



ABDOMINAL WOUND DEHISCENCE CAN WE PREDICT? A PROSPECTIVE STUDY

Ramlal Prajapati., Kalpesh Chaudhari and Monty Khajanchi

3/12 old Air India Colony, Kalina, Santacruz East, India

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ABSTRACT

Burst abdomen is the disruption of any or all layers in abdominal wound. Important risk factors for wound dehiscence are Jaundice, Sepsis, Hypoalbuminemia and Anemia. Complications include Infections, bleeding, incisional hernia, and intestinal fistula. As per our study Hypoalbuminemia and Sepsis were important factor responsible for wound dehiscence.

Key words:

Wound dehiscence, sepsis, hypoalbuminemia, jaundice.

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INTRODUCTION

Abdominal wound dehiscence is distressing both to the patient and treating surgeon. Many patients in India have poor nutritional status and presentation of patients with peritonitis is also delayed which makes problem of wound infection and dehiscence also more common. Burst abdomen is the disruption of any or all layers in abdominal wound. Prevalence rate of burst abdomen is as high as 10% to 30% for emergency cases and 0 to 5% for elective cases.(1,2) Major risk factors include age, anemia, jaundices, ascites, type of surgery, and wound infection. Patients with burst abdomen present with serosanguinous discharge from suture line in 23% to 84% patients.(3,4,5) Presence of fever, tachycardia, increase in number of dressings, giving way of skin suture, giving way of rectus sheath is a sign of impending burst.. Wound dehiscence is one of important factor responsible for long indoor stay. Our study also focused on post operative day of burst abdomen and also studied the incidence of re burst. Multivariate stepwise logistic regression test was used to identify risk factors of abdominal wound dehiscence. The ensuing regression coefficients for the major variables were used as their weights to calculate a risk score for abdominal wound dehiscence. Patient data confidentiality was maintained throughout the study.

Aim

To predict abdominal wound dehiscence in patients undergoing surgery in tertiary care center.

Objectives

1. To assess risk factor for abdominal wound dehiscence.
2. To assess outcomes of abdominal wound dehiscence.

MATERIALS AND METHODOLOGY

Study Design: Prospective observational study

Sample size: Sample size is 130.

Study Setting: Data collected from general surgery department of a tertiary public hospital (Seth G.S. Medical College and KEM Hospital, Parel, Mumbai).

Inclusion criteria: Emergency and elective abdominal surgeries done by midline/Para median/sub coastal incision done at KEM hospital will be included in this study. Laparoscopic surgeries which are converted to open are also included. Patients more than 18 years are included in the study.

Exclusion criteria: Abdominal wall surgery like elective herniorrhaphy, abdominal wall abscess, appendectomy done through McBurney's incision will be excluded. Laparoscopic surgeries in which incision is made to retrieve the specimen were excluded.

Variables

Data variables would be 1. Demographics:-Age, Sex 2. Co-morbidities:-Diabetes, cancer, hypertension, COPD, chronic steroid use. 3. Other pre-operative investigations :-Anemia (Hb < 10g/dl), hypo albuminaemia (serum albumin < 3.0 g/dl), jaundice (total bilirubin > 2.0 mg/dl) 4. Other conditions: - Sepsis, previous laparotomy (before 6 weeks), wound infection, uremia, ascites. 5. Surgery details: -emergency or

*Corresponding author: **Kalpesh Chaudhari**
3/12 old Air India Colony, Kalina, Santacruz East, India

elective, type of surgery (clean, clean contaminated, contaminated or dirty), incision taken, suture material used to close rectus sheath, suturing technique, closure performed by and organ involved in surgery.

Statistical analysis for the study

Patient with abdominal wound dehiscence were compared with those who did not have abdominal wound dehiscence, using various test such as Fischer exact test, unpaired t-test, chi square test and Mann-Whitney test. Each variable was divided into 2 groups of "wound dehiscence" and "No wound dehiscence". By applying the tests the significance of that variable was analyzed. This data is also depicted pictorially by bar charts.

DISCUSSION

Our study comprises to find out risk factors of wound dehiscence. Various patients' parameters like age, sex, co morbidities, lab investigations, type of surgery and their outcomes were assessed and there their results were compared with previous studies. In our study pre-operative low albumin and sepsis were two most important factors responsible for wound dehiscence. Hospital stay was also more for patients with wound dehiscence

1. **Age:** As per our study records age does not play any role in wound healing. Old age seems to have higher wound failure rate due to associated factors like malnutrition and atherosclerosis.
2. **Sex:** In our study, out of 72 males only 9 males developed wound dehiscence and out of 43 females only 6 females developed wound dehiscence. As per this study records there was no significance in incident of wound dehiscence in either of sex.
3. **Diabetes Mellitus:** In our study on 130 patients, only 7 were diabetic out of which only 1 developed wound dehiscence. In our study out of 7 diabetic patients only one patient had developed wound dehiscence. 6 out of 7 diabetic patients were operated on elective basis. These electively operated patients were well optimized prior to surgery. Their blood sugar level was properly controlled pre as well as post operatively. Hence due to proper control of blood sugar level, diabetic patients in our study did not develop wound dehiscence. In 2013 Endara (6) did study on seventy-nine patients with diabetes and found that rate of wound dehiscence was more in diabetic patients
4. **Chronic steroid uses:** Our study also did not show any role of steroids with wound dehiscence as in our study, steroid intake was done by only one patient.
5. **COPD:** COPD patients had chronic cough which post operatively raises intra-abdominal pressure leading to wound dehiscence. In our study there was no role of COPD on wound dehiscence. In our study there were only 3 COPD patients out of which one patient had wound dehiscence. No correlation was found as study included only 3 COPD patients.
6. **Malignancies:** Patients who received radiotherapy had poor wound healing due to decreased collagen. In our study there was no impact of malignancy on wound dehiscence.
7. **Hypertension:** In our study hypertension had no impact on wound dehiscence, this could be due to the fact that

hypertensive patients in our study were optimized and there blood pressure was well controlled prior to surgery. Hypertensive patients bleed more during surgery leading to hypoxia which leads to damage of tissues and affect wound healing.

8. **Jaundice:** Patients with hyperbilirubinemia have poor wound healing and increased risk of wound dehiscence. However in our study there was no significant role of jaundice in developing wound dehiscence. This difference might be due to impact of other variables in wound dehiscence patients. As per our study there was no role of jaundice on wound dehiscence. This is because the patients in our study had slow rise in the level of bilirubin.
9. **Hypoalbuminemia:** In our study of 130 patients, 17 patients had hypoalbuminemia out of which 8 patients developed wound dehiscence. From our study it indicates that wound dehiscence is commonly associated with low level of pre-operative serum albumin levels. Hence it is essential that pre-operative serum albumin to be more than 3.5 gm/dL. In 2001, Russel L (7) in his study found that low albumin and nutrition were important factor responsible for wound healing and wound dehiscence
10. **Uremia:** Clinically though rise in blood urea nitrogen increases chances of wound dehiscence, our study doesn't support uremia to be cause of wound dehiscence. Serum urea also inhibits growth of fibroblast.
11. **Anemia:** Nutritional anemia is directly related to wound healing. Our study did not show any co relation of wound dehiscence with anemia. Most of patients in our study had received blood transfusion intra operatively and post operatively so that the hemoglobin is corrected. Hence patients in our study did not develop wound dehiscence.
12. **Sepsis:** In 1997 Thornton FJ (8), in his study found that endotoxins and cytokines associated with sepsis induce nitric oxide synthesis both systemically and locally within colonic tissue. Hence patients with sepsis have poor wound healing and can pre dispose to wound dehiscence. Patients with sepsis have poor wound healing and can pre dispose to wound dehiscence. In our study it is clear that patients in sepsis had more chances of developing wound dehiscence.
13. **Ascites:** our study also did show any role of ascites with wound dehiscence which might be due to fact that patients in our study group might have had mild ascites. Ascites raises intra-abdominal pressure and can lead to wound dehiscence.
14. **Previous laparotomy:** As per our study there was no significance of previous laparotomy on wound dehiscence. This could be due to fact that patients in our study group might have been well optimized surgery.
15. **Timing of surgery:** As per this study there is not much significance in timing of surgery and wound dehiscence. This might be due to fact that patients operated on emergency basis were well optimized after the surgery by proper hydration and antibiotics. Electively operated patients have less chances of wound dehiscence as these patients are optimized prior

to surgery. While in emergency some patients are already in sepsis while operating which predispose them to wound dehiscence.

16. **Type of surgery:** As per our study the type of surgery did not have any impact on wound dehiscence. 3 patients were under category of dirty surgery, none of them developed wound dehiscence as all 3 patients did not have any co morbidities and they were 40 years of age. Usually dirty surgery has more chances of wound dehiscence. Wound dehiscence is more in contaminated and dirty surgery as sepsis play an important role in them. Our study did not show such any such co relation which could be due to fact that dirty surgeries in our study were only 3 in number and these patients also did not have other risk factors.
17. **Type of incision:** As per our study, type of incision did not have any impact on wound dehiscence. Anatomical factors which might make vertical upper abdominal wounds more likely to burst are the transverse arrangements of the fibers of the posterior rectus sheath, the elastic fibers of the skin, and the vascular supply of the abdominal wall. Movements of the thoracic cage also affect the upper abdomen more than the lower and here again coughing may be the most important factor. As per our study the type of incision did not play any role in wound dehiscence which might be due to fact that patients who had undergone midline incisions had less number of other risk factors.
18. **Suturing techniques:** In 2008, Gupta H(9) did meta-analysis on 23 studies on wound dehiscence and with study of 10,900 patients and found that the interrupted method of closure was associated with significantly less dehiscence as compared with the continuous method. In our study on 130 patients, 111 patients rectus sheath was closed in intermittent manner out of which 12 developed wound dehiscence while 19 patients rectus sheath was closed by continuous method out of which 3 developed wound dehiscence. As per our study type of closure did not have any impact on wound dehiscence. This could be due to the fact that less number of patients had undergone closure in continuous manner.
19. **Closure of rectus sheath:** 111 patients rectus sheath was closed by resident out of which 15 developed wound dehiscence. While 4 patients were closed by consultants and none of them developed wound dehiscence. As per our study closure done by consultant or residents did not have any impact on wound dehiscence which might be due to the fact that consultants did less number of sheath closures in our study.
20. **Re dehiscence:** Among the patients who were re-operated for wound dehiscence, none of them developed re dehiscence. This could be because these patients were nutritionally built up during the course in ward. They were given regular dressings and were given antibiotics as per culture and sensitivity. Since nutrition and wound infection plays major role in wound dehiscence, these two factors were given emphasis and hence on re operating the patients again they did not develop wound dehiscence.
21. **Duration of stay:** Patients who had developed wound dehiscence had a stay in ward ranging from 12 days to

100 days. Thus from our study it seems that the duration of stay in ward is more in patient who had developed wound dehiscence. Patients with wound dehiscence required regular dressings. Secondary suturing of wound was also done after granulation of wound. Gabriëlle H. van Ramshors (10) did study from January 1985 to December 2005 on post operated laparotomy patients and found that Hospital stay was significantly longer ($P < 0.001$) for patients with abdominal wound dehiscence, with a median of 36 days, versus 16 days in the control group.

22. **Final outcomes:** In our study we had 9 mortality out of which 3 had developed wound dehiscence. Remaining 6 patients had death in the immediate post operatively. Hence we were not being able to follow up them. Hence in our study it was difficult to conclude on impact of wound dehiscence and mortality.

SUMMARY AND CONCLUSION

Burst abdomen is the disruption of any or all layers in an abdominal wound. It is one of the surgical complication that results from poor wound healing. Important risk factors for wound dehiscence are Jaundice, Sepsis, Hypo albuminemia and Anemia. Wound dehiscence is one of important factor responsible for long indoor stay. Complications include intestinal fistula, incisional hernia, bleeding and infections. As per our study Hypo albuminemia and Sepsis were important factor responsible for wound dehiscence. Hence we can conclude that we can avoid wound dehiscence by correction pre-operative serum albumin level and controlling sepsis by proper antibiotics and hydration.

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