

A GP primer on incisional hernia

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This article is the second in a two-part series on the management of hernias.

Background

Incisional hernias are often overlooked as a source of morbidity in post-surgical patients.

Objective

Drawing on evidence-based literature and personal clinical experience, this article seeks to provide information relevant to GPs encountering patients with incisional hernias.

Discussion

Various patient-related and peri-operative risk factors may predispose to incisional hernia formation and recurrence following surgical repair. Options for surgical repair are a function of the location, size and complexity of the hernia. GPs have a key role to play in coordinating the care of patients with incisional hernia, in terms of detection, referral and optimisation of contributory co-morbidities. This is enhanced by a basic knowledge of the anatomy, pathogenesis and treatment options of the condition.

Anatomy, epidemiology and pathology

The integrity of the anterolateral abdominal wall is assured by the strength of overlapping and intersecting muscle layers and their investing fascia or aponeuroses. Incisional hernias, also known as ventral hernias, are defined as the protrusion of intra-abdominal viscera through a defect in the abdominal wall caused by a previous operative intervention. The visceral contents are covered by a lining of peritoneum known as the hernia sac. As with other types of hernia, the sac is not reducible, whereas the contents may be.

Of the millions of abdominal operations performed throughout the world each year, wound failure occurs in approximately 10–15%.¹ The risk is greater where certain predisposing factors are present. The initial symptom a patient may have is a bulge that is of cosmetic concern or causes mild discomfort. As the hernia enlarges over time, because of progressive dilatation of the abdominal wall defect and/or distension of the hernia sac, other complications may occur, such as strangulation with vomiting, absolute constipation, bowel gangrene and peritonitis. Over a longer time frame, there may also be pressure necrosis of overlying skin and enterocutaneous fistula formation. Truly massive incisional hernias, otherwise known as abdominal wall failure, may also cause core instability, back pain, respiratory compromise and difficulty evacuating due to an inability to increase intra-abdominal pressure.

Following an initial abdominal operation, incisional hernias may result from failure of wound healing in the musculo-aponeurotic layer of the abdominal wall; collagen metabolism is a key factor. Hernias that occur in the early post-operative period are usually attributable to inadequate

technique (where wound edges are closed incompletely and/or under excessive tension) or wound infection (where the proteolytic enzymes of neutrophils impede collagen synthesis).² Late occurrences are essentially due to factors that lead to a disequilibrium of collagen metabolism where breakdown exceeds synthesis, such as may occur with malnutrition or other forms of cachexia. True late recurrences are relatively uncommon, however, as evidence suggests that many abdominal wall defects are in fact present soon after the index operation and only manifest as clinical hernias after some years.³ Peri-operative and patient-related factors that have been implicated to a greater or lesser extent in the causation of incisional hernias are summarised in Table 1.^{4–7} For many of these, causal inference is based on observational studies with small numbers or no adjustment for likely confounders. Moreover, some of the putative risk factors have been confirmed by some studies but refuted by others. All are nonetheless worthy of consideration in the interests of an optimal patient outcome.

Attenuation of peri-operative and patient-related risk factors for incisional hernia represents primary prevention, while optimisation of factors that may cause an initially occult hernia to become clinically symptomatic is secondary prevention. Both primary and secondary prevention of incisional hernias are the shared responsibility of the surgeon, the general practitioner (GP) and the patient.

A similar multidisciplinary approach can be applied for risk reduction in patients with incisional hernias being considered for surgical repair.

Detection and referral

Incisional hernias are detected on examination as a palpable defect or bulge in the musculo-aponeurotic abdominal wall. Additional imaging is not required

for the diagnosis of clinically evident hernias. However, computed tomography (CT) scanning may be subsequently useful in staging the hernia in terms of visceral involvement and loss of abdominal wall domain.

While some incisional hernias are detected by surgeons as a part of ongoing follow-up for the index condition, many will only come to medical attention when the patient sees their GP. If they are symptomatic in any way – in terms of discomfort or a cosmetically unacceptable bulge – referral should be made to a suitably qualified general surgeon. An unduly expectant approach may sometimes result in an irretrievable situation, with extensive loss of domain and progressively worsening comorbidities.

Incisional hernias should ideally be described according to a graded classification system that ultimately permits stratified comparisons of operative outcomes. Such staging is usually based on variables such as site, size, patient and wound characteristics. Although proposed by a number of authors, international consensus has yet to be reached on a readily applicable staging system that prognosticates for surgical site events (infection) and long-term recurrence. Table 2 shows a classification schema that provides useful descriptors when referring a patient for specialist management.⁸ Figure 1 is an example of how this classification system can be applied.

Of particular interest are parastomal hernias, which are a distinct type of incisional hernia with unique properties and treatment options.⁹ They may develop in up to 50% of patients who have had an ileostomy or colostomy;¹⁰ the main complaint is increased difficulty fitting the stoma appliance and/or leakage of effluent. As with other incisional hernia types, all cases should be referred for a surgical opinion.

Referral should be prioritised according to the likelihood of significant complications if no operation were undertaken. If the hernia is associated with overlying skin changes, such as ulceration, this would convey a sense of urgency for surgical management, as

would difficult reducibility or symptoms of intermittent strangulation.

As with any referral, a minimum dataset of clinical information should be included. Details of past operations, if available, are particularly important. Equally, the nature and status of any active medical comorbidities, including medications, should be documented.

Pre-operative preparation

A number of chronic conditions may mediate general and specific complications following what is often a major abdominal intervention. GPs can take advantage of the patient's time on an elective waiting list to optimise any active comorbidities.

As well as being a risk factor for incisional hernia after initial abdominal surgery, obesity has been shown to be an independent risk factor for recurrence following hernia repair.¹¹ In fact, a patient may be deemed unready for operative management until their body mass index is within a suitable range. GPs may therefore need to oversee a weight loss regimen incorporating diet and exercise tailored to the patient's specifications.

While comorbidities such as diabetes, cardiomyopathy and chronic lung disease have not been shown to be associated with hernia recurrence,¹² optimisation of these by the GP will reduce the risk of various other postoperative complications.

The surgeon will generally take responsibility for assessment of the size and number of abdominal wall defects in order to plan the surgical intervention. CT scanning is particularly useful for determining loss of domain, the nature of sac contents and the presence or localisation of previously placed prosthetic mesh.¹³ Trophic skin ulcers, often due to ischaemia in dependent parts of very large hernias,¹⁴ are usually colonised with *Staphylococcus aureus* and should be treated with thorough wound care to minimise bacterial load prior to surgery.¹ Similarly, prophylactic antibiotics are often administered at the time of surgery, particularly if mesh is used, although a recent systematic review has not shown a conclusive advantage in non-contaminated operations.¹⁵

Treatment options

Once seen by the surgeon, expectant management with or without a suitably fitted orthotic device (corset) may be feasible for uncomplicated cases where active comorbidities preclude an operation or where further optimisation can be undertaken to ensure readiness for surgery. Operative management may present a complex set of options that is remit of the surgeon. It is nevertheless important for GPs to have a knowledge of the basic surgical principles involved.

Definitive treatment depends largely on the specifications of the hernia according to whichever stratification system is preferred. Small-to-medium

Table 1. Putative risk factors for incisional hernia

Peri-operative

- Inadequate technique/choice of suture material
- Wound infection
- Wound dehiscence
- Midline/medial paramedian incisions
- Larger port size (laparoscopic surgery)
- Post-operative ventilation
- Post-operative transfusion
- Chemotherapy
- Radiotherapy
- Abdominal aortic aneurysm surgery

Patient-related

- History
 - Age
 - Male sex
 - Previous incisional hernia surgery
 - Emergency surgery
 - Smoking
- Comorbidities
 - Obesity
 - Chronic pulmonary disease
 - Type 2 diabetes mellitus
 - Jaundice
 - Malnutrition
 - Malignancy
 - Renal failure
 - Connective tissue disorders
 - Anaemia
- Medications
 - Steroids
 - Oral anticoagulants

Table 2. A classification of incisional hernia based on localisation, size, recurrence, reducibility and symptoms⁸

Localisation

- Vertical incision
 - Midline, above/below umbilicus
 - Midline, including umbilicus
 - Paramedian, left/right
- Transverse
 - Above/below umbilicus, right/left
 - Crossing/not crossing midline
- Oblique
 - Above/below umbilicus, right/left
- Combined (eg midline + oblique, midline + parastomal, etc)

Size (real fascial gap, width or length)

- Small (<5 cm)
- Medium (5–10 cm)
- Large (>10 cm)

Recurrence

- Primary
- Recurrent (first, second, third, etc)

Reducibility

- Reducible with/without obstruction
- Irreducible with/without obstruction

Symptoms

- Asymptomatic
- Symptomatic

sized hernias can be repaired by open or laparoscopic techniques with comparable short-term and long-term outcomes.¹⁶ Whichever technique is used, it is important to achieve a tension-free repair, which generally necessitates the use of prosthetic mesh for defects greater than 2 cm.¹⁰ In the laparoscopic approach, the mesh is fixed within the peritoneal cavity to the underside of the hernial defect using staples or tacks. To avoid adhesion formation to bowel, the mesh used is typically composite, with the side facing inwards consisting of non-stick or absorbable material. Open repairs are usually approached via the original scar.

There are numerous variations on how a tension-free repair can be achieved; currently there is no evidence-based consensus on which is superior, or in which circumstances to use a particular type of repair. Increasingly used is the technique of component separation, where various musculo-aponeurotic layers of the abdominal wall are incised laterally to allow them to be easily approximated in the midline. Suture repair is invariably reinforced with prosthetic mesh, either between the peritoneum and the rectus muscles ('sub-lay') or pre-fascial beneath the subcutaneous fat ('on-lay'). Some surgeons simply place reinforcing or bridging mesh between the peritoneum

and the muscles or entirely within the peritoneal cavity, as with the laparoscopic repair ('in-lay'). Where feasible, the latter placement is generally avoided because of perceived risks of erosion into bowel and enterocutaneous fistula formation.¹

Large (or 'giant') incisional hernias represent a unique surgical challenge. There is usually 'loss of domain', whereby 15–20% of the abdominal contents reside permanently in the hernia sac outside their natural compartment; returning these would require significant physiological adaptation (mainly respiratory).¹⁷ Large incisional hernias are best treated in specialist centres with multidisciplinary input from plastic surgeons, anaesthetists and intensivists. Advanced techniques for abdominal wall reconstruction include fascial bridging using a composite mesh whose inner surface is hydrophilic, thereby minimising adherence of adjacent abdominal viscera.¹⁸ The abdominal wall musculature can also be relaxed by pre-operative conditioning with botulinum toxin.¹⁹

Whatever the specifications of surgery, the surgeon's informed consent process typically includes:¹⁰

- options for treatment (as outlined above)
- the importance of pre-operative optimisation
- the purpose and expected benefit of the operation
- the chance of short-term and long-term success
- the use of mesh and its associated risks and benefits
- the potential risks of the procedure, including inadvertent bowel injury, conversion to an open operation (in the case of laparoscopic surgery) and deferred operation.

Aftercare following incisional hernia repair should ideally follow an Enhanced Recovery After Surgery protocol.²⁰ Evidence has been inconclusive regarding the benefits of prophylactic abdominal binders or corsets in the postoperative period.²¹ The surgeon should advise the patient regarding resumption of usual activities. In general, heavy lifting or straining should be avoided until this no longer induces pain or discomfort.



Figure 1. Example of an incisional hernia classified as oblique, large, recurrent (second), reducible and symptomatic

A final word on primary prevention

When performing any abdominal surgery, surgeons are clearly responsible for attending to specific peri-operative risk factors outlined in Table 1. Various laparotomy wound closure techniques have been described to minimise the risk of subsequently developing a hernia. The general consensus is for a mass closure of abdominal wall layers with continuous or interrupted slowly absorbable suture material.^{22,23} For especially high-risk surgery, such as bariatric operations or aortic aneurysm repairs, supplementing primary wound closure with prosthetic mesh (usually on-lay) has been shown to reduce wound failure.^{24,25} Adherence to evidence-based therapeutic guidelines for appropriate antibiotic prophylaxis also means a lessening of the chance of postoperative wound infection.

GPs can also play a significant part in the primary prevention of incisional hernias through careful management of patient-related risk factors, such as obesity, diabetes and smoking, as well as the general health maintenance of patients' ongoing abdominal surgery.

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