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Original Research Article

A novel approach for anatomical repair of ventral hernia with modified smead jones technique

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ABSTRACT

Background: Ventral hernia repair is the most popular procedures done worldwide. Despite of enough literature, evidence for optimal repair is lacking. We introduced a novel surgical technique for open primary ventral hernia repair, using modified smead jones technique.
Methods: This prospective interventional study conducted at the department of general surgery in Midnapore Medical College and Hospital from October 2022 to February 2023 aimed to assess the efficacy of the modified smead jones technique in open primary ventral hernia repair.
Results: Thirty cases were enrolled, predominantly featuring umbilical hernias in females aged 51-60 years. All cases presented with swelling, pain, and irreducibility. The Modified smead jones technique, employing Prolene no. 1, was utilized, with post-operative complications primarily comprising superficial wound infections managed by IV antibiotics and post-operative pain addressed with adequate analgesia. Recurrence was not observed during follow-ups at 15 days, 1 month, 6 months, and 12 months.
Conclusions: The study concludes that this modified technique offers a straightforward approach with low rates of early and potential reduction in late complications, serving as a viable alternative in both elective and emergency settings for primary ventral hernia repair.

Keywords: Modified smead jones technique, Primary ventral hernia, Prolene

INTRODUCTION

Ventral hernias constitute a multifaceted clinical condition characterized by the abnormal protrusion of a peritoneal-lined sac through a defect in the anterior abdominal wall.[1] This pathology poses a widespread challenge for surgeons globally, with an overall prevalence of 1.7% across all age groups and a notably higher rate of 4% among individuals aged 45 years and older.[2-4] The spectrum of ventral hernias encompasses various subtypes, including epigastric, umbilical, paraumbilical (comprising supraumbilical and infraumbilical), and acquired hernias such as incisional hernias. Additionally, these hernias can be further classified based on their specific location on the abdominal wall, extending beyond the domain of groin hernias.[5]

Ventral hernia repairs typically constitute elective procedures, offering various modalities of repair methods despite insufficient evidence and unsatisfactory outcomes.[6] While these hernias are often asymptomatic, symptomatic cases can severely impact an individual's quality of life, leading to symptoms such as pain, bowel obstruction, functional limitations, and an aesthetically displeasing bulge.[7,8] Surgical interventions for ventral hernias are frequent in the United States, totaling approximately 175,000 procedures annually.[9] Nonetheless, the lack of robust evidence and consensus

regarding the optimal repair technique remains a challenge for this commonly performed surgical intervention.[6] Additionally, the complexity of ventral wall hernia repair, complicated anatomy, presence of adhesions, and delayed presentations with comorbidities contribute to increased postoperative morbidity and mortality.

Aims and objectives

In this study, we aimed to assess the outcomes of utilizing the Modified smead jones technique as an approach for repairing ventral wall defects, focusing on postoperative outcomes, recovery rates, and complications.

METHODS

This prospective interventional study was conducted at Midnapore Medical College and Hospital, located in Paschim Medinipur, West Bengal, spanning from October 2022 to February 2023. The study population consisted of 30 patients who presented to the surgical outpatient department with primary ventral wall hernias, all of whom were confirmed to have hernia defects through clinical and radiological assessments.

Inclusion criteria

The study included patients with following criteria- (a) age group from 18-70 years; (b) size less than or equal to 2.5 cm; (c) primary type of ventral hernia; (d) hemodynamically stable; and (e) all patients with associated co-morbidities like diabetes, obesity, ASA grade I, II and hypertension are all included

Exclusion criteria

The study excluded patients with following criteria- (a) age less than 18 years; (b) who are pregnant; (c) size more than 2.5 cm; (d) hemodynamically instability; (e) all type of incisional hernia and groin hernias; and (f) presenting with features of strangulation or obstruction coming in emergency.

Procedure

All subjects underwent comprehensive evaluation, including detailed clinical history taking into consideration their mode of presentation, along with thorough examination of clinical findings and hematological parameters. Subsequently, radiological investigations were conducted to assess the size of the defect and its contents. Detailed assessment of comorbidities was performed, and fitness for surgery was ensured through anesthetic evaluation. Informed consent was obtained from all patients after a clear explanation of the surgical procedure's benefits and potential complications. Following optimization of all parameters, patients were scheduled for repair of the defect using the modified Smead Jones 'far near - near far' technique (Figure 1 and 2).

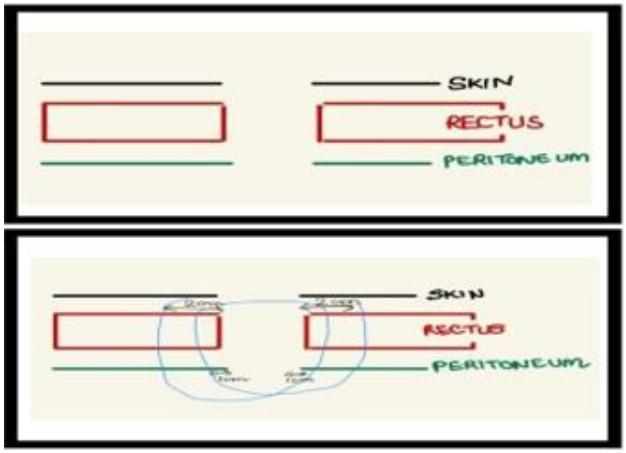

Figure 1: Schematic diagram of modified smead Jones technique.

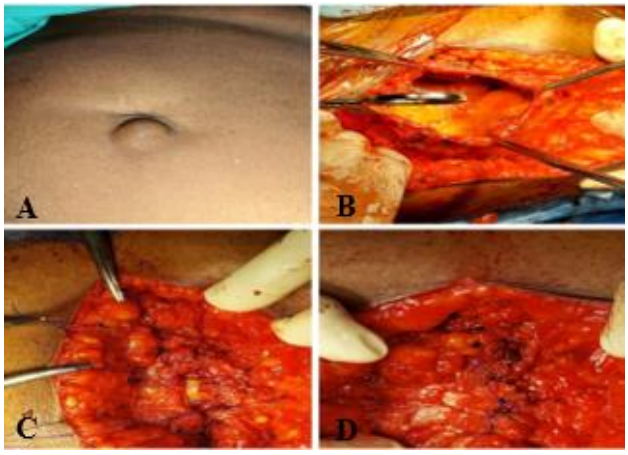

Figure 2 (A-D): Operative images of repair of umbilical hernia through modified smead Jones technique (A) umbilical type of hernia; (B) exposure of defect with reduction of the contents inside abdominal cavity; (C) repair of defect with modified smead jones technique; and (D) after closure of the defect.

The surgical procedure involved exposing the defect, reducing its contents into the abdominal cavity, and then closing the defect through intermittent suture approximation. Non-absorbable Polypropylene suture material of type 1 was utilized for closure, with the entry and exit of the suture positioned 2 cm from the defect and 1 cm from the edge of the gap on either side. Skin closure was achieved separately using non-absorbable monofilament sutures. Postoperatively, primary outcomes including wound infection and pain were assessed using the visual analog scale until postoperative day 3, managed with three days of intravenous antibiotics and adequate analgesia. Oral diet initiation commenced on postoperative day 2, and early ambulation was encouraged for all patients. Skin sutures were removed on postoperative day 10, and patients were discharged.

Follow-up visits were scheduled weekly for the first 15 days, followed by monthly visits for 6 months, and subsequently, for 1 year to evaluate wound infection, residual pain, prolene granuloma formation, and recurrence. Data collection and observations were meticulously recorded throughout the study duration.

RESULTS

This prospective interventional study, comprising 30 cases of primary ventral hernia admitted to the Department of General Surgery at Midnapore Medical College and Hospital, revealed a notable female predominance (Table 3), with the highest proportion of cases (33.33%) falling within the 51-60 years age bracket (Table 1). The most common mode of presentation was swelling, observed in 40% of cases, followed by swelling accompanied by pain (Table 4), particularly associated with small-sized defects (Table 5).

Umbilical hernia emerged as the predominant anatomical type, accounting for 47% of cases, followed by epigastric hernias at 23% (Table 2). Post-operatively, 27 cases (90%) demonstrated no complications, while in 10% of cases (3 cases), superficial wound infection necessitated management with intravenous antibiotics, and chronic pain was effectively managed with adequate analgesia (Table 6).

Notably, during the one-year follow-up period, none of the cases reported recurrence or other complications, indicating favorable long-term outcomes following surgical intervention.

Table 1: Distribution of patients in different age groups.

Age distribution (years)	Number of cases	Percentage of cases (%)
18-30	6	20
31-40	4	13.33
41-50	4	13.33
51-60	10	33.33
61-70	6	20

Table 2: Distribution of patients with their clinical types of ventral hernia.

Types of hernia	Number of cases	Percentage of cases (%)
Epigastric hernia	7	23.33
Supraumblical hernia	4	13.33
Umbilical hernia	14	46.66
Infraumblical hernia	5	16.66

Table 3: Distribution of patients in different gender.

Types of hernia	Number of cases	Male	Female
Epigastric hernia	7	4	3
Supraumbilical hernia	4	1	3
Umbilical hernia	14	6	8
Infraumbilical hernia	5	1	4

Table 4: Distribution of patients in according to clinical presentation.

Presenting complaints	Number of cases	Percentage of cases (%)
Swelling	12	40
Pain	6	20
Swelling with pain	9	30
Irreducibility	3	10

Table 5: Distribution of patients in according to size of deffect.

Size of defects (cm)	Number of cases	Percentage of cases (%)
Less than 1	8	26.66
1-2	15	50
2-2.5	7	23.33

Table 6: Distribution of post-operative complications among patients.

Post-operative complications	Number of cases	Percentage of cases (%)
Superficial wound infection	2	6.66
Wound dehiscence	0	0
Prolene granuloma formation	0	0
Recurrence	0	0
Post-operative pain	1	3.33
No complications	27	90

DISCUSSION

A primary ventral hernia often arises from congenital factors, linked to inherent weaknesses in the abdominal wall.[10] While common in adults, ventral hernias typically result from repeated stresses on the abdominal wall due to heightened intra-abdominal pressure, leading to tissue tears and subsequent weakening of the abdominal wall over time, predisposing individuals to hernia

formation.[11,12] The incidence of ventral hernias is notably higher in females, partly due to hormonal changes altering the composition of the extracellular matrix and weakening the midline of the abdominal wall.[13] Additionally, factors such as obesity and an aging population with associated comorbidities further complicate surgical management, necessitating carefully planned elective hernia repairs.[13-15]

Despite being commonly performed; hernia repairs lack robust evidence supporting optimal indications for repair and choice of surgical technique.[16] Various anatomical repair methods, including simple suturing, Mayo's repair, and Shoe-lace darn repair, have been described, but often yield disappointing results.[17], with recurrence rates reported as high as 40%.[18] Given the significance of hernia recurrence as a postoperative outcome measure, the primary objective of ventral hernia repair is to achieve a durable closure of the abdominal fascia while minimizing complications such as surgical site infections, bowel injuries, and hernia recurrence.[19,20]

Conventional closure methods, such as layered or mass fascial closure followed by subcutaneous and skin closure, are commonly employed but are associated with significant recurrence rates.[21,22] To address these issues, the adoption of single-layer mass closure techniques, involving the far near-near far technique, has been embraced. This approach aims for sequential closure of all abdominal layers, interrupting sutures to evenly distribute tension, thereby reducing the risk of recurrence.[23]

The modified version of the Smead-Jones method, employing polypropylene sutures, offers advantages in defect closure, ensuring efficient force distribution and contributing to durable hernia repair.[24-26] This technique combines the simplicity of sutures with favorable force distribution properties, enhancing the likelihood of successful hernia repair. [27,28]

CONCLUSION

This study sheds light on the intricate nature of primary ventral hernias, often stemming from congenital factors and exacerbated by heightened intra-abdominal pressure. Despite their prevalence, the optimal indications for repair and choice of surgical technique remain ambiguous, with conventional methods often yielding high recurrence rates. However, our investigation highlights the effectiveness of the modified Smead-Jones technique, employing polypropylene sutures, in achieving durable hernia repair. With a notable female predominance and a common presentation of swelling, this approach demonstrated favorable outcomes regarding postoperative complications and long-term recurrence rates.

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REFERENCES

1. Poulose BK, Shelton J, Phillips S, Moore D, Nealon W, Penson D, et al. Epidemiology and cost of ventral hernia repair: making the case for hernia research. Hernia. 2012;16(2):179-83.
2. Ramshaw BJ, Esartia P, Schwab J, Mason EW, Wilson RA, Duncan TD, et al. Comparison of laparoscopic and open ventral herniorrhaphy. Am Surg. 1999;65(9):827-32.
3. Colavita PD, Tsirline VB, Belyansky I, Walters A, Lincourt AE, Sing RF, et al. Prospective, long-term comparison of quality of life in laparoscopic versus open ventral hernia repair. Ann Surg. 2012;256(5):714-23.
4. Holihan JL, Li LT, Askenasy EP, Greenberg JA, Keith JN, Martindale RG, et al. Analysis of model development strategies: predicting ventral hernia recurrence. J Surg Res. 2016;206(1):159-67.
5. Holihan JL, Alawadi Z, Martindale RG, et al. Adverse Events after Ventral Hernia Repair: The Vicious Cycle of Complications. J Am Coll Surg. 2015;221(2):478-85.
6. Lindmark M, Löwenmark T, Strigård K, Gunnarsson U. Major complications and mortality after ventral hernia repair: an eleven-year Swedish nationwide cohort study. BMC Surg. 2022;22(1):426.
7. Helgstrand F. National results after ventral hernia repair. Dan Med J. 2016;63(7):B5258.
8. Helgstrand F, Rosenberg J, Kehlet H, Strandfelt P, Bisgaard T. Reoperation versus clinical recurrence rate after ventral hernia repair. Ann Surg. 2012;256(6):955-8.
9. Lindmark M, Strigård K, Löwenmark T, Dahlstrand U, Gunnarsson U. Risk Factors for Surgical Complications in Ventral Hernia Repair. World J Surg. 2018;42(11):3528-36.
10. Ross SW, Oommen B, Huntington C, Walters A, Lincourt A, Kercher K, et al. National Outcomes for Open Ventral Hernia Repair Techniques in Complex Abdominal Wall Reconstruction. Am Surg. 2015;81(8):778-85.
11. Sokolova S, Sherbatykh A, Tolkachev K, Beloborodov V, Dulskiy V, Kozlova N, et al. Efficacy Evaluation of a Case-Specific Approach for Surgical Treatment of Inicisional Ventral Hernia. Int J Surg Protoc. 2021;25(1):114-22.
12. Wolf LL, Ejiofor JI, Wang Y, Huinik MG, Losina E, Haider HA, et al. Management of Reducible Ventral Hernias: Clinical Outcomes and Cost-effectiveness of Repair at Diagnosis Versus Watchful Waiting. Ann Surg. 2019;269(2):358-66.
13. Halligan S, Parker SG, Plumb AA, Windsor ACJ. Imaging complex ventral hernias, their surgical

repair, and their complications. Eur Radiol. 2018;28(8):3560-9.
14. Agarwal BB, Agarwal S, Mahajan KC. Laparoscopic ventral hernia repair: innovative anatomical closure, mesh insertion without 10-mm transmyofascial port, and atraumatic mesh fixation: a preliminary experience of a new technique. Surg Endosc. 2009;23(4):900-5.
15. Plymale MA, Davenport DL, Walsh-Blackmore S, et al. Costs and Complications Associated with Infected Mesh for Ventral Hernia Repair. Surg Infect (Larchmt). 2020;21(4):344-9.
16. Paul A, Korenkov M, Peters S, Köhler L, Fischer S, Troidl H. Unacceptable results of the Mayo procedure for repair of abdominal incisional hernias. Eur J Surg. 1998;164(5):361-7.
17. Riet M, Steyerberg EW, Nellensteyn J, Bonjer HJ, Jeekel J. Meta-analysis of techniques for closure of midline abdominal incisions. Br J Surg. 2002;89(11):1350-6.
18. Gislason H, Viste A. Closure of burst abdomen after major gastrointestinal operations--comparison of different surgical techniques and later development of incisional hernia. Eur J Surg. 1999;165(10):958-61.
19. Ceydeli A, Rucinski J, Wise L. Finding the best abdominal closure: an evidence-based review of the literature. Curr Surg. 2005;62(2):220-5.
20. Cursos. Principals of abdominal wall closure, 2011. Available at: http:// cursoenarm.net/Up to Date. Accessed on 12 July 2023.
21. Idris SA, Ali AQ, Shalayel MH, Idris TA. Design of multicentre study to evaluate frequency and risk factors for wound dehiscence/ burst abdomen: a study of 1683 major midline laparotomies. Sudan Med Monitor. 2010; 5(4):185- 91.
22. Richards PC, Balch CM, Aldrete JS. Abdominal wound closure. A randomized prospective study of 571 patients comparing continuous vs. interrupted suture techniques. Ann Surg. 1983;197(2):238-43.
23. Elkheir IS, Idris SA. Evaluation of abdominal wall closure techniques in emergency laparotomies at a peripheral hospital. Sch J App Med Sci. 2014; 2(5):1591-5.
24. Os JM, Lange JF, Goossens RH, et al. Artificial midline-fascia of the human abdominal wall for testing suture strength. J Mater Sci Mater Med. 2006;17(8):759-65.
25. Wissing J, Vroonhoven TJ, Schattenkerk ME, Veen HF, Ponsen RJ, Jeekel J. Fascia closure after midline laparotomy: results of a randomized trial. Br J Surg. 1987;74(8):738-41.
26. Bande A, Saxena D, Nichkaode PB, Akhtar M. A comparative study of single layer closure versus conventional layered closure of laparotomy wounds Int Surg J. 2018;5(4):1459-63.
27. Bhavikatti GS, Gupta GHVR. Comparative study of mass closure and layered closure techniques in midline and paramedian laparotomies Acad J Surg. 2019;2(1):42-6.
28. Nitin KB, Vasudevaiah DT, Nayak DRM, Naik DD. Comparative study of efficacy of modified Smead-Jones technique versus conventional closure of midline laparotomy wound Int J Surg Sci. 2020;4(1):134-7.

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