Research Article

Retrospective Comparative Study of Modified Stoppa Hernioplasty (MSH) vs. Laparoscopic Ventral Intraperitoneal Hernioplasty (LVIH)

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Abstract

Background: An incisional hernia is a common long-term complication of abdominal surgery and is estimated to occur in 3% to 13% of laparotomy incisions. However, its incidence is greater than 23% in patients who have developed an infection in the laparotomy wound. **Aim:** What we aim from such a study is to compare laparoscopic ventral intraperitoneal hernioplasty (LVIH) done in KAU hospitals (KAUH) during the period from 2005 till 2015 and our cases done through the modified Stoppa Hernioplasty (MSH) in CUH & BEH. **Materials and Methods:** The 77 of laparoscopic ventral intraperitoneal hernioplasty (LVIH) done in King Abdul-Aziz University Hospital (KAUH) during the past 10 years were done by using meshes liable to be put on the intestine without inducing adhesion or fistulae formation as PTFE, vicryl and composite meshes. **Results:** Laparoscopic hernioplasty was used in 77 cases out of 245 (32%) abdominal wall hernias, while 58 cases of incisional hernia were treated by MSH (96.33%) and 2 cases (3.33%) were treated by sandwich technique; MSH and only mesh in one case and intraperitoneal mesh reinforced by subcutaneous proline mesh in the second case. The range of operative blood loss in KAUH was from 50 to 300 cc while it was from 80 to 200 in cases of BEH and CUH. The post-operative seroma was detected in 29 cases (21%) in KAUH in only those cases treated by only proline mesh, while 2 cases (3.33%) only were detected in the 60 cases done by MSH in BEH and CUH and it was in the form of mild hematoma due to clot obstruction of the drainage tube. The range of post-operative stay in hospital was from 1-30 days in KAUH with 29% of laparoscopic cases of hernioplasty discharged after one day while it was 2-15 cases in BEH and CUH with 32% of cases discharged within 2 days. **Conclusion:** To conclude, Open ventral hernioplasty with MSH is a safe, easy and rapid surgical technique, with negligible post-operative seroma, very low incidence of recurrence, short post-operative hospital stay, and suitable for all types of ventral hernia (complicated *vs.* non-complicated, recurrent *vs.* virgin, single defect *vs.* multiple defects), with minimal intraoperative blood loss and the most important advantage of such technique is the gain of all these benefits with comparative very low cost. LIH has becoming increasingly advanced with the progress of technology in laparoscopic field and non-adhesible new mesh production. The best advantage is that other synchronous intraperitoneal surgical procedures can also be done in the same sitting. One of great advantage in our opinion is that it can be used instead of MSH in cases with very wide defects. Also, it is the solution for ventral hernioplasty in patients with chronic pulmonary diseases with defective pulmonary functions. It is a more cosmetic procedure than MSH.

Keywords: Modified Stoppa Hernioplasty (MSH); Laparoscopic Ventral Intraperitoneal Hernioplasty (LVIH)

Introduction

An incisional hernia is a common long-term complication of abdominal surgery and is estimated to occur in 3% to 13% of laparotomy incisions. [1] However, its incidence is greater than 23% in patients who have developed an infection in the laparotomy wound. [2,3]

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Approximately 50% of incisional hernias develop within the first 2 years after the primary operation, and 74% develop after 3 years. [4,5]

Ventral abdominal wall hernias are common lesions and may be associated with life-threatening complications. The application of laparoscopic principles to the treatment of ventral hernias has reduced recurrence rates from a range of 25% to 52% to a range of 3.4% to 9%. [6]

The Rives-Stoppa (RS) repair of ventral incisional hernias is technically difficult. It involves the retro-muscular placement of mesh anterior to the posterior fascia and the primary closure of the anterior fascia. The rate of recurrence is 0-8%. [7]

Laparoscopic ventral and incisional herniorrhaphy is gaining popularity among both surgeons and patients and is less controversial than laparoscopic repair of inguinal hernias. As with any operation, the key to the success of this procedure is the avoidance of complications. [8]

Seroma is the commonest post-operative complication following ventral hernioplasty. It reached up to 14.5% in the study of DeBord et al. in 1992. [9] This complication is a chronic one and has plugged prosthetic repair of large ventral incisional hernia since its inception. [10] The major factor in seroma development is most likely the large dead space caused by extensive fascio-cutaneous dissection that is inevitable for on lay mesh hernioplasty with large defects. [9]

Prophylactic measures to avoid such seroma were the use of closed suction drain that has to be maintained from 2-6 days post-operatively. [9,10] Post-operative pressure dressings may help in minimizing seroma development. [9] Some cases of seroma are prolonged and seroma management in such cases is mandatory since it predisposes for infection through its mucin content that is proved to act as anti-complement and also due to its ischemic effect on surrounding tissues. This is of great consideration if applied to immuno-compromised patients. Infection on top of seroma causes mesh excursion and treatment failure with sure recurrence. [9]

The treatment of such long-standing seroma with repeated aseptic aspiration has the risk of the introduction of infection. Many trials had been done to solve the problem of seroma with ventral hernioplasty. Among these methods is the use of omentum to help to eliminate the dead space between the on lay mesh and the fascio-cutaneous layer and to absorb lymphorrhea and serous fluid accumulated through its blood supply. The omentum can be technically brought out on a pedicle away from the actual hernia orifice. [9]

Stoppa has discovered an intelligent method for fixation of the mesh without fascio-cutaneous dissection through skin stabs and u-shaped mono-filamentous non-absorbable stitches to fix a prosthetic merseline mesh in the plane between the rectus abdominis muscles and the posterior rectus sheath. [11,12]

DeBord et al. used the same technique of Stoppa but without any dissection at any planes using intraperitoneal expanded poly-tetra-fluoro-ethylene soft tissue patch (PTFE-STP) in 3 huge hernias without drain, seroma, infections, or recurrence. We did about 35 cases in Cairo University Hospital (CUH) and 25 cases in Bagedo-Erfan hospitals (BEH) in Jeddah, KSA, in the period from 1998 till 2005 by using a modified technique of Stoppa (MSH) where we used Proline mesh (being less costly, available, strong, and resisting infection rather than merseline and we use the enclose instruments for fixation of mesh in retro-rectal space The laparoscopic development of ventral hernioplasty was based on the same idea of DeBord (intraperitoneal mesh hernioplasty. [13]

What we aim from such study is to compare laparoscopic ventral intraperitoneal hernioplasty (LVIH) done in KAU hospitals (KAUH) during the period from 2005 till 2015 and our cases done through the modified Stoppa Hernioplasty (MSH) in CUH & BEH, particularly for the type of hernia, size of the defect, age of patients, sex, number of preoperative recurrences, number of defects, operative time, associated abdominal pathology, estimated intraoperative blood loss, post-operative estimated drained fluid, post-operative hospital stay, and estimated cost of surgery/each case and post-operative recurrences.

Materials and Methods

- The modified Stoppa hernioplasty (MSH) technique is a conventional open surgery done by insertion of a wide sheet of proline to be fixed in the retro-rectal space after the closure of the posterior rectus sheath and peritoneum in the middle line. The mesh should be inserted at least 8 cm away from the edge of the hernial defect. The suction drain was inserted in the retro-rectal space for 2-5 days. This procedure was associated with no facio-cutaneous dissection and it was very helpful in dealing with multiple defects and surgical treatment of other associated intraoperative procedures as cholecystectomies.
- The 77 of laparoscopic ventral intraperitoneal hernioplasty (LVIH) done in King Abdul-Aziz University Hospital (KAUH) during the past 10 years were done by using meshes liable to be put on the intestine without inducing adhesion or fistulae formation as PTFE, vicryl and composite meshes as shown in Table 1.

Results

Of the 245 patients in KAU hospital (KAUH), 66 were males and 179 were female while among the 60 cases done in BEH and KEUH 13 were males and 47 were females. The age range in KAUH was from 3 to 76 years, while in BEH and CUH the range was from 28 to 72.

The main bulk of hernioplasty in KAUH was for umbilical and paraumbilical hernia in 156 (64%) and the main bulk for hernioplasty in BEH and CUH was in the form of incisional hernias, 52 cases (87.6%).

The number of recurrent cases in KAUH was 8 cases (3.27%) and that of BEH & CUH was in 41 cases (68.3%).

Forty cases (16.33%) in KAUH were presented by complications (5 cases with irreducibility, 9 cases with strangulation, and 26 cases with obstructions) while only 9 cases (15%) were presented by complications mainly strangulations in 6 cases and 3 irreducibility in BEH & CUH.

Table 1: Showed the comparison between cases with LVIH and MSH techniques done in KAU hospital and CUH & BEH during the past 10 years.

Items of comparison	KAUH	KAUH (%)	BEH & CUH	BEH & CUH (%)
Total number	245 (77 of them treated with LVIH)	100	60	100
Age range	3-76		28-72	
Gender M/F	66-179	27%: 73%	13/47	22%:78%
Virgin/Recurrent hernia	237/8	96.7%: 3.3%	19/41	31.7%:68.3%
Umbilical hernioplasty	156	63.7%	8	13.3%
Incisional hernioplasty	86	35.1%	52	86.7%
Epigastric hernioplasty	3	1.22%	0	0%
Complicated hernia/noncomplicated hernia	40/205	16.32% - 83.67%	9/51	15% - 85%
Irreducible: obstructed: strangulated	5:26:09	12.5%:65%:22.5%	3: 0 :6	33.3%:0%:66.7%
Operative time in hours	1:6		2:4.5	
Numbers of defect	1:3		1:6	
Post-operative hospital stay in days	1:30	29% of LVIH discharged within 2 days	2-15	32% of MSH discharged within 2 days.
Associated surgical procedures	18 cases	7.35%	8	13.33%
Type of used mesh	Proline: 43 VYPRO: 18 Surgimesh: 17 Ventralight: 19 Mesorbable: 1 Physics: 3 Composite mesh: 20 Vicryl: 9 Ultrapro: 8 Ventralex: 6 Parietene macro porous: 3 Progrip: 2	17.6% 8.16%	Proline: 59 Composite: 1	98:33% 1.665%
Postoperative seroma	29	11.83% mainly with only mesh hernioplasty and 2.5% only with LVIH.	2	3.33%
Duration of drainage in days	2- 44		2 – 15 days.	
Follow up in months	1:6		1-12	
Herniorrhaphy	15	6.12%	0	0%
Hernioplasty with onlay mesh	135	55%	2 cases	6.66%
Lap hernioplasty	77	31.42%	0	0%
MSH	0	0	58	96.66%
Sandwich technique (interaperitoneal + onlay mesh)	0	0	2	3.33%
Range of operative blood loss in ml.	50:300		80-200	
Range of defect area	1 – 150 cm^2		7 – 180 cm^2	
Recurrence	0		0	

Laparoscopic hernioplasty was used in 77 cases out of 245 (32%) abdominal wall hernias, while 58 cases of incisional hernia were treated by MSH (96.33%) and 2 cases (3.33%) were treated by sandwich technique; MSH and only mesh in one case and intraperitoneal mesh reinforced by subcutaneous proline mesh in the second case.

Associated simultaneous abdominal surgery was found in 18 cases (7%) including colectomies, liposuction, omentectomy, intestinal resection anastomosis, and cholecystectomies while it was found in 8 cases (13.33%) of BEH and CUH including omentectomy, cholecystectomies, and intestinal resection and anastomosis [Figure 1].

The range of operative blood loss in KAUH was from 50 to 300 cc while it was from 80 to 200 in cases of BEH and CUH [Figure 2].

The post-operative seroma was detected in 29 cases (21%) in KAUH in only those cases treated by only proline mesh, while 2 cases (3.33%) only were detected in the 60 cases done by MSH in BEH and CUH and it was in the form of mild hematoma due to clot obstruction of the drainage tube [Figure 3].

The range of post-operative stay in hospital was from 1-30 days in KAUH with 29% of laparoscopic cases of hernioplasty discharged after one day while it was 2-15 cases in BEH and CUH with 32% of cases discharged within 2 days [Figure 4].

Discussion

Of the 245 patients in KAU hospital (KAUH), 66 were males and 179 were female while among the 60 cases done in BEH and KEUH 13 were males and 47 were females. The age range in KAUH was from 3 to 76 years, while in BEH and CUH the

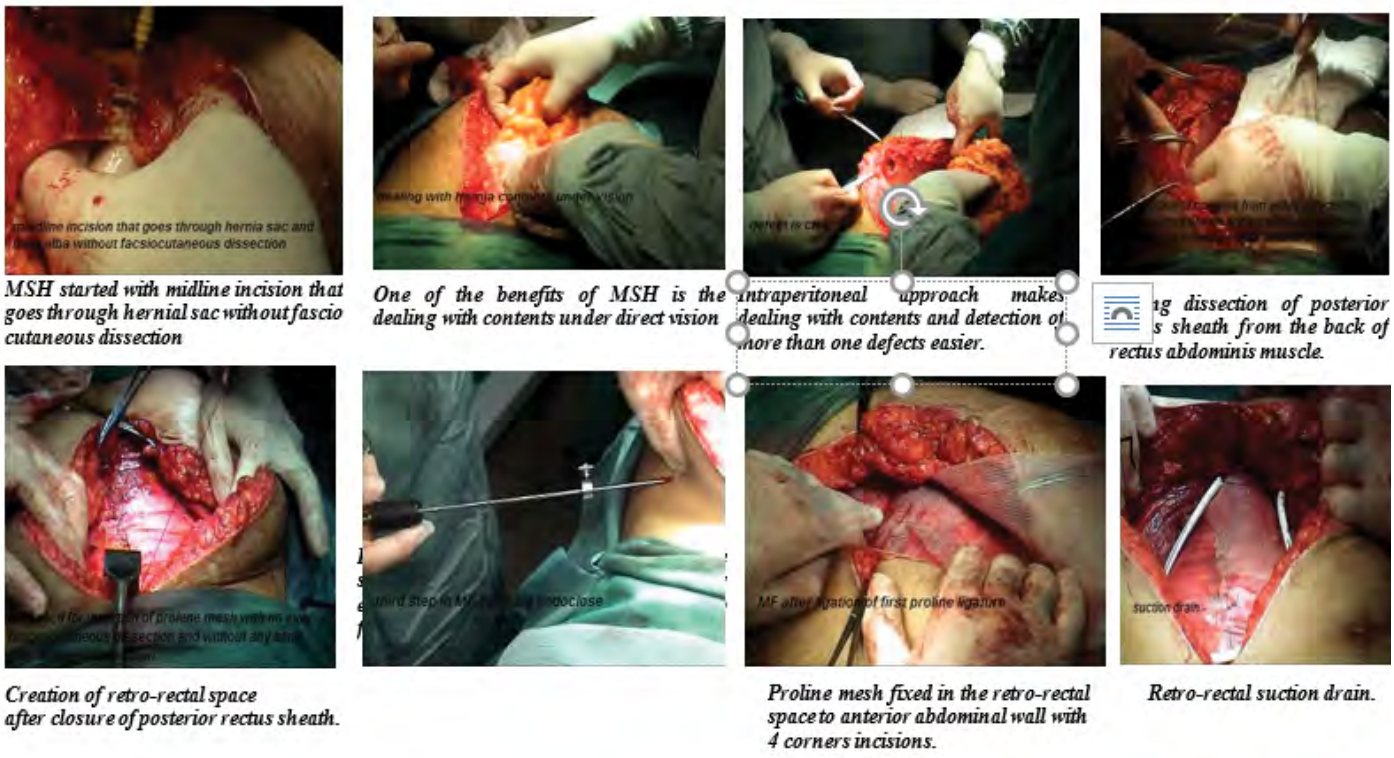

Figure 1: Steps of MSH done in cases of CUH and BEH.

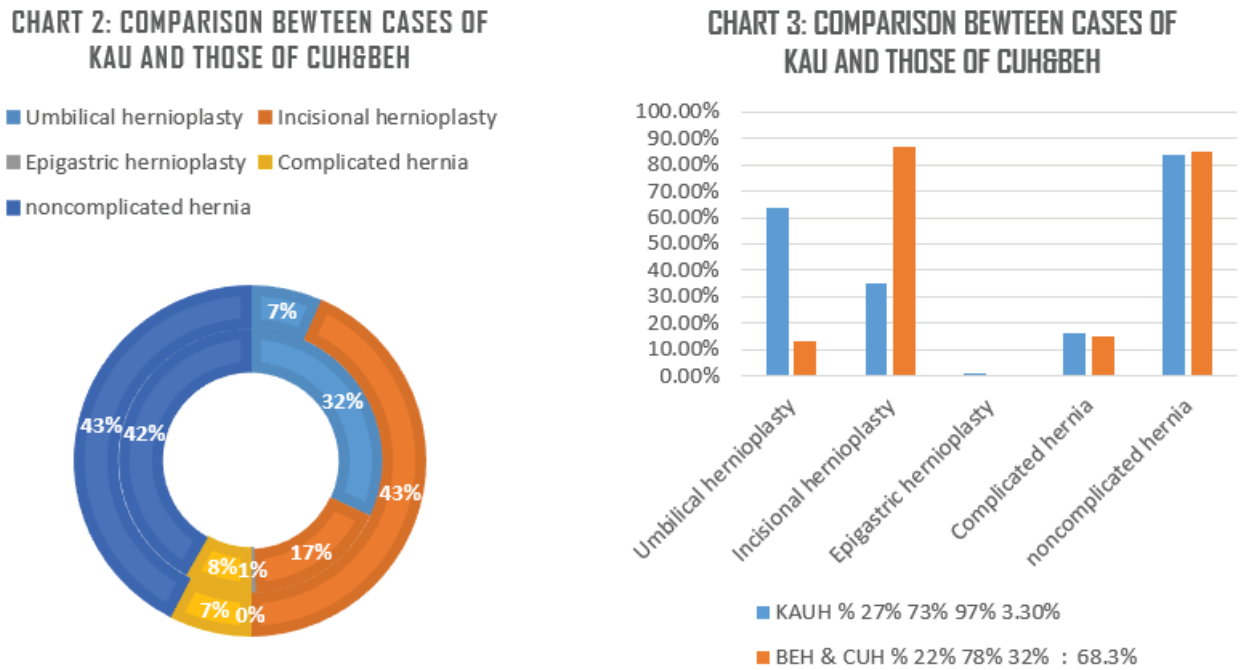

Figure 2: Comparison between cases of KAU and those of CUH & BEH.

range was from 28 to 72. In the study of George MEidMD et al, the mean age was 55.8 years (range 28–81).[6]

The main bulk of hernioplasty in KAUH was for umbilical and paraumbilical hernia in 156 (64%) and the main bulk for hernioplasty in BEH and CUH was in the form of incisional hernias, 52 cases (87.6%).

The number of recurrent cases in KAUH was 8 cases (3.27%) and that of BEH & CUH was in 41 cases (68.3%). In the study of George MEidMD et al, Sixty-eight patients had incisional hernias, including 17 (20%) with recurrent hernias and eleven patients (13%) had primary ventral hernias.[6]

Forty cases (16.33%) in KAUH were presented by complications (5 cases with irreducibility, 9 cases with strangulation, and 26 cases with obstructions) while only 9 cases (15%) were presented by complications mainly strangulations in 6 cases and 3 irreducibility in BEH & CUH. In the study of George et al.

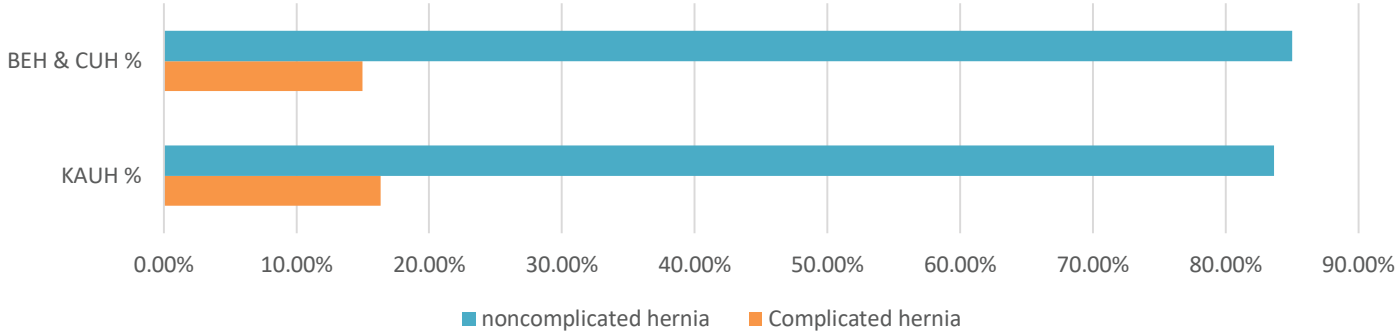

Figure 3: Non-complicated *vs.* complicated cases in KAU and those of CUH & BEH.

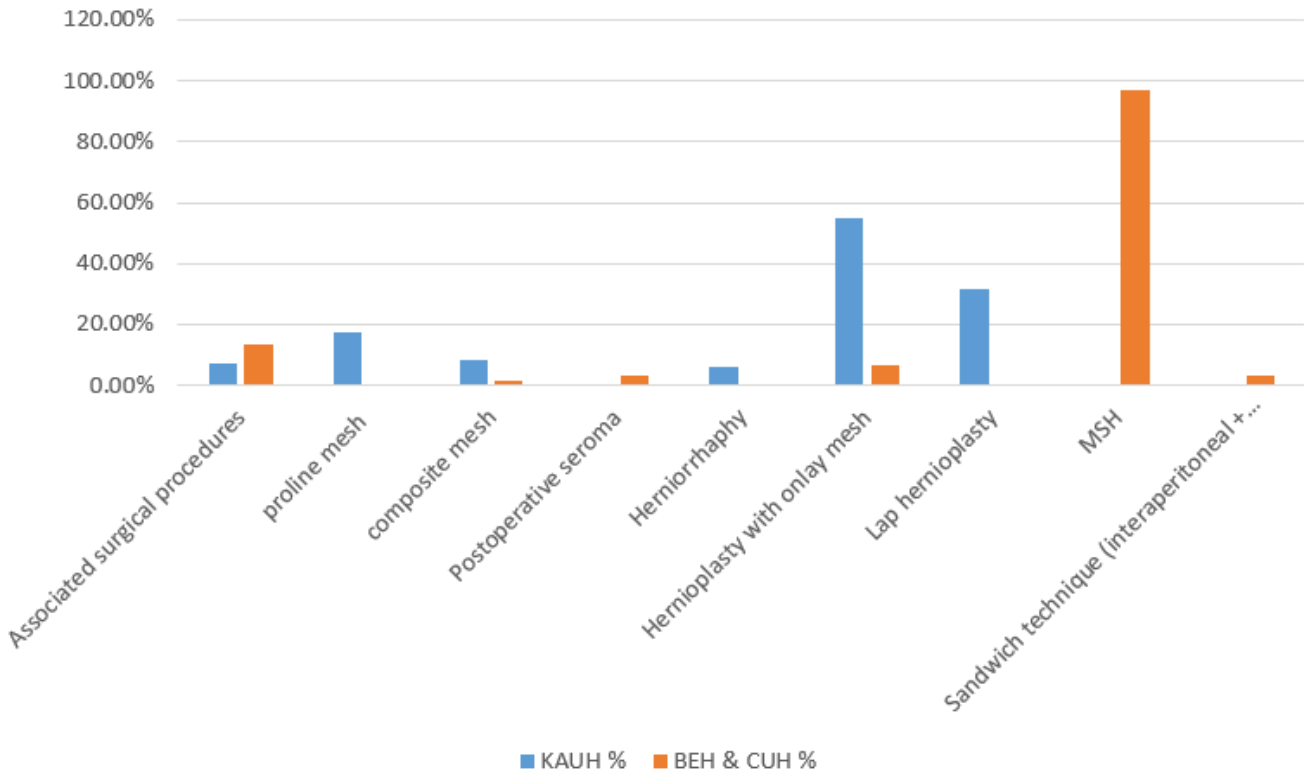

Figure 4: Cases of KAUH vs. CUH & BEH.

incarceration was present in 22 patients (27.8%).[6] [Figure 4]. The range of defect size in KAUH was from 1-150 cm^2 and 7-145 cm^2 in BEH and CUH. The number of defects range was 1-3 and from 1-6 in BEH and CUH. In the study of George et al. the range of defect size was 4–510 cm^2.[6]

Laparoscopic hernioplasty was used in 77 cases out of 245 (32%) abdominal wall hernias, while 58 cases of incisional hernia were treated by MSH (96.33%) and 2 cases (3.33%) were treated by sandwich technique; MSH and only mesh in one case and intraperitoneal mesh reinforced by subcutaneous proline mesh in the second case. In the study of George et al. laparoscopic expanded polytetrafluoroethylene mesh repair by the modified Rives-Stoppa technique was completed in 78 (98.7%) and one conversion occurred because of bowel injury.[6]

The range of operative time in the 245 cases done in KAUH was from 1-6 hours and that of cases done in BEH and CUH was from 2 to 4.5 hours. In the study of George et al. the mean operating time was 110 minutes (range 45–210).[6]

Associated simultaneous abdominal surgery was found in 18 cases (7%) including colectomies, liposuction, omentectomy, intestinal resection anastomosis, and cholecystectomies while it was found in 8 cases (13.33%) of BEH and CUH including omentectomy, cholecystectomies, and intestinal resection and anastomosis. The range of operative blood loss in KAUH was from 50 to 300 cc while it was from 80 to 200 in cases of BEH and CUH.

The post-operative seroma was detected in 29 cases (21%) in KAUH in only those cases treated by only proline mesh, while 2 cases (3.33%) only were detected in the 60 cases done by MSH in BEH and CUH and it was in the form of mild hematoma due to clot obstruction of the drainage tube. In the study of George et al. seroma and other post-operative complications developed in 11.4% of cases.[6]

The range of post-operative stay in hospital was from 1-30 days in KAUH with 29% of laparoscopic cases of hernioplasty discharged after one day while it was 2-15 cases in BEH and

CUH with 32% of cases discharged within 2 days. In the study of George et al. the mean hospital stay was 1.7 days (range 0–20), with 46 patients (58.2%) being discharged within 24 hours of surgery.[6]

In the study of George et al.[6] after a follow-up of up to 6 years (a mean of 34 months), there were 4 recurrences (5%). In our study, the range of follow up was only up to 6 months and one year in KAUH and BEH respectively, and during such a short period of follow up no recurrence cases were detected.

Current literature on the topic suggests that laparoscopic ventral hernial repair (LVHR), is a safe alternative to the open method with the main advantages being minimal post-operative pain, a shorter convalescence period, and better cosmetic results. Main complications after the laparoscopic approach, such as incidental enterotomy, protracted pain, post-operative seroma, or mesh infection occur at an acceptable rate. Furthermore, most articles favor LVHR versus operative ventral hernial repair (OVHR) in terms of recurrence rate.[14]

Conclusion

To conclude, Open ventral hernioplasty with MSH is a safe, easy and rapid surgical technique, with negligible post-operative seroma, very low incidence of recurrence, short post-operative hospital stay, and suitable for all types of ventral hernia (complicated *vs.* non-complicated, recurrent *vs.* virgin, single defect *vs.* multiple defects), with minimal intraoperative blood loss and the most important advantage of such technique is the gain of all these benefits with comparative very low cost. However, the main disadvantage of OHR with MSH and retro rectal proline mesh include that: In certain cases particularly with very wide defects, it is not suitable since the closure of posterior rectus sheath behind the mesh and both recti will be under great tension even if we did release lateral incisions that make the main advantage of MSH is lost due to the fascio-cutaneous dissection. We think also that such a technique is less convenient in patients with huge defects associated with chronic pulmonary diseases. When we look at the laparoscopic intraperitoneal hernioplasty (LIH) we can conclude: LIH has become increasingly advanced with the progress of technology in the laparoscopic field and non-adhesible new mesh production. The best advantage is that other synchronous intraperitoneal surgical procedures can also be done in the same sitting. One great advantage in our opinion is that it can be used instead of MSH in cases with very wide defects. Also, it is the solution for ventral hernioplasty in patients with chronic pulmonary diseases with defective pulmonary functions. It is a more cosmetic procedure than MSH. However, we can also conclude the following disadvantages: it is a costly procedure if we put in mind the increasing prices of laparoscopic instruments and the comparatively high prices of different intraperitoneal mesh compared with proline mesh. It needs high advanced skills in laparoscopy surgery. It is more liable for intraoperative enterotomy complications. We think that both procedures have their advantages and also disadvantages, but if we would like to summarize and concentrate our conclusions from such a comparative study, we can say: Surgeons should start training on the MSH before LIH. Surgeons should have a great experience in advanced laparoscopy before performing LIH. Ventral hernias with very wide defects plus or minus aggressive low pulmonary functions are better to be treated laparoscopically. The socio-economic standard, particularly, in private sections may direct the surgeon for MSH or LIP if all the conditions are fulfilled. Although further randomized studies are needed to have safe conclusions regarding recurrence, complications. However, LIH is increasingly becoming the more standard approach in the treatment repair of ventral hernias.

Competing Interests

The authors declare that they have no competing interests. All the listed authors contributed significantly to the conception and design of study, acquisition, analysis, and interpretation of data and drafting of the manuscript, to justify authorship.

References

1. Mudge M, Hughes LE. Incisional hernia: A 10 year prospective study of incidence and attitudes. Br J Surg. 1985;72:70-71.
2. Bucknall TE, Cox PJ, Ellis H. Burst abdomen and incisional hernia: a prospective study of 1129 major laparotomies. Br Med J (Clin Res Ed) 1982;284:931-933.
3. Carlson MA, Ludwig KA, Condon RE. Ventral hernia and other complications of 1,000 midline incisions. South Med J. 1995;88:450-450.
4. Pollock AV, Evans M. Early prediction of late incisional hernias. Br J Surg. 1989;76:953-954.
5. Anthony T, Bergen PC, Kim LT, Henderson M, Fahey T, Rege RV, et al. Factors affecting recurrence following incisional herniorrhaphy. World J Surg. 2000;24:95-101.
6. Eid GM, Prince JM, Mattar SG, Hamad G, Ikrammudin S, Schauer PR. Medium-term follow-up confirms the safety and durability of laparoscopic ventral hernia repair with PTFE. Surgery 2003;134:599-603.
7. Heartsill L, Richards ML, Arfai N, Lee A, Bingener-Casey J, Schwesinger WH, et al. Open Rives-Stoppa ventral hernia repair made simple and successful but not for everyone. Hernia 2005;9:162-166.
8. LeBlanc KA. Current considerations in laparoscopic incisional and ventral herniorrhaphy. JSLS-J Soc Laparoend. 2000;4:131.
9. De Bord JR. Repair of large ventral incisional hernias with expanded polytetrafluoroethylene prosthetic patches. Postgrad Gen Surg. 1992;4:156-160.
10. Rubio P. Use of double-layered expanded PTFE to repair giant ventral hernias. Contemp Surg 1995;46:189-192.
11. Stoppa RE. The treatment of complicated groin and incisional hernias. World J Surg. 1989;13:545-554.
12. Rives J, Pire JC, Flament JB, Palot JP. Major incisional hernia. Surg Abdominal Wall. 1987.
13. Miei R, Interlocking IM, Il N. Sci. Med. J. ESCME, 1998;10:119.
14. Misiakos EP, Machairas A, Patapis P, Liakakos T. Laparoscopic ventral hernia repair: pros and cons compared with open hernia repair. JSLS-J Soc Laparoend. 2008;12:117.