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Research Article

A Comparative Study of Efficacy of Sphincterotomy in Open Haemorrhoidectomy

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ABSTRACT
Background: Open Milligan–Morgan haemorrhoidectomy remains an effective operation for advanced haemorrhoidal disease, although postoperative pain, urinary retention, bleeding and delayed recovery continue to affect patient comfort and resource use. Internal sphincter spasm is considered an important contributor to pain after excisional haemorrhoidectomy. Lateral internal sphincterotomy may reduce resting sphincter pressure and improve early recovery, but its clinical value must be assessed against procedure-related morbidity.
Aim: To compare early postoperative outcomes following open haemorrhoidectomy with and without lateral internal sphincterotomy in patients with grade III or IV haemorrhoids.
Methods: This observational comparative clinical study was conducted in the Department of General Surgery at a tertiary-care centre in Visakhapatnam from May 2024 to April 2025. Sixty consenting adults with clinically and proctoscopically diagnosed grade III or IV haemorrhoids were analysed in two equal **groups:** Group A underwent open Milligan–Morgan haemorrhoidectomy, whereas Group B underwent open haemorrhoidectomy with lateral internal sphincterotomy. Postoperative pain was measured using a 0–10 visual analogue scale on days 1, 3 and 7. Urinary retention, postoperative bleeding, duration of hospitalization and wound-healing time were recorded. Continuous variables were compared using an independent t-test or Mann–Whitney U test, and categorical variables using the chi-square test; $p<0.05$ was considered statistically significant.
Results: Baseline age, sex and haemorrhoidal-grade distributions were descriptively similar between groups: mean age was 45.3 ± 7.6 years in Group A and 44.9 ± 8.1 years in Group B, and each group included 21 patients with grade III and nine with grade IV disease. Mean VAS scores were lower in Group B on day 1 (3.5 vs 6.6), day 3 (2.5 vs 5.0) and day 7 (1.5 vs 3.5), with $p<0.001$ for every comparison. Mean hospital stay was 3.0 versus 4.0 days, and mean wound-healing time was 14.0 versus 18.0 days, respectively (both $p<0.001$). Urinary retention occurred in 2/30 patients in Group B and 8/30 in Group A (Pearson x^2 $p=0.038$). Any postoperative bleeding occurred in 4/30 and 9/30 patients, respectively; this difference was not statistically significant on two-sided Fisher's exact testing ($p=0.209$).
Conclusion: Open haemorrhoidectomy with lateral internal sphincterotomy was associated with lower postoperative pain, less urinary retention, shorter hospitalization and faster wound healing. Postoperative bleeding did not differ significantly between the groups.

Keywords: Haemorrhoidectomy, LateralInternal Sphincterotomy, Postoperative Pain, Urinary Retention, Wound Healing.

INTRODUCTION

Haemorrhoidal disease is among the most common benign anorectal disorders encountered in surgical practice. It results from the symptomatic enlargement, engorgement, and distal displacement of the normal anal cushions, which ordinarily contribute to fine continence and closure of the anal canal [1]. Clinical manifestations include painless rectal bleeding, prolapse, discomfort, pruritus, mucous discharge, and, in complicated disease, pain that may substantially impair daily activities and quality of life. The pathophysiology extends beyond simple venous dilatation and involves deterioration of the supporting connective tissue, sliding of the anal cushions, altered vascular flow, and repeated straining [2]. Population-based observations indicate that haemorrhoids are common among adults, although the reported prevalence varies according to case definition, health-seeking behaviour, and the method of ascertainment

[3]. Internal haemorrhoids originate above the dentate line and are covered by relatively insensate columnar mucosa, whereas external haemorrhoids arise below the dentate line within the somatically innervated anoderm; this anatomical distinction has direct implications for clinical symptoms and postoperative pain [4]. The Goligher classification categorises internal haemorrhoids according to the degree of prolapse and reducibility and remains central to therapeutic planning. Conservative measures and office-based procedures may be appropriate for lower-grade disease, whereas persistent grade III and grade IV haemorrhoids frequently require operative management [5]. The Milligan–Morgan procedure, which involves excision of the principal haemorrhoidal complexes while preserving mucocutaneous bridges, provides definitive removal of prolapsing tissue and has long served as a reference standard for advanced disease [6]. Its effectiveness, however, is accompanied by a characteristic burden of early postoperative morbidity. Exposed wounds below or near the dentate line, oedema, local inflammation, defaecation-related trauma, and internal sphincter hypertonicity may cause severe postoperative pain. This pain may impede mobilisation, prolong hospitalisation, increase the need for postoperative observation, and contribute to reflex urinary retention. It may also make defaecation difficult, increase fear of stool passage, and potentially delay local wound healing [7]. Because internal sphincter spasm represents a modifiable component of this pathway, lateral internal sphincterotomy has been evaluated as an adjunct to excisional haemorrhoidectomy. Controlled partial division of the internal anal sphincter is intended to reduce resting anal canal pressure, relieve spasm, and improve local perfusion without materially compromising continence. Kanellos et al. reported that lateral internal sphincterotomy could reduce pain following open haemorrhoidectomy, thereby supporting the physiological premise of sphincter decompression [8]. A meta-analysis by Hsu et al. similarly demonstrated reductions in postoperative pain and anal pressure when sphincterotomy was performed alongside haemorrhoidectomy, while also emphasising the importance of considering functional safety [9]. Wang et al. further evaluated adjunctive sphincterotomy in excisional haemorrhoidectomy and provided comparative evidence regarding postoperative recovery [10]. Nevertheless, evaluation of the procedure should extend beyond pain alone. Urinary retention, postoperative bleeding, duration of hospitalisation, and wound healing are clinically relevant outcomes because they influence catheterisation, monitoring, discharge readiness, and follow-up requirements. Differences in operative technique, disease grade, patient selection, and perioperative practice may also modify the observed associations. Evidence derived from a clearly characterised surgical cohort with grade III or IV haemorrhoids is therefore valuable in determining whether the analgesic rationale for lateral internal sphincterotomy is accompanied by broader improvements in early postoperative recovery. Accordingly, this study compared postoperative pain, urinary retention, bleeding, duration of hospitalisation, and wound healing following open haemorrhoidectomy with and without lateral internal sphincterotomy.

Aim

To compare early postoperative outcomes following open hemorrhoidectomy with and without lateral internal sphincterotomy in patients with grade III or IV hemorrhoids.

Objectives

- To compare postoperative pain following open hemorrhoidectomy with and without lateral internal sphincterotomy.
- To compare postoperative urinary retention and bleeding between patients undergoing open hemorrhoidectomy with and without lateral internal sphincterotomy.
- To compare the duration of hospital stay and wound-healing time between the two operative groups.

MATERIALS AND METHODS

An observational comparative clinical study was conducted in the Department of General Surgery at a tertiary-care centre in Visakhapatnam from May 2024 to April 2025 over one year. The study population comprised patients admitted for operative management of third- or fourth-degree hemorrhoids. The required sample for comparing two independent means was calculated using (n=2(Z_{1-/2}+Z_{1-})22/d^2), where (Z_{1-/2}=1.96), (Z_{1-}=0.84), (), and (d=1.5). Substitution yielded (n=2(1.96+0.84)2(2)2/(1.5)^2=27.88), which was rounded to 28 patients per group. After allowing for possible attrition, 30 patients were included in each group, giving a total sample of 60. Adults older than 18 years who provided informed consent, had grade III or grade IV

hemorrhoids diagnosed clinically and by proctoscopy, and were fit for surgery under regional or general anesthesia were eligible. Patients with inflammatory bowel disease, anal fissure, fistula-in-ano, recurrent hemorrhoids, anorectal malignancy, portal hypertension, cirrhosis or pregnancy were excluded, as were those who declined participation. The enrolled participants formed two equal procedural cohorts. Group A underwent conventional open hemorrhoidectomy using the Milligan–Morgan technique, whereas Group B underwent the same operation with lateral internal sphincterotomy. Because the source methodology did not describe a randomized allocation sequence, the groups were analyzed as comparative observational cohorts. After institutional scientific and ethical clearance, demographic characteristics, presenting symptoms, clinical and proctoscopic findings, operative details and postoperative course were recorded in a predesigned case-record form. Age, sex and Goligher grade were documented to characterize the groups. Postoperative pain was measured on days 1, 3 and 7 using a visual analogue scale ranging from 0, indicating no pain, to 10, indicating the worst pain. Urinary retention was recorded as present or absent according to the need for postoperative catheterization. Bleeding was assessed clinically and by dressing soakage and categorized as none, mild or moderate. Hospital stay was measured in days from surgery to discharge, and wound-healing time was recorded in days. The analyzed outcomes were VAS pain on postoperative days 1, 3 and 7, urinary retention, postoperative bleeding, duration of hospitalization and wound-healing time. Data were analyzed using SPSS version 21.0. Continuous variables were summarized as mean ± standard deviation, with medians and ranges where available, and were compared using independent-samples t-tests or Mann–Whitney U tests as appropriate. The t-statistics for the displayed continuous outcomes were verified from the reported means, standard deviations and group sizes. Categorical variables were compared using Pearson's chi-square test when distributional assumptions were adequate. Because the bleeding data contained sparse severity cells, the three severity categories were reported descriptively, and any bleeding versus no bleeding was compared using a two-sided Fisher's exact test. A two-sided p-value below 0.05 was considered statistically significant. Findings were interpreted as associations within an observational design rather than causal treatment effects. Scientific and ethical approval was obtained from the Institutional Scientific and Ethics Committee of Andhra Medical College, Visakhapatnam. Written informed consent was obtained from every participant, and confidentiality was maintained throughout the study.

RESULTS

All 60 participants were included in the comparative analysis, with 30 patients in each procedural group. Baseline age, sex and hemorrhoidal-grade distributions were descriptively similar between the groups (Table 1). Mean age was 45.3 ± 7.6 years in Group A and 44.9 ± 8.1 years in Group B. Group A comprised 20 males and 10 females, while Group B comprised 19 males and 11 females. Each group contained 21 patients with grade III hemorrhoids and nine with grade IV disease. No inferential claim of baseline equivalence was made because the selected baseline table did not report p-values.

Postoperative pain and recovery differed consistently between groups (Table 2). Mean VAS pain on day 1 was 6.6 in Group A and 3.5 in Group B, giving a mean difference of 3.1 and $t=21.74$ ($p<0.001$). On day 3, corresponding means were 5.0 and 2.5, with a difference of 2.5 and $t=21.38$ ($p<0.001$). By day 7, mean VAS scores had declined to 3.5 and 1.5, respectively; the difference was 2.0, with $t=18.79$ ($p<0.001$). Hospital stay averaged 4.0 days in Group A and 3.0 days in Group B, producing a one-day difference and $t=6.37$ ($p<0.001$). Mean wound-healing time was 18.0 days following open hemorrhoidectomy alone and 14.0 days when lateral internal sphincterotomy was added; the four-day difference corresponded to $t=6.08$ ($p<0.001$).

Urinary retention occurred in eight patients in Group A and two in Group B, whereas 22 and 28 patients, respectively, did not develop retention (Table 3). The corresponding retention rates were 26.7% and 6.7%. Pearson's chi-square test without continuity correction yielded $\chi^2=4.32$ and $p=0.038$, indicating a statistically significant association between procedural group and postoperative urinary retention.

Postoperative bleeding was numerically less frequent in Group B but did not differ significantly between groups (Table 4). In Group A, bleeding was absent in 21 patients, mild in seven and moderate in two. In Group B, 26 patients had no bleeding, four had mild

bleeding and none had moderate bleeding. Any bleeding therefore occurred in nine patients (30.0%) in Group A and four (13.3%) in Group B. Because the severity table contained sparse cells, inferential testing was performed after classifying patients as having any bleeding or no bleeding; the two-sided Fisher's exact p-value was 0.209. The severity categories remained descriptive and did not demonstrate a statistically significant group difference.

Tables:

Table 1. Baseline Demographics by Group

Variable	Group A (N=30)	Group B (N=30)
Age, Mean ± SD	45.3 ± 7.6	44.9 ± 8.1
Sex: Male	20	19
Sex: Female	10	11
Grade III	21	21
Grade IV	9	9

Table 2. Inter-Group Comparisons (Independent-Samples T-Tests: Group a Vs Group B)

Variable	Mean (A)	Mean (B)	Difference (A–B)	T-Stat	P-Value
VAS Day-1	6.6	3.5	+3.1	21.74	<0.001
VAS Day-3	5.0	2.5	+2.5	21.38	<0.001
VAS Day-7	3.5	1.5	+2.0	18.79	<0.001
Hospital Stay (Days)	4.0	3.0	+1.0	6.37	<0.001
Wound Healing (Days)	18.0	14.0	+4.0	6.08	<0.001

Table 3. Urinary Retention by Group (X^2)

Group	Yes	No
Group A (N=30)	8	22
Group B (N=30)	2	28

Pearson $\chi^2=4.32$; p=0.038 (without continuity correction)

Table 4. Post-Operative Bleeding by Group

Group	None	Mild	Moderate
Group A (N=30)	21	7	2
Group B (N=30)	26	4	0

Any bleeding versus none: two-sided Fisher's exact p=0.209. Bleeding-severity categories were reported descriptively because of sparse cells.

DISCUSSION

The two procedural cohorts entered the study with closely aligned clinical profiles. Their mean ages differed by only 0.4 years, the numbers of male and female participants were nearly identical, and each group included 21 patients with grade III and nine with grade IV haemorrhoidal disease. Vijayaraghavalu et al. similarly evaluated adults with grade III or IV haemorrhoids in two equal groups [11]. Prashanth et al. reported a mean age of 45.32 years, with a predominance of male participants [12], while Shah and Mandal documented the same mean age in a 60-patient comparison [13]. Kadum et al. studied younger groups, with mean ages of 40.6 ± 10.7 and 35.9 ± 7.7 years; men constituted 66% and 76% of their respective cohorts [14]. Nevertheless, descriptive similarity cannot establish statistical equivalence because the baseline table contained no p-values, and allocation was not described as randomized. Unmeasured differences in sphincter tone, comorbidity, anaesthetic details, operative extent, and analgesic exposure could have influenced the observed associations.

Against this descriptively similar baseline, postoperative pain began to diverge from the first assessment. The difference in VAS scores was greatest on day 1 and remained substantial on days 3 and 7. Although pain declined in both cohorts, Group B retained a mean score that was two points lower at one week. The verified independent-samples t-statistics were 21.74, 21.38, and 18.79 on days 1, 3, and 7, respectively, with $p < 0.001$ throughout. Absolute differences of 3.1, 2.5, and 2.0 points indicate a sustained early postoperative pattern rather than an isolated difference. Hsu et al. reported that adding lateral internal

sphincterotomy reduced postoperative pain and resting anal pressure [9]. Wang et al. similarly found improved pain outcomes with adjunctive sphincterotomy [10], while Vijayaraghavalu et al. documented lower early VAS scores [11], and Roshdy et al. described faster pain resolution and recovery [15]. Limited division of the internal sphincter may reduce resting pressure, interrupt the spasm–pain cycle, and diminish ischaemia-related nociception. However, confidence intervals, adjusted estimates, and data on analgesic consumption were unavailable, and patient-reported pain could have been influenced by the absence of blinding.

The recovery pattern extended beyond pain. Group B had a mean hospital stay that was one day shorter and achieved wound healing four days earlier than Group A. Prashanth et al. reported mean hospital stays of 3.60 days without sphincterotomy and 2.60 days with sphincterotomy [12]. Shah and Mandal observed the same difference—3.6 versus 2.6 days—and a shorter time to return to work in the combined-procedure group [13]. Suresh et al. reported reductions in hospitalization and wound-healing time [16], whereas Selvarajan documented an earlier resumption of normal activities [17]. Pain, mobility, voiding, and wound progression are interconnected determinants of discharge readiness. Reduced sphincter spasm may facilitate movement and defaecation while improving local perfusion, thereby linking lower pain with earlier healing. Hospital stay is also influenced by institutional policy, anaesthetic practice, social circumstances, and clinician preference; the one-day difference should therefore be interpreted as a study-specific association rather than a universal estimate of bed-day reduction.

Postoperative urinary retention followed the same favourable direction. It affected eight patients after open haemorrhoidectomy alone and two after the combined procedure. Pearson's chi-square analysis yielded $p = 0.038$, although only 10 events occurred. Jeong et al. identified pain, analgesic requirements, and patient- or procedure-related factors as contributors to retention after haemorrhoidectomy [18]. Abdraboh et al. reported improved early functional recovery with partial lateral sphincterotomy [19], Dixit et al. described a favourable retention profile with the combined approach [20], and Vijayaraghavalu et al. recorded significantly less retention after sphincterotomy [11]. Retention may reflect pain, autonomic responses, and pelvic-floor guarding, and it may lead to catheterization, prolonged observation, and delayed discharge. In this study, retention was defined by the requirement for catheterization, thereby providing a clinically meaningful threshold. However, time to first void, bladder volume, fluid administration, anaesthetic technique, opioid dose, and pre-existing urinary symptoms were unavailable. The association is clinically coherent when considered alongside the lower pain scores, but it requires confirmation in larger cohorts using standardized bladder-monitoring protocols.

The findings for postoperative bleeding were less definitive. Mild or moderate bleeding occurred in nine patients in Group A and four in Group B; moderate bleeding occurred in two patients following open haemorrhoidectomy alone and in none following the combined procedure. Memon et al. reported fewer bleeding events with adjunctive sphincterotomy [21]. Taieb et al. demonstrated that severe postoperative bleeding is uncommon, procedure-dependent, and may occur after discharge [22]. Cheng et al. identified procedural experience and postoperative factors as determinants of delayed bleeding [23], while Kadum et al. reported significantly less bleeding with partial sphincterotomy [14]. Reduced pain and spasm may permit less traumatic defaecation, but bleeding is also influenced by pedicle haemostasis, tissue handling, infection, and bowel habits. Because only two moderate events occurred, the severity cells were sparse. Any bleeding was therefore compared with no bleeding using a two-sided Fisher's exact test, which yielded $p = 0.209$. The data do not demonstrate a significant difference in bleeding, although they provide no indication that sphincterotomy increased the risk.

Viewed as a continuous postoperative course, the findings form a clinically coherent narrative. The descriptively similar cohorts were followed by lower pain at every assessment, shorter hospitalization, faster wound healing, and fewer episodes of urinary retention in Group B, whereas the findings for bleeding remained statistically inconclusive. Severe pain can restrict mobilization, impair micturition, and delay discharge, while persistent sphincter spasm may prolong discomfort during defaecation and impede wound recovery. The convergence of these endpoints is compatible with the physiological premise that controlled

sphincter relaxation may improve several interconnected aspects of early recovery. Nevertheless, the observational design precludes causal attribution. Perioperative analgesia, operative execution, discharge criteria, and wound care may have differed in ways that were not captured.

Accordingly, lateral internal sphincterotomy may be considered when open haemorrhoidectomy is planned for appropriately selected adults with advanced haemorrhoidal disease and postoperative sphincter spasm is a clinical concern. Meticulous technique, limited sphincter division, informed counselling, and structured follow-up remain essential because standardized continence scores, anal manometry, and long-term functional outcomes were unavailable. Future multicentre studies should use prespecified allocation, objective sphincter assessment, standardized continence measures, and longer follow-up. Within the limits of these data, the combined procedure was associated most consistently with lower pain, less urinary retention, and shorter recovery, while its relationship with postoperative bleeding remained unresolved

CONCLUSION

In patients with grade III or IV haemorrhoids, open haemorrhoidectomy with lateral internal sphincterotomy was associated with lower pain through postoperative day 7, less urinary retention, shorter hospitalization and faster wound healing than open haemorrhoidectomy alone. Postoperative bleeding did not differ significantly between groups. Lateral internal sphincterotomy may therefore represent an adjunct associated with improved early postoperative recovery in appropriately selected patients, although causal and long-term functional conclusions cannot be drawn from this observational study.

Limitations

The single-centre observational design, sample of 60 patients and short follow-up limit generalizability and causal inference. Allocation was not described as randomized, blinding was infeasible, and confidence intervals were not reported. Anal manometry, standardized continence scoring, analgesic consumption, return-to-work time and long-term functional outcomes were unavailable.

Recommendations

Adjunctive lateral internal sphincterotomy may be considered selectively during open haemorrhoidectomy after assessment of continence risk and informed counselling. Future studies should use prespecified allocation, standardized analgesic and continence measures, objective sphincter assessment and longer follow-up to define sustained benefit and functional safety.

Ethical Approval

The study was conducted after obtaining approval from the Institutional Scientific and Ethics Committee of Andhra Medical College, Visakhapatnam. Written informed consent was obtained from all eligible participants before enrolment, and confidentiality of patient information was maintained.

REFERENCES

1. Bailey H, Love R. Bailey & Love's Short Practice of Surgery. 27th ed. London: Hodder Arnold; 2018.
2. Thomson WHF. The nature of haemorrhoids. Br J Surg. 1975;62(7):542-552.
3. Riss S, Weiser FA, Schwameis K, et al. The prevalence of hemorrhoids in adults. Int J Colorectal Dis. 2012;27(2):215-220.
4. Lohsiriwat V. Hemorrhoids: from basic pathophysiology to clinical management. World J Gastroenterol. 2012;18(17):2009-2017.
5. Sun Z, Migaly J. Review of hemorrhoid disease: presentation and management. Clin Colon Rectal Surg. 2016;29(1):22-29.
6. Milligan ETC, Morgan CN, Jones LE, Officer R. Surgical anatomy of the anal canal and the operative treatment of haemorrhoids. Lancet. 1937;230(5959):1119-1124.
7. Gupta PJ. Pain following hemorrhoidectomy: a review. Indian J Surg. 2004;66(4):210-216.
8. Kanellos I, Zacharakis E, Christoforidis E, Angelopoulos S, Kanellos D, Pramateftakis MG, Betsis D. Usefulness of lateral internal sphincterotomy in reducing postoperative pain after open hemorrhoidectomy. World J Surg. 2005;29(4):481-484.
9. Hsu TC, Wang CC, Tai HC, et al. Lateral internal sphincterotomy with hemorrhoidectomy reduces postoperative pain and anal pressure: meta-analysis of randomized controlled trials. Medicine (Baltimore). 2018;97(35):e11864.
10. Wang WG, Lu WZ, Yang CM, Yu KQ, He HB. Effect of lateral internal

sphincterotomy in patients undergoing excisional hemorrhoidectomy. Medicine (Baltimore). 2020;99(50):e23474.

11. Vijayaraghavalu S, Prasad RG, Rajkumar S. The role of lateral internal sphincterotomy in haemorrhoidectomy: a study in a tertiary care center. Cureus. 2021;13(6):e15630.
12. Prashanth K, Urs S, Priya PH, Amar M. Efficacy of lateral internal sphincterotomy in patients undergoing Milligan–Morgan hemorrhoidectomy. Int J Sci Stud. 2023;11(3):84-88.
13. Shah M, Mandal M. To study the effectiveness of combining internal sphincterotomy in patients undergoing open hemorrhoidectomy. Int J Pharm Clin Res. 2023;15(8):1612-1615.
14. Kadum AN, et al. The role of performing lateral partial internal sphincterotomy in patients who undergo excisional hemorrhoidectomy. J Dermatol Case Rep. 2023;7(2):256-262.
15. Roshdy A, Abd El Monem SA, Saadeldin A, et al. Post-hemorrhoidectomy pain relief by partial lateral internal sphincterotomy. Egypt J Surg. 2024;43(1):96-103.
16. Suresh A, Sashi MP, Harris Mohammed P. Comparative study on postoperative pain following open hemorrhoidectomy with or without sphincterotomy. J Contemp Clin Pract. 2025;11(8):861-869.
17. Selvarajan R. Efficacy of haemorrhoidectomy versus haemorrhoidectomy with internal sphincterotomy in treatment of haemorrhoids: a retrospective randomized controlled trial study. Int Surg J. 2021;8(3):839-843. doi:10.18203/2349-2902.isj20210913.
18. Jeong HY, Lee JK, Kim KY, et al. Predictors of postoperative urinary retention after semiclosed hemorrhoidectomy. Ann Coloproctol. 2021;37(2):100-107.
19. Abdraboh OH, El-Nakeeb A, Fikry A, et al. Does routine partial lateral sphincterotomy with open hemorrhoidectomy improve postoperative outcomes? Egypt J Surg. 2024;43(1):1-8.
20. Dixit S, et al. Comparative study of open hemorrhoidectomy with or without lateral internal sphincterotomy. Indian J Appl Res. 2024;14(10):1-4.
21. Memon AI, Kumar H, Behan RB, Bhatti AM, Naz T, Shazmah. Comparative study of open hemorrhoidectomy with or without lateral internal sphincterotomy. J Liaquat Univ Med Health Sci. 2022;21(Special Issue):64-69.
22. Taieb S, Atienza P, Zeitoun JD, Taouk M, Bourguignon J, Thomas C, et al. Frequency and risk factors of severe postoperative bleeding after proctological surgery: a retrospective case-control study. Ann Coloproctol. 2022;38(5):370-375.
23. Cheng KC, Song LC, Wu KL, Chen HH, Lee KC. Risk factors of delayed hemorrhage after LigaSure hemorrhoidectomy. BMC Surg. 2022;22(1):361. doi:10.1186/s12893-022-01802-w.