

A CLINICAL STUDY ON INCISIONAL HERNIA REPAIR AND ITS OUTCOME

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Abstract

Background: Incisional hernia is a common surgical problem, a common sequel of surgical interventions. It is the result of a failure of fascial tissues to heal and close following laparotomy. The aim is to study the following aspects of incisional hernia analyze various etiological factors responsible for causation, age and sex, clinical presentations, therapeutic modalities of treatment and immediate postoperative complications. **Materials and Methods:** It is Prospective study in 18 months in Department of surgery in Patients admitted with diagnosis of incisional hernia age between 30-60 years were considered for the study. **Result:** In 30 cases of incisional hernia (19.48%) was the 2nd most common hernia preceded by the inguinal hernia (69.48%). It was more common in females than in males with a ratio of approximately 6 : 1. Incidence of incisional hernia was highest in the age group ranging from 30-50 years. Most of the patients presented with swelling (73.3%) and swelling with pain (23.3%). Incisional hernia was more common in patients with previous history of gynaecological operations (56.6%). The incisional hernia was more common in the infraumbilical region (56.6%). In the majority of patients(82%), the incisional hernia occurred within 3 years of previous operation. Wound infection following previous surgery was the most important risk factor associated with wound failure. The other major risk factors were obesity and COPD. The size of the hernial defect less than 20sq cms was found in 19 patients (62.7%). 21 patients (70%) underwent mesh repair and 8 patients had post operative complications- wound infection being the commonest. Postoperative complications included wound infection (23.3%), seroma (16.5%) and wound dehiscence (9.9%). Respiratory complication was observed in 1 patient (3.3%). Postoperative complications were minimized by the use of closed suction drains. **Conclusion:** Mesh repair results in less post-operative complications for incisional hernia provided drains are used.

INTRODUCTION

Incisional hernia is a true iatrogenic hernia. Ian Aird defines it is a diffuse extrusion of peritoneum and abdominal contents through a weak scar of an operation or accidental wound. Based on statistics, incisional hernias account for 15% to 20% of all abdominal wall hernias. There are many factors associated with incisional hernia like age, sex, obesity, chest infections, type of suture material used and wound infection. All these present a challenging problem to the surgeon.^[1] Every year there are approximately 4 million abdominal operations are being performed and the reported incidence of incisional hernia following abdominal surgery ranges from 11-20%.^[2] Incisional hernia starts early after surgery, as a result of failure of the lines of closure of the abdominal wall following laparotomy. If left

untreated, they tend to attain large size and cause discomfort to the patient or may lead to strangulation of abdominal contents. Furthermore, an incisional hernia can incarcerate, obstruct, perforate or can cause skin necrosis, all of which markedly increase the risk to patient's life. These hernias' incidence is high even with recent advances in surgery, anaesthesiology, antibiotics, and suture materials used.

Laparoscopic repair has revolutionized the treatment of incisional hernia by reducing the morbidity and duration of hospital stay is also less. This study has been taken to assess the magnitude of this problem, various factors leading to the development of this condition, and the different modalities of treatment and its outcome.

MATERIALS AND METHODS

It is Prospective study done at GMC Guntur for one year duration from October 2022 to September 2023 in Department of surgery, Patients admitted with diagnosis of incisional hernia in Department of surgery, GUNTUR medical college, GUNTUR were considered for the study

Inclusion Criteria

Patients with age between 30-60 years admitted with diagnosis of incisional hernia in the Department of surgery, GUNTUR medical college, GUNTUR.

Exclusion Criteria

Loss due to follow-up.

Clearance from the institutional ethical committee was taken before starting the study. Total enumeration of all the patients who were diagnosed and admitted and were considered as participants in the study. Written informed consent was taken from the study participants before collecting the data. A detailed history of all patients was taken, and a thorough clinical examination was done as a very important step to determine the type and cause of hernia using a pre-tested, semi-structured questionnaire. All patients were analyzed in various aspects like age, sex, risk factors, mode of presentation, previous operation, and site of previous scar. Patients were also evaluated for other risk factors like obesity, HTN, DM, and malignant disease.

Routine investigations like Blood, Urine, CXR, and ECG were done. All the cases were operated with mesh repair either by open or laproscopic technique. The immediate postoperative complications were evaluated. Long term complications like recurrence, chronic infections and sinus tract formation were also evaluated.

Statistical Analysis: The data was collected and compiled in MS Excel. Descriptive statistics has been used to present the data. To analyse the data SPSS

(Version 26.0) was used. Significance level was fixed as 5% ($\alpha = 0.05$). Qualitative variables are expressed as frequency and percentages and Quantitative variables are expressed as Mean and Standard Deviation.

RESULTS

In this study out of 30 cases, it has been found that the incidence of incisional hernia is more common in females than males, and the overall M:F ratio is 1:6 (approx.). The incidence of incisional hernia is maximum in the age group of 30-50 years (60%). In this study, the youngest patient was 24 years and the oldest was 70 years.

In our study, 22 patients (73.3%) presented with only abdominal swelling, 7 patients (23.3%) presented with abdominal swelling and pain in the abdomen. One patient presented with pain in the abdomen as the chief complaint. [Table 1]

19 patients had hernial defect, which measured up to 5-10 cm. It is found that, 56.6% of patients had undergone gynaecological procedures. Among which Lower segment c-section was the most common operation followed by hysterectomy. The patients had previous operations using lower midline abdominal incisions in 56.6%. 16 patients had previous postoperative complications in the form of wound infection (10 patients) and wound dehiscence (4 patients). The other risk factors were obesity (10 patients), hypertension (4 patients). 14 patients had no complications following previous surgery. 6 patients (19.8%) presented with incisional hernia within 3 months of the previous surgery, 11 patients (36.3%) noticed swelling at the operated site within 3 months to one year of surgery. Nearly 82% of them developed incisional hernia within 3 years of surgery. Remaining 5 patients (16.5%) developed hernia after 3 years. [Table 2]

Table 1: Distribution of patients according to demographic details

Gender	No of cases	Percentage %
Male	04	13
Female	26	87
Age group		
11-20	0	0
21-30	5	16.6
31-40	9	30
41-50	9	30
51-60	5	16.6
61-70	2	6.66
Mode of presentation		
Swelling	22	73.3
Swelling and Pain	07	23.3
Pain	01	3.3

Table 2: Details of incisional hernia.

Size of the defect	No. of patients
Up to 5-10cm.	19
cm	07
>12 cm.	04
Mean	20 ±14.9
Name of the operation	

Hysterectomy	6
L.S.C.S.	9
Tubectomy	2
DU perforation closure	4
GJ + BTV	1
Exploratory laparotomy	2
Peritonitis	1
Appendectomy	1
Cholecystectomy	1
Nephrectomy	1
Miscellaneous	2
Previous Incision	No. of cases
Lower midline	17
Upper midline	5
Paramedian	4
McBurney	1
Transverse	2
Oblique lumbar	1
Risk factors	
Wound infection	10
Wound dehiscence	3
Postoperative Cough	4
Repeat surgery	3
Respiratory complications	1
No complications	14
Obesity	10
Diabetes Mellitus	1
Hypertension	4
Stricture Urethra	1
Duration since surgery	
0-3 months	6
3 months to 1 year	11
1-3 years	8
> 3 years	5

Table 3: Post-Operative Complications

Complications	No. of patients	Percentage
Wound infection	7	23.1
Wound dehiscence	3	10
Seroma	5	16.6
No complications	15	50
Expired	1	3.3
Respiratory complications	1	3.3
Recurrence	0	0

Table 4: Recurrence rate for the repair of incisional hernia

Author	Type of repair	No Of Cases	Recurrence	Percentage	Mortality
Rodney Maingot, ^[14]	Keel	115	5	4.3	Zero
Abrahamson, ^[11]	Shoelace	300	6	2.0	---
Adloff and Arnaud, ^[15]	Mersilene mesh (Intraperitoneal)	130	6	4.5	1.5%
Usher, ^[12]	Two Layer marlex mesh	96	10	10.4	

In our study, 7 patients had wound infection which was treated with antibiotics according to culture and sensitivity reports. 3 patients had wound dehiscence and were taken up for secondary suturing. 5 patients had seroma formation, which was treated by drainage and dressings. One patient who had postoperative cough was treated with antitussives, chest physiotherapy, and cough syrup. One patient expired due to associated renal failure. There was no surgery-related mortality in this study. [Table 3]

DISCUSSION

Incisional hernia is the second most common hernia among all the hernias operated in our institution (19.48%). The maximum age incidence of incisional

hernia in our study has been 30-50 years. Shankar Rao, Ramesh and George²⁹ in their study noticed a mean age of 49.4 years. The youngest patient in our study was 24 years and the oldest was 70 years. The sex incidence of incisional hernia among the 30 cases studied is 1:6 (M:F) approximately showing a female preponderance. This is because of the laxity of abdominal muscles due to multiple pregnancies and also an increased incidence of obesity in females. Shankar Rao, Ramesh and George,^[2] obtained an incidence of 64.6% female population in their study of 383 patients. J.B.Shah,^[3] studies and Goel and Dubey,^[4] series have male to female ratio 1:1.17 and 1:1.25 (M:F) ratios respectively. Almost all patients presented with abdominal swelling and pain (96.6%). Only 1 out of 30 patients (3.3%) presented with pain

as the only symptom. None of the patients presented with complications.

It is vertical, either above or below the umbilicus. Commonly used for exposure in a wide variety of intra-abdominal operations. No muscle fibres are divided. No nerves are injured. It is very easy to open and close, when speed is essential. It can also be extended and has the advantage of repeat surgery. Particularly useful in the presence of peritoneal contamination since, tissue exposure is minimized. Routinely done for appendectomy. It is an example of utilizing the muscle tension to achieve a secure wound closure. If further access is required in an upward or downward direction, muscles can be divided. Iliioinguinal nerve may be injured and cause incisional hernia.

A number of hernias have developed at the angle formed by a vertical midline incision followed by a subcostal incision. In our study, 56.6% of the incisional hernia occurred in midline infraumbilical incisions. Intraabdominal 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 the arcuate line. The incision used in gynaecological surgeries who have poor abdominal wall musculature. This is comparable with A.B.Thakore et al studies (67.1%) and Goel and Dubey studies (44.6%).^[4,5]

Over 56 % of cases occurred following gynaecological procedures (Hysterectomy, Tubectomy, Caesarean sections). This may be because most of these procedures were done through lower midline incisions. Ponka et al,^[6] in his study noted 36% incidence and Goel and Dubey,^[4] noted 28.76% incidence among gynaecological procedures. In considering the risk factors promoting incisional hernias, wound infection accounted for 33.3% in our study. The other risk factors observed were obesity (33.3%) and COPD (13.2%). This is comparable with that of Bose et al,^[7] studies in which wound infection (59 out of 110 patients-53.63%), obesity (33/110-30%), COPD (23/110 – 20.90%) and stricture urethra (10/110 – 9.09%). 3 patients (10%) had undergone more than one operation previously, which is also one of the risk factors in our study, which can be compared with Ponka,^[6] series (25%). Brenden Devlin,^[8] states that repeated wounds in the same region or just parallel to each other will often lead to the development of herniation.

In our study, 56.1% of patients developed incisional hernia within 1 year of previous surgery, 26.4% within 1-3 years and 16.5% after 3 years. Kim et al,^[9] incidence of incisional hernia after surgery has varied depending on study method 12% for major open abdominal surgeries and about 3% for major laparoscopic surgeries.

During the clinical examination in our study, 19 patients (63.3%) were found to have the hernial defect of up to 5-10 cm, and 4 patients had defects more than 12 cm. Thomas A.Santora et al,^[10] believes that the size of the fascial defect and the appearance

of the fascia should dictate the selection of the most appropriate method of hernia repair. Jack Abrahamson,^[11] believes that mesh repair is an excellent method of repair for large ventral abdominal hernias but has not specified the size of the defect. None of the patients required perioperative blood transfusion. 3 patients required preoperative preparation in the form of controlling skin infection, diabetic control and COPD management.

The initial step is to incising the old incision, mobilize the hernial sac, contents should be reduced, redundant peritoneum is excised and the sac is closed. Thinned out and redundant scar and fascia should be excised till healthy strong fascial margins. Wide flaps of skin and subcutaneous tissue should be dissected back from the wound margins in the suprafascial plane for a distance of 8-10 cms from the margin of the hernial aperture. The fascial margins are now tested for tension during approximation. If the margins of the hernia can be approximated without undue tension, then the technique of onlay reinforced primary repair is selected. If the margins of the hernia defect either cannot be approximated or can be brought together only with undue tension, then the technique of replacement of deficient tissue using a double layer graft repair are selected.

The peritoneum is closed after reduction of the viscera and excision of the redundant peritoneum and fascial scar. Wide dissection in the suprafascial plane is done and full-thickness flaps of skin and subcutaneous tissue is mobilized. With the fascial hernial aperture still open, a series of synthetic non-absorbable mattress suture are placed 1.5 cms apart, about 5-6 cms away from the fascial margin around the circumference of the hernia. The mattress sutures include the full thickness of the musculofascial abdominal wall but exclude the peritoneum. The suture ends are left long and collected in groups and held by the haemostats. The hernial defect is then closed with interrupted prolene (no.1 or '0') sutures. The knots are placed alternately on either side of the line of closure. The ends of these sutures are also left long. Polypropylene mesh is now cut to fit as an onlay, so that it is 1cm wider than previously placed mattress sutures all around the wound. The ends of the mattress sutures as well as the ends of the sutures used to close the hernia primarily are threaded on needles are then brought through the prosthesis tied and cut. One or more polyethylene suction drain tubes are placed over the surface of the mesh and brought out through stab wounds remote from the main incision. The wound is irrigated with antibiotic solution and complete haemostasis is achieved. The subcutaneous tissue is closed and the skin is closed. According to Larson and Vandertoll, onlay graft is not an ideal method for two reasons. First- the wound is repaired primarily with sutures often placed under excessive tension and subsequent application of this onlay mesh graft does little to relieve this tension. Second- since the hernia defect is already closed, it is both difficult and risky to place full-thickness sutures

through the mesh and fascial layer because of possible bowel injury. Therefore there is a tendency to place sutures too superficially.

With subfascial or intraperitoneal placement, it is anchored to a solid fascial rim by a series of mattress sutures placed along the length of the incision on one side, with no.1 polypropylene mattress sutures are placed about 3/4th of an inch back from the edge of the hernia. After all sutures are tied on one side, the mesh should be tailor-cut to bridge the defect, then another row of mattress sutures placed on the opposite side. The sutures are then pulled through by the assistant while each mattress suture is tied by the surgeon. The remaining anterior fascial layers may be closed if they meet, or they may be tackled down separately to the mesh. Redundant skin and excess subcutaneous tissue are excised to allow for snug closure. The suction drains are placed to prevent the collection of fluid in the wound. Skin is closed and pressure dressing is applied. Usher,^[12] has employed two modifications to guarantee better fixation of the mesh. In one method, he used two layers of mesh, internal and external to the fascial margin, and in the other he used a cuff of mesh on either side of the defect with subsequent imbrication of these cuffed layers. Usher has demonstrated that when this mesh is in contact with the musculofascial layers, there is satisfactory ingrowth of fibrous tissue that provides additional strength to the wound. The inlay technique seems to be the better technique in the repair of large midline incisional hernias with the use of a polypropylene mesh. Though it carries a high risk of complications and has a high reherniation rate.^[13]

The deep layer of the repair is located immediately extraperitoneal, but deep to the muscles and fascia of the abdominal wall. Prolene mesh is usually used for deep layer, but it has the disadvantage that its inflammatory response results in adhesions of intestines to the peritoneum adjacent to the prosthesis. If polypropylene mesh is used in this layer, the omentum should be interposed if possible between the intestine and peritoneum in the area of the hernia repair. If peritoneal closure cannot be accomplished, prolene mesh should not be placed permanently in direct contact with intestines. In this situation polylactic acid (vicryl) mesh can be used as a deep layer. Expanded PTFE mesh is less reactive and nonabsorbable, can also be used in the construction of the deep layer of the repair. The wide dissection in the suprafascial plane mobilizes the full thickness of skin and subcutaneous tissue for 8-10 cms from the margins of hernial aperture. The deep layer of the prosthesis is cut so that it will bridge the hernial aperture plus about 5-6 cmx on all margins. Mattress sutures are then placed about one cm from the free edge of the prosthesis. Both ends of the sutures are brought through the full thickness of the abdominal wall about 5cms from the hernial orifice. These sutures are placed one at a time, the prosthesis being repetitively inserted and partially removed to permit accurate placement of each suture. The second layer of prosthesis is cut to fit, the ends of the mattress

sutures are drawn through it, tied and cut. One or more closed suction drainage tubes are placed on the surface of the prosthesis and brought out through stab wounds remote from the main incision. Any redundant skin and subcutaneous fat are excised. Haemostasis is achieved. The subcutaneous tissue and skin are closed. Pressure dressing is applied.

In our study, polypropylene mesh and the suture material of the same type was used to repair the incisional hernias, and the technique of repair was based on the size of hernia defect, abdominal muscle tone, whether hernial defect could be approximated without tension and general condition of the patient. All 30 patients were treated with polypropylene mesh repair after primary closure. Incidental surgeries were performed in 2 patients; appendectomy in 1 patient and TAH + BSO in another.

In our study, we had no recurrences, however the follow-up period was variable and short to comment upon. Usher,^[12] reported zero percent recurrence in 48 patients who were treated by polypropylene mesh repair. Jacobus W.A et al,^[16] reported a 10 year cumulative rate of recurrence of 63% in anatomical repair and 32% in mesh repair. The recurrence rate thus varies in different studies, but all studies favour mesh repair to decrease the recurrence rate. With thorough patient evaluation, preoperative preparation, meticulous operative technique, use of non-absorbable sutures for musculo-aponeurotic tissue, use of suction drain, use of peri-operative broad-spectrum antibiotics, nasogastric aspiration, 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 repair over suture repair can be accounted for.

CONCLUSION

The use of midline incision should be restricted to operations in which unlimited access to the abdominal cavity is necessary. Meticulous aseptic technique and careful closure of the abdominal wound is necessary to prevent incisional hernia. Proper preoperative preparation of the patients with high risk is an important factor in preventing recurrence of incisional hernia. Mesh repair results in less post-operative complications for incisional hernia provided drains are used.

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