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Original Article

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The Efficacy of Risk Factors for Predicting Wound Dehiscence: A Prospective and Retrospective Study

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ABSTRACT

INTRODUCTION: Wound dehiscence is among the most dreaded complications faced by surgeon and is of greatest concern because it leads to many other problems like increased morbidity and mortality ,prolonged hospital stay ,economic burden on society The mortality rate following wound dehiscence ranges from **9%-43%**. .there are many factors related to patient, related to disease, and also related to treatment like emergency surgery, Intraabdominal infections, malnutrition, advance age, systemic disease, ascites, diabetes, postoperative coughing etc. **METHOD and MATERIAL:** These factors are studied in cases and there outcome are compared with control.thsi study was done in NSCB medical college Jabalpur from September 2018 to September 2020.100 cases and controls are takens and study is done Retrospective and prospective manner in those patients which are operated in institute. Details of patients are taken and compared with p value and chi square test applied and there results found. **S**among all factors age, jaundice ,anaemia, hypoalbunemia, ascites, diabetes, postoperative coughing were found affecting wound dehiscence.

Key Words: *Risk Factors, Predicting Wound*

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INTRODUCTION

Wound dehiscence is defined as a partial or complete disruption of a sutured wound with or without protrusion and evisceration of abdominal contents. Dehiscence of the wound occurs before cutaneous healing

There are two basic types of wound dehiscence, depending upon the extent of separation.

1. **Partial wound dehiscence-** In partial dehiscence, only the superficial layers or part of the tissue layers open.
2. **Complete wound dehiscence-** In the complete wound dehiscence; all layers of the wound thickness are separated, revealing the underlying tissue and organs, which may protrude out of the separated wound. This can be seen in some cases of abdominal wound dehiscence.

Wound dehiscence is among the most dreaded complications faced by surgeons and is of greatest concern because of the

- Risk of evisceration
- Need for immediate intervention
- Possibility of repeat dehiscence
- Surgical wound infection
- Incisional hernia formation.
- Wound dehiscence (burst abdomen, fascial dehiscence) is a severe postoperative complication, with mortality rates reported to be as high as 20%. Incidence as described in the literature ranges from 0.4% to 3.5%.

Various risk factors are responsible for the development of wound dehiscence such as

- Emergency surgery
- Intra-abdominal infection
- Malnutrition (hypoalbuminemia, anemia)
- Advanced age
- Systemic diseases
- Ascites
- Diabetes

- Wound infection,
- Postoperative coughing etc.

Good knowledge of these risk factors is mandatory for prophylaxis. Patients at high risk for wound dehiscence can be benefitted from close observation and early intervention.

This study was done to highlight the risk factors for wound dehiscence, the incidence rate in this hospital, and remedial measures to prevent or reduce the incidence of wound dehiscence and to predict the outcome of the management of wound dehiscence.

This will certainly reduce mortality and morbidity in the form of prolonged hospital stay, increased economic burden on health care resources, and long term complications of incisional hernia

Postoperative period for a patient after emergency laparotomy may be dangerous due to a burst abdomen followed by a prolonged hospital stay, increased morbidity, and even death. Morbidity and mortality can be reduced by increasing awareness and concern about this problem and accordingly taking more active steps for its prevention by identifying the high-risk groups and high-risk factors.

AIMS and OBJECTIVE-
To asses the incidence of wound dehiscence and risk factors associated with them.

MATERIAL and METHODS-
This study is an observational prospective and retrospective study conducted in the Department of General Surgery, NSCB MCH, Jabalpur, Madhya Pradesh, by using medical records of patients treated at NSCB MCH between September 2018- September 2020 and in the previous years. Patients which were included underwent laparotomy and other surgical procedures which were complicated by development of postoperative wound dehiscence.

A total of 100 cases clinically presenting as gaping of wound and discharge from the site from March 2019 to August 2020 were taken for study. Each case was examined clinically and properly in a systematic manner and an elaborative study of history based on chief complaints, significant risk factors, investigations, time and types of surgery performed, and postoperative events and day of onset of wound dehiscence. Following which the management of these cases in NSCB MEDICAL COLLEGE was based on facilities available here was done.

INCLUSION CRITERIA
1. Patients presenting with abdominal and other surgical sites wound dehiscence after undergoing an elective or emergency operation
2. Patients in follow up outpatient Department
3. Patients who are ready for investigations and treatment for their condition

EXCLUSION CRITERIA
1. Patients not willing or unable to give informed consent
2. Patients with poor follow-up
3. Patients below 10 years of age

An elaborative study of these cases about
- Admission,
- Clinical history,
- Significant risk factors,
- Investigations,
- Type of surgery,
- Postoperative follow up,

The study of diagnosis and day of diagnosis of wound dehiscence was done until the patient was 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. All details regarding the clinical diagnosis of the patients and whether the operation was conducted in emergency or routine. Intra-operative findings were noted and classification of surgical wounds done accordingly. The type of surgical procedure done was recorded.

FACTORS USED IN STUDY
1. **Age-** more than 10 years of age group populations were taken in this study.
2. **Wound infection** - was recorded in database when at least one of the following was observed within 30 days after operation.

- Purulent discharge,
- organisms isolated from fluid/tissue,
- atleast one sign of inflammation (pain or tenderness,
- induration,
- erythema,
- local warmth of the wound),
- if wound was deliberately opened by the surgeon or the surgeon declared the wound infected.

3. **Anemia** - blood hemoglobin level less than 12 g/dl
4. **Jaundice** - total level of bilirubin in blood serum 3 mg/dl or higher.
5**. Postoperative coughing** - was define as coughing documented by nurses in the patient charts beforethe diagnosis of abdominal wound dehiscence, orbefore discharge in patients without abdominalwound dehiscence.
6. **Ascites** - accumulation of free fluid in the peritonealcavity on clinical examination and ultrasound.
7. **Hypoalbuminemia** - serum albumin level < 3.5gm/dl. 29
8**. Diabetes** - raised level of blood sugar level >140 mg/dl can lead to poor wound healing and wound dehiscence, so blood sugar levels should be in controlled for better wound healing in diabetic patients

PARTIAL WOUND DEHISCENCE

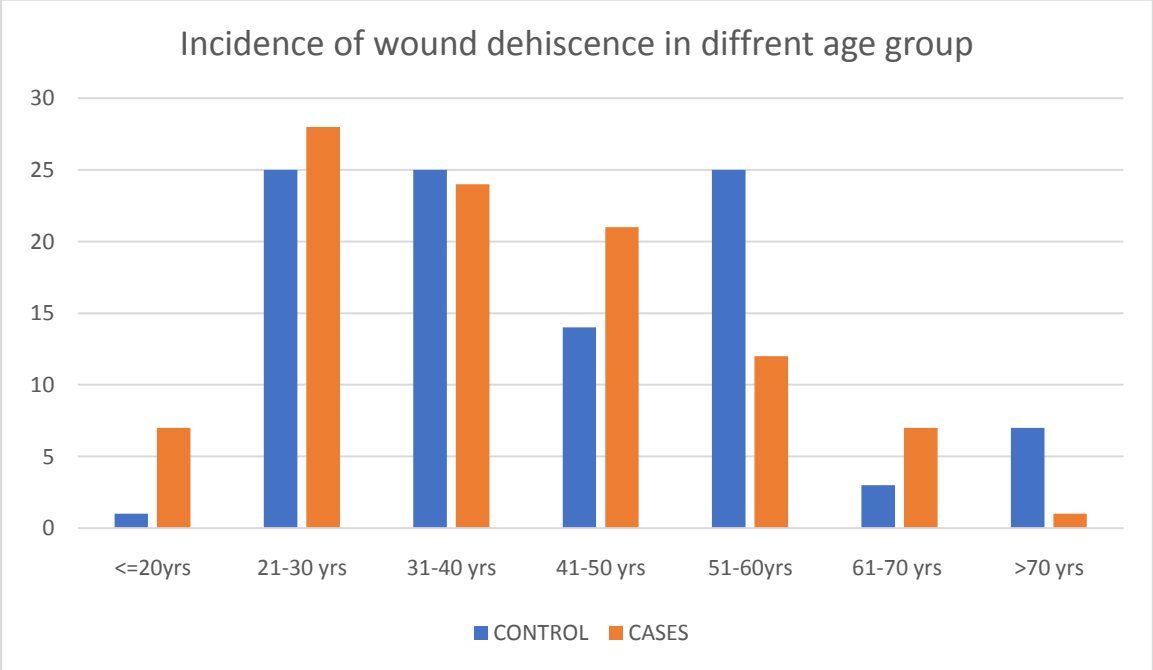
OBSERVATION and RESULT

- **AGE**

In this study majority of patients belonged to the age group between 21- 60 years. The youngest patient was 13 years old and the oldest patient was 76 years who develop wound dehiscence. The mean age of patients among cases was 38.16±14.5 and among control 42.51±14.86 years.

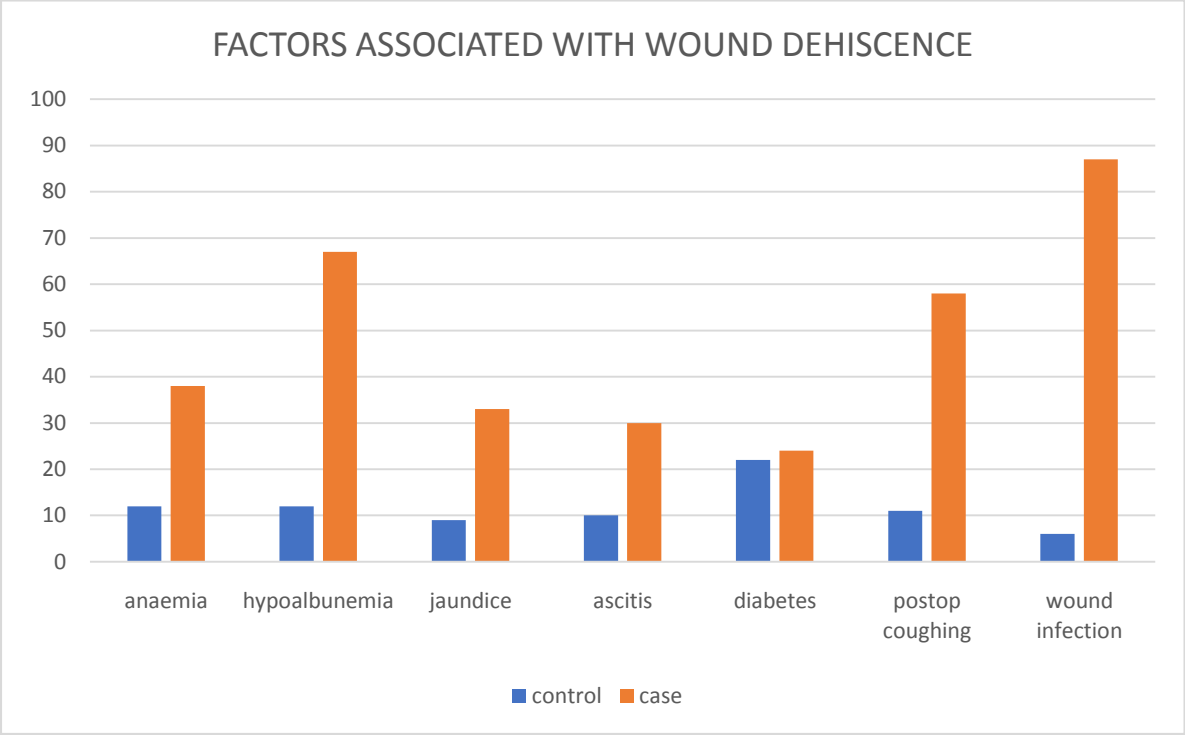
AGE GROUP(years)	GROUP			
	CONTROL		CASE	
	N	%	N	%
<=20 yrs	1	1	7	7
21- 30 yrs	25	25	28	28
31-40 yrs	25	25	24	24
41-50 yrs	14	14	21	21
51-60 yrs	25	25	12	12
61-70 yrs	3	3	7	7
>70 yrs	7	7	1	1
MEAN SD	42.51(14.86)		38.16(14.58)	
T-test, P-value	2.09, P - 0.038			

Chi-square = 16.76; P-value = 0.01



		GROUPS		
		CONTROL	CASES	
ANAEMIA	Absent	88	62	P value<0.001
	present	12	38	Chi square-18.03
HYPOALBUNIMEA	Absent	88	32	P value<0.0001
				Chi sq-64.42
	Present	12	67.7	
JAUNDICE	Absent	91	67	P=<0.OO01
	Present	9	33	Chi=17.36
ASCITIS	Absent	90	70	P=<0.0001
	Present	10	30	Chi=12.50
Diabetes	Non diabetic	78	76	P=.737
	Diabetic	22	24	Chi=0.11
Post operative coughing	Absent	89	42	P<0.0001

	Present	11	58	Chi=48.88
Wound infection	Absent	94	13	P<0.0001 Chi=131.87
	Present	6	87	



DISSCUSION

In the study we found that Wound dehiscence is a morbid postoperative complication. The mortality rate following wound dehiscence ranges from **9%-43%**. Prevention is therefore an important step in preventing this dreaded complication. Patients and patient attendants must be fully informed about these complications following surgeries. The risk indices used in this study are age, diabetes, wound infections, anemia, jaundice, hypoalbuminemia, ascites, and postoperative coughing for predicting the wound dehiscence in postoperative patients. The study shows the significance of all the risk factors for predicting wound dehiscence and this scoring system helps us to predict the risk of wound dehiscence following surgeries and preventive measures can be used preoperatively while closing the wound and postoperatively.

The difference in risk indices between cases and control is statistically significant (p-value <0.737).except for diabetes because diabetic patients in the control group have good glycemic control, pre and postoperatively and among cases glycemic control was poor (p value<0.737).

In this study, we have taken variables before the preoperative and intra-operative and postoperative factors such as wound infections, post-op chest infection. Hypoalbuminemia was the most important risk factor in our study as most of the patients were from a poor socio-economic class. Hypoalbuminemia is associated with poor wound healing, decreases collagen 66*synthesis in the surgical wound, and anastomosis.23*,24* It hampers the immune responses, such as macrophages activation and granuloma formation. Therefore, in patients with hypoalbuminemia, wound infections, remote infections such as pneumonia, septicaemia, and anastomotic leakage are commonly found. It decelerates neo angiogenesis and wound remodelling. Loss of protein from protein-calorie malnutrition leads to decreased wound tensile strength, decreased T-cell functions, decreased phagocytic activities, and decreased complement system and antibody levels, ultimately diminishing the body's ability to defend the wound healing against infections

Patients with chest infection have postoperative coughing that requires prolonged ventilator support and repeated coughing causes an increase in intraabdominal pressure which results in breakage of the suture, undoing of the knots, or pulling through the tissue. In my study, 58% of cases reported postoperative coughing leads to wound dehiscence with a significant difference in the control group(p- value<0.0001)In Anurag et al and Makela et al study the chest infection was more than 30% in patients with wound dehiscence.26* Chronic obstructive pulmonary (COPD) disease increases the risk due tosystemic tissue hypoxia. COPD is a frequent disease in the elderly and consequently, the incidence of wound dehiscence is more in the elderly. Anemia is often blamed as an important risk factor in poor wound healing. Low haemoglobin means reduced oxygen supply to tissues and therefore poor tissue healing and inability to resist infection. In

the present study, patients (more than 60 years (66%) developed wound dehiscence and this goes with the study of Rodriguez Hermosa who established that the mean age was 70 years. This may be due to deterioration of the tissue repair mechanism in the elderly especially during the first few days of the wound healing process.

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