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Original Research Article

Study of burst abdomen: it's causes and management

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ABSTRACT

Background: Burst abdomen (abdominal wound dehiscence) is a severe post-operative complication. Burst abdomen is defined as post-operative separation of abdominal musculo-aponeurotic layers. The study aims to find etiological factors of burst abdomen in hospitalised patients, evaluate current management methods and to compare conservative and operative approach with respect to complication and outcomes.
Methods: All cases presenting with abdominal wound dehiscence after surgery were included. An elaborate clinical history was taken in view of the significant risk factors, the types of surgery performed, type of disease involved and management methods and their outcome. A total of 82 cases were included in this prospective study. Data was analyzed using appropriate software.
Results: The results concluded that male patients have a higher incidence of laparotomy wound dehiscence and in 5th decade. Patients presenting with peritonitis secondary to gastro-duodenal perforation are more prone to burst abdomen.
Conclusions: Burst abdomen is a serious sequel of impaired wound healing. Presence of anaemia, hypoproteinaemia favours high incidence of burst abdomen. Delayed suturing, of burst abdomen has a lower frequency of complications. Adherence to proper technique and sincere efforts to minimize the impact of the predisposing factors play a much larger role in both treatment and prevention of this condition.

Keywords: Abdominal wound dehiscence, Burst abdomen

INTRODUCTION

Burst abdomen (abdominal wound dehiscence) is a severe post-operative complication. Incidence as described in literature ranges from 0.4% to 3.5%.[1] Burst abdomen is defined as post-operative separation of abdominal musculo-aponeurotic layers, which is recognised within days after surgery and requires some form of intervention.

Various risk factors are responsible for wound dehiscence such as emergency surgery, intra-abdominal infection, malnutrition (hypoalbuminemia, anaemia), advanced age, systemic diseases (uraemia, diabetes mellitus) etc.[2] Good knowledge of these risk factors is mandatory for prophylaxis.[3]

Patient identified as being high risk may benefit from close observation and early intervention.

The study aims to find etiological factors of burst abdomen in hospitalised patients, evaluate current management methods and to compare conservative and operative approach with respect to complication and outcomes.

METHODS

This is a prospective study carried out from August 2015 to November 2017 in the Department of General Surgery, government medical college, Nagpur, India.

Total 82 patients who underwent both emergency or elective abdominal procedure and developed post-operative dehiscence during the study period were included. The inclusion criteria used were patients above 18 years of age of either sex, who gave consent for investigations and treatment. exclusion criteria being primary operated outside or patient who had undergone previous laparotomy for any condition (or had an incisional hernia or burst abdomen).

A comprehensive history and thorough physical examination with any other relevant history were recorded. Statistical analysis was processed using Excel software programs. Observations are represented as bar diagrams and pie charts.

RESULTS

Age

The youngest patient was 19 years old and the oldest patient was 70 years old. The highest incidence of burst abdomen in the present study was between 51 and 60 years of age, the average age being approximately 49 years. The patients in this study were in the range of 49±13.5 (standard deviation) years.

Sex distribution

In present study, 64 patients (78%) of the patients were male and the remaining 18 (22 %) were females. The male: female ratio was approximately 4:1.

Figure 1: Partial abdominal wound dehiscence.

Preoperative predisposing causes

The study showed that the majority of patients had intra-abdominal sepsis (66 patients) and anaemia (60 patients) as preoperative predisposing factors. Many patients had more than one predisposing factor.

Figure 2: Conservative management dressing with saline soaked gauzes.

Figure 3: Immediate suturing with vacuum suction drain.

Figure 4: Purulent discharge from burst abdomen.

Planned or emergency surgery

The incidence of burst abdomen was much higher in patients operated as emergency surgery (75/82) as compared to planned surgery (7/82).

Figure 5: Complete burst abdomen.

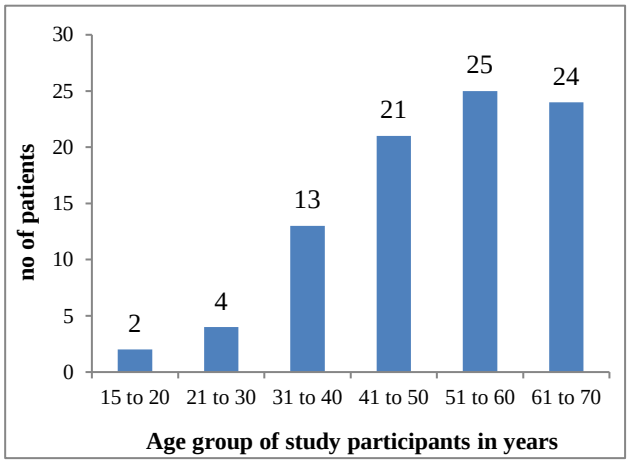

Figure 6: Age and number of study participants with burst abdomen.

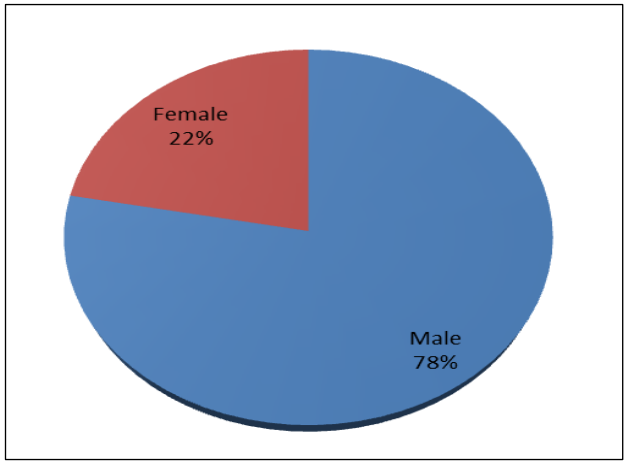

Figure 7: Sex distribution in cases of burst abdomen.

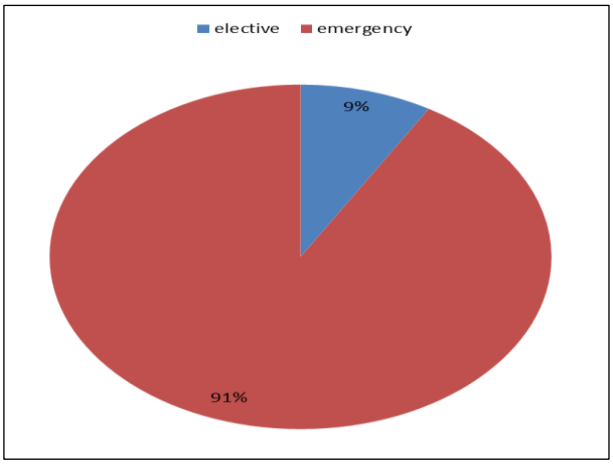

Figure 8: Incidence of burst abdomen in elective cases and emergency cases.

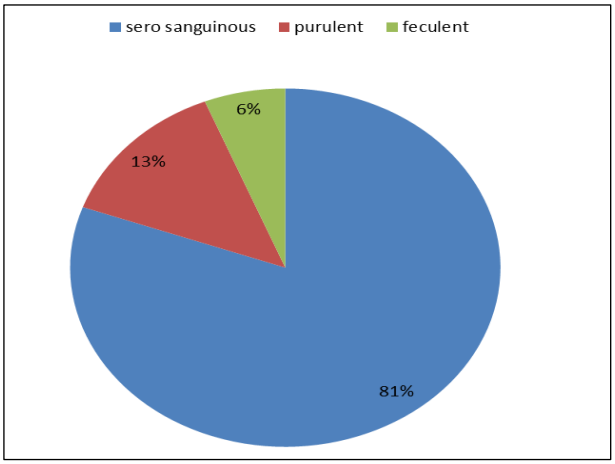

Figure 9: Post-operative wound discharge.

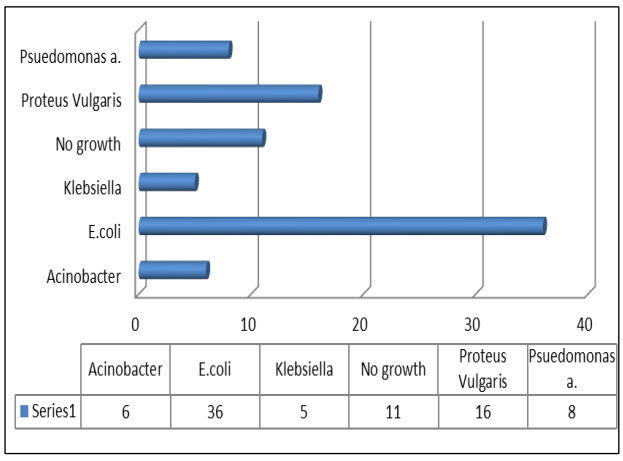

Figure 10: Organism cultured from wound discharge.

Intra-abdominal pathology and its origin

Indication of laparotomy being perforation peritonitis are most commonly being gastro duodenal perforation (36%) and Ileal perforation (23%) other indication.

Table 1: Predisposing factors observed in present study, out of 82 cases.

Predisposing factors	No. of cases
Intra-abdominal sepsis	66
Anaemia	60
Hypoproteinemia	48
Chest disease	43
diabetes	24
Uraemia	27
Jaundice	16

Table 2: Frequency of pathologies among patients.

Indication	Percentage	Cases
Gastro duodenal perforation	29.26%	24
Ileal perforation	19.51%	16
Intestinal obstruction	18.29%	15
Malignancy	14.63%	12
Large bowel perforation	7.31%	6
Koch's abdomen	2.43%	2
Stab injury	4.87%	4
Blunt trauma abdomen	3.65%	3

Type of closure

Mass closure was the standard technique used in all the cases in this series; the technique involves incorporating all of the layers of the abdominal wall (except skin) as one structure. Continuous sutures with No 1 polyamide was used in 10 patients. In other 72 patients, abdomen was closed with simple interrupted polyamide sutures.

Table 3: Mode of treatment given to the patient of burst abdomen

Group	Treatment given	%	N
I	Immediate re suturing with tension suture	15.85%	13
II	Immediate re suturing without tension suture	21.95%	18
III	Delayed secondary suturing	47.56%	39
IV	Conservative management	14.63%	12

Time of disruption

The majority of burst abdomen occurred between 7th and 10th post-operative day, with the highest incidence on the 7th post-operative day.

Post-operative wound discharge

In present study, 66 patients out of 82 had serosanguinous discharge from the wound. Eleven patients out of 82 had purulent discharge. Five patients experienced feculent discharge from wound site.

Table 4: Comparison of outcome in the four management groups.

	Group I	Group II	Group III	Group IV	%	N
Full recovery	7	7	17	0	37.8%	31
Incisional hernia	2	4	12	10	34.14%	28
Re burst	0	0	3	0	3%	3
Death	4	7	10	2	28%	23

Partial or complete burst

In present study, 49 patients out of 82 (60%) had complete burst involving the whole length of the wound while 33 patients out of 82 (40%) had partial burst.

Culture of discharge

Gram-negative organisms were the ones most commonly grown from culture of the wound discharge

Management

Conservative treatment (daily saline dressings) was done in 12/82 cases. Immediate re suturing of the wound in the operation theatre was done in 13 patients with tension sutures. Through and through vertical mattress sutures with supporting PVC tubing were used.

While 18 patients were re sutured without tension sutures. In 39 patient delayed secondary suturing was done.

Complications of management and their treatment

Out of 82 patients 31 (37.8%) patients fully recovered 28 patient developed incisional hernia over a period of 3 to 21 months. Three patients developed subsequent re-burst who subsequently died due to septicaemia. Out of 82 patients in the present study death occurred in 23 patients (28%) of which 4 patients was from group I ,7 patient was from group II, 10 patients were from group III while 2 patients were from group IV

Total hospital stay

Total hospital stay of the patients increases because of burst abdomen. In present study, out of 82 patients, 11

had a total hospital stay between 31 and 40 days. The mean duration of total hospital stay was 35±6.9 days.

Mortality

Out of 82 patients, death occurred in 23 patients, giving a mortality rate of 28%. All 23 died of complications due to septicaemia and multi-organ failure.

DISCUSSION

This study reviewed 82 patients who had laparotomy wound dehiscence over a period from august 2015 to November 2017. Present study analyzed the potential causes of burst abdomen.

Table 5: Comparison of age group.

Studies	Mean age (year)
Spiliotis J et al[4]	69.5
Waqar SH et al[5]	39.67
Present study	49

Table 6: Comparison of sex distribution.

Studies	Sex	
	Male (%)	Female (%)
Spiliotis J et al[4]	60	40
Waqar SH et al[5]	73.64	26.4
Present study	78	22

Table 7: Comparison of incidence in elective versus emergency surgery.

Studies	Type of surgery	
	Emergency	Elective
Spiliotis J et al[4]	60	40
Waqar SH et al[5]	72	28
Present study	91	09

In present study average age of burst abdomen is 49 years. Burst abdomen is more common in males. In this study 78% cases were male which is well comparable with other studies.

High incidence of burst abdomen was seen in emergency operation as compared to elective surgeries. Lack of bowel preparation, pre-operative optimization and higher frequency of contaminated cases are the major causes responsible for burst abdomen in emergency surgeries. In present study 75 cases underwent emergency operation while 7 cases underwent elective cases.

Present study showed that peritonitis due to perforation was a common cause of burst abdomen. Amongst which gastro duodenal perforation accounted for 29.26%. Other intra-abdominal pathologies in present study are ileal perforation (19.51%), Intestinal obstruction (18.29%), malignancy (14.63%), Koch's abdomen (2.43%), Stab injury (4.87%) and blunt trauma abdomen (3.65%). peritonitis was the most common cause associated with burst abdomen.

Table 8: Comparison of gastro duodenal perforation.

Studies	Gastroduodenal perforation
Halasz NA et al[7]	25%
Jean-pierre et al[8]	12.90%
Waqar SH et al[5]	28.57%
Present study	29.26%

In 60 patients out of 82 cases haemoglobin level was less than 10gm%. The incidence of anaemia in cases of burst abdomen varies widely from series to series. It was only 6.66% in the study conducted by Wolf WI et al, while it was 90% in study conducted by Pierre J et al and 100% in study conducted by Waqar SH et al.[5,8,9] Hypoproteinemia is also one of the most important factor which leads to delayed wound healing. In present study 48 patients out of 82 cases had a serum protein below 6gm%. Afzal et al studies a subgroup of patients with peritonitis had protein energy malnutrition as one of significant risk factor for burst abdomen (p value 0.037).[10]

Out of 82 patients 28 developed incisional hernia. Many surgeons place retention sutures at laparotomy closure, in those with several risk factors for burst abdomen. Despite these measures, repaired dehisced laparotomy wound have a 69% incisional hernia development risk (over 10 years period), the majority of which develops over first 2 years.

Table 9: Comparison of mortality.

Studies	Mortality (%)
Wolf et al[9]	11
Winfield H et al[11]	40
Present study	28

There was a 28% mortality in present study. Although the incidence of burst abdomen has not changed much, the mortality due to it has decreased due to early recognition, early ambulation, better broad-spectrum antibiotics, better post-operative management and increasing awareness about the condition.

CONCLUSION

Burst abdomen is a serious sequel of impaired wound healing. Presence of anaemia hypoproteinemia favors high incidence of burst abdomen. Gram negative bacteria are most common organism involved in abdominal wound dehiscence. When operative and conservative treatment was compared, it was found that retention suture placement helped to decrease the frequency of complications when immediate resuturing was performed. The conservative approach had a higher morbidity. Hence delayed suturing, which had a lower

frequency of complications in this study, may serve as a "middle path" between the two options. Burst abdomen remains a dreaded post-operative complication. Newer materials and devices continue to be developed and may simplify the treatment of burst abdomen, but adherence to proper technique and sincere efforts to minimize the impact of the predisposing factors play a much larger role in both treatment and prevention of this condition.

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