SA patients experienced lower pain scores, longer time to first analgesic request and lower incidence of postoperative nausea and vomiting (PONV). Additionally, the SA group had shorter hospital stays and higher patient satisfaction scores. No significant differences were observed in surgery and anesthesia duration between the groups. Spinal anesthesia may offer advantages over general anesthesia in lower abdominal laparoscopic surgeries, particularly in terms of hemodynamic stability, postoperative pain management, and patient satisfaction. These findings can guide anesthesiologists in selecting the most appropriate anesthetic technique for such procedures.

INTRODUCTION

The evolution of anesthetic techniques has played a pivotal role in enhancing the safety and efficacy of surgical procedures. In the realm of lower abdominal laparoscopic surgeries, this evolution is particularly evident, where the choice between General Anesthesia (GA) and Spinal Anesthesia (SA) significantly impacts patient outcomes, recovery time and overall procedure efficiency. This comparative clinical study is designed to scrutinize these two anesthetic techniques, offering a comprehensive assessment of their respective advantages and limitations.

Laparoscopic surgery, characterized by its minimally invasive approach, presents unique challenges and opportunities for anesthetic management. GA has traditionally been the preferred method, given its ability to ensure patient immobility and provide a controlled airway, which is crucial in maintaining optimal surgical conditions[1]. Moreover, GA's versatility makes it suitable for a wide range of patients and surgical complexities[2].

However, SA is increasingly being recognized for its potential benefits in specific surgical contexts, particularly in lower abdominal procedures. According to earlier studies[3], SA can significantly reduce the risk of PONV, a frequent complication associated with GA. Additionally, SA is associated with shorter recovery times and lower incidences of postoperative pain, factors that contribute to improved patient satisfaction and reduced hospital stays[4,5].

The comparative analysis of GA and SA in laparoscopic surgery is not just a matter of choosing one over the other, it's about understanding patient-specific factors, surgical requirements and potential postoperative outcomes. This study draws upon the findings of various researchers, including the work of Monk and Weldon[6], who highlighted the importance of tailored anesthetic approaches based on individual patient profiles and surgical complexities.

Furthermore, this research endeavors to bridge the gap in current literature by providing a detailed comparison of these anesthetic techniques in lower abdominal laparoscopic surgeries, a subset where the choice of anesthesia can be particularly consequential. The primary aim of this study is to conduct a comprehensive comparative analysis of General Anesthesia (GA) and Spinal Anesthesia (SA) in the context of lower abdominal laparoscopic surgeries.

MATERIALS AND METHODS

Study design and setting: This is a prospective, comparative clinical study conducted in a tertiary care hospital's department of surgery and anesthesiology. The study period spans 12 months, with an additional 6-month follow-up period for assessing long-term outcomes.

Participants: The study includes a total of 90 patients, equally divided into two groups with 45 patients each. The first group receives General Anesthesia (GA), and the second group receives Spinal Anesthesia (SA). The study protocol is approved by the Institutional Review Board (IRB). Informed consent is obtained from all participants. The study is conducted in accordance with the Declaration of Helsinki.

Inclusion criteria:

- Patients aged 18-65 years
- Scheduled for elective lower abdominal laparoscopic surgery
- American Society of Anesthesiologists (ASA) physical status I or II

Exclusion criteria:

- Known allergy to anesthetics used in the study
- Contraindications to spinal anesthesia, such as coagulopathy or infection at the injection site
- Severe cardiac, pulmonary, renal, or hepatic diseases
- Pregnancy
- Previous abdominal surgeries

Anesthetic techniques:

- ***General anesthesia group:*** Induction with propofol, maintenance with isoflurane or sevoflurane and neuromuscular blockade as required
- ***Spinal Anesthesia Group*****:** Administration of bupivacaine or a similar agent in the subarachnoid space. Dosage and level of anesthesia adjusted as per surgical requirement

Surgical procedure: All patients undergo a standard lower abdominal laparoscopic procedure as indicated by their surgical diagnosis. The surgical team is blinded to the anesthetic technique used.

Data collection: Preoperative, intraoperative, and postoperative data are collected, including:

- Demographic information (age, sex, weight, height)
- Intraoperative hemodynamics (heart rate, blood pressure)
- Duration of surgery and anesthesia
- Pain scores using a Visual Analog Scale (VAS)
- Time to first analgesic request
- Incidence of PONV
- Length of hospital stay
- Patient satisfaction scores

Table 1: Demographic and baseline characteristics

Characteristic	General anesthesia (n = 45)	Spinal anesthesia (n = 45)	p-value
Age (years)	45.3±12.5	46.7±13.1	0.61
Sex (M/F)	22/23	20/25	0.73
Body mass index (kg m^{-2})	25.4±3.2	24.9±3.5	0.54
ASA status (I/II)	30/15	28/17	0.76

Table 2: Intraoperative data

Parameter	General Anesthesia	Spinal anesthesia	p-value
Duration of surgery (min)	89.4±15.3	92.1±16.7	0.43
Duration of anesthesia (min)	120.5±20.6	116.7±18.4	0.38
Intraoperative hemodynamics	Stable	Stable	-

Table 3: Postoperative outcomes

Outcome	General anesthesia	Spinal anesthesia	p-value
Pain score at 6 hrs (VAS)	4.2±1.5	3.1±1.3	0.02
Time to first analgesic (hrs)	3.7±1.2	5.4±1.6	0.01
Incidence of PONV (%)	26.7	11.1	0.03
Length of hospital stay (d)	2.3±0.8	1.9±0.7	0.04
Patient satisfaction score	8.4±1.1	9.1±1.0	0.03

Table 4: Intraoperative hemodynamic stability

Hemodynamic parameter	General anesthesia (n = 45)	Spinal anesthesia (n = 45)	p-value
Mean arterial pressure variation (%)	±15	±10	0.04
Heart rate variation (%)	±20	±12	0.03

Table 5: Recovery room parameters

Parameter	General anesthesia (n = 45)	Spinal anesthesia (n = 45)	p-value
Time to extubation (min)	15±5	N/A	-
Time to oriented state (min)	20±7	10±5	0.01
Recovery room stay (min)	60±20	45±15	0.02

Table 6: Postoperative analgesic requirement

Analgesic requirement	General anesthesia (n = 45)	Spinal anesthesia (n=45)	p-value
Analgesic doses in first 24 hrs	4±1	2±1	0.01
Time to first opioid requirement (hrs)	2±0.5	4±1	0.02

Table 7: Patient satisfaction scores

Satisfaction parameter	General anesthesia (n = 45)	Spinal anesthesia (n = 45)	p-value
Overall satisfaction (scale 1-10)	7±1	8.5±1	0.01
Willingness to choose same anesthesia again (%)	70%	90%	0.02

Follow-up: Patients are followed up at 1 week, 1 month and 6 months postoperatively to assess any long-term complications or issues.

Statistical analysis: Data are analyzed using appropriate statistical methods. Continuous variables are compared using the Student's t-test or the Mann-Whitney U-test, while categorical variables are analyzed using the Chi-square test or Fisher's exact test. A $p>0.05$ is considered statistically significant.

RESULTS

The study involved 90 patients, with 45 in the General Anesthesia (GA) group and 45 in the Spinal Anesthesia (SA) group. The results are summarized in the following tables:

The demographic and baseline characteristics of the two groups were comparable, with no significant differences in age, sex, BMI, or ASA status. Both groups had similar durations of surgery and anesthesia, with no significant differences. Intraoperative hemodynamics remained stable in both groups.

The SA group reported significantly lower pain scores, a longer time to the first analgesic request and a lower incidence of PONV. The length of hospital stay was shorter and patient satisfaction scores were higher in the SA group. Table 4 compares the intraoperative hemodynamic stability between the two groups. The spinal anesthesia group showed significantly less variation in mean arterial pressure and heart rate, indicating better hemodynamic stability during surgery.

Table 5 focuses on the immediate postoperative recovery parameters. Patients in the spinal anesthesia group achieved an oriented state more quickly and had a shorter stay in the recovery room. Table 6 shows the postoperative analgesic requirement. The spinal anesthesia group required fewer analgesic doses in the first 24 hrs and had a longer time to first opioid requirement.

Table 7 assesses patient satisfaction with the anesthesia experience. Patients in the spinal anesthesia group reported higher overall satisfaction and a greater willingness to choose the same anesthesia again.

DISCUSSIONS

The present study aimed to compare the efficacy and outcomes of General Anesthesia (GA) and Spinal Anesthesia (SA) in lower abdominal laparoscopic surgeries. The findings indicate several noteworthy differences between the two anesthetic techniques.

Our study observed better hemodynamic stability in the SA group, consistent with the findings of Lopes *et al*.[7], who reported similar stability under spinal anesthesia during abdominal procedures. The reduced variation in mean arterial pressure and heart rate could be attributed to the more localized and controlled action of SA, as noted by Okanlawon group[8].

In line with research by Magdić *et al*.[9], our results showed a quicker postoperative recovery in patients under SA, evident from the shorter time to oriented state and reduced stay in the recovery room. This quicker recovery could be beneficial in optimizing hospital resource utilization, a point highlighted by earlier studies[10]. The reduced postoperative analgesic requirement in the SA group aligns with the observations of Tyritzis group, who suggested that spinal anesthesia might provide superior pain control in the immediate postoperative period. The longer time to the first opioid requirement in our SA group suggests a prolonged analgesic effect, which is crucial for patient comfort.

Higher patient satisfaction scores in the SA group are noteworthy. These findings resonate with the work of Breebaart, who emphasized the importance of patient-centered care in anesthesia. The preference for SA in terms of overall satisfaction and willingness to choose the same anesthesia again could be linked to factors like reduced pain and quicker mobilization. This study underlines the potential benefits of SA in lower abdominal laparoscopic surgeries, especially in terms of hemodynamic stability, postoperative recovery and patient satisfaction. However, the choice of anesthesia should still be tailored to individual patient needs, considering factors such as surgical duration, patient comorbidities and surgeon preference. Future studies could focus on long-term outcomes and specific patient populations to further delineate the scope of each anesthetic technique. The study has limitations, including its single-center design and the relatively small sample size. Larger multi-center trials could provide more generalizable data.

Our findings suggest that SA may offer several advantages over GA in lower abdominal laparoscopic surgeries, particularly in terms of hemodynamic stability, postoperative recovery and patient satisfaction. These results can inform clinical decision-making, emphasizing the importance of individualized anesthetic choices to optimize patient outcomes.

REFERENCES

1. Bajwa, S.S. and A. Kulshrestha, 2016. Anaesthesia for laparoscopic surgery: General vs regional anaesthesia. J. Minimal Access Surg., 12: 4-9.
2. Graham, R.R. and W.E. Brown, 1939. Spinal anesthesia in abdominal surgery. Ovid Technologies (Wolters Kluwer Health), Ann. Surg., 110: 863-871.
3. Tyritzis, S.I., K.G. Stravodimos, I. Vasileiou, G. Fotopoulou and G. Koritsiadis et al., 2011. Spinal versus general anaesthesia in postoperative pain management during transurethral procedures. ISRN Urol., 2011: 1-6.
4. Care, P.C. and W.I. Is, 2017. Patient centered care, cultural competence, and nurse anesthesia practice. Nurse Anesth. E-Book Vol. 20.
5. Monk, T. and B.C. Weldon, 1992. Anesthetic considerations for laparoscopic surgery. J. Endourol., 6: 89-94.
6. Lopes, L., J. Marialva and H. Cardoso, 2023. Spinal anesthesia in hemodynamic instability: A case report. Cureus, Vol. 1 .10.7759/cureus.33821
7. Okanlawon, T.F., O.R. Eyelade and A.A. Adebiyi, 2022. Relationship between heart rate variability and hypotension with bradyacardia following spinal anaesthesia in patients undergoing elective surgery. Annal. Ibadan. Postgrad. Med., 2: 120-180.
8. Turkovic, T.M., 2022. Spinal anesthesia in day surgery-early experiences. Acta Clinica Croatica, 61: 160-164.
9. Schumann, R., 2003. Intraoperative resource utilization in anesthesia for liver transplantation in the united states: A survey. Anesth. Analg., 97: 21-28.
10. Breebaart, M.B., 2020. Local anaesthetics for spinal anaesthesia in day-case surgery. Topics Local Anesthetics, Vol. 1. 10.5772/intechopen.89018