

STATISTICAL SIGNIFICANCE OF THREE INCISIONAL HERNIA FACTORS

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ABSTRACT

Objective: To find out statistical significance of wound infection, use of absorbable suture material and obesity in causation of incisional hernia.

Design: A case-control comparative study.

Place and Duration of Study: Combined Military Hospitals Rawalpindi and Peshawar from 01 Jan 2000 to 31 Dec 2002.

Subjects and Methods: In total 93 patients with incisional hernia were reviewed. A control group of 90 patients was also included in the study, which was operated during the same period who did not develop incisional hernia but had similar selection criteria otherwise. Patients of study group having post operative wound infection, in whom absorbable suture material was used and who were obese were cross tabulated with patients of control group having no incisional hernia, to identify statistically significant variables between these groups by calculating P value for these three factors. P value of < 0.01 was considered highly significant, P-value 0.05 as significant and P-value of >0.05 as insignificant or equivocal.

Results: Out of 93 patients who developed incisional hernia 35 (37.6%) had postoperative wound infection. In control group 7 (7.8%) patients, out of 90 had post operative wound infection. The P value for post operative wound infection was < 0.01 . It was statistically highly significant. In Study group chromic catgut, which is an absorbable suture, was used in 59 (63.4%) cases. Where as in control group chromic catgut was used in 10 (11.1%) patients and prolene was used in 80 (88.9%) patients. The P value for use of non absorbable suture material was < 0.01 . It was statistically highly significant. There were 14 (15.05%) patients who were obese (weight more than 20% of the ideal weight) in the study group where as in control group 5 (5.6%) patients were overweight. The P value for obesity was >0.05 . Its statistical significance was equivocal.

Conclusion: Our study has shown that out of three incisional hernia factors under study, the wound infection and absorbable suture material were statistically most important factors. (P-value <0.01) and obesity was statistically insignificant (P-value >0.05).

Keywords: Incisional hernia, wound infection, absorbable suture material, obesity.

INTRODUCTION

Hernia is one of the oldest afflictions of mankind. The word itself originates from the Greek word 'Hernios' which means branch or off shoot. A protrusion of any viscus from its

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proper cavity is called a hernia (Sir Astley Cooper 1804)

Incisional hernia occurs through the scar from a previous operation. Most are wide necked but strangulation can occur [1-5]. Incisional hernia is a truly iatrogenic condition. It causes great distress to the patients and in most instances is perceived as

a failure of the treatment, if not an outcome, worse than the disease itself. It causes embarrassment and reflects directly on the surgeon's operative techniques [6-8]. Incisional hernia is the third most frequently diagnosed hernia after inguinal and para-umbilical varieties [9]. Incisional hernia represents a late failure of fascial healing, after a surgical incision. It may reasonably be thought of as a continuation of wound dehiscence [10]. Incisional hernias develop in 3.8-11.5% of cases after abdominal surgery [11,12]. Many factors, singly or in various combinations, may cause failure of the wound to heal satisfactorily and may lead to the development of a postoperative hernia. The two main causes listed in the past were poor surgical technique and sepsis [13]. The factors usually listed in the current literature include obesity, use of absorbable suture material, pregnancy, midline or other vertical abdominal incision, older age, general debility, malnutrition, postoperative coughing and straining. Ninety percent of incisional hernias occur within 3 years of operation [11].

Surgeons continue their clinical research to find out causes of incisional hernia and keep on trying to develop ways and means of preventing this iatrogenic disease.

This study was designed to find out statistical significance of wound infection, use of absorbable suture material and obesity in causation of incisional hernia in our setup.

PATIENTS AND METHODS

This is a case-control comparative hospital based study conducted between Jan 2000 to Dec 2002 at surgical departments of Combined Military Hospital Rawalpindi and Combined Military Hospital Peshawar.

Patients were identified by using hospital information system. The statistical departments keep the records of all admitted and operated patients. The operated patients on discharge are handed over a follow up proforma and discharge certificate with admission and discharge numbers written on

it. The follow up proforma contains information about type and procedure of operation and its follow up. The data was taken in retrospective manner i.e. case review was done. The medical record of previous abdominal operation of all the patients included in the study was obtained from statistical department of both hospitals by help of discharge slip and follow up proforma and medical record of the patients were reviewed and information recorded in a separate proforma. The proforma was developed after review of international literature to identify the important factors causing incisional hernia which included wound infection, type of suture material used and obesity. A total of 183 patients was included in the study. Out of these 183 patients, 93 patients had incisional hernia and remaining 90 patients were control group in the study who underwent abdominal surgery during same period but did not develop incisional hernia. The main components of the proforma included information related to the patient's age, sex, weight, height, obesity, site of defect and physical status according to American Society of Anesthesiologist. It also included information about type of operation, incision and use of absorbable or non absorbable suture material. Inclusion criteria included all the male and female patients between 20 to 60 yrs of age and having American Society of Anesthesiologist Score of I and II. Patients having American Society of Anesthesiologist Score III, IV, V and patients with ascities were excluded from the study.

Patients of study group having postoperative wound infection, in whom absorbable suture material was used and who were obese were cross tabulated with patients of control group having no incisional hernia, to identify the statistically significant variables between these groups of patients.

STATISTICAL ANALYSIS

SPSS ver-10.0 had been used to analyse the data. Chi-square test was used to compare the two groups. P-value < 0.01 was

considered as highly significant, P-value < 0.05 as significant and P-value > 0.05 as insignificant.

RESULTS

Out of 93 patients who had incisional hernia were reviewed, there were 60 (64.5%) female and 33 (35.5%) male patients. The mean age was 41.3 years (range 20-60 yrs). All were admitted electively. 60 (64.5%) patients were operated for Gynecological and obstetric problems and 33 (35.5%) had general surgical operations. The site of incisional hernia in study group was infraumbilical midline in 49 (52.7%) patients, In fraumbilical transverse in 33 (35.5%) patients Paramedian in 6 (6.5%), Right Subcostal 4 (4.3 %) and right iliac fossa 1 (1.1%). In patients, who had incisional hernia, midline incision was the commonest. In study group 35 (37.6%) patients had postoperative wound infection. In control group 7 (7.8%) patients had post operative wound infection. The P value for post operative wound infection was statistically highly significant (table-1). In patients who had developed Incisional hernia, the initial operation was clean in 49 (52%) patients, clean contaminated in 24 (25.8%) patients and contaminated in 20 (21.5%) patients. In clean cases intravenous Ampicillin and Cloxacillin 25mg/Kg of body weight each were used in divided doses for three days. Whereas in clean contaminated and contaminated cases intravenous gentacin and metronidazole were added along with above-mentioned antibiotics. This protocol was adopted in study group as well as control group. Similarly, aseptic technique was adopted in all cases to prevent infection. Out of 35 patients, who developed wound infection, 15 (42.9%) patients had localized abscess and needed opening up of surgical wound with drainage of pus, in addition to antibiotics. Intravenous co-amoxiclave 50mg/Kg of body weight was used in divided doses for three days followed by oral co-amoxiclave 50mg/Kg body weight for seven days. In remaining 20 (57.1%) patients, wound infection was not severe (cellulitis only) and

subsided with oral co-amoxiclave 50mg/Kg of body weight for three days and removal of skin stitches. 7 patients developed atelectasis post operatively, which resolved with steam inhalation and chest physiotherapy.

Out of 93 patients who developed incisional hernia, 20 (21.5%) patients were operated by consultants and 73 (78.5%) were operated by registrars. In control group the level of surgical expertise was almost similar. 22 (24.4%) were operated by consultants and 68 (75.6%) by registrars.

In Study group chromic catgut, which is an absorbable suture, was used in 59 (63.4%) cases. Where as in control group chromic catgut was used in 10 (11.1%) patients. The P value for use of non-absorbable suture material was 0.01 (table-2), which is statistically highly significant.

In patients who developed incisional hernia 14 (15.05 %) were obese (weight more than 20% of the ideal weight) where as in control group 5 (5.6%) patients were overweight. The P value for obesity was < 0.05 (table-3) which is statistically insignificant.

Out of 93 patients who developed incisional hernia, 4 (4.3%) patients developed abdominal distention post operatively which responded to conservative treatment consisting of nasogastric suction and correction of fluid and electrolyte balance. Similarly in control group 3 (3.3%) patients had abdominal distention, which also responded to conservative treatment.

DISCUSSION

Incisional hernia is a type of wound failure. It results in increased morbidity and in many cases another operation for the patient. Many factors are significant in causation of incisional hernia. By addressing these factors, incisional hernia can be prevented in some cases.

Incisional hernia appears to have a low incidence in our local population. During a period of three years 93 patients presented

Table-1: Postoperative wound infection.

	No. of Postoperative Wound Infection	No. with no Postoperative Wound Infection	P-value
Study group	35	58	< 0.01
Control group	7	83	

Table-2: Suture material.

	No. with Absorbable Suture Material	No. with Non Absorbable Suture Material	P-value
Study group	59	34	< 0.01
Control group	10	80	

Table-3: Obesity.

	No. of Obese	No. of Non Obese	P-value
Study group	14	79	< 0.05
Control group	05	85	

with incisional hernia in two major hospitals of Pakistan Army. Fifty-four patients reported at Combined Military Hospital Rawalpindi and 39 patients reported at Combined Military Hospital Peshawar because drainage population of Combined Military Hospital Rawalpindi is larger than Combined Military Hospital Peshawar. This is comparable to a study at Rawalpindi General Hospital where only 30 patients reported in two years time [14].

In our study male to female ratio was 1:2. A female preponderance in our study was noticed possibly because of increased number of gynecological and obstetric procedures. Mean age was (41.3) years in our study which is comparable to others local studies [14-16].

The operative procedure prior to development of incisional hernia was a clean operation in 49 patients, clean contaminated in 24 patients and contaminated in 20 patients. This is similar to another study carried out by Bhopal FG et al [14].

The incidence of post operative wound infection in cases who develop incisional hernia varies widely between 37% to 88% world wide [11,17]. In our study post operative wound infection was seen in 35 patient's i.e. (37.6%). Patients with wound infection developed hernia 4 times more often [18]. Afzal Khan [15] has reported 37.8% infection rate in his study.

In another study, the rate at which the abdominal wall incisions regain their tensile

strength was outlined. It was found that no tensile strength is regained within the first week after surgery, but there is rapid increase in tensile strength over the next 70 days, with recovery being 90% after one year. Suture support is required to avoid wound failure [19].

The choice of suture material is crucial, no matter which anatomic type of incision is made. In 59(63.4%) patients catgut was used. Clinical studies have shown that there is a high incidence of incisional hernia after abdominal wound closure with catgut [20].

In 1975, a controlled clinical trial was conducted by Goligher et al comparing wire sutures and catgut in the closure of 319 laparotomy incisions. The combined incidence of wound dehiscence and incisional hernia was 0.9% following closure with wire sutures, compared with 14% following layered catgut closure. The study also highlights the importance of use of non-absorbable sutures in addition to mass closure technique of entire musculo aponeurotic layer [21].

Obesity has been associated with three-fold increase in herniation [11]. Review of literature revealed that incidence of obesity in patients of incisional hernia varies from 18.6% to 60% in different studies [14,15]. In current study obesity was noticed in 14 patients (15.05%) which was not significant. Primary disease may have some influence on the occurrence of incisional hernia as in our

study, the predominant group had Gynecological/Obstetric operation (n ; 58) i.e. 62.4% which is comparable to Bhopal et al [14] with 60% cases of Gynaecology and Obstetric in their series.

Lower mid line incision was noted in 49 cases in our study. The present study also shows that lower midline incision is the single most common incision resulting in incisional hernia. The most probable cause in this group was the use of absorbable suture material for wound closure. These results are comparable to other local studies [14-16]. The absence of posterior rectus sheath below the point midway between umbilicus and pubic symphysis resulting in less secure wound closure may be another factor.

CONCLUSION

Incisional hernia is a multi factor wound complication. Few factors are preventable, at least in planned operations. Obese patients can be advised to reduce weight. Post operative wound infection can be prevented by adhering to aseptic technique, and surgeons should ensure use of non absorbable suture material for wound closure. Our study has shown that out of three incisional hernia factors under study, wound infection and absorbable suture material were statistically speaking, most important factors (P-value <0.01) and obesity was statistically insignificant (P-value > 0.05) but is an important factor as we know from other studies.

On the other hand there are factors involved in causation of incisional hernia which can't be controlled e.g. jaundice, ascites and poor nutritional state especially during emergency surgery.

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