International Journal Dental and Medical Sciences Research
Volume 6, Issue 1, Jan-Feb 2024 pp 640-644 www.ijdmsrjournal.com ISSN: 2582-6018

A Prospective Study of Burst Abdomen at Osmania General Hospital Running title: Burst Abdomen Incidence & factors at Osmania General Hospital

Gorre Bharath Kumar[1], Prasad Manipal Kumar Puvvala[1], Paladugu Ramu[1], Srilakshmi K[2], Winnie Thomas[3], Madhavi Latha Manolla[3] and Sirisilla poornaiah Rambabu[1]
1 Department of general surgery, Gandhi Medical College and Hospital,
2.Department of pediatrics, Osmania Medical College and Hospital
3. Multi-Disciplinary Research Unit, Gandhi Medical College

Submitted: 28-02-2024 Accepted: 08-03-2024

ABSTRACT:
Despite advancements in wound healing and postoperative care, burst abdomen remains a significant challenge in surgical management, causing prolonged hospital stays and mortality rates above 20%. Continuous research is vital for understanding causes and developing prevention and treatment strategies. In a tertiary hospital, burst abdomen incidence varied from 0.2% to 3%, with more severe outcomes in India and occurrences around post-surgery days 6 to 8. While Western studies report similar wound complication rates with different closure methods, Indian emergency cases show 10%-30% rates.

Examining emergency and elective laparotomies, this study uncovers a 12% burst abdomen incidence, reflecting diverse cases with midline incisions. Notably, 60% of 3,500 laparotomies with wound dehiscence were emergencies, exhibiting an 84% incidence and significant association ($p < 0.001$). Inadequate prep and higher contamination in emergencies contribute to this trend. Anaemia (Hb < 10g %) hampers wound healing, and its importance is evident with a 3.75% incidence in non-anaemic cases, warranting preoperative intervention. Hypoalbuminemia (26%) delays healing, while coughing, infection, immune status, and emergencies contribute. Infections weaken wounds, leading to breakdown and granulation tissue healing.

It was also observed that increased burst abdomen risk in emergencies was due to poor prep, inflammation, and infection. Individualized approaches, like conservative measures or tension band suturing, can mitigate burst abdomen. Comprehensive strategies to prevent burst abdomen involve suturing, prep, and post-op care that should be tailored to patient factors.

Financial support, including the source(s) of the grant: Nil
Keywords: Burst abdomen; Wound dehiscence; Postoperative care; Emergency laparotomies; Tension band suturing

I. INTRODUCTION

Burst abdomen, also known as abdominal wound dehiscence, is a serious complication that can occur after a surgical procedure [1]. This can result in the exposure of underlying organs and tissues, leading to increased morbidity and mortality rates. Elderly or malnourished patients are particularly vulnerable to this complication, as their weakened physiology makes it more difficult for their bodies to heal properly [2]. For these patients, a burst abdomen represents an additional stressor on their already compromised health.

Prevention of burst abdomen involves various strategies, such as employing good surgical technique, gentlet issue handling, and adequate mobilization of the intestine. Maintaining adequate issue perfusion throughout the procedure and ensuring proper tension in knots are also important. Correcting anemia and hypoproteinemia before surgery, along with providing good post-operative care, are essential for reducing the risk of abdominal wound dehiscence[3].

This study identified several pre-operative risk factors for the development of burst abdomen, including anemia, hypoproteinemia, intra-abdominal infection, and post-operative abdominal distension and cough. These factors can weaken the tissues and impair wound healing, increasing the risk of wound dehiscence[4].

II. METHODOLOGY:

This is a longitudinal study conducted, involving 100 patients who underwent emergency and elective laparotomy procedures using a midline incision. The study period spanned from September 2016 to January 2019. Data is collected in a clinical proforma. Consent from the patients is obtained

All patients more than 14 years underwent emergency and elective laparotomy by midline incision. Females underwent gynecological procedures were also included. Antibiotics were administered as part of the pre-operative treatment for patients presenting with acute abdomen in the

International Journal Dental and Medical Sciences Research
Volume 6, Issue 1, Jan-Feb 2024 pp 640-644 www.ijdmsrjournal.com ISSN: 2582-6018

emergency ward, as well as for some cases of elective laparotomies.

Routine investigations were conducted for all patients, including complete blood count (CBC), renal function tests (RFT), serum electrolytes, electrocardiogram (ECG), chest X-ray (CXR), blood grouping, abdominal ultrasound (USG), and abdominal computed tomography (CT).These routine investigations are important for assessing the patient's overall health status, identifying any underlying medical conditions or abnormalities, and obtaining baseline data for comparison during the follow-up period of the study.

III. RESULTS

A total of 100 patients were included in this study who underwent laparotomy midline incision. Of these, 74 (74.94%) were male and 26 (25.06%) were female. The mean age was47.78±18.04 (range 14-80) years with the most common age of presentation being 51-60 years(Error! Reference source not found.). The incidence of burst abdomens was highest in the age group of 51-60(41.6%).There were no burst abdomens in the age group of 14-30 and above 70 years of age. The incidence of burst abdomens in the age group of 41-50 was 33%. The incidence of burst abdomens in the age group of 61-70 was 8.33%.

Incidence rate is slightly higher in males (12.16%) compared to females (11.53%). Though the difference is small, but information helps in understanding the patterns and trends in the study (

Figure legends

Figure 1).

According to the data, it appears that there is a higher incidence of burst abdomens in patients with hypoalbuminemia (26.6%) compared to those without hypoalbuminemia (5.7%). Similarly, there seems to be a higher incidence of burst abdomens in patients with anemia (9 out of 20 cases) compared to the overall incidence of burst abdomens (12 out of 100 cases). These findings highlight the potential impact of hypoalbuminemia and anemia on the development of burst abdomens (

Figure legends

Figure 1: Number of Burst abdomen in males and females

Figure 2**)**.

Out of the 100 cases studied, the majority of burst abdomens occurred in cases of DU perforation (6 cases), followed by ileal perforations (3 cases). There were also individual cases of burst abdomen in blunt injury abdomen, intestinal obstruction, diaphragmatic hernia, and jejuna perforation. These findings provide valuable insights into the distribution and occurrence of burst abdomens in different types of abdominal conditions.

Out of the 12 cases of burst abdomen, 5 cases were managed surgically using tension band suturing, while the remaining 7 cases were managed conservatively. Almost all 12 cases of burst abdomen occurred in laparotomies rectus closed by continuous technique and no burst observed in cases of interrupted X- closure of rectus (

Figure legends

Figure 1: Number of Burst abdomen in males and females

Figure 2: Prevalence of Burst abdomen with different Risk factors

Figure 3: No. of bursts

Figure 4).

IV. DISCUSSION

Burst abdomen is indeed a serious complication. Despite advancements in our understanding of wound healing and improvements in preoperative and post-operative care, burst abdomen continues to pose challenges in patient management[5]. It not only leads to a prolonged hospital stay but is also associated with significant mortality rates, which can be as high as 20%. It highlights the importance of continued research and efforts to better understand the underlying causes and develop effective strategies for prevention and management.

In our country no study was found, but observational incidence in the tertiary hospital varies between 0.2-3%. It occurs mostly between the sixth and eight days after surgery.

It's interesting to note that while randomized trials in the West have reported equal wound complication rates using continuous or interrupted monofilament facial closure, the magnitude of burst abdomen seems to be more serious in India [6-11]. The Indian authors have reported burst abdomen occurrence ranging from 10% to 30% in emergency cases, [1, 7-8, 9] with Professor Naithani's unit reporting 30% burst abdomen specifically in infected cases from Allahabad[10]. These findings highlight the

importance of considering regional variations and factors such as infection rates when studying burst abdomen. It also emphasizes the need for tailored approaches and strategies to address this specific issue in different populations.

Our study showed emergency and elective laparotomy cases with multiple factors adverse to healing, the incidence of burst abdomen was observed to be 12%. This highlights the significance of considering various factors that can potentially affect wound healing and increase the risk of burst abdomen. The fact that the study included cases that underwent laparotomies with midline incisions for different indications adds to the diversity of the findings.

The study conducted in the department of surgery of Hospital and Teaching Hospital found that out of the 3500 abdominal laparotomies performed, 60% of the patients who developed wound dehiscence had undergone emergency surgery. In the present study, it was observed that 84% of patients who underwent emergency surgery developed abdominal wound dehiscence, which was statistically significant ($p < 0.001$) [11].

This study also revealed a higher incidence of burst abdomen in emergency operations compared to elective surgeries. This could be attributed to several factors, including the lack of bowel preparation, inadequate pre-operative optimization, and a higher frequency of contaminated cases in emergency surgeries. It is important to note that burst abdomen, or abdominal wound dehiscence, is a serious complication that can lead to increased morbidity and mortality in surgical patients. Therefore, efforts should be made to address the causes identified in this study, such as improving pre-operative preparation and minimizing contamination in emergency surgeries, in order to reduce the incidence of burst abdomen.

The present study observed that 45% of burst abdomen cases occurred in anemic patients with a hemoglobin (Hb) level of less than 10g%. This finding suggests that anemia may not be the sole

cause of burst abdomen, but it does contribute to its occurrence by interfering with the healing process of the wound. Previous studies conducted have also demonstrated that anemic individuals tend to have poor wound healing and are more likely to experience wound gaping [12,13]. This supports the notion that anemia can negatively impact the healing process and increase the risk of burst abdomen. Furthermore, the present study found that only 3.75% of burst abdomen cases were noted in preoperative patients without anemia. This suggests that anemia may be a significant contributing factor to the occurrence of burst abdomen.

Overall, the findings of the present study and previous research highlight the importance of addressing anemia in surgical patients to optimize wound healing and reduce the incidence of burst abdomen. Proper management of anemia preoperatively, such as through blood transfusions or iron supplementation, may help mitigate this risk. Effects of hypoalbuminemia, abdominal distension and cough, immune compromised status, intra-abdominal infection, and the higher incidence of burst abdomen in emergency cases.

Hypoalbuminemia, characterized by low serum albumin levels, was found to be present in 26% of burst abdomen cases in the present study. This suggests that malnourishment and low albumin levels contribute to a prolonged inflammatory phase and impair various processes involved in wound healing. Therefore, hypoalbuminemia is considered a significant causative factor for the development of burst abdomen.

Abdominal distension, often caused by intestinal dilatation or the collection of fluid, generates stresses in the abdominal wall. This can result in the under-tension suture cutting through the rectus sheath and leading to wound disruption. Coughing, especially in the post-operative period, can increase intra-abdominal pressure, potentially causing the breakage of sutures, undoing of knots, or pulling through the tissue[14]. Increased intra-abdominal pressure due to abdominal distension, coughing, or vomiting is considered a major cause of burst abdomen.

Patients with compromised immune status, such as those with HIV and immunodeficiency, are observed to have an increased risk of developing burst abdomen due to the impact on the healing process of the woodwinder-abdominal infection was found to be the most common factor observed in 90% of patients with burst abdomen in the present study. Infection can significantly decrease the tensile strength of contaminated wounds, leading to wound breakdown and subsequent healing by granulation tissue[15].

The incidence of burst abdomen is higher in emergency cases compared to elective cases. This can be attributed to poor patient preparation, complicated inflammatory disease, premorbid factors, and operating at odd hours. Additionally, the laparotomy wounds in emergency cases were often contaminated or dirty. Contaminated or dirty wounds have been identified as important predictors for wound infection. The duration of

emergency laparotomy also played a role, with burst abdomen occurring in 13% of cases with emergency laparotomies lasting for more than 2 hours.

Management of burst abdomen can be approached conservatively or through surgical intervention such as tension band suturing[16]. In the present study, some cases were managed conservatively with regular dressings followed by secondary suturing, while others required immediate surgical procedures. The overall goal is to prevent burst abdomen by ensuring proper preoperative preparation, following good suturing techniques during closure, and providing postoperative care until the patient is discharged from the hospital.

It is important to note that each case is unique, and individualized management plans should be developed based on the specific factors contributing to burst abdomen in each patient.

V. CONCLUSION

In conclusion, burst abdomen remains a significant and serious complication in surgical practice, posing challenges in patient management despite advancements in our understanding of wound healing and improvements in preoperative and post-operative care.This study, conducted in our country, highlights several important findings:

Regional Variations: The incidence of burst abdomen appears to vary widely across regions, with higher rates observed in emergency cases in our population compared to Western studies. This underscores the importance of considering regional variations and local factors, such as infection rates, when studying and addressing this complication.

Risk Factors: Multiple factors were identified as contributing to the development of burst abdomen. These include emergency surgeries, anemia, hypoalbuminemia, abdominal distension, coughing, compromised immune status, intra-abdominal infection, and the duration of emergency laparotomies.

Anemia's Role: Anemia emerged as a significant factor in the occurrence of burst abdomen, interfering with the wound healing process. Managing anemia preoperatively through strategies like blood transfusions or iron supplementation may help mitigate this risk.

Hypoalbuminemia: Low serum albumin levels were associated with a considerable proportion of burst abdomen cases, emphasizing the role of malnourishment and low albumin in impairing wound healing.

Infection and Immune Status: Infection, particularly intra-abdominal infection, was identified as a common factor in burst abdomen cases, underscoring the importance of infection control measures. Patients with compromised immune status were also at increased risk.

Emergency Surgery: The study reaffirmed that burst abdomen is more common in emergency surgeries, possibly due to factors like poor patient preparation, contaminated wounds, and longer operative durations.

Management: The management of burst abdomen can range from conservative approaches with regular dressings and secondary suturing to surgical interventions such as tension band suturing. However, prevention remains paramount through proper preoperative preparation, meticulous suturing techniques, and comprehensive postoperative care.

Individualized Approach: It is crucial to recognize that each case of burst abdomen is unique, and management plans should be tailored to address the specific factors contributing to the complication in each patient.

In light of these findings, this study reinforces the urgency of ongoing research and efforts to understand and prevent burst abdomen. It emphasizes the need for tailored approaches that consider regional variations and individual patient characteristics. Ultimately, the goal should be to reduce the incidence of burst abdomen and improve patient outcomes by addressing the identified risk factors and optimizing surgical practices.

REFERENCES:

[1]. Shukla HS, Kumar S, MisraMC,Naithani YP, Burst abdomen and suture material: acomparison of abdomen wound closure with monofilament nylon and chromic catgut,IndianJ surg; 1981, 43;48791.

[2]. DudleyHAF,Layeredand mass closureof the abdominalwall. Br JSurg 1970; 57.664-7.

[3]. Jenkins TPN,The burst abdominal wound:a mechanical approach. Br J Surg 1976;63;873-6

[4]. JonesTE, Brubaker RE.the useofalloy steel wirein closureoftheabdominal wounds.

[5]. Surgery,gynaecological/Obst 1941;72: 1056-9,

[6]. Irvin TT, Wound repair. Closure of the abdominal wound. Ann R CollSurg Eng1 1978;60:224-6.

[7]. Ellis H, Bucknall TE, Cox PJ, abdominal incision and their closure, CurrProbSurg1985:22-1-51.

[8]. Auspbsky Jar,Evans M, Pollock AV. Does mass closure of midline laparotomiesstandthe test of time? A random control clinical trail. Ann R CollSurgEng 1985:67: 159-51.
[9]. SinghA,SinghS,DhaliwalU,SinghS.Techni queofabdominalwallclosure:Acomparative study.Ind Jsurg.1981:43: 785-90.
[10]. Trombose JP. Smith IB, HOLM JP, Hermans JP, randomized cliccal trial comparing twomethodsof fasciaclosurefolloein midline laparotomy.
[11]. McNellPM,SugemanHJ.Continuousabsorb ablevsinterrupted.Nonabsorbablefascialclo sure.A prospective, randomizedcomparison. Arch Surg197=86; 121:821-3.
[12]. ColomboM,MagoiniA,Parma G,Scalambrino /S,Milani.A randomizedcomparisonofconitinuousverus interrupted mass closure of midline incisonin patients withgynacecologicalcancer/ Obst. 1997:89;684-9.
[13]. Keill RH, Keitzer WF, Nichols Wk, Henzel J, Dewerse MS: abdominal wound dehiscence. Arch Surg 2003; 106:573-577.
[14]. Preventionofburstabdominalwoundbynewt echnique:Arandomizedtrialcomparingcont inuous versus interrupted X-sutures. Anuragsrivasthava& other.AIIMS DELHI,Journalof Surgery.2004,66 pages 19-22.
[15]. PenninckxFM,PoelmansSV,KerremansRP etal(1979)Abdominalwounddehiscenceing astroenterological surgery.AnnSurg 189:345–352.
[16]. Mehdorn, M., Groos, L., Kassahun, W., Jansen-Winkeln, B., Gockel, I., &Moulla, Y. (2021). Interrupted sutures prevent recurrent abdominal fascial dehiscence: a comparative retrospective single center cohort analysis of risk factors of burst abdomen and its recurrence as well as surgical repair techniques. BMC surgery, 21(1), 208.
[17]. Lopez-Cano M, Pereira JA, Armengol-Carrasco M. "Acute postoperative open abdominal wall": nosological concept and treatment implications. World J Gastrointest Surg. 2013;5(12):314–320.

Figure legends
Figure 1: Number of Burst abdomen in males and females
Figure 2: Prevalence of Burst abdomen with different Risk factors
Figure 3: No. of bursts
Figure 4: Burst Abdomen and Suturing Technique