ORIGINAL RESEARCH PAPER VOLUME-6 | ISSUE-7 | JULY-2017 | ISSN No 2277 - 8179 | IF : 4.176 | IC Value : 78.46

INTERNATIONAL JOURNAL OF SCIENTIFIC RESEARCH

HYBRID TECHNIQUE FOR INCISIONAL HERNIA REPAIR: 18 PATIENTS IN A SINGLE CENTER IN LEBANON CASE SERIES

Medical Science

Elias Saikaly Saint George Hospital University Medical Center, Beirut, Lebanon University of Balamand, Beirut, Lebanon. Corresponding Author

Fahim Abi Fadel Chief Resident Saint George Hospital University Medical Center. General Surgery Department. University of Balamand. Lebanon

Ziad El Rassi Associate Professor of General Surgery, Saint George Hospital University Medical Center, University of Balamand. Lebanon

ABSTRACT

Background: Incisional hernia is one of the most common complications post laparotomy; hybrid technique is an emerging method that was reported in the repair of mainly large, complicated and recurrent incisional hernias.

Summary: Incisional hernia is one of the most common complications post laparotomies [1, 2]. The hybrid technique combining both the open and laparoscopic approaches is in our opinion the best method to benefit from the advantages of both techniques in the matter of safe adhesiolysis and fascia approximatiaon of the open approach and the outcomes of mini-invasive procedures post-operatively including postoperative pain, recovery and hospital stay. We present eighteen patients underwent incisional hernia repair using the hybrid technique. Medical records were reviewed for risk factors for hernia development, previous surgery, incision site, Body mass index (BMI), size of defect, type of mesh that was used, and size of mesh, operative time, hospital stay and postoperative complications.

Materials and methods: Eighteen patients underwent incisional hernia repair using the hybrid technique. Medical records were reviewed for risk factors for hernia development, previous surgery, incision site, Body mass index (BMI), size of defect, type of mesh that was used, and size of mesh, operative time, hospital stay and postoperative complications.

Results: 2 hybrid techniques were used, open first completed by laparoscopic approach and laparoscopic first completed by open approach. The first starting by open approach for adhesiolysis, four quadrant mesh fixation using laparoscopic suture passer, and three 5 mm trocars was inserted under direct vision lateral to the lateral border of the mesh, followed by closure of the defect. Then pneumoperitoneum was established for complete mesh fixation and adequate spreading of the mesh. The second method starting by laparoscopy where inspection of the abdominal cavity was done, adhesiolysis done laparoscopically up to the point till reaching dense adhesions where a small midline incision (5 to 10 cm) was done for safe completion of adhesiolysis, insertion of the mesh and four quadrant fixation using laparoscopic suture passer. Closure of the fascia, then reestablishment of pneumoperitoneum for completion of mesh fixation and spreading. Only one type of mesh was used (double-layered synthetic) with adequate different sizes covering the actual hernia size and at least 5cm from the defect edges and all of them were intraperitoneal. 18 cases of incisional hernia repair using the hybrid technique including small, medium sized and large defects were included. Mean age was 59.4 years, mean BMI was 27.17 kg/m^2. Mean defect size was 13 x 6.3 cm, the mean mesh size was 26 x 18.5 cm. The mean hospital stay was 4 days. Morbidity was 11.11 percent including one Clostridium Difficile colitis and one prolonged ileus. 13 patients underwent the first technique and 5 patients underwent the second. There was no surgical site infection and no seroma formation.

Conclusion: The hybrid technique combining both the open and laparoscopic approaches is in our opinion a promising method to benefit from the advantages of both techniques in the matter of safe adhesiolysis and the outcome of mini-invasive procedures post-operatively. It is a safe method in repair of incisional hernias with small, medium sized and large defects. Data is still lacking to establish clear indications for its use and it is kept as an operator's decision based on a case-by-case analysis. Further retrospective studies are needed in order to establish the guidelines for its use.

KEYWORDS:

Incisional Hernia, Hybrid Technique for Hernia Repair

Introduction

Incisional hernia is one of the most common complications post any laparotomy, its incidence ranges from 10 to 20% [1,2] depending on multiple factors including the type of surgery, the method used for closure of the abdomen and patient related factors. There are two worldwide used techniques for the repair of incisional hernias, open and laparoscopic, both of which has good results. The indications, complications and comparison between the outcomes of these two techniques are well described in literature. However, over the last decade, the complexity of inscional hernias has increased and hence its management strategy has evolved. Some incisional hernias have a very large hernia sac, which makes an exclusive laparoscopic approach challenging. On the other hand, some patients are found to have very dense adhesions, which makes laparoscopic approach unsafe, and almost impossible necessitating conversion from laparoscopic to open surgery. This has led to the birth of what is known as the Hybrid Technique for incisional hernia repair. The hybrid technique combines the conventional open and laparoscopic repairs and is being lately utilized in the treatment of many complicated cases of incisional hernias. Its main advantage is that it combines the safety of open surgery for adhesiolysis, the rapid post-operative recovery of laparoscopic surgery. It has been reported in large, complicated and recurrent incisional hernias [3-5]. To our knowledge, no previous reports utilizing the hybrid technique for repair of medium and small sized incisional hernias. Here in we present, 18 cases of incisional hernias with small, medium and large defects that were repaired at our institution using the hybrid technique. Currently, the indications of hybrid technique in mesh repair has not yet been established. We believe that it should not be only reserved for giant or majorly complicated incisional hernias, but should also be applied for medium and small defects as well.

Materials and methods

Between November 2007 to July 2015, we performed eighteen hybrid incisional hernia repairs at Saint Georges Hospital University Medical Center, Beirut, Lebanon. After obtaining informed consent from all individual participants included in the study and getting the approval of the ethics committee, the medical records of these patients were retrospectively reviewed for risk factors for hernia development, previous surgery, incision site, Body mass index (BMI), size of defect, type of mesh that was used, and size of mesh, operative time, hospital stay and postoperative complications.

Techniques Two hybrid techniques were used, open first completed by laparoscopic approach and laparoscopic first completed by open approach. 13 patients underwent the first technique and 5 patients underwent the second. The two hybrid techniques are described below.

First technique: Open first completed by laparoscopic approach

Patients under general anesthesia, supine position, Foley catheter inserted, antibiotic prophylaxis given, scrubbing and draping. A midline small or mini laparotomy was performed over the noted defect, entry to the abdomen achieved through the hernia sac. Lysis of adhesions and sac excision was done. Double-layered synthetic mesh was inserted through the incision, application of four quadrant sutures using the laparoscopic suture passer to ensure adequate mesh spread. Insertion of 3 x 5mm trocars under direct vision lateral to the lateral borders of the mesh, primary closure of the defect using non-

absorbable monofilament 1-0 sized sutures. Then converting to laparoscopic phase of the procedure where pneumoperitoneum was established using the previously inserted trocars, and using a 5mm 30 degrees angled laparoscope and non-absorbable metallic tacks the mesh was circumferentially fixated to the abdominal wall spaced 3 to 4 cm apart. Disinflation, extraction of the trocars and closure of the skin incisions done using skin staplers without drain placement.

Second technique: Laparoscopic first completed by open approach

Patients under general anesthesia, supine position, Foley catheter inserted, antibiotic prophylaxis given, scrubbing and draping. Entry to the abdomen away from the defect by either open technique or under vision trocar. Pneumoperitoneum, 2 additional trocars inserted under direct vision. Inspection of the hernia defect site which will lead to a more accurate positioning of the laparotomy wound. Lysis of fine adhesions done laparoscopically. This was followed by the open phase of the procedure for safe adhesiolysis of dense adhesions through a mini or small laparotomy. Insertion of the appropriate sized double layered synthetic mesh and its extension was ensured by 4 quadrant sutures using the suture passer, primary closure of the defect was done using non absorbable monofilament 1-0 sized sutures. Reconverting to laparoscopy and fixation of the mesh circumferentially to the abdominal wall using a non absorbable metallic tacks. Disinflation, extraction of the trocars and closure of the skin using skin stapler without drain placement.

Results

A total of 18 patients underwent the hybrid technique for repair of their incisional hernias. One type of mesh was used (double-layered synthetic) with adequate different sizes in order to reach at least 5cm from the defect edge. All patients received antibiotics prophylaxis (ceftizoxime 1g 30 min before the incision) and 3 more doses post operatively as a protocol used at our institution, anticoagulation prophylaxis for the two weeks following the procedure. Patients were instructed to wear an abdominal belt for one month and avoid heavy lifting for one month post-surgery. Thirteen patients underwent the first technique and five patients the second. There were 5 males and 13 females, mean age was 59.4 years, mean BMI was 27.17 kg/m^2. Mean defect size was 13 x 6.3 cm, the mean mesh size was 26 x 18.5 cm. The mean hospital stay was 4 days. Patients' age, gender risk factors for hernia development, incision site, BMI, and defect size are listed in table 1. The technique used along with the operative time, size of mesh used, hospital stay and the post-operative complications are listed in table 2. No surgical site infection, mesh infection, or seroma formation was detected. Morbidity was 11.11 percent including one Clostridium Difficile colitis and one prolonged ileus. At a mean follow up of 25 months, no hernia recurrences has been detected.

Table 1: summary of patient's characteristics

Table 1 (COPD: Chronic obstructive pulmonary disease, DM: Diabetes mellitus, VBG: Vertical banded gastroplasty, RYGB: Roux-en-Y gastric bypass, HTN: Hypertension, CAD: Coronary artery disease, TAHBSO: Total abdominal hysterectomy and bilateral salpingo-oophorectomy, PVD: Peripheral vascular disease, AAA: Abdominal aortic aneurysm)

Technique	Operative time (Min)	Mesh size (Cm)	Hospital stay (Days)	Complications
2	210	30x20	3	0
1	165	20x15	6	C-diff colitis
2	150	20x15	4	0
1	135	25x20	4	0
1	140	25x20	4	0
1	90	15x10	2	0
1	105	30x20	3	0
1	105	37x28	4	0
1	115	30x20	4	0
1	135	25x20	4	0
1	95	30x20	6	0
2	145	30x20	4	0
1	100	20x15	2	0
1	90	20x15	4	0
2	160	30x20	5	0
1	140	20x15	5	0
2	90	30x20	4	0
1	125	30x20	9	Prolonged ileus

Table 2: summary of operative course

Age (Years)	Sex	Risk factors	Previous operations	Incision site	BMI (Kg/m2)	Defect size (CM)
53	M	COPD, DM, wound infection	Open VBG, open RYGB	Supra-umbilical midline laparotomy	32.1	18x8
56	M	HTN, smoker	Umbilical hernia repair	Infra-umbilical smiling incision	28.7	9x4
71	F	CAD	TAHBSO	Infra-umbilical midline laparotomy	25.06	8x5
34	F	Wound infection	Open RYGB	Supra-umbilical midline laparotomy	25.2	12x7
79	F	PVD, HTN	hysterectomy	Midline laparotomy	26.8	13x8
53	F	smoker	Left oophorectomy	Infra-umbilical midline laparotomy	19.7	5x2
48	F	Urgent laparotomy for colonic perforation, wound infection	Right hemi-colectomy	Midline laparotomy	20.2	16x7
76	M	Heavy smoker	AAA repair	Midline laparotomy	26.8	21x8
74	F	Colon cancer, chemotherapy	Left hemi-colectomy	Midline laparotomy	27.3	17x7
48	F	HTN	Hysterectomy, enterectomy	Midline laparotomy	24.2	15x6
61	F	HTN, DM	Hysterectomy, left oophorectomy	Infra-umbilical midline laparotomy	35.1	18x8
55	F	Smoker, colon cancer, chemotherapy	Low anterior resection	Midline laparotomy	29.3	17x7
65	F	HTN	Cesarean section	Infra-umbilical midline laparotomy	25.2	9x5
75	F	Small bowel adenocarcinoma, chemotherapy	Laparoscopic small bowel resection	Supra-umbilical midline laparotomy	26.8	8x4
73	F	Smoker, uterine cancer, chemotherapy	TAHBSO, umbilical hernia	Midline laparotomy	35.4	16x8
65	F	Smoker, HTN	Cesarean section	Infra-umbilical midline laparotomy	31.6	10x4
42	M	Colon cancer, chemotherapy	Left hemi-colectomy	Midline laparotomy	25.4	18x7
42	M	Urgent laparotomy x2, wound infection	Small bowel resection, exploratory laparotomy for bleeding	Midline laparotomy	24.3	19x8

Discussion

Incisional hernia is one of the most common complications post laparotomies [1, 2]. Its incidence is related to many factors including type of surgery, the method used to close the abdomen, patients' age, BMI, and comorbidities [6,7] and whether there were or not a wound infection or other wound complications [2]. Laparoscopic incisional hernia repair is gaining more and more popularity due to many advantages that has been reported including less pain when compared to open surgery, shorter hospital stay, quicker return to daily activities, ability to determine the presence of other defects in the abdominal wall [8,9], and low risk of recurrence [10-12]. However, many incisional hernias could not be completed by the laparoscopic approach due to

very large hernia defect or dense adhesions and conversion to open technique is inevitable especially as reported for large complicated incisional hernias [13]. The hybrid technique combining both the open and laparoscopic approaches is in our opinion the best method to benefit from the advantages of both techniques in the matter of safe adhesiolysis and fascia approximation of the open approach and the outcomes of mini-invasive procedures post-operatively including postoperative pain, recovery and hospital stay. The second technique, laparoscopic completed by open, was used in all obese patients (BMI greater or equal to 30 kg/m2) and in one patient with BMI of 28.7 Kg/m2 but with centrally distributed fat. By this, the size of the wound in this population will be limited and hence decreasing the risks of wound complication.

Despite the small population in our series the results were comparable to the laparoscopic approach concerning the surgical site infection, seroma, recurrence (0% vs 2.7%, 4.2%, 4.4% respectively) and the duration of hospital stay (4.27 days vs 4 days) [14]. In addition, our series is the first reported series with small, medium sized and large defects which are non-recurrent with no previous mesh placed. All the skin incisions were up to 10 cm. All the patients that underwent the hybrid repair benefited from the avoidance of creating larger incisions, large skin flaps, and safer adhesiolysis.

In our opinion, the hybrid technique for incisional hernia repair is a safe method to be used in patients with small, medium sized and large defects. Awaiting attempts to identify the characteristics of patients undergoing the hybrid repair, whether starting by the open or laparoscopic phase is to be decided based on the patients' history and surgeon's preference.

Conclusion:

Hybrid technique is an emerging method used in the repair of incisional hernia. It has been repeatedly reported in the repair of large and complicated hernia defects. However, its role in the treatment of small and medium sized defects was not yet been reported. We presented a series of patients with small, medium sized and large defects hernias where hybrid technique was safely used with minimal complications. In our opinion, this is an additional step in directing the management of incisional hernias. It combines the advantages of both open and laparoscopic repair but it is demanding in respect to surgical skills and cost effectiveness. Data is still lacking to establish clear indications for its use and it is kept as an operator's decision based on a case-by-case analysis. Further retrospective studies are needed in order to establish the guidelines for its use.

Conflict of interest FAF declares no conflict of interest, ES declares no conflict of interest, ZER declares no conflict of interest
Funding No funding was obtained for this article

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