Study of factors responsible for causing burst abdomen in patients operated for emergency and planned laparotomy.

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Abstract:

Burst abdomen (BA) or 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 hospitalized patients. The comparative study was carried out over 50 patients who underwent either emergency or elective laparotomy in our institute in the 2.5-year duration spanning from September 2014 to November 2016. Predisposing factors responsible for burst abdomen were identified as poor nutritional status, emergency surgery, intra-abdominal infection, uraemia, hemodynamic instability, hemoglobin, COPD, jaundice, Diabetes mellitus.

Keywords: - Burst abdomen, Laparotomy, Predisposing factors.

Introduction:

Burst abdomen (BA) or abdominal wound dehiscence is a severe post-operative complication. Incidence as described in literature ranges from 0.4%[(8)]to 3.5%[(9)].Burst abdomen is defined as post-operative separation of abdominal musculo-aponeurotic layers, which is recognized 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, anemia), advanced age, systemic diseases (uremia, diabetes mellitus) etc.

Good knowledge of these risk factors is mandatory for prophylaxis. Suture materials are of great importance in providing sufficient strength and influencing adverse event[(1)], Retention sutures has also been suggested as a treatment choice for managing fascial burst abdomen[(2)]. Patient identified as being high risk may benefit from close observation and early intervention. Complications prohibit the surgeons from performing this technique[(3)]. The study aims to find etiological factors of burst abdomen in hospitalized patients, evaluate current management methods and to compare conservative and operative approach with respect to complication and outcomes.

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Material and method

The comparative study was carried out

with 50 patients who underwent either emergency or elective laparotomy in our institute in the 2.5-year duration spanning from September 2014 to November 2016. The patients were chosen based on the inclusion and exclusion criteria mentioned below. Informed consent was taken from all the patients.

Occurrence of BA (the primary outcome) was assessed daily by precise examination of the wound. When wound disruption and/or secretions were observed, digital examination of wound depth was performed to evaluate the integrity of the fascia.

When the clinical findings were not conclusive other factors were assessed like evisceration of abdominal content, wound infection (based on clinical findings approved by microbiological culture), postoperative pain, length of postoperative hospital stay, occurrence of incisional hernia, and post-dehiscence in-hospital mortality.

Retention sutures[(2)] were removed 3 or 4 weeks postoperatively when they were loose and bare no strain. Patients were followed for a median of 6 months.

Inclusion criteria:

- Midline laprotomy closed with primary intention.
- Cases where retention sutures were taken as a prophylactic measure to prevent burst abdomen
- All kind of laprotomy like blunt abdominal trauma, GI obstructions, peritonitis due to viscous perforation, abdominal mass, Koch's abdomen etc.
- Laparotomies done as emergency or planned surgery Patient with age >12 years
- Patient with no history of previous laparotomies.

Exclusion criteria:

- Cases with stoma exteriorized from the midline main wound
- Laprotomy wound closed with retention sutures in cases of re-laprotomy for burst abdomen
- Those laprotomy with anterior abdominal wall injured due to blunt or sharp trauma in the form of muscle hematoma, muscle disruption, abdominal wall laceration.
- Age group i.e. below 12 years of age history of previous laparotomy

Baseline parameters:

- Poor nutritional status (S. Albumin<3.5g %);
- Emergency surgery;
- Intra-abdominal infection (peritonitis);
- Uremia (S. urea > 60 mg% and S. Create >2mg %);
- Hemodynamic instability (BP<100/70mmhg);
- Hemoglobin (<10 g %);
- Chronic pulmonary diseases;
- Clinical jaundice (total bilirubin >1 mg/dl);

- Diabetes mellitus (FBS>127mg% or RBS >140mg %);

Result:

Table 1: Risk Factors & their correlation with burst abdomen

Risk factor	BA in emergency surgery	BA in planned surgery	Total BA rate n=50	BA rate in Ramneesh et al study (n=50)
Diabetes Mellitus	88.89%	11.11%	18%	8%
Uremia	88.88%	11.11%	36%	38%
Jaundice	86.95%	13.05%	46%	16%
Anemia	88.57%	11.43%	70%	26%
Hypoproteinemia	87.18%	12.82%	78%	24%
Wound infection	88.23%	11.77%	68%	90%
WCC III *	94.12%	5.88%	68%	44%
WCC IV *	100%	0%	6%	44%
Cough	88%	12%	50%	18%
Vomiting	89.66%	10.34%	58%	20%
Abdominal distension	90%	10%	44%	12%

Image 1: Case of splenic abscess, shows severe sero-sanguineous discharge & Burst was observed on 9th Postoperative day

Image 2: Case of jejunal perforation & Burst was observed on 7th Postoperative day

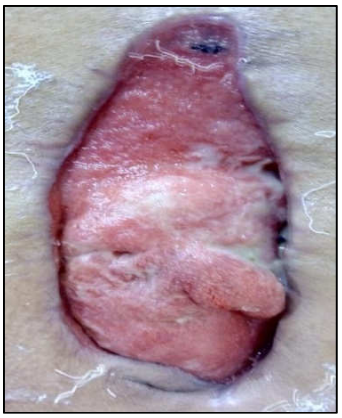

Image 3: Case of enteric ileal perforation. Ileostomy was done and wound closed with retention suture.

Image 4: Case of stab injury operated for mesenteric tear. Wound closed with retention suture.

Discussion:

Our study was done with50 patients, out of which 6were operated in plan surgery and 44 patients were in emergency, incidences of burst abdomen depends upon various factors like age, gender, nutritional status, anemia, uremia, jaundice, wound infection, technique of wound closure, suture material used, emergency or elective surgery etc[(4)].The following observations were made in our comparative study of complications following the midline laparotomy wound closure with and without prophylactic tension sutures.

A. Age:

The patients are divided almost equally in all age groups. Maximum cases of burst abdomen, 95.83% in emergency group were observed in 41-60-year age group and 66.67% in plan group were observed in the age group of <20 years. Thus, the risk of burst abdomen increases with age. Mean age was 46 year.

B. Sex

Total 35 male had BA out of which 31(88.57%) were operated in emergency and 4(11.43%) as planned/elective surgery.

Similarly, in females a total of 15 BA were found, of which 13 were operated in emergency (88.67%) than 2 as elective surgeries (13.33%). Overall the rate of BA was more in males (70%) than females (30%), male predominance which was also noted by Pennickx et al [5] and Keil et al [6].

C. Shock

There were 44 patients of burst abdomen having hypotension at the time of or after surgery suggestive of hemodynamic instability as a predisposing factor.

D. Diabetes Mellitus

In our study 18% patients with DM developed BA which was more than the rate shown in study by Ramneesh et al[7] (8%).Total of 9 patients having diabetes mellitus had BA. Out of it 8 (88.89%) were in emergency group and 1 (11.11%)patient in planned group.

E. Jaundice

In our study total 23 had clinical jaundice, thus affecting healing and causing burst abdomen, of which 20 patients were in emergency group and 3 patients in planned group.

F. Anaemia

Total 32 patients in emergency group had low hemoglobin level and 3 patients in planned group. All patients having anemia had burst abdomen.

G. Hypoprotinemia

Total of 34 patients in emergency group had low protein levels and 5 patients in planned group. All patients with hypoproteinemia (S. Albumin<3.5g %) had burst abdomen.

H. Intra-abdominal Pathology

The patients with peritonitis due to viscus perforation (24) and intra-peritoneal

abscesses (5) had maximum rate of BA. While the patients with malignancy and Koch's abdomen also showed significant number of BA.

This shows that emergency surgery like viscus perforation and peritonitis dueto abscess formation have high risk for burst abdomen due to severe inflammatory reaction.

I. Wound infection

Wound infection has direct positive correlation to BA. Total of 30 patients of emergency group and 4 patients of planned group wound infection.

J. Peritonitis

K. Type of closure of sheath

Out of 50 patient 36 patients in emergency while 6 patients in planned surgeries had continuous sheath suture. Other 8 patients who were operated in planned surgery had interrupted sheath closure.

Our study shows high chance of burst abdomen occurs in emergency group with continuous sheath closure.

Conclusion:

Burst abdomen is multifactorial in cause. In our study it occurs most commonly in Emergency laparotomyespecially in 41-60-year age group with midline incision predominately in males. Thus, elderly age and sex had no positive significance on burst abdomen as predisposing factor.In our study 88.89% were operated in emergency, 11.11% as planned surgeries.

A total of18% of patient having **diabetes** had burst abdomen. So, diabetes act as a predisposing factor for burst abdomen. About 13.64% patient with **Shock** later on had burst abdomen due to reduced vascularity in emergency group of patients. **Jaundice, Uremia, Anemia, Hypoproteinemia and pneumonia** was present in most patients of BA and most of such patients were operated in emergency setting, **Abdominal distention** post operatively was found in total 44% of patient having BA. We recommend **A Predisposing Factor Data Table** for assessing the patient pre- and post-operatively to quantify the risk of burst abdomen. These factors are: -

- Poor nutritional status (S. Albumin<3.5g %);
- Emergency surgery;
- Intra-abdominal infection (peritonitis);
- Uremia (S. urea > 60 mg% and S. Create >2mg %);
- Hemodynamic instability (BP<100/70mmhg);
- Hemoglobin (<10 g%);
- Chronic pulmonary diseases;
- Clinical jaundice (total bilirubin >1 mg/dl);

- Diabetes mellitus (FBS>127mg% or RBS >140mg %)

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