Original Research Article

Laparoscopic ventral hernia repair with tacker only mesh fixation: single centre experience

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ABSTRACT

Background: Abdominal wall or ventral hernias are common surgical problem in day to day surgical practice. With the time repair of abdominal wall hernia through laparoscopic route becoming more acceptable and popular but still there is wide variation in the way we are fixing the mesh to the abdominal wall. Tacker is one of the commonest and most convenient way, used now a day for fixation of mesh. Aim of this study is to find the result in respect of surgical outcome of laparoscopic ventral hernia repair using only tack for mesh fixation.

Methods: For this retrospective observational study, data in respect of all laparoscopic ventral hernia repair performed with tacker only mesh fixation, as an elective case during the period from 15 October 2013 to 15 February 2016 has been collected and analysed.

Results: Out of total number of thirty-six patients (n=36), 27 were female and 09 were male (F: M = 4:1) with mean age of 42.61±13.47, 19.44% was having co-morbid illness and 55.55% was a case of post-surgery incisional hernia. Mean operative time was around 79 minutes and mean post-operative hospital stay was 2.9 days. In 13.88% of cases seromas, in 08.33% cases prolonged pain and 02.77% of cases recurrence was reported.

Conclusions: Laparoscopic ventral hernia repair with tacker only mesh fixation is safe and convenient way for treatment of abdominal wall hernia and its results in respect of surgical outcomes and recurrences are comparable to any other method of ventral hernias surgery.

Keywords: Laparoscopic ventral hernia repair, Mesh fixation, Tack fixation, Incisional hernia, Abdominal wall hernia

INTRODUCTION

Abdominal wall or ventral hernias are common surgical problem in day to day surgical practice. These are the hernias coming out through defects in the abdominal wall fascia and muscle through which intra-abdominal or pre-peritoneal contents protrudes out. It can be either spontaneous ventral hernias or as a consequence of past surgery involving incision of abdominal wall termed incisional abdominal wall hernias. According to anatomical location it can be upper abdominal epigastric,

umbilical, para-umbilical, lower abdominal and non-midline or rarely lateral. Most of the time abdominal wall hernia tends to originate out of the mid line probably through linea alba or weak mid line vertical scar.¹

Treatment for abdominal wall hernias are repair of abdominal wall defect which now a day always been preferred with some additional enforcement by mesh which has reduced the recurrence significantly. Till the year of 1992 these repair used to be done as an open surgical procedure only which was associated with lot of

morbidity like pain, wound infection etc. First time in 1992, Karl Leblanc reported the repair of abdominal wall ventral hernia by laparoscopic route.² Since then repair of ventral abdominal wall hernia by laparoscopic route has evolved rapidly and now this is well accepted and preferred approach for management of abdominal wall ventral hernia.³

Commonly practiced technique of mesh fixation in Laparoscopic ventral hernia repair (LVHR) is, fixation of mesh circumferentially with tacks and use of trans fascial stay sutures at the four corner of the graft. Majority of reports come up in favor of this traditional technique.^{4,5} But at the same time several studies have come up with the equally good result with tackler only fixation.^{6,7} The aim of our study is to further evaluate and analyze the result of tackler only fixation of mesh in LVHR at tertiary centre.

METHODS

For this retrospective observational study, data in respect of all the laparoscopic ventral hernia repair performed with tackler only mesh fixation, as an elective case in routine operation theatre of Lady Hardinge Medical College, New Delhi, India, during the period from 15 October 2013 to 15 February 2016 has been collected and analysed. All the data in respect of demographic and clinical profile e.g. - age, sex, weight, symptoms and its duration, comorbidity, past history of surgery; total duration of surgery (from making first incision to taking last suture), all intra and post-operative events e.g.- size and location of defect, intra and post-operative different complications, follow up period and reported recurrence screened and evaluated in detail.

Surgical techniques

All cases were done under general anaesthesia as an elective case at Lady hardinge Medical College and Smt. S.K. hospital, New Delhi, India. Only the patients who were medically fit in term of any associated medical co morbidities for e.g.- diabetes control, cessation of smoking, weight reduction etc. were taken for surgery. Operative techniques were followed as per SAGES guideline and conventional standard protocols based on different recommended trials.^{8,9}

In all cases three ports, one camera 10-11 mm and two working port of 5mm has been used. Placement of ports depends on site of hernia. Rest of the steps were done as a normal conventional way. For adhesion lysis and dissection, we always used ultrasonic harmonic scalpel. Instead of closing the defect by approximating its margin, we pull the redundant sac and tack this to adjoining normal abdominal wall as this helps in reducing the dead space and preventing the post-operative seroma formation. As per protocol after thorough haemostasis we place the mesh according to the size of defect and which can overlap beyond 5 cm. of defect margin.¹⁰ After

taking care of placement covering defect area centrally, we fixed the mesh circumferentially by double crowning with non-absorbable titanium tack (Protack, Covidien). Our common practice is to place large cotton ball compression elastic pressure dressing over the large defect thinking to reduce post-operative seroma. Post-operatively for inspection of port site wound and hernial site, we removed the dressing of the wound after 48 hours.

RESULTS

During the said period from 15 October 2013 to 15 February 2016, we found total number of thirty-six cases (n=36), in which LVHR done with tack only fixation, eligible for study. Out of total thirty-six patients, as expected, female to male ratio were 4:1 with mean age of 42.61 years in range of 25-68 year of age and most of these patients were overweight. Summary of all the epidemiological parameters are depicted in Table 1.

Table.1 Epidemiological parameters and important time durations for patients

Parameters	Range	Mean	Std. deviation (SD)
Age (in years)	25 - 68	42.61	13.47
Sex (n = 36)	Male = 09 (25%) and female = 27 (75%)		
Weight (in kg.)	49 - 98	68.80	12.02
Duration of post-operative Hospital stay (in days)	01 -14	2.91	2.39
Follow up period (in months)	01- 26	16.05	06.55

About 19.44% of patients were having pre-existing co-morbid illnesses, among which Diabetes type – II, Hypertension and Diabetes with Hypertension combined were more common and equally distributed in 16.66% of sample population. Rest 02.77% of sample population had Hypothyroidism as a co-morbid condition. A large percentage (55.55%) of the patients were of incisional hernia, among which commonest surgery was lower caesarean section (25%), next in order was Emergency exploratory laparotomy (11.11%) out of which 05.55% were done for appendicular perforation peritonitis and rest 02.77% each were operated for peptic ulcer perforation and ischaemic gangrene bowel perforation peritonitis. Further details in respect of co-morbid illness and past history of surgery is summarised in Table 2.

As mentioned above large percentage of abdominal hernia constituted of incisional variety and only 44.44% were of spontaneous variety which was mostly of para umbilical or umbilical variety. Most of the patients with spontaneous type hernia were obese. Clinically 61.11% of hernias were reducible and rest 38.88% were either non reducible (30.55%) or only partially reducible

(08.33%). All para umbilical and epigastric hernias were either non or partially reducible with presence of mild to moderate tenderness. As far as anatomical locations are concerned, majority (41.66%) belongs to lower abdomen, obviously as a result of more prevalence of gynaecological and obstetrics surgical interventions in female. All details related to hernia types and its presentations are shown in Table 3.

Table 2: Associated pre-operative co-morbid illness and Past H/O surgery.

co-morbid illness and past h/o surgery	Total (n =%)
Diabetes mellitus (DM)	2 (05.55%)
Hypertension (HTN)	2 (05.55%)
DM and HTN	2 (05.55%)
Hypothyroidism	1 (02.77%)
Lower caesarean section	9 (25%)
TAH	3 (08.33%)
Emm. appendectomy	2 (05.55%)
Emm. expl. laparotomy	4 (11.11%)
Laparoscopic cholecystectomy	1 (02.77%)
Laparoscopic oophorectomy	1 (02.77%)

Table 3: Presentations, types and anatomical location of hernia.

Presentation	Total number (n) and percentage (%)
Presentations	
Reducible	22 (61.11%)
Partially reducible	03 (08.33%)
Non-reducible	11 (30.55%)
Types	
Spontaneous hernia	16 (44.44%)
Incisional hernia	20 (55.55%)
Anatomical location	
Upper Abdomen	09 (25%)
Lower Abdomen	15 (41.66%)
Umbilical	04 (11.11%)
Para umbilical	07 (19.44%)
Both upper & Lower abdomen	01 (02.77%)

Mean duration of surgery was 79.16±23.09 minutes. Maximum time taken for surgery was 150 minutes and this was a case of incisional hernia with largest defect size (962 cm.) with past history of mid-line emergency laparotomy for ischemic gangrene bowel perforation peritonitis. This is the same patients in which abdominal wall cellulitis and skin gangrene in early post-operative period and later on in follow-up recurrence reported. This was the only recurrence (02.77%) reported in our series. Most common post-operative complication was seroma (13.88%) followed by prolonged pain (08.33%) and hematoma (05.55%). All the other peri-operative events, complications and other details are summarised in Table 4.

Table 4: Operative details including complications.

Peri-operative events	Average / range / % of total patients
Duration of surgery (in minutes)	79.16 (50-150); S.D. = 23.09
Defect size (in cm)-diameter - (vertical x horizontal)	26.36 ² (2 ² -96 ²); S.D. = 25.77 Smallest (2x1) cm. / Largest (12x8) cm.
Complications (n/%)	5 (13.88%)
Seroma	3 (08.33%)
Prolonged (>1 month) Pain	2 (05.55%)
Hematoma	1 (02.77%)
Cellulitis/skin necrosis	1 (02.77%)
Post-op Ileus recurrence	1 (02.77%)

Mean duration of post-operative hospital stay was 02.91±02.39 days, which was in range of 01-14 days. Maximum duration of hospital stay of fourteen days was of the patient in which post-operative abdominal wall cellulitis and skin necrosis developed. Next longest post-operative hospital stay was seven and six days, for one each patient who developed hematoma and large seroma respectively with evidence of associated inflammatory feature which required prolonged intravenous antibiotics and observation. Mean follow-up periods for patients were 16.05±06.55 months (range of 1-26 months). Only one patient was lost in follow-up after one month.

DISCUSSION

Use of tacker only mesh fixation for LVHR has always been a matter of huge debate as at one point few studies reported in favour of it but another studies result in unfavourable surgical outcome. Although sample size of our study is not much huge but respectable in number and most importantly it has been spread over long span of time period. As far as epidemiological profile of the sample population (mean age, weight of the patients and sex distributions) is concerned, it is quite obvious of the fact that it shows general trend as expected in any case series of abdominal wall ventral hernias.

Female to male sex ratio is 4:1, which is little higher in comparison to other reported series but here in India Females are comparatively more subjected to surgeries especially in respect of gynaecological and obstetrics interventions as well as in female, obesity is more rampant. Although further study is required to confirm these aspects. A little less than twenty percent of the patients found to have associated co-morbid illness which confirms the point that ventral hernias are more associated with general co-morbid condition of the patient.

More than fifty-five percent of patients were having incisional hernia and among these incisional hernias most

common surgery done in the past was LSCS followed by Emergency exploratory laparotomy for infective peritonitis and abdominal hysterectomy. Although incisional hernia as a consequence of exploratory laparotomy for infective peritonitis is not an exception but one must look at the reason for such a high rate of hernia in Post LSCS and TAH cases to prevent it in future.

In our studies most common anatomical location of hernia was at lower part of abdomen which is a common trend and probably owing to more prevalent gynaecological surgeries in women. Most of the hernias were reducible and non-tender and large percentage of hernias which were non-reducible and tender was of Para umbilical variety. This is the reason that's why para umbilical hernias are considered comparatively more risky and early surgery and repair is recommended for this to prevent complications.

Average time duration of surgery in our series were around 79 minutes which was little more than average operative time reported by another series.^{11,12} This may be due to particular case to case variations and individual surgeon's experience. But overall mean duration of post-operative hospital stay was here 02.91 days which is very well matched with other case series report.⁵ Smallest hernia defect size was 2x1cm while largest defect was of 12x8 cm size which was found in the male patient covering both upper and lower part of abdomen and was a result of surgery done for faecal peritonitis. This is the same patient in which cellulitis and skin necrosis developed in early post-operative period and recurrence happen at latter stage. This was the only patient in our series which has got recurrence.

The patient who got recurrence had largest defect size and higher rate of recurrences associated with larger defect size is reported in earlier series also.¹¹ Another factor worth mentioning here that how important is the reason for surgery, consequence of which incisional hernia develop. Rest of the post-operative complications were at par or even lower than results of other reported series.^{13,14} Prolonged seromas is considered one of the commonest post-operative complication followed by prolonged pain. In normal circumstances seromas are supposed to be resolved within ninety days of post-operative period.¹⁵

In many studies fixation with tacker is found to result in more chronic post-operative pain but in our series, 08.33% of patient complained little prolonged pain is below the average of other reported series and quite acceptable.¹⁶ There are many studies which reported so many complications associated with the use of tack for mesh fixation for e.g.- Tack site hernia, gall bladder or bowel perforation and even cardiac tamponade, but in our series no such complication occurs.¹⁷⁻²⁰ Post-operative ileus was also reported here in this series but only in

02.77% of cases, which was much less than other reported series.¹³

Riley KK et al. in their study titled suture versus tack fixation of mesh in laparoscopic umbilical hernia repair didn't find any differences in their result between suture and tack fixation of mesh for LVHR.²¹ Here, result of this study also didn't find any shortfall in surgical outcome of these tack only mesh fixation after comparing with result of any other case series reported earlier in respect of LVHR.^{22,23} At last, as reported earlier also, one thing is absolutely true that LVHR is a better way of repair for abdominal ventral hernia with less morbidity and recurrence in comparison to open technique.²

CONCLUSION

On the basis of our results of study it is now very well concluded that LVHR is as safe and better alternative in respect of surgical outcome, early recovery and rate of recurrences for treatment of ventral abdominal wall hernias. Surgical outcome and result of tack only fixation of mesh for repair of ventral hernia is as good as and comparable to any other techniques of mesh fixation.

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