

“A Clinical Study of Abdominal Wound Dehiscence and Its Management”

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Abstract: Wound dehiscence is one among the most dreaded complications faced by the surgeons. By definition, dehiscence is the separation of fascial layers early in the postoperative course. Wound dehiscence is described as partial or complete disruption of an abdominal wound closure with or without protrusion and evisceration of abdominal contents. Dehiscence of wound occurs before cutaneous healing.¹ Wound dehiscence is a very serious postoperative complication associated with high mortality and morbidity. It has significant impact on health care cost, both for patients and hospitals. Prolonged hospital stay, high incidence of incisional hernia, and subsequent reoperations underline the severity of this complication. Conditions associated with increased risk of wound dehiscence are anaemia, hypoalbuminemia, malnutrition, malignancy, jaundice, obesity and diabetes, male gender, elderly patients and specific surgical procedures as colon surgery or emergency laparotomy which are associated with wound disruption. We prospectively analysed various risk factors and management in 30 patients with abdominal wound dehiscence in Siddhartha Medical College, Vijayawada.

Keywords: wound dehiscence, postoperative, evisceration, incisional hernia, anaemia, hypoalbuminemia, jaundice.

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I. Introduction

Abdominal wound dehiscence (burst abdomen, fascial dehiscence) is a major postoperative complication, with mortality rates reported as high as 45%. The incidence, as described in the literature, ranges from 0.4% to 3.5%. Abdominal wound dehiscence can result in evisceration, requiring immediate treatment. Many causes of wound disruption are avoidable. Good and active resuscitation of patients before surgery with emphasis on fluid and electrolytes balance, antibiotic cover, nasogastric tube aspiration, and proper intake and output monitoring, will pay in the end. Strict post-operative care with stress on prevention of wound infection and other risk factors associated with wound dehiscence will have a positive outcome.

PATIENT RELATED RISK FACTORS: Age, Sex, Obesity, Anemia, Diabetes, Malnutrition, Vascular diseases, Chemotherapeutic agents, Wound infection, Uremia, Jaundice, Smoking, Alcoholism

SURGEON RELATED RISK FACTORS: Direction of the incision, Location of the incision, Length of the incision, Suture material, Technique of closure, Placement of stomas and drains

INTRA OPERATIVE RISK FACTORS: Emergency surgery, Abdominal surgery, Length of operation (>6hrs), Intra abdominal infection

POST OPERATIVE RISK FACTORS: Prolonged ventilation, Post-operative elevation of intra-abdominal pressure, Post-operative blood transfusion, Poor tissue perfusion (e.g. post-operative hypotension), Excessive patient coughing, Radiotherapy, Hydration.

AIM AND OBJECTIVES:

To identify the disease involved in causing abdominal wound dehiscence. To assess the association and prevalence of risk factors involved in causing abdominal wound dehiscence. To formulate a protocol in the prevention of wound dehiscence and to effectively manage cases of abdominal wound dehiscence.

PATIENTS AND METHODS: Among the 180 cases who underwent exploratory laparotomy at Siddhartha Medical College, Vijayawada, 30 cases presented as gaping of abdominal wound and discharge from the site during the period of October' 2015 to October' 2017 were taken for study. Each case was examined clinically and properly in systematic manner and an elaborative study of history based on chief complaints, significant risk factors, investigations, time and type of surgery performed and postoperative events and day of onset of wound dehiscence. Following which management of these cases in Siddhartha Medical College, Vijayawada based on facility available here was done.

Inclusion criteria:

- Patients developing abdominal wound dehiscence after undergoing elective or emergency laparotomy procedures
- Patients of both the sex more than 18yrs of age

Exclusion criteria:

- Patients less than 18yrs of age
- All female patients who developed wound dehiscence after undergoing any gynecological procedures

An elaborative study of these cases with regard to date of admission. clinical history regarding the mode of presentation, significant risk factors, investigations, time of surgery and type of surgery and postoperatively, study of diagnosis and day of diagnosis of wound dehiscence is done till the patient is discharged from the hospital. In history, details regarding presenting complaints, duration, associated diseases, significant risk factors like, anemia, malnutrition, obesity, chronic cough, smoking, alcoholism were noted. Details regarding the clinical diagnosis, whether the operation was conducted in emergency or electively, type of incision taken were noted. Intra operative findings noted and classification of surgical wounds done accordingly. The type of surgical procedure done was recorded.

II. Results And Observations:

Age wise distribution

TABLE -1 : INCIDENCE OF ABDOMINAL WOUND DEHISCENCE IN DIFFERENT AGE GROUPS

Age group	No. of Cases	Percentage
21-30	3	10%
31-40	6	20%
41-50	7	23.33%
51-60	8	26.67%
61-70	5	16.67%
71-80	1	3.33%
Total	30	100.00%

In this study majority of patients belonged to the age group between 51-60years, youngest patient was 21 year old and oldest patient was 80 years. The mean age of patients affected was 47.06yrs

TABLE – 2: INCIDENCE OF ABDOMINAL WOUND DEHISCENCE IN DIFFERENT GENDER

Gender	No. of Cases	Percentage
Male	21	70%
Female	9	30%
Total	30	100.00%

Table 3: Co morbid condition at the time of admission

Conditions	No. of Cases	Percentage
Intra-Abdominal Infection	19	63.33%
Malnutrition	15	56.67%
Anemia	17	43.33%
Diabetes(DM)	10	33.33%
Pulmonary disease	7	23.33%
CRF	5	16.67%
Malignancy	2	6.66%
Drug history	1	3.33%
Radiation	0	0

TABLE – 4: EFFECT OF EMERGENCY SURGERY IN DEVELOPMENT OF ABDOMINAL WOUND DEHISCENCE

		No. of Cases	Percentage
Surgery	Elective	4	13.33%
	Emergency	26	86.67%
		30	100%

TABLE – 5: FREQUENCY OF ABDOMINAL WOUND DEHISCENCE IN RELATION TO TYPE OF INCISION

Type of Incision		No. of Cases	Total
Upper midline		6	23
Midline (M)		15	
Lower midline		2	
Right-upper		2	4
Paramedian (RUP)			
Right	lower	2	
Paramedian (RLP)			
Mc Burney's		3	3
	Total	30	30

TABLE – 6: VARIOUS ABDOMINAL PROCEDURES AND INTRA ABDOMINAL PATHOLOGY LEADING TO ABDOMINAL WOUND DEHISCENCE.

Procedure	No. of cases
Perforation closure	13
Resection and anastomosis	9
Appendectomy	3
Malignancy	2
Blunt Trauma Abdomen	3
Total	30
Diagnosis	No. of cases
Hollow viscus perforation	13
Intestinal obstruction	9
Appendicitis	3
Malignancy	2
Blunt trauma abdomen	3
Total	30

Table -7 :Post opertive day of Wound Dehiscence

Time in Days	No..of Patients	Percentage
D8	2	6.67%
D9	22	73.33%
D10	5	16.67%
D11	0	0
D12	1	3.33%

TABLE -8 : TREATMENT

Type of Wound Dehiscence	No.of Patients	Management
Partial Wound Dehiscence	7	Conservatively management (healing by secondary intension)
	14	Secondary suturing
Complete Wound Dehiscence	9	Tension Suturing
Total	30	

III. Discussion

Abdominal wound dehiscence (burst abdomen, fascial dehiscence) is a severe postoperative complication, with mortality rates reported as high as 45%. The incidence, as described in the literature, ranges from 0.4% to 3.5%. Abdominal wound dehiscence can result in evisceration, requiring immediate treatment. Prolonged hospital stay, high incidence of incisional hernia, and subsequent reoperations underline the severity of this complication. 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 outweighing the benefits of technical achievements. Several, mainly retrospective studies have been performed to identify risk factors for this complication, often presenting conflicting results. Unfortunately, multivariate analysis has only been performed in a minority of studies and in general on small numbers of patients^{7-10,13,18}. especially in elective operations should be recommended to reduce or eliminate the risk, such as no tobacco use, no steroid use prior to surgery, careful control of the patients comorbidities like anemia, malnutrition, obesity and cardiovascular or lung diseases. During the surgical procedures, measure to reduce the risk of infections and hypoxia in the tissue are the two most important factors for the postoperative wound healing process. The type of abdominal closure may play an important role. The tension free closure is recommended and a continuous closure is preferable. A midline incision is frequently used in abdominal surgery. It provides a relatively quick and wide access to the abdominal cavity and can be made with minimal damage to muscles, nerves and blood supply as these structures do not cross the midline⁵⁵⁻⁵⁸. Techniques for closure of the midline abdominal incision have varied over time with better understanding of the physiology and engineering of closure of the abdominal wall and improvement in materials of surgical suture. The ideal wound closure provides strength and barrier to infection. To achieve that goal closure should be fast, efficient, performed without tension/ischaemia, comfortable to the patient, technically easier to surgeon and anaesthetic. Hence, one should follow the principles of wound closure. In this present clinical study , 30 patients who developed abdominal wound dehiscence after operation in Siddhartha Medical College and General Hospital were studied. A total of 30 cases among 180 cases who underwent exploratory laparotomy were included in a study conducted in the period October 2015-October 2017.

Table -14 : Comparison of Incidence of Wound Dehiscence in various studies

Author	No.of Patients	Wound dehiscence(%)
Riou JP et al ¹⁸	31	1.1%
Khan MN et al ²⁶	406	7.8%
S.H.Waquer et al ²⁴	117	5.9%
Present study	30	6.3%

In the present study the mean age of patients was shown to be 47.06 years, which is similar in comparison to the above studies. Also, the incidence of appendicular perforation and duodenal ulcer perforation is more common in this age group.

In the present study males predominated the picture with the ratio of 3:1. This male predominance may be due to the higher incidence of peptic ulcer perforation and intestinal obstruction in male sex (78%).

Elective midline exploratory laparotomy and its closure is a frequent performed procedure in any surgical unit worldwide and secure closure of a laparotomy incision remains an important aspect of any abdominal operation with the aim to avoid the postoperative morbidity and hasten the patient's recovery⁶⁷. Emergency surgical procedures have higher risk of dehiscence than elective procedures as the patients undergoing surgery in emergency are in suboptimal condition, hemodynamically unstable, and the risk of contamination of surgical field is high.

Anemia is a risk factor that is related to increased perioperative stress, blood transfusions, and decreased tissue oxygenation, all of which can affect the immune system and the wound healing process. The effect of anaemia on wound healing often is compounded by the associated hypovolemia or hypoxia. Anaemia and hypovolemia cause decreased tissue oxygenation causing impairment of wound healing by decrease in wound tensile strength.

In our study, 15(50%) out of 30 patients were malnourished at the time of surgery, making it a potent risk factor in the development of wound dehiscence. Diabetes is considered as one of the significant risk factor in the present study as 10(33.33%) out of 30 patients were associated with diabetes. Diabetes has significant impact on all stages of wound healing. Moreover, diabetics are further more susceptible to infections. Diabetes is often associated with poor wound healing. Granulocytes from diabetic patients demonstrate decreased phagocytic activity and poor chemotaxis. These granulocyte defects and local ischemia secondary to accelerated atherosclerosis and small vessel disease result in increased susceptibility to infection. This may increase the risk of developing dehiscence.⁷¹

7(23.33%) out of 30 patients in our study were associated with pulmonary disease. Chest physiotherapy, tracheobronchial toilet will reduce the frequency of wound failure. Therefore post operative cough is considered as an independent risk factor. In our study, 2(6.66%) out of 30 cases who developed abdominal wound dehiscence were having a malignant disease. The average day of abdominal wound dehiscence was found to be 9.2 days which is similar to the results mentioned in the following studies: The incidence of postoperative wound infection was 43.3% in our study.

out of the 30 patients who developed abdominal wound dehiscence, 7 were managed conservatively, secondary suturing(SS) was done in 14 patients and the remaining 9 were managed with tension suturing(TS).

Protocol in the prevention of wound dehiscence

- **Wound dehiscence risk assessment**
- **Reduce the incidence of surgical site infections**
- **Postoperative wound assessment**
- **Educational Recommendation**
- **Effectiveness of Action Items**

Abdominal wound dehiscence (burst abdomen, fascial dehiscence) is a severe postoperative complication, with mortality rates reported as high as 45%^{3,5,6}. The incidence, as described in the literature, ranges from 0.4% to 3.5%⁷⁻²⁰. Abdominal wound dehiscence can result in evisceration, requiring immediate treatment. Prolonged hospital stays, high incidence of incisional hernia, and subsequent reoperations underline the severity of this complication. 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 outweighing the benefits of technical achievements. Several, mainly retrospective studies have been performed to identify risk factors for this complication, often presenting conflicting results. Unfortunately, multivariate analysis has only been performed in a minority of studies and in general on small numbers of patients. Wound dehiscence is a mechanical failure of wound healing, remains a problem and it can be affected by multiple factors'-operative conditions especially in elective operations should be recommended to reduce or eliminate the risk, such as no tobacco use, no steroid use prior to surgery, careful control of the patients comorbidities like anemia, malnutrition, obesity and cardiovascular or lung diseases. During the surgical procedures, measure to reduce the risk of infections and hypoxia in the tissue are the two most important factors for the postoperative wound healing process. The type of abdominal closure may play an important role. The tension free closure is recommended and a continuous closure is preferable. A midline incision is frequently used in abdominal surgery. It provides a relatively quick and wide access to the abdominal cavity and can be made with minimal damage to muscles, nerves and blood supply as these structures do not cross the midline. Techniques for closure of the midline abdominal incision have varied over time with better understanding of the physiology and engineering of closure of the abdominal wall and improvement in materials of surgical suture. The ideal wound closure provides strength and barrier to infection. To achieve that goal closure should be fast, efficient, performed without tension/ischaemia, comfortable to the patient, technically easier to surgeon and anesthetic. Hence, one should follow the principles of wound closure. In this present clinical study of abdominal wound dehiscence, all patients who developed abdominal wound dehiscence after operation in Siddhartha Medical College and General Hospital were studied.

IV. Conclusion

Abdominal wound dehiscence is a preventable complication. The care to prevent dehiscence starts in the preoperative period itself. The surgeon and the surgical techniques play a very important role in prevention. The prevention strategy continues into the postoperative period also. 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.

- The incidence of wound dehiscence was found to be 6.3%.
- Age of the patient more than 50 years was a significant risk factor for the development of dehiscence.
- Anemia was a highly significant factor for wound dehiscence.
- Peritonitis or any other cause associated with intra-abdominal sepsis increases the incidence of wound dehiscence.
- Malignancy is associated with higher incidence of wound dehiscence.
- A significantly higher incidence of post operative wound dehiscence is seen in emergency than in elective patients.
- The nutritional status of the patient was important. Patients with either obesity or malnutrition had a higher incidence of wound dehiscence.
- All measures to reduced postoperative chest infection should be made, because cough increases intra-abdominal pressure.
- Simple investigations like Hb%, RBS, RFT, LFT, chest x-ray, may help to detect predisposing factors.
- Abdominal wound dehiscence causes significant morbidity and mortality.

V. Summary

- Males outnumbered females with ratio of 2.3:1.
- Patients in the age group of 41-50 years and 51-60 years found to have highest incidence of abdominal wound dehiscence. Mean age of the patients affected was 47.1 years.
- Incidence of abdominal wound dehiscence is more common in patients with peritonitis due to duodenal and appendicular perforation than in case of intestinal obstruction.
- Incidence of abdominal wound dehiscence is more common in patients who are operated in emergency(86.67%) than elective (6.5:1).
- Surgical procedures which included perforation closure (43.33%) carried higher incidence of wound dehiscence.
- Patients operated with midline incision carried higher risk(76.66%) for wound dehiscence than those operated with Paramedian incisions.
- Incidence of abdominal wound dehiscence is more common in patients having their BMI>25(40.00%).
- Incidence of abdominal wound dehiscence it more common in patients with anemia (Hb% <10g %) (56.6%).
- Mean days of presentation was day 9.2days.
- Average stay was 21.03 days.

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