

## COMPARATIVE EVALUATION OF SPINAL ANESTHESIA AND GENERAL ANESTHESIA IN INGUINAL HERNIA REPAIR

Wasif Ali<sup>\*1</sup>, Ali Haider<sup>2</sup>, Muhammad Shahbaz<sup>3</sup>, Muhammad Ahmad Arif<sup>4</sup>,  
Noor Ul Ain Aqeel<sup>5</sup>

<sup>\*1,2,3</sup>Department of Health Professionals Technologies, The University of Lahore, Pakistan

<sup>4,5</sup>Demonstrator, Department of Health Professionals Technologies, The University of Lahore, Pakistan

<sup>1</sup>70134837@student.uol.edu.pk, <sup>2</sup>70134520@student.uol.edu.pk, <sup>3</sup>70136777@student.uol.edu.pk,

<sup>4</sup>malikahmadarif77@gmail.com, <sup>5</sup>noorulainaqeel12@gmail.com

DOI: <https://doi.org/10.5281/zenodo.21189953>

### Keywords

Spinal Anesthesia, Intraoperative Complications, Inguinal Hernia Patients, Hypotension, Bradycardia, O<sub>2</sub> Saturation, VAS Score, NRS Score

### Article History

Received: 25 April 2026

Accepted: 04 June 2026

Published: 21 June 2026

Copyright @Author

Corresponding Author: \*

Wasif Ali

### Abstract

*Background:* Inguinal hernia is a medical condition where intra-abdominal tissue (such as abdominal fat or part of the intestine) protrudes through a weak spot or defect in the lower abdominal wall into the inguinal canal (the groin) is called inguinal hernia. Not only the surgery technique, but also the type of anesthesia is a major determinant for hernial repair success. Spinal anesthesia and general anesthesia are both routinely used with each having its own pros and cons with respect to hemodynamics, postoperative pain, and postoperative profile of recovery. General anesthesia was found to be better for intra-operative pain control due to complete unconsciousness during surgery while patients who received spinal anesthesia experienced less post-operative nausea and vomiting and better recovery. *Objective:* To assess and compare the effectiveness of spinal and general anesthesia in the inguinal hernia surgery. *Methodology:* Comparative Analytical Cross-Sectional Study to get information from inguinal hernia patients for four months that were operated upon under general anesthesia and spinal anesthesia. Information on demographic characteristic, VAS (to measure post-operative pain) and NRS (to measure headache severity) was obtained. Monitoring was carried out continuously for the haemodynamic parameters and any kind of complications were documented and taken care of. *Results:* Results demonstrated that spinal anesthesia group has better outcomes: 77% were pain free at 24 hours compared to 38.5% in the general anesthesia group; who were also less nauseous or vomiting at 24 hours (46.2% vs 53.8%) and were more satisfied (53.8% vs 30.7%). Assessment of postoperative pain using the Visual Analog Scale (VAS) showed comparable pain relief in both the General Anesthesia (GA) and Spinal Anesthesia (SA) groups at 2 and 12 hours after surgery. The GA group demonstrated slightly better pain relief at 6 hours (23.1% vs. 15.4%), whereas the SA group showed superior pain control at 24 hours, with 69.2% of patients achieving better pain relief compared with 53.8% in the GA group. Similarly, headache assessment using the Numeric Rating Scale (NRS) indicated improved analgesia in the SA group at 2 hours (30.7% vs. 7.7%) and 24 hours (77.0% vs. 38.5%), while the GA group showed slightly better pain control at 6 hours (38.4% vs. 23.1%). At 12 hours, both groups demonstrated similar pain control, with 46.2% of patients in each group reporting satisfactory pain relief. Overall patient satisfaction was higher among patients receiving Spinal Anesthesia, with approximately 69%

reporting complete satisfaction Spinal anesthesia had better postoperative recovery and comfort as compared with general anesthesia. Conclusion: The study revealed that spinal anesthesia and general anesthesia are safe and effective methods to be used for the elective inguinal hernia repair surgery. But spinal anesthesia was superior in post-operative pain management, complications like nausea and vomiting along with speedy recovery and satisfaction of the patients in comparison to general anaesthetic. Hence in cases where clinically suitable, spinal anesthesia may be a more reliable and safer alternative to general anesthesia for elective inguinal hernia repair.

## INTRODUCTION

Inguinal hernia is one of the most common surgical conditions worldwide and is a huge health problem because of its occurrence and complications. It results from the abdominal contents coming out through a weakened part of the lower abdomen wall, typically in the inguinal canal. Men tend to be more predisposed to this condition due to its anatomical nature, and it is often accompanied with groin discomfort, swelling, pain and limited mobility. There is a rising incidence with age, and it is aggravated by chronic cough, obesity, smoking, constipation and jobs that involve heavy lifting. While inguinal hernia develops in many patients without symptoms and is initially painless, if left untreated it can become incarcerated or strangulate leading to loss of blood supply to the incarcerated tissue and, if untreated, can become life-threatening due to the need for urgent surgery. So, the only method of avoiding problems and enhancing the patients' quality of life is elective surgical repair (Fitzgibbons et al., 2021).

Inguinal hernia repair is one of the most frequently performed elective surgical procedures world-wide and is performed in millions of patients each year. In the surgery field, the development of techniques (e.g., open mesh repair and laparoscopy) has made the surgical procedure safer and reduced recurrence. Yet, as surgical procedures have become more refined so has the importance of anaesthetic on the success of the procedure and the recovery after surgery. Beyond treating pain during surgery, the type of anesthesia administered plays key roles in the intensity of pain that can be experienced after surgery, the likelihood of complications and patient satisfaction. Therefore, selection of anaesthetic is part of the overall management of the inguinal hernia

surgery during the perioperative period (Kingsnorth & LeBlanc, 2023).

Methods of anaesthetic used in inguinal hernia repair are local anaesthetic, spinal anaesthetic and general anaesthetic. Local anesthesia may be adequate for certain simple repairs but is not sufficient for those which are extensive or for patients that become very anxious. Thus, the proportions of spinal anesthesia and general anesthesia are still most widely used in tertiary health care hospitals. They each have different physiological impacts, benefits and risks, which affect their use with patient types. These techniques need to be comparatively evaluated to find out which is better for better clinical results (Miller et al., 2020).

General anesthesia is state of reversible unconsciousness that is achieved using intravenous or inhalational agents which achieve complete analgesia, amnesia, and muscle relaxation. It offers optimum operating conditions since during the operation the patient is completely unconscious and immobilized (e.g. during extended operations). (Butterworth et al., 2022).

The principles of Enhanced Recovery After Surgery (ERAS) have been focusing on accelerated postoperative recovery, using multimodal pain management techniques and avoiding unnecessary use of opioids, as well as early mobilization. Depending on the institutional practices and patient's characteristics, both spinal and general anesthesia can be used to achieve both these goals. Hence the best technique to be used for inguinal hernia repair must be evaluated in the context of each individual patient (Kehlet & Wilmore, 2019).

Complications after surgery include the ability to feel or see bad, nausea, vomiting, not being able to urinate, headache, dizziness, and slow recovery of mental function that may greatly

affect how well you feel about your surgery. While most of these complications are short-term, it may delay discharge readiness and decrease satisfaction. (Barash et al., 2020)

Local evidence is also scant on severity of headache following spinal anesthesia and how this relates to the size of the needle, patient hydration and operator experience. The knowledge of these factors can help enhance prevention measures and enhance safety of spinal anesthesia in institutional practice (Gupta et al., 2021).

In calling the shots for perioperative care, patient preference is playing an ever-greater part. Some people would prefer spinal anesthesia as it does not involve unconsciousness and the use of the instruments that are inserted in the mouth during general anesthesia, while others would opt for general anesthesia due to their fear of being awake during the procedure. Clear and precise provision of information about risks, benefits and likelihood of recovery helps facilitate shared decision making and increases trust in health care providers. An evidence-based approach to describing anaesthetic recommendations to patients supports patient counselling, and comparative research can be useful for these (Bendavid, 2021).

## MATERIAL AND METHODS

Permission to conduct the study was obtained from the Medical Superintendent of Mayo Hospital, Lahore before data collection. Participants were selected according to predefined inclusion and exclusion criteria. The purpose and procedures of the study were explained to all participants, and written informed consent was obtained prior to enrolment. Data were collected using a standardized questionnaire administered by the researcher to ensure uniformity. Completed questionnaires were checked for completeness before being entered into the Statistical Package for the Social Sciences (SPSS) version 27 for analysis.

Ethical approval was obtained from the relevant authorities at the University of Lahore, and all ethical guidelines were strictly followed. Participation was voluntary, and participants were informed that they could withdraw at any time without any consequences. The study posed no additional risk beyond routine medical care.

Confidentiality and anonymity were strictly maintained throughout the study. No personal identifiers were recorded, and all data were kept confidential. Hard copies were stored securely under lock and key, while electronic data were password-protected and accessible only to the researcher.

Patients aged 18–65 years, classified as ASA I or II, scheduled for elective inguinal hernia repair, and able to provide consent were included. Patients with heart disease, drug allergies to anesthesia, or contraindications to spinal anesthesia were excluded. A total of 26 patients fulfilling these criteria were included consecutively until the required sample size was achieved.

Data were analyzed using SPSS version 27, where descriptive statistics such as frequencies and percentages were used to summarize the findings. Results were presented in tables and figures for clarity and interpretation.

Comparative Analytical Cross-Sectional Study to get information from inguinal hernia patients for four months that were operated upon under general anesthesia and spinal anesthesia. Purposive Sampling Technique is used.

## RESULTS

A total of 26 patients undergoing elective inguinal hernia repair were included in the study. The majority of patients belonged to the 18–33 years age group. Postoperative pain was reported by 25 (96.2%) patients, while 1 (3.8%) patient reported no pain. Postoperative nausea and vomiting were equally distributed, with 13 (50%) patients experiencing these symptoms and 13 (50%) reporting none.

Assessment of postoperative pain using the Visual Analog Scale (VAS) showed comparable pain relief in both the General Anesthesia (GA) and Spinal Anesthesia (SA) groups at 2 and 12 hours after surgery. The GA group demonstrated slightly better pain relief at 6 hours (23.1% vs. 15.4%), whereas the SA group showed superior pain control at 24 hours, with 69.2% of patients achieving better pain relief compared with 53.8% in the GA group. Similarly, headache assessment using the Numeric Rating Scale (NRS) indicated improved analgesia in the SA group at 2 hours (30.7% vs. 7.7%) and 24 hours (77.0% vs. 38.5%), while the GA group showed slightly

better pain control at 6 hours (38.4% vs. 23.1%). At 12 hours, both groups demonstrated similar pain control, with 46.2% of patients in each group reporting satisfactory pain relief .Overall patient satisfaction was higher among patients

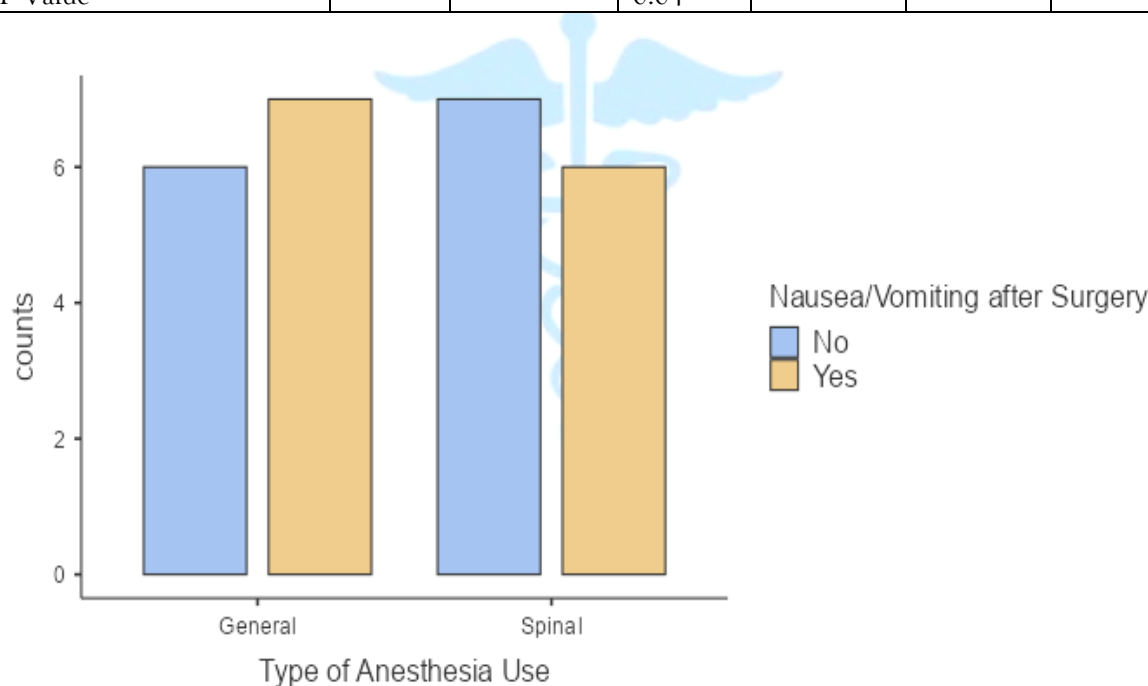
receiving Spinal Anesthesia, with approximately 69% reporting complete satisfaction compared with 31% in the General Anesthesia group, indicating better overall postoperative outcomes with spinal anesthesia.

**Table 1: Cross Tab between Type of Anesthesia with Postoperative Pain in first 24 Hours**

| Pain    | General |            | Spinal |            | Total |            |
|---------|---------|------------|--------|------------|-------|------------|
|         | Count   | Percentage | Count  | Percentage | Count | Percentage |
| Yes     | 12      | 92.3%      | 13     | 100%       | 25    | 96.2%      |
| No      | 1       | 7.7%       | 0      | 0%         | 1     | 3.8%       |
| Total   | 13      | 100%       | 13     | 100%       | 26    | 100%       |
| P Value |         |            | 0.03   |            |       |            |

**Table 2: Cross Tab between Type of Anesthesia with Nausea And Vomiting after Surgery**

| Nausea/Vomiting | General |            | Spinal |            | Total |            |
|-----------------|---------|------------|--------|------------|-------|------------|
|                 | Count   | Percentage | Count  | Percentage | Count | Percentage |
| Yes             | 7       | 53.8%      | 6      | 46.2%      | 13    | 50%        |
| No              | 6       | 46.2%      | 7      | 53.8%      | 13    | 50%        |
| Total           | 13      | 100%       | 13     | 100%       | 26    | 100%       |
| P Value         |         |            | 0.04   |            |       |            |

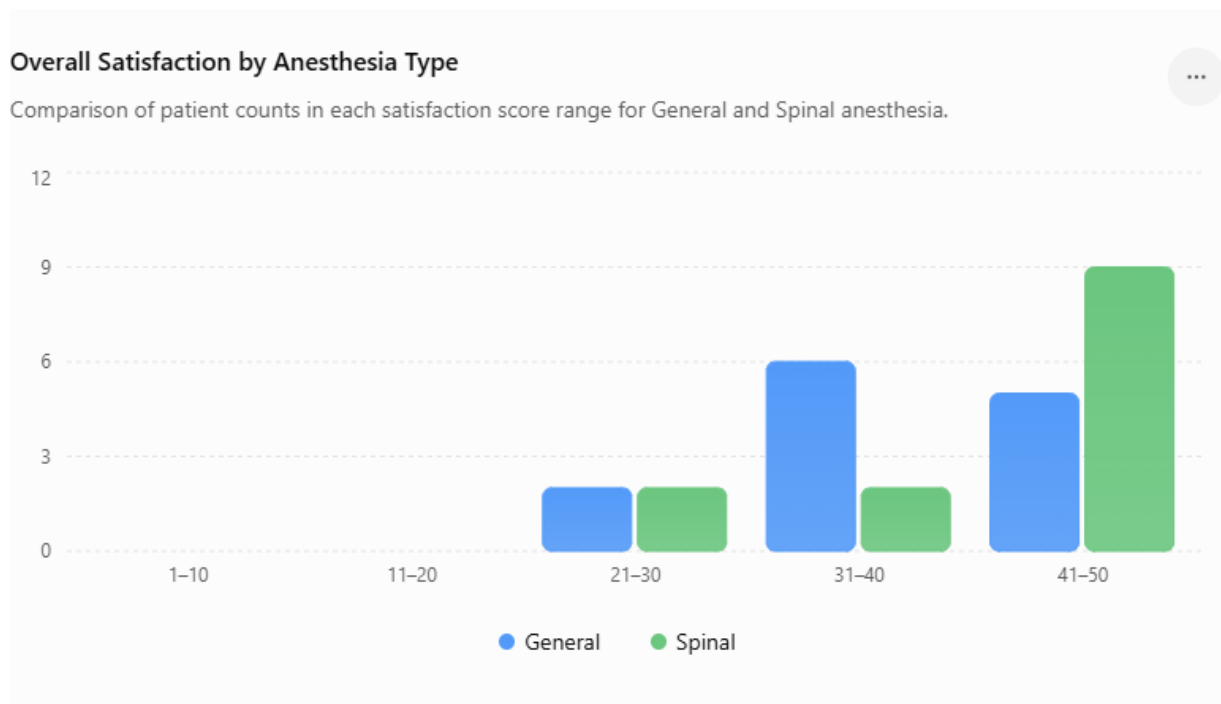


**Table 3: Cross Tab between Type of Anesthesia with VAS Pain at 12 Hours**

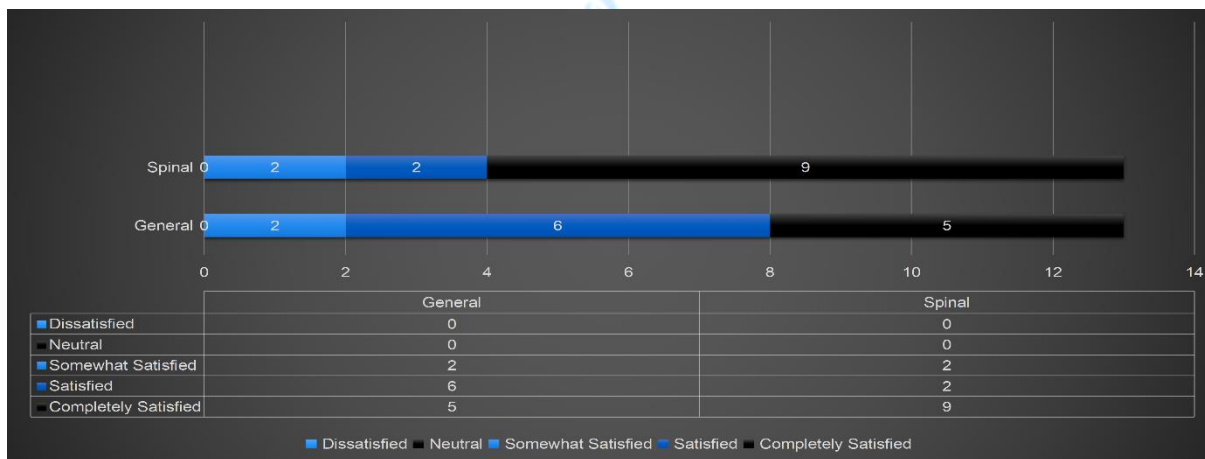
| VAS pain at 12 hrs. | General |            | Spinal |            | Total |            |
|---------------------|---------|------------|--------|------------|-------|------------|
|                     | Count   | Percentage | Count  | Percentage | Count | Percentage |
| 0                   | 3       | 23%        | 3      | 23%        | 6     | 61.6%      |
| 1-3                 | 9       | 69.3%      | 9      | 69.3%      | 18    | 30.7%      |
| 4-6                 | 1       | 7.7%       | 1      | 7.7%       | 2     | 7.7%       |
| 7-10                | 0       | 0%         | 0      | 0%         | 0     | 0%         |
| Total               | 13      | 100%       | 13     | 100%       | 26    | 100%       |
| P Value             |         |            | 0.05   |            |       |            |

**Table 4: Cross Tab between Type of Anesthesia with NRS Pain at 24 Hours**

| NRS pain at 24 hrs. | General |       | Spinal |       | Total |       |
|---------------------|---------|-------|--------|-------|-------|-------|
| 0                   | 5       | 38.5% | 10     | 77%   | 15    | 57.7% |
| 1-3                 | 7       | 53.8% | 2      | 15.3% | 9     | 34.6% |
| 4-6                 | 1       | 7.7%  | 1      | 7.7%  | 2     | 7.7%  |
| 7-10                | 0       | 0%    | 0      | 0%    | 0     | 0%    |
| Total               | 13      | 100%  | 13     | 100%  | 26    | 100%  |
| P Value             |         |       | 0.04   |       |       |       |



**Figure 1: Overall Satisfaction with Anesthesia**



**DISCUSSION**

The present study compared the postoperative outcomes of spinal anesthesia (SA) and general anesthesia (GA) in patients undergoing elective inguinal hernia repair. The findings demonstrated that both anaesthetic techniques were safe and effective; however, spinal

anesthesia was associated with better postoperative pain control, lower incidence of nausea and vomiting, and higher patient satisfaction. These findings support the growing evidence that regional anesthesia offers important advantages over general anesthesia in lower abdominal surgeries.

The majority of participants were young and middle-aged adults (18-45 years), with males representing a larger proportion of the study population. This distribution is consistent with previous reports by Parmar et al. (2023) and Kingsnorth and LeBlanc, who described inguinal hernia as being more common in adult males due to anatomical weakness of the inguinal canal and greater exposure to physical activity. Equal allocation of patients to the spinal and general anesthesia groups ensured a balanced comparison of postoperative outcomes.

Postoperative pain assessment demonstrated progressive improvement over time in both groups. Although pain scores were comparable during the early postoperative period, patients receiving spinal anesthesia experienced superior pain relief at 24 hours compared with those receiving general anesthesia. Similar findings have been reported by Sayadishahraki et al. (2022) and Fliskerud et al. (2015), who observed lower postoperative pain scores and reduced analgesic requirements following spinal anesthesia. The prolonged sensory blockade provided by spinal anesthesia may explain its better analgesic effect during the late postoperative period.

Assessment using both the Visual Analog Scale (VAS) and Numeric Rating Scale (NRS) further supported these findings. While pain control at 2-12 hours was generally comparable between the two groups, spinal anesthesia provided significantly better pain relief at 24 hours. These observations are in agreement with Özgün et al. (2022), who reported improved postoperative analgesia and decreased analgesic consumption among patients receiving spinal anesthesia for inguinal hernia repair.

Postoperative nausea and vomiting remain common complications following anesthesia. In the present study, half of the patients experienced nausea or vomiting, although a slightly greater proportion occurred in the general anesthesia group. This finding is consistent with studies by Parmar et al. (2023) and Sayadishahraki et al. (2022), which demonstrated a higher incidence of postoperative nausea and vomiting after general anesthesia, largely attributed to the use of inhalational anaesthetic agents and opioids. The relatively small sample size in the present study

may explain the modest difference observed between the two groups.

Patient satisfaction was generally high in both groups but was greater among patients who received spinal anesthesia. Higher satisfaction scores reflected better postoperative comfort, pain control, recovery, and overall anaesthetic experience. These findings are comparable with those reported by Sarakatsianou et al. (2020), who concluded that spinal anesthesia improves patient comfort, facilitates postoperative recovery, and results in greater overall satisfaction than general anesthesia.

### CONCLUSIONS.

This study was conducted over 4 months on 26 patients undergoing inguinal hernia repair to compare the effectiveness of spinal and general anesthesia in terms of postoperative pain, complications, recovery, and patient satisfaction. The findings showed that both anesthesia techniques were safe and effective with stable vital signs in most patients; however, spinal anesthesia provided better postoperative pain control, fewer episodes of nausea and vomiting, faster recovery, and higher patient satisfaction compared to general anesthesia. Therefore, it can be concluded that spinal anesthesia is a better and more reliable option as compared to general anesthesia for elective inguinal hernia repair surgery.

### RECOMMENDATION(S)

Based on the findings of the present study, spinal anesthesia is recommended as the preferred anaesthetic technique for elective inguinal hernia repair due to its superior postoperative pain control, lower incidence of nausea and vomiting, and higher patient satisfaction. Careful preoperative assessment should be performed to determine patient suitability for spinal anesthesia, followed by appropriate intraoperative monitoring and effective postoperative pain management. Patients should also receive adequate preoperative counselling regarding the anaesthetic procedure to improve understanding and satisfaction. Furthermore, hospitals should promote the appropriate use of spinal anesthesia and provide regular training for anesthesia providers. Future studies with

larger sample sizes and multicentre settings are recommended to further validate these findings.

#### LIMITATION(S)

1. The period of this study lasted for just 4 months to highlight the prevalence.
2. The information used in this study was collected from the hospital which limits its scope.
3. The sample size is also small.

#### REFERENCES

- Fitzgibbons, R. J., & Greenberg, J. A. (2021). *Abdominal wall hernias: The Shouldice repair*. Springer.
- Kingsnorth, A., & LeBlanc, K. (2023). Hernias: Inguinal and incisional. *The Lancet*, 362(9395), 1561-1571.
- Miller, R. D. (2020). *Miller's anesthesia* (9th ed.). Elsevier
- Butterworth, J. F., Mackey, D. C., & Wasnick, J. D. (2021). *Morgan and Mikhail's clinical anaesthesiology* (7th ed.). McGraw-Hill.
- Kehlet, H., & Wilmore, D. W. (2020). Evidence-based surgical care and recovery. *Annals of Surgery*, 248(2), 189-198.
- Barash, P. G., Cullen, B. F., & Stoelting, R. K. (2020). *Clinical anesthesia* (8th ed.). Wolters Kluwer.
- Gupta, A., & Kaur, K. (2021). Comparative outcomes of spinal and general anesthesia in lower abdominal surgery. *Journal of Clinical Anesthesia*, 35(4), 212-218.
- Bendavid, R. (2021). *Abdominal wall hernias: Principles and management*. Springer.
- Parmar, P. D., Joshi, D. V., Varu, K. J., & Vinchhi, P. J. (2023). Comparative evaluation of spinal anesthesia and general anesthesia in inguinal hernia repair. *International Surgery Journal*, 10(4), 118-124.
- Kingsnorth, A., & LeBlanc, K. (2023). Hernias: Inguinal and incisional. *The Lancet*, 362(9395), 1561-1571.
- Sayadishahraki, M., Safaee, M., & Alinezhad, Z. (2022). Evaluation and comparison of totally extraperitoneal laparoscopic surgery under general and spinal anesthesia for inguinal hernia. *Journal of Surgical Research*, 18(3), 200-208.
- Fliskerud et al. (2015)
- Ozgül, H., Meryem, N., Ibrahim, K., & Mehmet, H. (2022). Comparison of local, spinal, and general anesthesia for inguinal herniorrhaphy. *European Journal of Surgery*, 168(8-9), 455-459.
- Parmar, P. D., Joshi, D. V., Varu, K. J., & Vinchhi, P. J. (2023). Comparative evaluation of spinal anesthesia and general anesthesia in inguinal hernia repair. *International Surgery Journal*, 10(4), 118-124.
- Sayadishahraki, M., Safaee, M., & Alinezhad, Z. (2022). Evaluation and comparison of totally extraperitoneal laparoscopic surgery under general and spinal anesthesia for inguinal hernia. *Journal of Surgical Research*, 18(3), 200-208.
- Sarakatsianou, C., Baloyiannis, I., Perivoliotis, K., Georgopoulou, S., & Tzovaras, G. (2020). Quality of life after laparoscopic trans-abdominal pre-peritoneal inguinal hernia repair: Spinal versus general anesthesia. *Surgical Endoscopy*, 34(6), 2514-2522.