

Study of Etiopathogenesis and Management of Incisional Hernia

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Abstract

Aim: The purpose of the present study was to analyze various etiological factors and to compare various surgical modalities based on size of incisional hernia.

Methods: The present study was conducted in the Department of Surgery, JLNMCH, Bhagalpur, Bihar, India for the period of eight months. Out of 200 cases of various types of hernias operated a total of 60 cases of incisional hernias were studied and followed for a period varied from 6 months to 8 months.

Results: During the period of our study, a total of 200 patients have been operated for various types of hernia, out of these 60 cases were incisional hernia. Inguinal hernia was most common type accounting for 45%, next common hernia was incisional hernia (30%) remaining rare type of hernias constituting 25% of total cases studied. Maximum number of cases in middle age group (30-60 yrs.) constituting 71.66 %.

Conclusion: Hence the incidence of the incisional hernia can be decreased by preventing these factors. Incidence of incisional hernia is more common in the age groups 30-50 years. Incidence of incisional hernia is more common in females especially due to abdominal wall weakness secondary to multiple pregnancies, increased number of caesarean sections and gynaecological surgeries.

Keywords: Incisional Hernia, Anatomical Repair, Mesh Repair, Etiological factors, Laparoscopic surgery

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Introduction

Incisional hernia is defined as any abdominal wall defect with or without swelling in the area of a postoperative scar palpable by clinical examination or imaging. [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] Unlike other abdominal wall hernias, which occur through anatomical

points of weakness, incisional hernias occur through a weakness at the site of abdominal wall closure. [3]

The postulated predisposing factors for incisional hernia are obesity, diabetes mellitus, steroids, smoking, sub-optimal surgical technique, old age, malnutrition, multiple laparotomies, chronic pulmonary disease, type of incision and closure including suture material used and the most important wound infection. [4] The

pressure in the lower abdomen is more than upper abdomen and the posterior rectus sheath is deficient below umbilicus, any stress and strain on lower abdomen predisposes to hernia formation. Among the various etiological factors responsible for incisional hernias, raised intra-abdominal pressure and post-operative wound infections were found to be most common causes. So, while planning surgery for the repair of incisional hernias utmost care should be taken in selecting the method of repair, suture material and Mesh used for preventing further recurrence. There are various methods used for repair of incisional hernias like anatomical repair, onlay mesh repair, laparoscopic repair etc. After Usher reported his experience with use of polypropylene suture, Prolene mesh, modern era of prosthetic hernia repair began in 1958 being widely used for wide defects in incisional hernias with considerably good results. [5,6] Laparoscopic techniques of hernia repair have revolutionised the treatment of incisional hernia repair by reducing the morbidity and less hospital stay. Advantages of laparoscopic incisional hernia repair are no re-incision, less painful, safe, speedy recovery and less recurrence. [7]

Furthermore, an incisional hernia can incarcerate, obstruct, perforate or can cause skin necrosis all of which markedly increase the risk to patient's life. Highest incidences of incisional hernia occur in the lower abdominal incisions, from where most of the gynaecological operations are being done. The posterior rectus sheath is deficient below the arcuate line and pressure in lower abdomen is more than upper abdomen and the stress and strain on the lower abdomen predispose for herniations. [8]

The purpose of the present study was to analyze various etiological factors, study the age and sex incidence, time of occurrence of incisional hernia following

various abdominal incision and to compare various surgical modalities based on size of incisional hernia.

Methods

The present study was conducted in the Department of Surgery, JLNMCH, Bhagalpur, Bihar, India for the period of eight months.

Out of 200 cases of various types of hernias operated a total of 60 cases of incisional hernias were studied and followed for a period varied from 6 months to 8 months. Patients of age 15 years and above of both sexes who presented with incisional hernia post abdominal surgery were included in this study. Age below 12 years and those presented with other hernias like inguinal/ventral hernias were excluded.

In this series patients admitted in surgical wards under all surgical units were examined to assess the abdominal wall defects, etiological and predisposing factors. A detailed case history and thorough clinical examination was done to determine the type and cause of hernia and necessary investigations were done according to proforma.

After detailed physical examination of patients, clinical diagnosis was established including the associated etiological and predisposing factors. A final decision was made regarding method of repair to be done individually for every case depending on the need of surgery. Fifty cases underwent surgery and patients were preoperatively prepared to be medically fit to withstand the surgery. All cases were evaluated to look for immediate and late postoperative complications. Data was analysed to find out predisposing factors, advantage of various operative techniques, complications developed, need of good post-operative care and outcome of the various operations done.

Statistical Analysis

The statistical analysis was done by using SPSS software version 10.0 was used. Data was analyzed descriptively and

tabulated using mean and standard deviation.

Results

Table 1: Incidence of Incisional Hernia

Type	No. of Cases	Percentage
Inguinal	90	45
Incisional	60	30
Femoral	15	7.5
Umbilical	10	5
Paraumbilical	13	6.5
Epigastric	12	6
Total	200	100

During the period of our study, a total of 200 patients have been operated for various types of hernia, out of these 60 cases were incisional hernia. Inguinal hernia was most common type accounting for 45%, next common hernia was incisional hernia (30%) remaining rare type of hernias constituting 25% of total cases studied. (Table 1)

Table 2: Age Wise Incidence of Incisional Hernia

Age	No. of Patients	Percentage
15-20	4	6.66
21-30	5	8.34
31-40	10	16.66
41-50	20	33.34
51-60	13	21.66
61-70	8	13.34
Total	60	100

Maximum number of cases in middle age group (30-60 yrs.) constituting 71.66 % (Table-2).

Table 3: Nature of Operation

Nature	Number of Cases	Percentage
Emergency	35	58.33
Elective	25	41.67
Total	60	100

Majority of patients who underwent emergency surgery developed incisional hernia. (Table 3)

Discussion

Incisional hernia (IH) is defined by the European hernia society as “any abdominal wall gap with or without a bulge in the area of postoperative scar perceptible or palpable by clinical examination or imaging”. [9] Incisional hernia occurs when the tissue structure and function is disturbed over a previous

surgical scar. Two main biological mechanisms are involved in the pathogenesis of IH: Primary fascial pathology and secondary wound failure over a surgical scar. The extra cellular molecular defect that develops after these two mechanisms leads to IH. [10]

The postulation that IH is developed as a result of multiple biological factors action is raised after the failure of reducing the incidence of IH by other non-biological measures. [11-13] There are some

procedures and interventions, used for prevention and management of IH that played a major role in reducing the incidence of IH and its recurrence: These include: Technique and suture material selected for closure of the abdominal incisions; the use of prosthetic repair of IH; the introduction of minimally invasive surgery for treating IH and control of wound infection and wound dehiscence. Selection of a slowly absorbable or non-absorbable mono filament suture material and increasing the ratio of SL to WL >4 significantly reduced the incidence of IH. [14,15]

The incidence of Incisional hernia in this study was 30% which was second only to inguinal hernia (59.5%). According to a study done by Mutwali et al [16] the incidence was 11 – 20% which was slightly lesser when compared to the present study. Incisional hernia is a common complication due to patient or wound related factors in spite of the good technique adopted by the surgeons.

In the present study incisional hernia occurred in 26% of cases in the first postoperative year, about 50% of cases occurred in 2nd to 4th postoperative year, 28% of cases developed incisional hernia after 4th postoperative year, compared with study done by Bucknell et al, [7] 42% patients of presented with incisional hernia 1-5 years after primary surgery and around 68% patients who had lower midline abdominal incisions developed incisional hernia followed by 18% patients with upper midline incision, 10% patients with right paramedian and 4% patients with left paramedian incisions. Similarly, Millbourn et al [17] and Carlson [18] also found that this type of hernia is common in females undergoing gynecological surgeries in which lower abdominal incisions are made. In this study 55% of the incisional hernia occurred over lower midline incisions this could be due to raised intra-abdominal hydrostatic pressure in lower abdomen compared to upper abdomen and

due to absence of posterior rectus sheath below arcuate line. This incision is commonly used in gynaecological surgeries where patients may already have poor abdominal wall musculature. In the present study Wound infection (20%) and wound dehiscence (30%) were found to be more common postoperative complications after previous abdominal surgeries. In several studies wound infection following surgery was the main factor for the development of incisional hernia. Out of 50 cases studied, 12 had complications, wound seroma is the most common complication accounting for 22% and is more common in Prolene mesh repair than anatomical repair.

Khaira H.S et al [19] reported seroma formation in 6 out of 35 patients and wound infection in 1 out of 35 patients. In a study done by Tulaskar et al [20] 9 cases (14%) had surgical site infection, 4 cases (6.25%) had seroma formation and 2 cases (3.1%) had wound gaping. In this study 4 methods were used for the repair of incisional hernia among which polypropylene mesh repair was used in 63% of patients, laparoscopic hernia repair (17%), double breasting method (12%) and anatomical repair (8%). In the present study there were no recurrences until some months of follow up.[21]

Conclusion

The main etiological factors identified for the occurrence of incisional hernia were wound related complications, faulty techniques, comorbid conditions. Hence the incidence of the incisional hernia can be decreased by preventing these factors. Incidence of incisional hernia is more common in the age groups 30-50 years. Incidence of incisional hernia is more common in females especially due to abdominal wall weakness secondary to multiple pregnancies, increased number of caesarean sections and gynaecological surgeries. Laparoscopic repair of incisional hernia is showing promising results and is being widely practiced nowadays. Sterile

aseptic technique and appropriate use of pre-operative antibiotics is necessary to reduce the occurrence of incisional hernia. Suction drains must be used in both anatomical and mesh repairs to reduce the postoperative complications like seroma, wound infection and wound gapping, thereby reducing the recurrence of incisional hernia. Mesh repair has less rate of recurrence when compared to anatomical repair; hence, mesh repair should be preferred over anatomical repair. Laparoscopic hernia repair should be the first line of treatment for recurrent incisional hernias.

References

1. Korenkov M, Paul A, Sauerland S, Neugebauer E, Arndt M, Chevrel JP, Corcione F, Fingerhut A, Flament JB, Kux M, Matzinger A. Classification and surgical treatment of incisional hernia. *Langenbeck's archives of surgery*. 2001 Feb;386(1):65-73.
2. Williams N, O'Connell PR, editors. *Bailey & Love's short practice of surgery*. CRC press. 2008 Jun 27.
3. Sanders DL, Kingsnorth AN. The modern management of incisional hernias. *BMJ*. 2012 May 9;344.
4. Anthony T, Bergen PC, Kim LT, Henderson M, Fahey T, Rege RV, Turnage RH. Factors affecting recurrence following incisional herniorrhaphy. *World journal of surgery*. 2000 Jan;24(1):95-101.
5. Dixon CF. Repair of incisional hernia. *Surg Gynecol Obstet*. 1929;48:700-1.
6. Usher FC. Hernia repair with knitted polypropylene mesh. *Surg Gynecol Obstet*. 1963;117:239-40.
7. 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 Mar 27;284(6320):931-3.
8. RH A, CN F. Use of pliable synthetic mesh in the repair of hernias and tissue defects. *Surgery, Gynecology & Obstetrics*. 1959 Feb 1;108(2):199-206.
9. Muysoms FE, Miserez M, Berrevoet F, Campanelli G, Champault GG, Chelala E, Dietz UA, Eker HH, El Nakadi I, Hauters P, Hidalgo Pascual M. Classification of primary and incisional abdominal wall hernias. *2009 Aug;13(4):407-14*.
10. Franz MG. The biology of hernia formation. *Surgical Clinics of North America*. 2008 Feb 1;88(1):1-5.
11. Sørensen LT, Hemmingsen UB, Kirkeby LT, Kallehave F, Jørgensen LN. Smoking is a risk factor for incisional hernia. *Archives of surgery*. 2005 Feb 1;140(2):119-23.
12. Bellón JM, Durán HJ. Biological factors involved in the genesis of incisional hernia. *Cirugía Española*. 2008 Jan 1;83(1):3-7.
13. Salameh JR, Talbott LM, May W, Gosheh B, Vig PJ, Mcdaniel DO. Role of biomarkers in incisional hernias. *The American surgeon*. 2007 Jun;73(6):561-7.
14. Jargon D, Friebe V, Hopt UT, Obermaier R. Risk factors and prevention of incisional hernia--what is evidence-based?. *Zentralblatt für Chirurgie*. 2008 Sep 1;133(5):453-7.
15. Albertsmeier M, Seiler CM, Fischer L, Baumann P, Hüsing J, Seidlmayer C, Franck A, Jauch KW, Knaebel HP, Büchler MW. Evaluation of the safety and efficacy of MonoMax® suture material for abdominal wall closure after primary midline laparotomy—a controlled prospective multicentre trial: ISSAAC [NCT005725079]. *Langenbeck's archives of surgery*. 2012 Mar;397(3):363-71.
16. Mutwali IM. Incisional hernia: Risk factors, incidence, pathogenesis, prevention and complications. *Sudan Medical Monitor*. 2014 Apr 1;9(2):81.
17. Millbourn D, Cengiz Y, Israelsson LA. Effect of stitch length on wound complications after closure of midline incisions: a randomized controlled

- trial. Archives of Surgery. 2009 Nov 16;144(11):1056-9.
18. Carlson MA. New developments in abdominal wall closure. Der Chirurg; Zeitschrift für Alle Gebiete der Operativen Medizen. 2000 Jul 1;71(7):743-53.
 19. Khaira HS, Lall P, Hunter B, et al. Repair of incisional hernias. J R Coll Surg Edinb. 2001;46 (1):39-43.
 20. Tulaskar N, Nichkaode P, Dasgupta S, et al. Clinical study and management of incisional hernia by onlay or preperitoneal mesh repair: a prospective study in rural set up. International Journal of Biomedical and Advance Research. 2013;4 (5):328-34.
 21. Balde A. K., S, D., C, K. K. B., K, B. A., M, B. T., F, H., M, S. D., & A, M. Alteration Perimetriques Glaucomateuses Au Depistage: Experience Du Cades/O Donka De Conakry. Journal of Medical Research and Health Sciences. 2022; 5(9): 2210–2220.