Abdominal wound dehiscence and incisional hernia

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Abstract
Abdominal wound dehiscence and incisional hernias are common problems facing the general surgeon. Both can be thought of as forms of ‘wound failure’ and the risk factors are similar for both. Some of these may be avoided by sound surgical technique and correct patient preparation. The management of wound dehiscence ranges from simple dressings to emergency surgery to close a ‘burst abdomen’ followed by a period of intensive care. The management of incisional hernias is a much bigger topic and encompasses various surgical techniques. This review will describe the aetiology of wound failure and the management of acute wound dehiscence. It will then go on to cover in more detail the assessment of patients presenting with incisional hernia as well as outlining some of the auxiliary techniques that are used to aid repair. Lastly the topic of laparostomy closure, an increasing problem due to the increasing numbers of patients undergoing major surgery, and the use of Vacuum Assisted Closure devices are briefly reviewed.

Keywords dehiscence; hernia; hernia repair; incisional hernia; incisional hernia repair; laparostomy; VAC therapy; vacuum assisted closure; ventral hernia; wound dehiscence; wound failure

Introduction
Abdominal wound dehiscence and incisional hernia can both be thought of as forms of wound failure, which may be defined as the failure of the incision to heal and to maintain the normal anatomy of the abdominal wall. Wound dehiscence is an acute wound failure and can be defined as the partial or complete disruption of any or all layers of a surgical wound. This can range from a relatively minor breakdown of the skin and subcutaneous tissue to a complete failure of the entire wound with eversionation, or ‘burst abdomen’. The incidence of abdominal wound dehiscence ranges from 0.25–3% with an associated mortality of up to 25% and is most often seen at around 1 week post surgery.

Incisional hernia (Figure 1) is a chronic wound failure and presents some time after surgery, often at follow-up clinics or as a new referral. The incidence varies between 5% and 15% following vertical midline incisions at one year follow up. More than 50% of incisional hernias occur in the first year post-operatively and 90% of incisional hernias occur within three years of surgery.

Cause and prevention
The causes of acute and chronic wound failure are similar. Poor surgical technique and wound infection can cause acute dehiscence; acute dehiscence is the commonest cause of incisional hernia which is preceded by wound infection in nearly 50%. There are a number of other risk factors that predispose to wound failure. These can be divided into preoperative (patient related) factors, operative (surgical) factors and postoperative (related) factors (Table 1). There is evidence that, in many cases, wound failure after abdominal wall closure is dependent on the surgeon.

Many of these risk factors are not readily avoidable, but sound surgical technique with appropriate suture material, good bites of tissue (>1 cm), properly laid knots with sufficient throws and avoidance of excessive tension is important. If possible, the restoration of normal anatomy during the closure of abdominal wounds should be attempted. In the midline, this means apposition of the linea alba and, in lateral or horizontal incisions, closure of tendinous, aponeurotic and fascial structures (e.g. posterior and anterior rectus sheath) in layers. The optimal technique for closing a midline incision is mass closure with a continuous slowly absorbable monofilament suture. The use of a slowly absorbable material, such as PDS, appears to provide sufficient strength for a long enough period to allow the wound to heal, whilst reducing other complications such as persistent wound pain and suture sinus. Whilst there is little evidence of its superiority over interrupted sutures in randomised trials, a continuous suture ensures that tension is distributed evenly along the length of the wound and is a popular technique because of its safety, efficacy and speed. A suture length to wound length ratio of at least 4:1 should be used, allowing a minimum of 1 cm bites at 1 cm intervals, and is associated with a lower rate of incisional hernia.

The choice of incision is a further consideration. There has been a growing interest in transverse incisions which provide excellent access to most parts of the abdomen. This approach has been found to have a lower incidence of both early and late complications including wound dehiscence and incisional hernia.

Incisional hernia at port sites following laparoscopic surgery is also a recognised complication with an incidence of up to 3.6%. These usually remain unreported until a complication occurs. The midline supra- or subumbilical port site used during many procedures should be closed with a slowly absorbable monofilament suture. Consideration should also be given to closing port sites of 10 mm or more elsewhere, especially when they have been stretched, for example, to remove a gallbladder.

References
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It is particularly important to identify the existence of a pre-existing umbilical hernia when using an umbilical port, and to ensure that the defect is properly defined and repaired at the end of the procedure.\textsuperscript{15}

In addition to sound surgical technique, the risk of infection must also be minimised. This can be achieved through:

- Ensuring that the skin is shaved as late as possible
- Adequate skin preparation
- Appropriate use of prophylactic antibiotics for high-risk patients and procedures.

Minimal dissection of tissue, good haemostasis and the selective use of drains can reduce postoperative formation of a seroma or haematoma and subsequent infection that could lead to dehiscence.

Management of wound dehiscence

Superficial wound dehiscence can often be managed conservatively. This involves regular inspection and dressing of the wound. If the dehiscence has been caused by an infected collection then the opening of the wound and the resulting drainage may allow subsequent healing by secondary intention. Remaining sutures or skin clips that prevent the wound from opening sufficiently to allow drainage should be removed. If there is ongoing infection or surrounding cellulitis then antibiotics will be required. Large superficial dehiscences may require debridement of infected and necrotic tissue as well as careful selection of appropriate packing and dressing materials. More advanced techniques such as vacuum dressings may also be required. Specialist tissue viability nurses often have a lot to offer and should be involved in difficult cases. A fit patient with a clean, non-infected wound may benefit from delayed primary closure which usually results in a superior cosmetic outcome. The management plan should be discussed with the patient and reassurance offered. Many patients find the sudden ‘opening-up’ of their wound distressing.

A complete dehiscence, or ‘burst abdomen’, due to disruption of the fascial layers with exposure of the viscera will require emergency surgery. This involves debridement of the wound edges as necessary with removal of previous suture material and re-suturing, often with ‘retention sutures’. Interrupted heavy 1/0 non-absorbable suture is used taking large bites from the wound edge (>3 cm) and including all layers. A plastic sleeve may be used over the suture where it overlies the skin to prevent it from cutting into the skin (Figure 2). However, whilst retention sutures may allow satisfactory closure of the abdomen, there is evidence that this technique does not reduce the incidence of later incisional hernia.\textsuperscript{16} Occasionally it becomes clear that such a closure will have serious effects on the patient, such as compromising ventilation or risking abdominal compartment syndrome. In such cases it will be necessary to leave the patient with a laparostomy. Such patients may become seriously ill with sepsis and organ failure, and are best managed in a HDU or ICU.

Management of incisional hernias

Most patients with incisional hernias, at least initially, have few symptoms. At presentation up to 25% of patients are asymptomatic.\textsuperscript{17} If symptoms occur, they commonly consist of:

- Restriction of movement or of wearing certain clothes
- Embarrassment due to disfigurement
- Discomfort or pain.

Such patients usually present to the general surgical outpatient clinic. Less commonly they may present as an emergency with:

- Bowel obstruction
- Ischaemic bowel
- Spontaneous rupture of the contents of the hernia (rare).