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INCISIONAL HERNIA REPAIR – A CLINICAL STUDY OF 30 PATIENTS

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ABSTRACT

Background: Incisional hernia is defined as any abdominal wall gap with or without bulge in the area of a postoperative scar perceptible or palpable by clinical examination or imaging [1]. Surgical management of incisional hernias has evolved over the last century, but consensus is lacking.

Aims and objectives: This study aims to analyze the etiological factors of incisional hernia, modes of presentation, therapeutic modalities and the immediate postoperative complications.

Materials and methods: The study is a prospective study conducted at a tertiary care teaching hospital for over 18 months. Thirty patients were studied and followed up for immediate post-operative complications.

Observations and Results: Incisional hernia was found to occur more often in the 5th decade, females, and housewives, obese. The incidence was higher following gynecological operations, lower abdominal incisions, transverse incisions and when there was post-operative wound infection following the index surgery. Most patients noticed the incisional hernia only 1 to 3 years after the index surgery. A combination of mesh repair along with anatomical repair was carried out in 23 of the 30 patients, anatomical repair alone in 6 patients and one patient underwent laparoscopic mesh repair.

Conclusion: Incisional hernias occur more often in females as they are more likely to undergo lower abdominal surgeries. Mesh repair was deemed superior to anatomical repair alone as post-operative complications were lesser. Placement of suction drain played an important role in reducing the likelihood of post-operative wound complications. There were no recurrences during our follow up period, albeit a longer follow up is required to draw definitive conclusions.

Keywords: Incisional hernia, ventral hernia, post operative hernia, mesh repair

INTRODUCTION

Incisional hernia is defined as any abdominal wall gap with or without a bulge in the area of a postoperative scar perceptible or palpable by clinical examination or imaging [1]. Incisional hernia is an iatrogenic hernia. Incisional hernia occurs in 5-11% of patients subjected to abdominal operations [2, 3]. Incisional hernias can occur early or late following the index surgery (the surgery done following which the hernia developed). If left unattended they can progress to massive sizes and cause discomfort to the patient. In some cases may even lead to strangulation of abdominal contents. Even worse may incarcerate, obstruct, perforate or can cause skin necrosis. An important factor in the etiology of incisional hernia is the type of suture used to close the wound. Other factors are associated with development of incisional hernia like increasing age, female sex, obesity, chest infections, type of suture material used, operative technique and most important wound infection [2]. The treatment of

incisional hernia has evolved over the years. Starting from the days of anatomical repair to darning to patching to mesh repair. Now with the advent of laparoscopic technique of hernia repair, the treatment armory for incisional hernia has gained yet another dimension. This study tries to assess the magnitude of the problem, analyze the various factors that lead to the development of incisional hernia. The study also aims to evolve a consensus regarding the best possible management options.

AIMS AND OBJECTIVES

This study aims to analyze the etiological factors of incisional hernia, identify and ascertain various modes of presentation, to study therapeutic modalities (anatomical repair and meshplasty) and the immediate postoperative complications.

MATERIAL AND METHODS

The study is a prospective study carried at Mahatma Gandhi Medical College & Research Institute, Puducherry, between, October 2010 and March 2012. A total number of 30 cases were studied and the follow up period varied from 2 months to 4 months. All patients with incisional hernias during the study period who underwent surgical treatment were included in the study. Those with other abdominal wall hernias and aged above 70 years were excluded. A detailed history and thorough clinical examination was carried out in all patients. All patients underwent routine blood and radiology investigations to obtain fitness for surgery. Ultrasound abdomen was done for all patients to determine the size of the hernia defect. All patients underwent either anatomical repair alone or mesh repair based on the size of defect. Patients who underwent mesh repair had a suction drain left in situ. Patients were followed up for immediate post-operative complications. Data was tabulated and analyzed for statistical significance using univariate and multivariate analysis.

OBSERVATIONS AND RESULTS

Of the 30 patients studied, the youngest patient was 25 and the oldest was 60 years old. The mean age was 43.63 years. The highest incidence was in 5th decade (P: 0.0000). There were 23 females (76.7%) and 7 males (23.3%) with a P value of 0.0035. 16 were housewives (P: 0.0000).

Thirteen patients (43.33%) complained of a lower midline swelling (P: 0.0002) [Table 2]. The mean duration of the swelling was 32.2 months. The smallest swelling was 2*2 cm and the largest 10*10 cm.

Twelve of the 30 patients studied were overweight, 6 had chronic cough and 4 were grade 1 obese, 4 had voiding difficulty and 3 had constipation. However, 8 had no risk factors and 7 had more than one risk factor (P: 0.0081).

Six patients (20%) had lower segment caesarian section (LSCS) previously, 4 (13.3%) LSCS + tubectomy, 4 (13.3%) total abdominal hysterectomy + bilateral salpingo-oophorectomy, 3 (10%) Tubectomy, 3 (10%) duodenal ulcer perforation closure, 2 (6.7%) laparotomy for peritonitis, and 1 (3.3%) each ovarian cystectomy, left nephrectomy, truncal vagotomy and gastro-jejunostomy , open cholecystectomy, open appendectomy, and unknown procedure (P: 0.3944). 60% had undergone obstetrics & gynecology operations . 63.3% of the patients underwent emergency surgery . 66.7% of the 30 patients had undergone 1 index surgery, 16.7% underwent 2, 13.3% had 3 and 3.3% underwent 4 previous surgeries .

Only one patient noticed the hernia within a year of the index surgery. However, 15 patients noticed it between 1-3 years, 4 patients between 3-5 years and 10 patients after 5 years. Sixteen patients had swelling that reduced on manipulation, 12 were spontaneously reducible, 1 was irreducible and 1 patient had no swelling (P: 0.0004]. 56.7% patients had enterocoeles on clinical examination, 40% omentocoeles and 1 patient could not be evaluated (P: 0.0012).

Of the 30 patients, 17 (56.7%) patients did not have any post-operative complications, 11 (36.7%) had wound infection and 2 (6.7%) had wound dehiscence.

Twenty-one (70%) patients had lower abdominal incisions in the index surgery and 9 (30%) had upper abdominal incisions (P: 0.0285) [Table 1]. Fourteen (46.7%) had midline infra-umbilical incision, 6 (20%) upper midline incisions, and 5 (16.7%) had right infra-umbilical incision, 2 (6.7%) left infra-umbilical incision, 2 (6.7%) left lumbar and 1 (3.3%) right supra-umbilical (P: 0.0003). Eighty percent patients had transverse incisions during their index surgery and 20% had vertical incisions (P: 0.0121) [Table 2].

Sixteen patients (53.3%) had hernia defect of size between 1-10 cm^2, 11 (36.7%) between 11 and 20 cm^2 and 3 (10%) 21-30 cm^2 (P: 0.0136). 73.3% patients had good abdominal muscle tone and 26.7% had poor muscle tone (P: 0.0106).

Twenty-three of the thirty patients underwent anatomical repair along with meshplasty (AR+MP), 6 (20 %) underwent only anatomical repair (AR) and 1 (3.3%) laparoscopic meshplasty (Lap MP). All 23 who underwent mesh repair had 1 suction drain placed after surgery. Fifteen (50%) of the thirty patients had spinal anesthesia (SA), 10 (33.3%) had general anesthesia (SA), 4 (13.3%) had spinal along with epidural anesthesia, 1 (3.3%) general anesthesia plus spinal.

Among the 30 patients, 17 (56.7%) had no post-operative complications, 8 (26.7%) developed seroma, 2 (6.7%) each had wound infection and dehiscence and 1 (3.3%) had serous discharge [Table 3]. Sutures were removed day 9.7 on an average among the patients studied. Average duration of hospital stay was 13.36 days. 29 patients followed up for at least 2 months and there were no recurrence. 1 patient was followed up for 6 weeks and had no recurrence

Table 1: Location of incision (Index Surgery)

Location of incision	No. of patients	%
Supra-umbilical	**9**	**30.0**
Infra-umbilical	21	70.0
Total	**30**	**100**
P value : 0.0285 {SIGNIFICANT}		

Table 2: Direction of incision (Index Surgery)

Location of incision	No. of patients	%
Transverse	**24**	**80.0**
Vertical	6	20.0
Total	**30**	**100**
P value : 0.0121 {SIGNIFICANT}		

Table 3: Post-operative complications

Complication	Number of patients	%
None	**17**	**56.7**
Seroma	8	26.7
Wound dehiscence	2	6.7
Wound infection	2	6.7
Serous discharge	1	3.3
Total	**30**	**100**

DISCUSSION

The peak age incidence of incisional hernia in our study was in the 5th decade. Age was found to be significant risk factor for incisional hernia by univariate analysis. Ellis et al in their study, reported a mean age of 49.4 years [4]. This was in

tune with our findings. Our study showed a female preponderance with male to female ratio of 1: 3.29. This could be because of laxity of abdominal muscles due to multiple pregnancies and increased number of lower abdominal incisions in females. Ellis et al reported an incidence of 64.6% female population in their study of 383 patients [4]. Harding [5] and Milbourn et al [6] in their series showed a male to female ratio 1:1.17 and 1:1.25 ratios respectively. All studies allude to the fact that incisional hernias were more common in women. We found that the incidence was highest among housewives. This finding may have been incidental, as most of our patients were women.

About 43% of our patients presented with lower midline swellings and this was significant. This is comparable with the results by Milbourn et al [6], and Carlson et al [7]. This may be because of the following features:

• Intra-abdominal hydrostatic pressure is higher in lower abdomen compared to upper abdomen in erect position i.e., 20 cm of water and 8 cm of water respectively.

• Absence of posterior rectus sheath below arcuate line.

• This incision is used for mostly gynecological surgeries in patients who have poor abdominal wall musculature.

In our study 40% patients who developed incisional hernia were overweight, 13 % were grade 1 obese, 20 % had chronic cough, 10% had constipation, 13% had voiding difficulty and 23% had more than one risk factor. Only 27% patients had no risk factors. Average BMI in our study was 24.172 kg/m2. This is comparable with results published by Cameron et al., in which obesity (33/110-30%), chronic obstructive pulmonary disease (COPD) (23/110 – 20.90%) and stricture urethra (10/110 – 9.09%) was reported [8].

Sixty percent of our patients underwent gynecological procedures (lower abdominal surgeries). This may be because most of these procedures were done through lower midline incisions. Ponka [9] in his study noted 36% incidence and Milbourn [6] noted 28.76% incidence among gynecological procedures. Our numbers show a significantly higher incidence of incisional hernia in patients undergoing gynecological surgeries.

Thirty three per cent of our patients had undergone more than one surgery prior to the development of incisional hernia. In another study [10], 10% had undergone more than one operation previously. This also happens to be one of the significant risk factors in our study, which can be compared with Ellis' [10] series (25%). Goligher [11] reported that repeated wounds in the same region or just parallel to each other will often lead to the development of hernia.

The incidence of incisional hernia was higher following emergency surgery. This could be attributed to the lack of pre-operative preparation, higher rates of wound infection and possibility of making larger incisions in an emergency situation. Similar claims have been made by two other studies [9, 12]. Wound infection following the index surgery puts the patients at increased risk for incisional hernia [12]. In our study 37% patients had wound infection and 7% had wound dehiscence following the index surgery.

In Akman's series more than 65% of the incisional hernias occurred within 1 year after index surgery [13]. However, we found that half our patients noticed the incisional hernia only 1 to 3 years after the index surgery and only one patient noticed it before a year following the index surgery. These patients may have developed the hernia earlier but had not noticed it till the swelling was of an appreciable size.

In our study 70% patients with incisional hernia had infra-umbilical incisions. It was found to be a significant factor leading to incisional hernia. Of the 21 patients who had infra-umbilical incisions, 14 had midline incisions. This was also a statistically significant risk factor for development of incisional hernia. Lower abdominal incisions are at higher risk for incisional hernias [5, 6 and 7].

Meta- analyses comparing the rate of incidence of hernia following vertical and transverse incisions have found no significant difference between the two [14]. However, 80% of our patients with incisional hernia had transverse skin incisions. We found it to be a significant risk factor. But, we could not assess whether they had muscle cutting or muscle splitting incisions. It may also be because most of these patients with transverse incisions had infra-umbilical incisions, and that lower abdominal incisions are more prone to develop incisional hernia, as the rectus sheath is deficient below the arcuate line and the abdominal muscles may have to be divided [15]. Midline line incisions are more likely to result in incisional hernias compared to paramedian incisions. Of the two types of incision, the lateral paramedian incision takes longer to perform, requires a longer incision, rarely results in dehiscence, and does confer protection against incisional hernia [16]. Even we found that lower midline incisions were more prone to developing incisional hernias.

In our study, 73% patients had good abdominal muscle tone and had no significant systemic examination findings. This was significant. It hints that the incisional hernias could develop as easily in patients with good muscle tone compared to the ones with poor tone. It highlights the thought that the development of incisional hernia is related to factors related to the index surgery rather than the tone of abdominal muscles.

In our study polypropylene mesh and the suture material of the same type was used to repair the incisional hernias and the technique of the repair was decided by the size of the hernia defect, abdominal muscle tone, whether hernia defect could be approximated without tension and general condition of the patient. The choice of anesthesia was based on the location of the swelling, general condition of the patient and preference of the patient.

More than half of our patients had no post-operative complications. However, seroma formation was seen in 8 patients, wound infection and dehiscence in 2 each. Seroma formation was observed 4 each in patients who underwent meshplasty and anatomical repair alike. Wound dehiscence in one each in the both groups and were treated appropriately. Lall P. et al [17] reported seroma formation in 6 out of 35 patients and wound infection in 1 out of 35 patients. The lesser rates of seroma formation could be attributed to placement of suction drain in all patients who underwent meshplasty.

In our study the follow-up period was variable, ranging between 6 weeks to 4 months, and no immediate recurrence. Usher [18] reported zero recurrence in 48 patients who were treated by polypropylene mesh repair. Usher et al [19] also reported a 10 year cumulative rate of recurrence of 63% in anatomical repair and 32% in mesh repair. Suture repair should only be performed when the fascial edges are suitable for suturing and come together without any tension. There should also be no risk factors for wound failure. The recurrence rate thus varies in different studies but all studies favor mesh repair to decrease the rate of recurrence. Recurrence rates with mesh repair are much lower than with suture repair[i]. Laparoscopic repair is as effective as open prosthetic repair and complications are less likely and hospital stay is shorter [19].

With thorough patient evaluation, pre-operative skin preparation, meticulous operative technique, use of non-absorbable sutures for musculo-aponeurotic tissue, use of suction drain, use of peri-operative broad spectrum antibiotics, early ambulation and chest physiotherapy, complication rates in our study were minimized. With prosthetic mesh, defects of any size can be repaired without tension. The polypropylene mesh, by inducing inflammatory response sets up scaffolding that in turn induces the synthesis of collagen. Thus the superiority of mesh repairs over anatomical repair. Recurrence rates with mesh repair are much lower than with suture repair. Mesh repair is the technique of choice for most incisional hernias [19].

CONCLUSIONS

Incisional hernia was the second most common hernia following inguinal hernia. It was found to more common in the 5th decade; in females and in housewives. Almost all patients presented with a swelling involving a post-operative scar and lower midline swellings were commonest. The incidence was higher following lower abdominal incisions and in patients who underwent gynecological operations as they mostly had transverse incisions. Wound infection following index surgery was the most important risk factor associated with incisional hernia. The other major risk factors were obesity, chronic cough, constipation and difficulty voiding urine. More patients had enterocoeles and majority of them were reducible. The size of the hernia defect was less than 10 cm^2 in over half the patients studied. The tone of abdominal muscles was good in about three quarters of the patients. Most patients underwent mesh repair. Spinal anesthesia was used in half the patients. Seroma formation was the commonest post-operative complication and occurred in about a quarter of our patients. However, more than half our patients had no post-operative complications. The use of suction drains was probably the reason for lower rates of seroma formation in patients who underwent mesh repair. The average duration of hospital stay in our patients was 13.36 days.

LIMITATIONS AND FURTHER RESEARCH

This study may not reflect all the aspects of incisional hernia including the treatment options as the series is small and follow up was for a short period in most of the cases. Also the details of index surgery, like what suture material was used, what technique was used to close the rectus sheath was not available as most patients had undergone their previous surgeries in other hospitals.

A randomized controlled study may be done to compare the outcomes of mesh repair and anatomical repair. Similarly a randomized controlled study may be carried out to judge the efficacy of suction drain tubes. A larger study spanning over longer time period is required to draw definitive conclusions.

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INFORMED CONSENT

An informed consent was sought from all the patients who were included in the study. The methodology of the study was explained to the patients individually in a language of their understanding. The patients were allowed to withdraw from the study at any point. The patients were also informed that the data collected from this study would be used for medical research and the material could be published, and they authors would take responsibility to protect the privacy of the patients. The format of the informed consent was approved by the institutional human ethics committee.

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