



Factors Affecting Post Laparotomy Abdominal Wound Dehiscence: A Clinical Study

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Abstract

Of all the fallouts of abdominal surgery, abdominal wound dehiscence is a very serious complication both for patient and treating surgeon. Despite advances in perioperative care and suture materials, incidence and mortality rates in regard to abdominal wound dehiscence have not significantly change over the past decades. Postoperative wound problems leads to extra financial burden on patient and health system. It also leads to mental and emotional trauma to patient by delaying recovery and increasing hospital stay and producing lasting sequale. The treatment requires an array of extra investigations, aggressive management and meticulous nursing care, therefore its prevention is of utmost importance for both patients and surgeons. Considering the wide prevalence of the post laparotomy wound problems, the present study was done to find out the incidence of wound dehiscence after laparotomy, factors that influence its occurrence and guidelines for effective management of abdominal wound dehiscence.

Introduction

An abdominal wound may occur due to disruption in the anterior abdominal wall caused by either trauma¹ or any surgical intervention in order to gain access to the underlying pathology.² Of all the fallouts of abdominal surgery, dehiscence of abdominal wound is most notorious.³ It is a very serious complication both for patient and treating surgeon, resulting in morbid consequences and at times potentially dreadful outcome.⁴

Wound dehiscence is a life-threatening complication with the mortality rate up to 20%.^{5,6} Laparotomy wound dehiscence (LWD) is a term used to describe separation of the layers of a

abdominal wall incision before complete healing has taken place.

Wound dehiscence has been noted to occur when a wound fails to gain sufficient strength to withstand stresses placed upon it. The separation may occur when overwhelming forces break sutures, when absorbable sutures dissolve too quickly or when tight sutures cut through tissues. The treatment of wound evisceration may be dual: conservative or surgical treatment. The latter is the most common option with urgent repeated midline laparotomy and revision. In order to avoid and reduce the rate of wound dehiscence, the need of risk factors identification is mandatory. Despite

advances in perioperative care and suture materials, incidence and mortality rates in regard to abdominal wound dehiscence have not significantly changed over the past decades. This may be attributable to increasing incidences of risk factors within patient populations outweighs the benefits of technical achievements.

The wound healing may occur by primary intention (wounds with opposed edges) or by secondary intention occurs, whenever there is extensive loss of cells and tissue as occurs in infarction, inflammatory ulceration, abscess formation etc, resulting in a wider or broader scar. Factors affecting wound healing in laparotomy wound dehiscence and those leading to complications have been discussed by various previous studies but no clear consensus could be made. Many intraoperative measures have been over the time used by surgeons to reduce of causes of wound sepsis and failure like use of the good variety of gloves, use of drains, use of antibiotics – intralesional and intravenous, use of better and modified instruments alongwith diathermy (electrocautery) etc.

Factor influencing post laparotomy wound dehiscence can be broadly studied under 2 groups – Local and general factors. Local factors comprised of good surgical technique (judicious handling of tissues, meticulous hemostasis, dead space elimination and avoiding excessive diathermy usage), suitable suture material with acceptable knotting technique and adequate immobilization of wound. General factors included patient profile like age, sex, weight, nutritional status, immune status, chronic illnesses⁹ (like diabetes, jaundice, renal failure, malignancies) and social habits like smoking or alcohol addiction. Whether the patient is being operated electively or in emergency also affects the outcome.⁸ Factors hampering blood supply like infection, local hematoma, seroma and diabetes mellitus also leads to wound dehiscence. Patients who have infective (Acquired immunodeficiency syndrome) or therapeutic

(steroid's chemotherapy) immunosuppression have relatively poor wound healing.⁵

Aims and Objectives

Out study hence aimed

1. To study the incidence of abdominal wound dehiscence in our setup
2. To study various risk factors associated with abdominal wound dehiscence.
3. To formulate management guidelines for effective treatment of abdominal wound dehiscence.

Material and Methods

After obtaining approval from ethical committee, this prospective study was conducted on 100 patients who developed abdominal wound dehiscence after laparotomy in the Department of Surgery, JA Group of Hospitals and GR Medical College, Gwalior (MP) during 1 December 2015 to 30 November 2016 after getting well written informed consent from the patients.

These patients were followed up for a period of 6 months. All the patients with indication for laparotomy (emergency or elective) were included. Pediatric patients and patients developing dehiscence after second surgery were excluded. Ryle's tube insertion, urinary catheterization was done in all cases. Preoperative antibiotic were given and antidiabetic and anti-hypertensive precautions were taken as per medical advise. Preoperative shaving and local skin care with povidone iodine scrub was done. In elective cases, when indicated bowel preparation was done along with pre-operative enema preparation while in emergency cases, no bowel preparation was possible.

All patients were operated under general anaesthesia through midline incision. Saline wash was given in all cases. Drainage was done through separate incision in lumbar region. Layered closure of abdomen was done with absorbable or non-absorbable suture. Skin was approximated with nylon intermittent stitches.

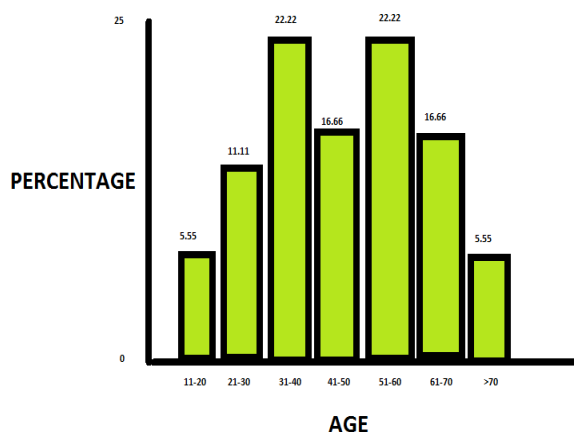
Postoperatively patient was given antibiotic according to need and early ambulation encouraged. Anterior abdominal wall wound was examined as 3rd, 7th and 10th postoperative day and sutures was removed on 10th postoperative day. All patients were followed up to 6 months.

Results and Discussion

In the present study the mean age of patients having post laparotomy wound dehiscence was 45.5 years. This mean age predilection could be due to maximum incidence of appendicular pathology and duodenal ulcer perforation in the said age group.

Approx. 39% of patients between age group of 41-60 years developed complication of wound dehiscence.

Graph 1: Incidence of Abdominal Wound Dehiscence in Different Age groups



The studies conducted by Garg Ramaneesh et al⁵ also suggested 41.6 years of mean age while studies done by Spiliotis⁶ suggested higher mean age of 69.5 years for development of post laparotomy wound complication.

Old age is associated with high incidence of wound failure due to possible malnutrition, impaired circulation, altered metabolism, chronic illnesses and loss of skin elasticity and muscle tone.

Out of 100 patients, 90% of patients had undergone emergency surgery while 10% had undergone elective surgery ($p < 0.001$, significant). Emergency surgeries was associated with more disturbances in internal milieu of patients, resulting in more complications.

Table 1: Effect of Emergency Surgery in Development of Abdominal Wound Dehiscence

| Type of Surgery | No of Cases | Percentage |
|-----------------|-------------|------------|
| Elective | 10 | 10 |
| Emergency | 90 | 90 |

Our study showed that abdominal wound dehiscence is more common in patients operated in emergency for peritonitis due to hollow viscus perforation, in which wound was contaminated and dirty (90%).

Table 2: Distribution of Patients with Abdominal wound Dehiscence according to Underlying Intra abdominal Pathology

| Diagnosis | No. of Cases |
|----------------------------|--------------|
| Hollow viscous perforation | 56 |
| Duodenal ulcer | 30 |
| Others | 26 |
| Appendicular perforaton | 17 |
| Intestinal obstruction | 15 |
| Malignancy | 9 |
| Others | 3 |
| Total | 100 |

It was clear that patients operated in emergency (90%) had significantly developed wound dehiscence in comparison to patients undergoing routine laparotomy (10%). Similar observation has been made by Penninckx et al¹¹ where the wound dehiscence rate was 6.7% in emergency laparotomy and 1.5% in elective cases. This fact may be due to poor patients preparation, complicated inflammatory disease, premorbid factors, compromised reserves of the patient and operating at odd hours.

In the present study males predominated the picture with the ratio of 3:1. Out of 100 cases, 75 cases (75%) were males and 25 cases (25%) were females ($p < 0.001$ significant).

Table 3: Gender Wise Distribution

| Gender | No of Cases | Percentage |
|--------|-------------|------------|
| Male | 75 | 75 |
| Female | 25 | 25 |

This male predominance may be due to the higher incidence of peptic ulceration and intestinal obstruction in male sex.

The rates shown in present study was higher in males than females is also explained by higher

incidence of smoking, alcoholism, malnutrition and associated medical illness. All 20 patients with poor nutritional status developed complication while 10(20%) out of 50 with good nutrition had complications. 10(67%) obese patients developed complications. Excess fat at wound site have poor perfusion and also fat necrosis secondary to diathermy leads to dehiscence. The studies conducted by Garg Ramaneesh et al⁵ and Spiliotis⁶ also found the male gender predominance for post laparotomy wound dehiscence.

Out of total 100 patients, 15 were found to be obese (BMI > 35). Obese patients are also associated with other co-morbid conditions like diabetes mellitus, hypertension, herniation etc which can lead to poor wound healing.¹⁰ Anaemia and hypoproteinemia are known to impair wound healing. Hypoproteinemia contributes to prolonged inflammatory phase by impairing fibroplasia and collagen synthesis, neoangiogenesis and wound remodelling.

In the present study out of 100 patients, the mean hospital stay was 20±5 days. About 88% of patients showed haemoglobin < 10gm%. Other risk factors in the study included, hypoalbuminemia, malnutrition, chronic lung diseases, old age, malignancy, obesity, emergency procedure and peritonitis with dirty surgical wounds. 1 patient died due to septic shock.

Other risk factors for the development of abdominal wound dehiscence included chronic cough, wound infection, poor surgical technique. Haley et al¹² shown that surgery duration, if persisting for more than 2 hours was also one of the significant risk predictor of postoperative wound dehiscence.

Abdominal drains were kept in 86 patients and in 14 patients drain was not kept. Jenkin et al¹³ depicted in his studies that fascial layers tend to lengthen as the wound distends where as suture length remains the same leading to breakage of suture, undoing of knot or a pulling through tissue.

Postoperative wound infection has found to be the single most common factor observed in 90% of the patients of our study as reason for post laparotomy wound dehiscence. It has also been suggested by various other studies^{14,15,16} that tensile, strength of staph aureus infected wound in rates on 6th postoperative day was much decreased.

Conclusion

Significant risk factors for the development of post operative abdominal wound dehiscence are: Patient factors like older age group, male sex, anaemia, malnutrition, obesity, patients with peritonitis due to bowel perforation, intestinal obstruction, those who have undergone operation in emergency and those who have undergone perforation closure, resection and anastomosis. Surgeon factors like midline incisions, improper suture technique and improper aseptic precautions which may lead to wound infection and then wound dehiscence. Postoperative abdominal wound dehiscence can be prevented by improving the nutritional status of the patient, strict aseptic precautions, improving patients respiratory pathology to avoid postoperative cough and by proper surgical technique.

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