



A PROSPECTIVE STUDY OF FACTORS AFFECTING POST LAPAROTOMY ABDOMINAL WOUND DEHISCENCE

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ABSTRACT

Background: Break in continuity of the skin with or without deeper tissues, following laparotomy, results in abdominal wound dehiscence. This study was done to evaluate the risk factors that lead to wound dehiscence in the postoperative period. **Aim-** this study was conducted to analyze various factors which are responsible for post-laparotomy wound dehiscence. **Material and Methods:** This was a prospective study done on 120 patients who developed wound dehiscence following laparotomy. The pre-operative investigations, intraoperative findings, and any postoperative complications were recorded in a specified Performa. **Results:** The highest incidence of wound dehiscence was found to be in patients of the second to a fourth decade, with male preponderance. patients were found to be malnourished cachexia (BMI < 22) and 99 patients were anemic. 86 (71.67) had low serum albumin, 16% had raised serum bilirubin and 4 patients were diabetics. Decreased renal function was found in 87 (72.5) patients.. In 54 (45%) of patients, laparotomy wounds were either contaminated or dirty. Post-operative nausea and vomiting were found in patients. **Conclusions:** Abdominal wound dehiscence after laparotomy is a surgical emergency with high morbidity and mortality leading to an escalation in hospital costs and prolonged illness. This complication can be avoided if the factors involved in wound dehiscence are properly addressed.

KEYWORDS : Wound dehiscence, Laparotomy, Peritonitis

Introduction

An abdominal wound may occur due to disruption in the anterior abdominal wall caused by either trauma [1] or any surgical intervention in order to gain access to the underlying pathology [2]. In the latter scenario, the incision thus made passes through various layers of the anterior abdominal wall from the skin, subcutaneous tissue, Linea alba, and peritoneum. This incision when made initiates a cascade of mechanisms at the cellular level, which aims at achieving healing at the incision site [3]. This healing may occur by primary intention (wounds with opposed edges) or by secondary intention (wounds with separated edges). Healing by secondary intention occurs whenever there is extensive loss of cells and tissue as occurs in infarction, inflammatory ulceration, abscess formation, etc. Whenever there is a hindrance in the normal cascade of the abdominal wound healing process, it results in the disruption of the abdominal wound which is also known as wound dehiscence. This abdominal wall disruption may be partial or complete. Partial disruption is when one or more layers have separated but the underlying sheath and peritoneum are intact. Complete disruption is when all the layers have been disrupted leading to viscous evisceration. The reported incidence continues to be 0.2% to 6% with an associated mortality of 9 to 44% [4]. Factors affecting wound healing in the abdominal wall and those leading to its disruption have been discussed by various previous reports but no clear consensus could be made. General patients profile like age, sex, nutritional status, a preoperative medical condition like anemia, diabetes, jaundice, renal failure, intra-operative knot breakage, suture material rupture or suture cut through, emergency or elective surgery, type and duration of surgery and Post-operative wound infection or increase in intra abdominal pressure are the various factors leading to abdominal wall dehiscence.

Material and methods

The study was conducted on 120 patients who developed abdominal wound dehiscence after laparotomy in the Department of Surgery, JA Group of Hospitals and GR Medical College, Gwalior (MP) from 1 December 2021 to 30 November 2022 after getting well-written informed consent from the patients. A detailed pre-operative clinical examination and investigations were done for patients who were candidates for undergoing laparotomy. Abdominal skin was prepared 2-3 hours prior to surgery and laparotomy was performed under general anesthesia, through a vertical midline incision. Laparotomy incision was closed using various techniques which depends on the operating surgeon with peritoneum and Linea alba in a using nonabsorbable continuous monofilament polypropylene number 1 and skin with interrupted nylon 2-0. The total duration of surgery from incision to closure of the wound was recorded.

In the postoperative period, a record was kept regarding the incidence of nausea, vomiting, urinary retention, cough, and abdominal distension on the 1st, 2nd, 4th, 7th, and 10th days. The wounds were dressed daily and inspected for any discharge. The presence of pus or discharge positive for bacteria on culture was considered as positive for infection. The total hospital stay, any events, and final outcome were also recorded. Those patients who developed wound dehiscence were included in the study and the factors contributing to wound dehiscence were analysed.

Results

In this study, the following results were observed:

1. Age/Sex: The highest incidence of wound dehiscence was found to be in patients of the second and fourth decade 59.17% (69/120). The mean age for wound dehiscence was 38.72 years.

Sex : 85% (102) were males whereas 15% (18) were females in our study

Table 1 shows age group in our study

Age Group		
Age distribution	Frequency	Percent
11-20	7	6
21-30	36	30
31-40	35	29.17
41-50	13	11.2
51-60	17	14.7
61-70	7	6
>70	5	4.3
Total	120	100

2. nutritional status 24.17% (29) of patients had more than equal to 22 BMI whereas 75.83% (91) of patients had <22 bmi.

3. Anaemia: In the present study, 21(17.5) patients were anaemic with Hb of less than 10g%. These patients were transfused blood pre-operatively. Intraoperative and postoperative blood transfusion was also given as and when required.

4. Hypoalbuminemia: 86 (71.67) of our patients had serum albumin levels of 3.0gm%.

5. Diabetes: Patients with fasting blood sugar >127 mg% or random sugar >140 mg% were considered diabetics. Only 38 (28.33%) of our wound dehiscence patients were diabetics. These patients were given management as per the physician. No mortality was observed among these patients.

6. Jaundice: Any patient with serum bilirubin >1.0mg% was considered jaundiced and considered indicative of hepatic dysfunction.

7. Renal Failure: 87(72.5%) of the total 120 patients with wound dehiscence, had raised blood urea levels (>45mg%). Levels ranged from 41 to 146 mg%, with a mean of 66.48 +/- 26.60. and 90 patients (70.5%) had serum creatinine levels >1.5mg %.

8. Wound contamination: In this study, 54 patients (45%) had contaminated or dirty wounds.

Table 2: Nature of wound

Wound		
Nature	Frequency	Percent
Clean	66	55
Clean Contaminated	54	45
Total	120	100

10. Duration of surgery: in our study encountered wound dehiscence in(90) 75% of emergency procedures cases were taking surgery time approximately more than equal to 1.5 hours whereas(30) 25% were taking surgery time less than 1.5 hours.

11. Tubercular association : (26) 21.67% were associated with previous tubercular treatment or having active disease whereas (94)78.33% were not having a tuberculosis association.

Active tubercular infection and tubercular association and previous infection lead to the poor immune status of the patient which leads to poor wound healing and further leads to wound dehiscence.

12. Hypertension :(34)28.33% were hypertensive and on medication as advised by the physician whereas (86)71.67% were non-hypertensive patients.

13. Emergency procedures :(107)89.17% were enrolled in

emergency whereas(13) 10.83% enrolled electively in our study.Our study shows emergency procedure leads to more cases of wound dehiscence as compared to a routine elective procedure.

14. Raised tlc status :(103) 85.83% were having more than or equal to 11,000 TLC showing active disease or inflammation status of the patients whereas (17)14.17 % were < than 11,000 TLC.It depicts that an increase in TLC count shows active inflammation status of pt which decreases the wound healing and further lead to wound dehiscence.

15.Early ambulation: (62)51.67% were having early ambulation whereas(58) 48.33% were not having early ambulation.It shows that pts ongoing early ambulation encounters decrease the incidence of wound dehiscence.

DISCUSSION

Abdominal wound dehiscence after laparotomy is a surgical emergency with high morbidity and mortality leading to an escalation in hospital costs and prolonged illness. The reported incidence of major abdominal wound disruption is 1-3% and is associated with a mortality rate of 15-20% [4]. Although several systemic factors, local mechanical factors, and post-operative events have been possible for abdominal wound dehiscence, yet there is no clarity on the importance of each of these factors. In this study, the highest incidence of wound dehiscence (39.5%) was recorded in the age group of 31-40 years, probably because of the higher incidence of acute abdomen in this decade. Our study showed no correlation between the increased incidence with the increasing age as was shown by Halasz et al., [5]. Our study showed male predominance (102/120) as was also recorded by studies of Keill et al., [6]and Penninckx et al., [7]. Of the total of 120 patients, 91 were found to be malnutrition (BMI<22) Obesity and malnutrition are associated with other co-morbid conditions like diabetes, hypertension, herniation, etc., which can all, contribute to poor wound strength and healing. In the present study, 99% of patients were anemic with Hb of less than 10g%. It has been depicted by earlier studies by Keill et al., [6] and Whipple et al., [9] that anemic people have poor wound healing and tend to have wound gaping. our 86 patients had serum albumin levels of 1.0mg%. As we know that the activity of collagen synthesis parallels the production of prolyl hydroxylase which is decreased in jaundiced patients thereby impairing healing capacity [13]. Impaired renal function was found in 87 of our 120 patients. A similar finding has been reported by studies by Ellis et al., also [14]. Pre-existing systemic illness contributes to higher ASA scores and higher wound dehiscence rates because of increased wound infection [15]. One of the significant findings is that all the 120 patients who had developed wound dehiscence had undergone laparotomy on an emergency basis. A similar observation has been made by Penninckx et al., [7], where wound dehiscence rate was found to be 6.7% in emergency laparotomy and 1.5% in elective cases. This fact may be attributed to poor patient preparation, complicated inflammatory disease, premorbid factors and operating at odd hours. Another characteristic feature of our study was that these laparotomy wounds were either contaminated or dirty in 88% of patients. Similar results were found in a study by Haley et al., [16], in which they showed contaminated/ dirty wounds to be an important predictor for wound infection. Our study showed that 20% (10/50) of our dehiscence patients had emergency laparotomy lasting for more than 2 hours. Haley et al. demonstrated that the duration of surgery of more than 2 hours was the second greatest independent predictor of risk after multivariate analysis. Post-operative nausea and vomiting (significant if is more than 2 times a day/requiring treatment). It has been proved by Jenkin et al., [17] in a study that facial layers tend to lengthen as the wound distends, whereas suture length remains the same leading to breakage of suture, undoing of knots, or pulling through tissue. Post-operative wound infection was found to be the single most

common factor observed in 90% of our patients as a cause of abdominal wound dehiscence. It has been shown by various other studies [14,18] that the tensile strength of staphylococcus aureus contaminated wounds in rats on the 6th postoperative day was much decreased. These infected wounds slowly break down and then heal by granulation tissue. All our patients had multiple risk factors contributing to wound dehiscence. The least number of risk factors recorded was 3 and the maximum number was 11, the same was also interpreted by Riou et al., [19].

REFERENCES

- [1] Thomas CL. Taber's Cyclopedic Medical Dictionary, 17th ed. Philadelphia: F.A. Davis Company. 1993: 2165.
- [2] Coleman DJ. Wounds, tissue repair, and scars. In: Bailey and Love's: Short Practice of Surgery, Russel RCG, Williams NS and Bulstrode CJK (eds). London: Arnold Publisher. London. 23rd ed. 2000; 29.
- [3] Ramzi S. Cotran, Vinay Kumar and Tucker Collins: Tissue repair; Cellular growth, Fibrosis, and wound healing. In: Robin's Pathologic Basis of Disease. USA: W.B. Saunders Co. 6th ed; 2001: 89.
- [4] Poole GV. Mechanical factors in abdominal wound closure. The prevention of fascial dehiscence. Surg. 1985; 97: 631-9
- [5] Halasz NA. Dehiscence of laparotomy wounds. Amer J Surg. 1968; 116:210-4
- [6] Keill RH, Keitzer WF, Nichols WK. Abdominal wound dehiscence. Arch Surg. 1973; 106: 573-7.
- [7] Penninckx FM, Poelmans SV, Kerremans RP Abdominal wound dehiscence in
- [8] Cruse PJE and Foord R. The epidemiology of wound infection: A 10 year prospective study of 62939 wounds. SurgClin North Am. 1980; 60:27
- [9] Whipple AO. The critical latent or lag period in the healing of wounds. Ann Surg. 1940; 112:481. [10] Pollack SV. Wound healing: A review III. Nutritional factors affecting wound healing. J Dermatology Surg Oncol. 1979; 5: 615.
- [11] Bybee JD and Rogers DE. The phagocytic activity of polymorphonuclear leukocytes obtained from patients with diabetes mellitus. J Lab Clin Med. 1964; 64: 1-13
- [12] Goodson WH III and Hunt TK. Wound healing and diabetic patient. Surg Gynecol Obstet. 1979; 149: 600-8.
- [13] Than T, McGee JO, Sokhi GS. Skin prolyl hydroxylase in patients with obstructive jaundice. Lancet. 1974; 2: 807-8.
- [14] Ellis H. Wound Healing. Annals of the Royal College of Surgeons of England. 1977; 59: 382-6.
- [15] Sawyer GS and Pruett LP Wound infection. Surgical clinics of North America. 1984; 74(3): 523. [16] Haley R, Culver DH, Morgan WM. Identifying patients at high risk of surgical wound infection. Am J Epidemiol. 1985; 121: 206
- [17] Jenkins TPN. The burst abdominal wound: A mechanical approach. Br J Surg. 1976; 63: 873-6. [18] Smith M and Enquist IF. A quantitative study of the impaired healing resulting from infection. Surggynecol Obstet. 1967; 125: 965-73. [19] Riou JP, Cohen JR and Johnson H. Factors influencing wound dehiscence. Am J Surg. 1992; 163: 324-30