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Original Article

Postoperative Complications of Laparoscopic versus Open Varicocelectomy

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ABSTRACT

Background: Varicocele, characterized by the dilation and swelling of testicular veins, significantly impacts male infertility and semen quality, affecting 10-15% of the male population. Surgical intervention is essential to alleviate these effects, with various techniques available, including laparoscopic and open subinguinal varicocelectomy.

Objective: This study aimed to compare postoperative complications between laparoscopic and open subinguinal varicocelectomy to determine the superior approach in terms of patient outcomes and complications.

Methods: A randomized controlled trial was conducted, involving 130 patients admitted to Hayatabad Medical Complex, Peshawar, from November 10, 2021, to July 31, 2022. Participants, presenting with symptoms of scrotal heaviness, testicular swelling, pain, and infertility, were randomly assigned to either the laparoscopic (Group L, n=70) or open subinguinal (Group O, n=60) varicocelectomy groups. Preoperative assessments included medical history, clinical examination, and necessary tests. Informed consent was obtained from all participants. Exclusion criteria included patients with malignancy, diabetes (BSR > 200 mg/dl), or unstable hemoglobin levels (Hb < 10 mg/dl). Postoperative complications, including wound erythema, hydrocele, epididymitis, and bruising, were documented and analyzed using SPSS version 25, with a significance level set at $P \leq 0.05$.

Results: The mean age of Group L was 27.3 years (±2.3), and Group O was 25.2 years (±3.5) ($P = 0.042$). Postoperative complications were significantly lower in Group L compared to Group O. Wound erythema was observed in 1.42% of Group L and 8.3% of Group O ($P = 0.05$). Hydrocele occurred in 2.8% of Group L versus 10% of Group O ($P = 0.04$). Epididymitis was found in 1.42% of Group L and 6.5% of Group O ($P = 0.03$). Bruising was noted in 1.66% of Group O, with no cases in Group L ($P = 0.05$).

Conclusion: Laparoscopic varicocelectomy resulted in fewer postoperative complications compared to open subinguinal varicocelectomy, making it the preferred surgical approach for varicocele treatment. Further studies with larger sample sizes and long-term follow-up are recommended to validate these findings.

Keywords: Varicocele, Laparoscopic Varicocelectomy, Open Subinguinal Varicocelectomy, Postoperative Complications.

INTRODUCTION

Varicocele, a condition characterized by the dilation and swelling of testicular veins, significantly impacts male infertility and semen quality, affecting 10-15% of the male population (1-3). The primary symptoms include a sense of heaviness in the scrotum, scrotal swelling, localized pain, infertility, dull aching, and reduced testosterone production (4). Research indicates that palpable varicocele considerably diminishes fertility while improvements in seminal qualities are observed post-treatment (5). In 1952, Tollouch WS successfully operated on an infertile man with varicocele, resulting in restored fertility (6).

Surgical intervention is vital to mitigate the adverse effects of varicocele, particularly infertility (7). Various surgical techniques have been developed for varicocele treatment, including microscopic surgery, open surgery, sclerotherapy, and laparoscopic surgery (8). The laparoscopic method, introduced by Aaberg in 1991, is considered the least invasive surgical approach for varicocele removal (9). Previous studies have demonstrated the superiority of laparoscopic surgery over open surgery in terms of effectiveness (10, 11).

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However, many of these studies primarily compare the classic and modified Palomo techniques with laparoscopic methods, focusing on a limited number of variables (12, 13).

This study aims to evaluate significant postoperative complications such as bruises, epididymitis, wound erythema, and hydrocele in patients undergoing open subinguinal and laparoscopic varicocelectomy procedures. A bruise, an injury to the testicular arteries resulting in skin discoloration without incisions, is a noteworthy complication (14). Epididymitis, presenting as swelling and inflammation of the epididymis, the small coiled tube located behind the testes, is another critical postoperative concern (15). Wound erythema, indicating localized inflammation or reduced blood supply due to prolonged pressure around the wound area, also warrants attention (16). Additionally, hydrocele, characterized by scrotal swelling due to fluid accumulation in the thin layer surrounding the testes as a result of infection, is examined (17). Notably, there has been an increasing preference for laparoscopic varicocelectomy at our institution, Hayatabad Medical Complex, Peshawar.

In conclusion, this study meticulously compares the postoperative complications of laparoscopic versus open varicocelectomy, with a particular focus on bruises, epididymitis, wound erythema, and hydrocele. By assessing these complications, we aim to provide comprehensive insights into the relative efficacy and safety of these surgical techniques, thereby informing clinical practices and improving patient outcomes.

MATERIAL AND METHODS

The study employed a randomized controlled trial design to compare the outcomes of open and laparoscopic varicocelectomy. A total of 130 patients admitted to the surgical wards of Hayatabad Medical Complex, Peshawar, from November 10, 2021, to July 31, 2022, were included. These patients presented with symptoms of scrotal heaviness, testicular swelling, pain, and male infertility. Upon admission, the day prior to their scheduled surgeries, patients underwent a thorough history-taking, clinical examination, and requisite preoperative tests. Informed written consent was obtained from all participants. The sample was selected using a probability sampling technique. Ethical approval for data collection was granted by the Ethical Committee of Hayatabad Medical Complex, Peshawar, Pakistan, in accordance with the principles outlined in the Declaration of Helsinki.

Patients were randomly assigned into two groups to compare the anticipated postoperative complications: bruises, epididymitis, wound erythema, and hydrocele. Group O, comprising 60 patients, underwent open subinguinal varicocelectomy, while Group L, comprising 70 patients, underwent laparoscopic varicocelectomy. The randomization process ensured unbiased allocation based on patient consent.

Inclusion criteria included male patients aged between 18 and 70 years, of Pakistani or Afghani origin, who presented to the hospital with varicocele symptoms. Exclusion criteria included patients with malignancy, diabetes (BSR > 200 mg/dl), or unstable hemoglobin levels (Hb < 10 mg/dl). All surgeries were performed by the same surgical team under general anesthesia. Postoperatively, all patients received antibiotics and were admitted for one day of inpatient care. Follow-up visits were scheduled two weeks post-surgery, either in the outpatient departments of the same hospital or in private clinics.

Data were meticulously collected using a specially designed proforma that documented all relevant variables. The primary postoperative complications evaluated were bruises (indicative of injury to testicular arteries), epididymitis (swelling and inflammation of the epididymis), wound erythema (localized inflammation or reduced blood supply due to prolonged pressure), and hydrocele (scrotal swelling caused by fluid accumulation around the testes).

The collected data were analyzed using SPSS software version 25. Statistical analysis included t-tests to determine significant differences between the two groups, with a 95% confidence interval and a significance level of 5%. P-values equal to or less than 0.05 were considered statistically significant. This comprehensive approach aimed to provide a robust comparison of postoperative outcomes between laparoscopic and open varicocelectomy, thereby contributing valuable insights to clinical practice.

RESULTS

Table 1: General Characteristics

Characteristics	Group L (n=70)	Group O (n=60)	P-value
Number of patients	70	60	
Mean age ± SD	27.3 ± 2.3	25.2 ± 3.5	0.042
Male	70	60	
Complaints			
- Pain	21 (30%)	15 (25%)	0.061
- Infertility	30 (42%)	23 (38%)	0.070

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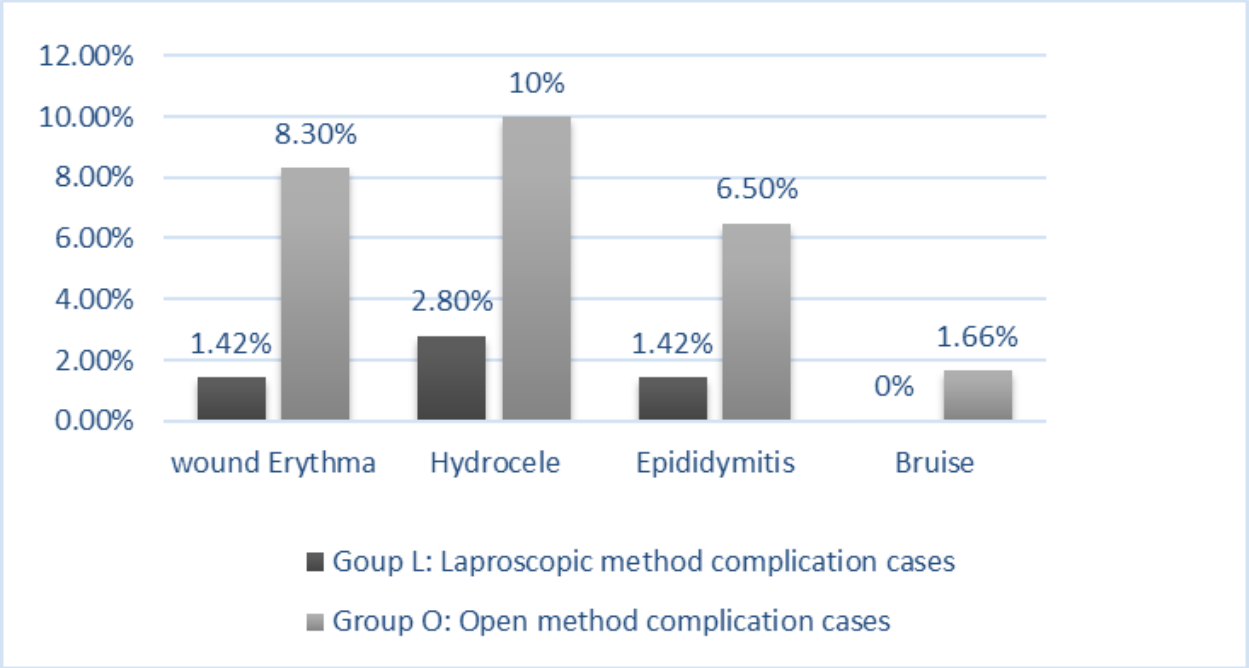
Characteristics	Group L (n=70)	Group O (n=60)	P-value
- Swelling of testes	19 (27%)	22 (36%)	0.069

Table 2: Frequency of Complications in Laparoscopic vs. Open Varicocelectomy

Complications	Group L (n=70)	Group O (n=60)	P-value
Wound Erythema	1 (1.42%)	5 (8.3%)	0.05
Hydrocele	2 (2.8%)	6 (10%)	0.04
Epididymitis	1 (1.42%)	4 (6.5%)	0.03
Bruise	0 (0%)	1 (1.66%)	0.05

These tables provide a clear and concise summary of the general characteristics and frequency of complications in the two groups, enhancing readability and understanding.



The study compared the postoperative complications of laparoscopic versus open varicocelectomy, and the results were tabulated and visualized for clarity. Table 1 provides a summary of the general characteristics of the two groups. The mean age of patients in Group L was 27.3 years (±2.3), while in Group O, it was 25.2 years (±3.5), with a statistically significant difference (P = 0.042). Both groups comprised entirely male patients. Complaints of pain were reported by 30% of patients in Group L and 25% in Group O, with no significant difference (P = 0.061). Infertility was noted in 42% of Group L and 38% of Group O patients (P = 0.070). Testicular swelling was reported by 27% of patients in Group L and 36% in Group O, also showing no significant difference (P = 0.069) (Table 1).

The frequency of postoperative complications was assessed and compared between the two groups. Wound erythema occurred in 1.42% of Group L patients and 8.3% of Group O patients, showing a significant difference (P = 0.05). Hydrocele was observed in 2.8% of Group L patients compared to 10% of Group O patients, with a significant difference (P = 0.04). Epididymitis was present in 1.42% of Group L patients and 6.5% of Group O patients, again showing a significant difference (P = 0.03). Bruising was noted in 1.66% of Group O patients, while no cases were reported in Group L, which was statistically significant (P = 0.05) (Table 2).

The bar chart visually reinforces these findings, highlighting the lower complication rates in the laparoscopic group compared to the open surgery group. The significant reduction in complications such as wound erythema, hydrocele, and epididymitis in the laparoscopic group underscores the effectiveness and safety of the laparoscopic method over the open subinguinal approach. These findings suggest that laparoscopic varicocelectomy may offer superior postoperative outcomes, with fewer complications and improved patient recovery profiles.

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DISCUSSION

The study's comparison of laparoscopic and open subinguinal varicocelectomy outcomes corroborated prior research favoring laparoscopic techniques. Studies such as those by Kocvara et al. and Cooper et al. have documented similar trends, indicating superior outcomes with laparoscopic approaches in terms of postoperative complications (18, 19). This current research further substantiated these findings, demonstrating significantly lower rates of wound erythema, hydrocele formation, epididymitis, and bruising among patients undergoing laparoscopic varicocelectomy. These results aligned with the work of Tan et al., who also observed reduced surgical complications and improved patient outcomes with laparoscopic methods (20).

The cosmetic benefits of laparoscopic varicocelectomy were another important consideration, as smaller incisions and reduced tissue trauma lead to better cosmetic outcomes and enhanced patient satisfaction. This aspect was similarly highlighted in the studies by Fuse et al. and Misseri et al., who emphasized the aesthetic advantages of laparoscopic procedures (21, 22). The superior clinical outcomes and cosmetic benefits collectively underscored the clinical preference for laparoscopic techniques over open subinguinal methods.

The findings of this study contributed significantly to the ongoing discourse on varicocele management, providing valuable insights for clinicians and surgeons. By highlighting the advantages of laparoscopic varicocelectomy in terms of fewer postoperative complications, the research offered critical information that could guide surgical decision-making and ultimately enhance patient outcomes and satisfaction. The adherence to ethical standards, including informed consent and approval from the ethical committee of Hayatabad Medical Complex, Peshawar, further reinforced the reliability and validity of the study's findings.

However, the study acknowledged several limitations. Despite employing a robust methodology, the relatively small sample size and single-center data collection limited the generalizability of the results. Future research should aim to include larger sample sizes and multi-center collaborations to enhance the applicability of the findings across diverse patient populations. Additionally, the need for long-term follow-up to assess further postoperative complications such as varicocele recurrence, hematoma formation, and persistent local pain was identified. Understanding these long-term outcomes is crucial for guiding clinical practice and optimizing patient care.

CONCLUSION

The study demonstrated that laparoscopic varicocelectomy resulted in fewer postoperative complications compared to open subinguinal varicocelectomy, making it a preferred surgical approach for varicocele treatment. However, the study recommended extending the research to include long-term outcomes and a broader patient population to fully understand the efficacy and complications associated with both surgical methods. This comprehensive approach would ensure that clinical practices are informed by the most reliable and extensive evidence available, thereby improving patient care and outcomes.

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