ABDOMINAL WOUND DEHISCENCE: AN ONGOING DILEMA

ADNAN AZIZ, SHAMS NADEEM ALAM, IRFAN SHAIKH, S. MANZAR
Department of Surgery, Dow University of Health Sciences & Civil Hospital, Karachi

ABSTRACT
Objective: *To find out the frequency of Abdominal Wound Dehiscence(AWD) and review the associated risk factors.*
Study Design: *Cross-sectional study with prospective data collection.*
Setting & Duration: *Surgical Unit II of Civil Hospital Karachi, from June 2006 to March 2007.*
Methodology: Inclusion Criteria: *One hundred patients of both genders who consented to be included in the study. All patients above the age of 12 years who underwent emergency or elective laparotomy through a midline incision were included in the study. Patients undergoing a second laparotomy or subsequent surgeries during the same admission were part of the study.*
Exclusion Criteria: *Patients under 12 years of age or operated through other incisions were excluded from the study. Methods: All data collection was prospectively done on specifically designed proforma. Categorization of wound dehiscence was done into two groups; partial and complete.*
Results: *Out of total 100 patients there were 106 laparotomies. A total 7 cases developed wound dehiscence giving an overall frequency of 6.6%. Age ranged from 15-62 years with mean age of 33. Male to female ratio of 3:1. The frequency of AWD was greater in males than females. Majority of patients had gut perforation with peritonitis, Emergency surgery showed a higher frequency of wound dehiscence 7.9% (6/76) compare to elective surgery 3.3% (1/30). Wound infection was a major factor leading to wound failure. Old age was also associated with greater frequency. The mortality rate of abdominal wound dehiscence was 10%, due to septicemia and multiple organ failure.*
Conclusion: *Abdominal wound dehiscence has significant impact on health care cost due to high morbidity and mortality. The significant risk factors in this study were primary disease presented with peritonitism, emergency surgery, old age, male gender, wound infection and technique of closure. Less significant factors were jaundice, uremia, diabetes and type of suture material used.*

KEYWORDS: *Wound Dehiscence, Burst Abdomen, Laparotomy, Risk Factors,Exvisceration*

INTRODUCTION

Abdominal wound dehiscence (AWD) is a multi factorial problem.[1] It is conditioned by local systemic as well as pre-, peri, and postoperative factors. Incidence of wound dehiscence following laparotomy was in 1979 shown to be 2.58 % in 4538 patients by Freddy Penninckx[1] in Belgium. This was echoed in a 5 year study of 1129 laparotomies showing a frequency of 1.7% wound dehiscence by Bucknall and Ellis[2] from London in 1980. Even after nearly three decades carries with it is a substantial problem even in countries who are leading the world like USA. An estimated 2.057 postoperative abdominal wound dehiscences occurred per 1,000 abdominopelvic surgeries (excluding obstetric and neonatal conditions) in the USA[3] in 2000. This did not show a major change in 2002 with abdominal wound dehiscence carrying a 2.15% incidence.[4] Ussiri from Dar es Salaam[5] in 2005 showed wound dehiscence was 1.1% in laparotomy wounds. Plowman[6] in 2000 showed there is an increase in the cost of care both in terms of increased hospital stay, nursing and manpower cost in managing complications. In his study of 4000 patients the cost of managing was approximated to be £3500 per patients. Tyburski[7] when comparing the effectiveness of two regimens of prophylactic antibiotics for penetrating abdominal injuries, found that the overall wound infection was 18%. Infection increased length of hospital stay from 8.7±3.5 days to 23.3±10.9 days

Correspondence:
Dr. Adnan Aziz, Assistant Professor
Department of Surgery, Unit VI
Dow University of Health Sciences &
Civil Hospital, Karachi.
Phones: 0321-9242202.
E-mail: dradnanaziz@gmail.com

and hospital charges from $24507 ± $9860 to 104920 ±49083.

Although the incidence of AWD in the international literature[1-7] is between 1.1 to 2.8%, the few studies emerging from Pakistan[8-12] have shown an incidence between 2.7 to 8.3%. Probably many patients in Pakistan have a poor nutritional status and the presentation of patients with peritonitis is often delayed in the emergency, although there are no studies to validate this. This makes the problem of wound dehiscence more common and graver in the Asian sub-continent setting as compared to the West as showed by Mathur.[13] Deep wound infection of the abdominal wall and postoperative abdominal wound rupture are dangerous complications of laparotomy that require emergency operative intervention.[14] Use of steroids are generally considered to inhibit primary wound healing and delay the formation of granulation tissue. It is also well known that long-term treatment with steroids induce an increase in complications during and after an operation because the patient is in secondary adrenal insufficiency as a result of suppression of the hypothalamic-pituitary-adrenal axis.[15] The significant risk factor in this study are age more than 55 years, male gender, underlying malignancy, wound infection, jaundice, use of steroids, emergency surgery, uremia and technique of closure.[10] Surgical wound site infections increase patient morbidity with physical disability, prolonged hospital stay and poses heavy economic burden.[16] Peritonitis, wound infection and failure to close the abdominal wall properly are most important causes of wound dehiscence.[17] Surgical skills and techniques of trainee surgeons may or may not have a bearing on postoperative wound infection.[18] Meticulous surgical technique, proper sterilization and judicious use of antibiotics help control the morbidity of wound site infection.[16]

Rationale of Study:
The current study was done to see if the factors affecting AWD in our setting had a different relationship to the problem than other local and international studies.

METHODOLOGY

This study was carried out at Surgical Unit II, Civil Hospital Karachi, from June 2006 to March 2007. A total of 100 patients above 12 years of age and both sexes admitted in our unit, who underwent elective surgery or emergency laparotmy, through a midline incision were included. Patients undergoing a second laparotomy or subsequent surgeries during the same admission were part of the study.

A specially designed performa was this is included in detailed history filled each patient. Each patient underwent a detailed assessment detailed history and local and systemic clinical examination including and duration of steriods use. Irradiation, other chronic illness and any malignancy duration and nutritional status all patients underwent a series of blood picture, ESR, serum electrolytes, blood sugar, urea and creatinine x-ray chest, x-ray abdomen and ultrasound abdomen. The category of surgery whether emergency or elective was documented. The patients in critical condition were initially resuscitated. The operative findings were recorded. Operative findings included the length of incison, method of closure and type of suture material used. The postoperative course of wound was monitored from third postoperative day onward on a daily basis and this included redness and oedema and presence or absence of discharge, nature of discharge, estimated volume of discharge.

The wound dehiscence was categorized into two groups i.e. partial and complete. Patients with wound failure in which the intestine had not eviscerated, but stuck to the edges were labeled as partial (incomplete) wound disruption. These were managed conservatively by gentle bedside debridment, daily dressing and abdominal binders. Skin closed without repairing fascia, knowing very well that these patients may develop incisional hernia later on. Patients with acute wound disruption with evisceration of intestines were labeled as complete wound dehiscence. These were managed in emergency by closure of the abdomen en-mass with tension sutures.

RESULTS

A total number of 100 patients with various etiologies of emergency and elective laparotomies were included in this study. Age ranged from 15 to 62 years. Majority of the patients fell in the age range of 20 to 40 years followed by 50 to 60 years. There were 75 males and females patients. Male to female ratio 3:1. After preoperative measures, surgery were performed through midline incision. A total of 106 laparotomies were performed as 6 patients had to have second procedure done during the same admission. The rate of wound dehiscence in emergency laparotomies was 7.9% (6/76) compare to elective surgery 3.3% (1/30). Overall rate of Abdominal Wound Dehisence (AWD) was 6.6% i.e. 7 out of 106 laparotomies. Wound infection was a major factor to wound failure. The overall frequency in males was higher. There was also increasing tendency towards wound dehiscence with increasing age above 50 years and the highest risk was found in patients more than 60 years of age.

Among 100 patients, 15 developed wound infection,

Gender	No. of Patients	%
Male	75	75
Female	25	25
Total	100	100

Table I. Gender distribution

out of 15 cases 3 patients developed partial wound dehiscence and 4 patients developed complete wound disruption. This study showed that 5 patients had serum albumin below 3.5 mg/dl and 1 developed wound dehiscence while other patients had serum albumin above 3.5 mg/dl and 2 developed wound disruption. In this study 3 patients were having jaundice but none had developed wound dehiscence. Twenty four patients were diabetic of who 4 developed wound dehiscence while among 76 of non diabetic group 2 developed the same. One patient died after emergency surgery and one died after elective surgery. Overall mortality was 1.88% in the study.

DISCUSSION

Abdominal Wound Dehisecnce or Burst abdomen is a serious postoperative complication that concerns every abdominal surgeon. The incidence of this complication as reported in this study was 6.6% . This is comparable with other previously published works by Lodhi[9] who

Age	No. of Patients	%
12-19 Years	5	5
20-29 Years	26	26
30-39 Years	28	28
40-49 Years	18	18
50-59 Years	19	19
60-69 Years	4	4
Total	100	100

Table II. Age distribution

showed a frequency of 8.3%. This was echoed in a in single centre study by Khan[10] from Multan in 2004 on 406 patients of which 32 showed wound dehiscence giving an over all frequency of 7.8%. A slightly lower frequency 5.33% of AWD was shown by Shaikh[12] in his 2005 study on 300 patients. In the same study by Shaikh published in 2005, the rate of AWD in emergency surgery was 7% as compared to 2% for Elective cases. This was duplicated in our smaller group. Mathur[13] in 1983 showed the problem of wound dehiscence more common and graver in our South Asian setting as compared to the West.

The male to female ratio in the current study was 3:1 which is comparable to the study from the Multan[10] group of 2.8:1.This was in contrast to the finding of the

Table III. Disease Pattern

Disease	No. of Patients	No. of Wound Dehiscence
Gunshot	24	2
Tuberculosis abdomen	17	2
Small Bowel Pathology	11	1
Appendicitis	9	Nil
Perforated Duodenal Ulcer	8	Nil
Stabbings	7	Nil
Colorectal Carcinoma	7	1
Benign Biliary Disease	5	1
Malignant Biliary Disease	3	Nil
Mesenteric Cyst	2	Nil
Gastro-Intestinal Stromal Tumour	1	Nil
Splenic Pathology	1	Nil
Miscellaneous	5	Nil
Total	100	7

study from Larkana[12] of male to female ratio was 1:0.58. Mathur[13] showed a male to female ratio of 1.85: 1.

The presented study showed a AWD rate of 7.9% for Emergency surgery which is slightly less than the 12.5% frequency of AWD seen in the Multan group[10] while Shaikh[12] showed a rate 0f 7% for emergency surgery. Efforts have been made to overcome this complication with various innovations in the technique of closure of laparotomy incision and use of different types of suture materials. Clinical studies have reported a significant reduction in the incidence of burst abdomen by using a single layer closure of laparotomy incisions with a non-absorable suture material. The incidence of burst abdomen with technique as shown by Geldere[19] is 1.3%.

The literature shows that SSI increases with obesity, one reason being a decrease in blood circulation in fat tissues[16]. Malnutrition is another factor predisposing to SSI[20]. Recent reports refer to potential causative factor for AWD; of which steriod use[21] is thought to be one. However, these references were based on studies that compared the risk factors influencing wound dehiscence after all types of abdominal surgery and numerous other factor could be involved, both surgery-related (wound infection, pulmonary disease, homodynamic instability, emergency operation, type of incision and closure, etc.) and systemic (hypoalbuminaemia, systemic infection, obesity, uraemia, could be significant[22], but there were no indications of the amounts or durations of steriod intake before and after surgery that were required in order to increase the risk[21]. Duration of length of the surgical procedure[23] could be a risk factor for AWD as demonstrated in 2001 by Salman and his co-workers. Improvement in the surgical skills and techniques of resident staff and also their direct supervision not only decreases the duration of operation but also incidence of postoperative wound infection.

CONCLUSION

Rate of wound dehiscence is highest in patients undergoing the emergency laparotomy, associated with low albumin and malnourishment.

REFERENCES

1. Penninckx F M, Poelmans S V, Kerremans R P, Beckers J P. Abdominal wound dehiscence in gastroenterological surgery. Ann Surg 1979; 189(3): 345-352.

2. Bucknall T E, Cox P J, Ellis H. Burst abdomen and incisional hernia: a prospective study of 1129 major laparotomies Br Med Journ 1982: 284: 931-33.

3. National Healthcare Quality Report, AHRQ, DHHS, 2003 Data Tables Appendix. National Healthcare Quality Report, 2003. Agency for Healthcare Research and Quality, Rockville, MD. Available online http://www.ahrq.gov/qual/nhqr03

4. National Healthcare Quality Report, AHRQ, DHHS, 2005 Data Tables Appendix. National Healthcare Quality Report, 2005. Agency for Healthcare Research and Quality, Rockville, MD. Available online http://www.ahrq.gov/qual/nhqr05/

5. Ussiri E V, Mkony C A, Aziz M R. Surgical Wound Infection in Clean-Contaminated and Contaminated Laparotomy Wounds at Muhimbili National Hospital. East and Central African Journal of Surgery, 2005; 10(2): 19-23.

6. Plowman R. The socioeconomic burden of hospital acquired infection. Euro Surveill 2000; 5(4): 49-50.

7. Tyburski J G, Wilson R F, Warson K M, McCreadies S. A trial of ciprofloxacin and metronidazole versus gentamicin and metronidazole for penetrating abdominal trauma. Arch Surg 1998; 133: 1289-96.

8. Lodhi F, Ayyaz M, Majeed H J, Afzal F, Farooka M W, Islam H R U, Chaudhry Z. Etiological Factors Responsible for Abdominal Wound Dehiscence and their Management Ann King Edward Med Coll 1999; 5(3-4): 312-14.

9. Lodhi F B, Asrar R, Akram M, Hussain R. Incidence of Abdominal Wound Dehiscence (Midline Vs Paramedian Incision Closed with Vicryl No.1) Ann King Edward Med Coll 2001; 7(1): 38-40.

10. Khan M N S, Naqvi A H, Irshad K, Chaudhary A R. Frequency and risk factor of abdominal wound dehiscence J Coll Physicians Surg Pak 2004; 14(6): 355-7.

11. Waqar S H, Zafar L M, Zahid M A, Muhammad S. Frequency and risk factors for wound dehiscence / burst abdomen in midline laparotomies. J Ayub Med Coll Abbottabad 2005; 17(4): 70-3.

12. Shaikh M S, Shaikh S A, Shaikh B A, Abro A, Sikandar S. Abdominal wound dehiscence: fre quency and risk factors Journ Surg Pak 2005; 10(4): 30-33.

13. Mathur S K. Burst abdomen a preventable complication, monolayer closure of the abdominal incision

with monofilament nylon. Journ Postgrad Med 1983; 29:

14. Fleischer G M, Rennert A. Infected abdominal wall and burst abdomen. Chirug 2000; 71(7): 754-62.

15. Kihara A, Kasamaki S, Kamano T, Sakamoto K. Abdominal wound dehiscence in patients receiving long-term steroid treatment. J Int Med Res 2006; 34(2): 223-230.

16. Salman A, Khalid M G, Mohammad A, Yar M, Abdul R G, Fowad K, Abdul M C. Surgical wound site infection - our experience. Ann King Edward Med Coll 2001; 7(3): 211-2

17. Waqar S H, Zafar L M, Zahid M A, Muhammad S. Frequency of wound dehiscence / burst abdomen in midline laparotomies. Ann Pak Inst Med Sci 2005; 1(2): 74-8.

18. Gislasona H, Søreideb O, Viste A. Wound complications after major gastrointestinal operations the surgeon as a risk factor Dig Surg 1999; 16: 512-514.

19. Dvan Geldere. One hundred years of abdominal wound dehiscence and nothing has changed Hernia 2000; 4(4): 302-304.

20. Syed M R, Mohammad I, Ahmad S K, Ali J. Abdominal surgical site infection: Incidence and risk factors at an Iranian Teaching Hospital, BMC Surg 2005; 5: 2.

21. Kihara A, Kasamaki S, Kamano T, Sakamoto K. Abdominal wound dehiscence in patients receiving long-term steroid treatment. Journ Int Med Res 2006; 34(2): 223-230.

22. Riou J P, Cohen J R, Johnson H. Factors influencing wound dehiscence Am Journ Surg 1992; 163(3): 324-30.

23. Salman A, Ali A A, Karim F, Aslam N, Gondal K M, Chaudhry A M. Duration of Surgery: Does it contribute to post-operative wound infection? Pak Journ Surg 2001; 17(3): 35-40.