

A simple and effective way of treating dehiscence of big incision caused by severe abdominal infection

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Abstract

Wound dehiscence may happen at single or multiple regions, or comprise the full length of an incision and may affect some or all tissue layers. Sometimes there is even evisceration in which dehiscence of the wound follows abruptly and is accompanied by protrusion of abdominal structures, usually bowel, through the disrupted wound.

We are here introducing a new type of delayed closure for the management of our surgical wound dehiscence cases which proved to be effective. Our method's priorities aligned were; prevention of bowel protrusion, control of infection while at the same time promoting healing. After an adequate amount of time, our patients recovered well due to granulation formation and suturing. Our delayed primary closure technique proved to be convenient and safe, but a prospective comparative study is needed to confirm its usefulness in patients whose wounds are dehisced. We believe this technique can be appreciated in

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its own way and considered as an option in the treatment of surgical wound dehiscence.

Key words: Delayed primary closure, Surgical wound dehiscence, Incision, Infection

Abbreviations:

Surgical wound dehiscence (SWD)

Negative pressure wound therapy (NPWT)

INTRODUCTION

Surgical wound dehiscence is a severe problem that until today torments surgeons and threatens the patient. Surgical wound dehiscence (SWD) is the disruption or breakdown of the margins of a closed surgical incision that has been made in skin, with or without exposure or protrusion of underlying tissue, organs or implants (WUWHS¹).

SWD is indeed under-reported and is an important matter that affects large numbers of patients. The scope of its degree may range from a failure of the deeper portions of the abdominal incision to connect, which, if unrecognized in the postoperative course, may develop later into an incisional hernia, to the dramatic "burst abdomen" (Michael S. Eisenstat et.al²). Abdominal wound dehiscence post-laparotomy is a dreaded complication, which leads to severe morbidity and increased mortality (Fleischer GM et.al³, Poole GV Jr et.al⁴).

There are many ways suggested for management which include debridement, antibiotic therapy, re-suturing or use of wound closure devices such as mesh repair, vacuum pack, abdominal packing or even Negative pressure wound therapy(NPWT) but there is no consensus as they all have their specific advantages and disadvantages (Finn Gottrup et.al⁵). In the past five years, we have used an improvised method to treat sixteen abdominal wound dehiscence accompanied with severe abdominal problems which achieved good results.

Here, we present this technique in the management of "burst abdomen" which required meticulous attention and we believe it can

be a viable option in treating similar cases in the future.

Case:

Case 1. A 36-year-old male patient was injured by a car accident and was sent to the local hospital. He was given a CT scan and was diagnosed as spleen rupture. The patient underwent an urgent abdominal exploration and the ruptured spleen was removed. After surgery, the patient's condition was not improved but exacerbated. Ten days later, he was transferred to our hospital. We gave the patient a second surgery and found that the horizontal part of duodenum was ruptured. Seven days after the second surgery, the incision was infected and the middle part of the incision was opened (Fig.1). In order to prevent intestinal protrusion and skin defect which would require future skin graft, we dissected the margin of the incision with the use of local anesthesia and closed it with stitches from the skin to the anterior peritoneum tissue to reduce the incision at the bedside and the opened incisional part was covered with saline gauze. (Fig.2). We continued doing it to reduce the wound dehiscence. And at last the incision was healed (Fig.3). Infection and inflammation were managed using antibiotics according to incisional site and resistance patterns. Most importantly a drainage tube was left to drain out any accumulated fluid. After two years of follow up, there were no complications such as incisional hernia.

Fig.1. Opening of the middle part of the incision



Fig.2. Use of normal saline to cover the incision.



Fig.3. Incision healing.



Case 2

A 66-year old male patient underwent whipple procedure for ampullary adenocarcinoma in another hospital. Eight days later, he underwent a second surgery because of jejunal rupture. Another five days later, he had an abdominal infection with type 1 respiratory failure and was transferred to our hospital where he underwent a third surgery. A small intestinal rupture with both pancreatic and biliary leakage were found. The patient's incision was kept open because of abdominal infection and for drainage purposes (Fig.4). We made sure to monitor suspiciously for signs of infection at the incisional site at each dressing change. Additionally, wound cleansing was often done using sterile saline. We gradually reduced the incision by stitching the two incisional ends from the skin to the peritoneum in order to prevent intestinal protrusion and skin defect (Fig.5). It was imperative for us to notice the sight of thickened tissues developing into a healing ridge signifying the formation of new collagen. As one suture healed itself, we proceeded on doing the next suture. One of the

indications would be to being able to clear the incisional margin and freeing the skin properly. We were able to reduce the incisional site while all the time being able to drain out accumulated exudates. Abdominal pressure was maintained and there was no bowel protrusion and the dehiscence were healed (Fig.6). No herniation occurred after two years of follow up.

Fig.4. Abdominal incision kept open because of infection for drainage.

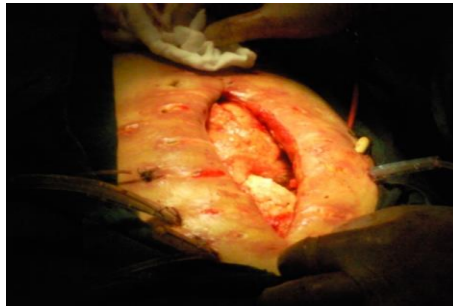


Fig. 5. Reduction by stitching the two incisional ends from the skin to the peritoneum to prevent intestinal protrusion and skin defect.



Fig.6. Dehiscence Healed.



DISCUSSION

Surgical wound dehiscence after laparotomy remains a serious complication with both high morbidity and mortality. Infection is the most common cause of abdominal wound dehiscence. Patients, most of the time have a delayed hospital discharge, readmission, additional surgeries. Even adjuvant therapy is delayed. Primary closure of abdominal dehiscence is unsuitable in most of these patients with wound infection, peritonitis and severe pancreatic or bowel leakage. Complete wound dehiscence is a serious condition when all layers of the abdomen are torn and underlying tissues and organs are exposed, which in some circumstances lead to “bulging out”. In cases of large fascia defects and evisceration of the bowel, the fascia is repaired by surgery. And if the abdomen is too distended to close the wound, temporary abdominal closure options which include the Bogota bag and NPWT are used (Kirshtein, Boris & Shapira et.al⁶). Recommended and definitive reconstruction is done with mesh, biologic mesh, components separation, and rectus abdominis sheath turnover flap method, and so on (Ramirez OM et.al⁷). However, although those methods have proved to be effective, unfortunately they still have some disadvantages. For example, with NPWT, these included leaving foam within a healed wound, damage to underlying organs, cellulitis, and further wound infection (Ont Health Technol Assess Ser et.al⁸). While they are cheap, drawbacks of Bogota bags have been reported as evisceration, which might occur from tearing correlated with increased internal abdominal pressure, an intestinal fistula may develop, and there is a low degree of primary closure in patients (Sherck J et.al⁹). In cases of mesh/skin graft, there are chances of tissue necrosis. There’s even a tendency of contraction and it is often more fragile. In our cases, we used a new type of delayed closure for the management of surgical wound dehiscence with infection which deemed to be very effective.

The advantages of this were we had direct visualization of the inside of the abdomen which made it easy to monitor. Our method provided easy sufficient drainage, thus allowing better management of infection. Moreover, our delayed closure allows decompression and reduction of internal abdominal pressure which helps to prevent bowel evisceration, in addition to preserving the fascial borders for

subsequent abdominal closure. Analgesics use was minimal and patient underwent less trauma. Furthermore, there was no need for graft use, healing time was less and management cost was reduced. We believe this technique can be appreciated in its own way and considered as an option in the treatment of surgical wound dehiscence.

Conflict of interest Statement: This statement is to certify that all Authors have seen and approved the manuscript being submitted. We warrant that the article is the Authors' original work and we have no conflict of interest to declare.

REFERENCES:

1. World Union of Wound Healing Societies (WUWHS) Consensus Document. Surgical wound dehiscence: improving prevention and outcomes. Wounds International, 2018
2. Causes and management of surgical wound dehiscence; Michael S. Eisenstat, M.D.# Stanley O. Hoerr, M.D. Department of General Surgery ; Cleveland Clinic Journal of Medicine. 1972 January;39(1):33-42
3. Fleischer GM, Rennert A, Rühmer M. Die infizierte Bauchdecke und der Platzbauch. *Chirurg* 2000; 71:754– 762.
4. Mechanical factors in abdominal wound closure: the prevention of fascial dehiscence. Poole GV Jr. *Surgery* 1985; 97:631–640.
5. An overview of surgical site infections: aetiology, incidence and risk factors Finn Gottrup, Andrew Melling, Dirk A. Hollander, *EWMA Journal* 2005; 5(2): 11-15
6. Use of the "Bogota bag" for temporary abdominal closure in patients with secondary peritonitis. Kirshtein, Boris & Shapira, Aviel & Lantsberg, Leonid & Mizrahi, Solly. (2007). *The American surgeon*. 73. 249-52.
7. "Components separation" method for closure of abdominal-wall defects: an anatomic and clinical study. Ramirez OM, Ruas E, Dellon AL. *Plast Reconstr Surg*. 1990;86:519–526.
8. Health Quality Ontario. Negative pressure wound therapy: an evidence-based analysis. *Negative pressure wound therapy: an evidence-based analysis. Ont Health Technol Assess Ser.* 2006;6(14):1–38.
9. Covering the "open abdomen": a better technique Sherck J, Seiver A, Shatney C, Oakes D, Cobb L. *Am Surg*. 1998 Sep;64(9):854-7.