FRCS General Surgery

Section 2: Comprehensive Vivas

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Scenario 1

Female groin hernia

A 75-year-old female patient is referred by her general practitioner (GP) to your out-patient clinic with a symptomatic (painful) groin lump, which does reduce on lying supine.

Her body mass index (BMI) is 22 kg/m^2, she is hypertensive and a non-smoker. *On examination there is a*: reducible non-tender groin lump – thought to be an inguinal hernia.

Q. 1.1 How would you manage the patient?

Clinical assessment: Hernia symptoms including reducibility, comorbidities including fitness for general anaesthesia (GA), previous abdominal surgery (? hostile abdomen for laparoscopy).

Careful clinical examination of the hernia – to assess site, reducibility, and tenderness.

If the abdomen is not 'hostile' for laparoscopy – list the patient urgently for diagnostic laparoscopy proceeding to laparoscopic repair ± bilateral repairs.

If the patient is unfit for GA – list urgently for local anaesthesia (LA) open repair via an inguinal approach – if on opening the inguinal canal no hernia is evident and a femoral hernia is diagnosed – repair via the posterior inguinal canal wall – middle approach and carry out inguinal repair on exiting.

If the abdomen is hostile for laparoscopy then carry out a similar open approach under GA or LA.

Q. 1.2 What investigations are appropriate?

Although ultrasound/MRI might be helpful in diagnosis – investigating the patient introduces further delay before surgery and increases the risk of strangulation if the hernia is femoral. The definitive investigation here is a diagnostic laparoscopy – proceeding to hernia repair.

The diagnostic accuracy of clinical examination and differentiation between femoral and inguinal hernia in females is poor (50–60%) even in experienced hands.

Because of the high risk of strangulation with femoral hernias (cumulative probability of strangulation was 22% at 3 months and 45% at 21 months following diagnosis) and their need for urgent treatment. All females with a groin hernia, irrespective of whether thought to be inguinal or femoral should be assumed to have a femoral hernia until proven otherwise at urgent diagnostic laparoscopy or by urgent open inguinal surgical approach.

There is also a high prevalence of bilateral femoral hernias in females (30–50%). Therefore, diagnostic laparoscopy will determine the bilateral nature of the hernias, and even if asymptomatic, the contralateral femoral hernia should also be repaired.

It is not uncommon also in females to have concomitant inguinal and femoral defects – which can be repaired at laparoscopy.

'To quantify the risk of obstruction in groin hernia, the cumulative probability of strangulation in relation to the length of history has been calculated for inguinal and femoral hernias in a study of 476 patients (439 inguinal and 37 femoral). There were 34 strangulations (22 inguinal and 12 femoral). After 3 months, the cumulative probability of strangulation for inguinal hernias was 2.8%, rising to 4.5% after 2 years. For femoral hernias, the cumulative probability of strangulation was 22% at 3 months and 45% at 21 months.'

Q. 1.3 What guidelines are available regarding the management of groin hernias?

There have been many published guidelines over the last two decades, including the National Institute of Clinical Excellence (NICE) guidelines, the European Hernia Society Guidelines, etc.

The most up-to-date guidelines are as follows:

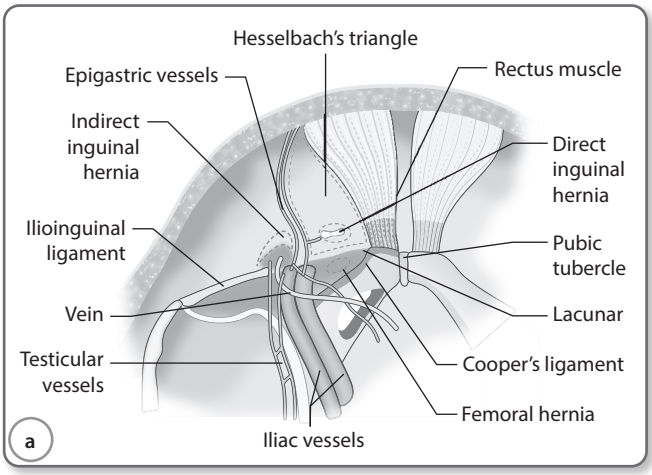
- British Hernia Society – Groin Hernia Guidelines (ASGBI) 2013, updated in 2016
- The Hernia Surge Group. International guidelines for groin hernia management. Hernia 2018; 22:1–165

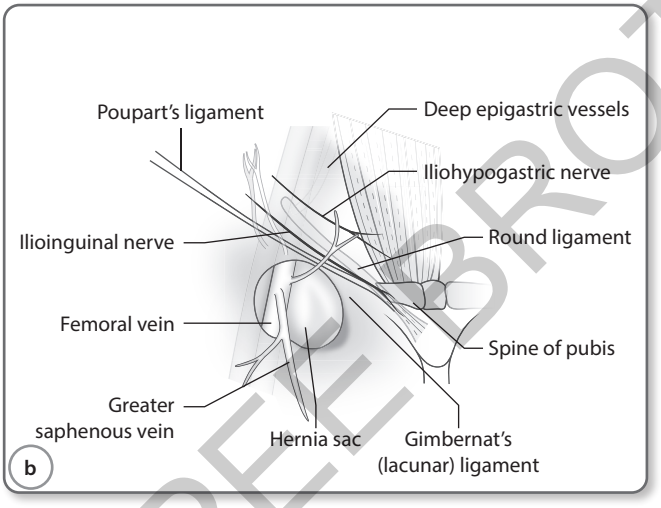
These guidelines recommend that females with a groin hernia should be referred urgently by their GP to a surgeon who should list for urgent diagnostic laparoscopy and hernia repair.

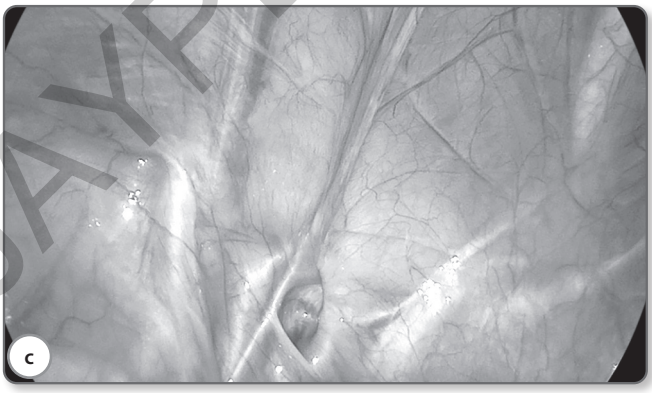
Q. 1.4 What are the boundaries of the femoral canal?

- *Anteriorly:* Inguinal ligament
- *Posteriorly:* Pectineal ligament
- *Medially:* Lacunar ligament
- *Laterally:* Femoral vein

Femoral canal anatomy – open and laparoscopic (see figures below)







Further reading

Gallegos NC, Dawson J, Jarvis M, Hobsley M. Risk of strangulation in groin hernias. Br J Surg 1991; 78:1171–1173.

Scenario 2

Consent for inguinal hernia repair

A 47-year-old builder presents with a symptomatic inguinal hernia. He has no significant comorbidities and has no previous abdominal surgery.

Q. 2.1 How would you consent the patient with regard to management of his groin hernia?

Having established that the patient has capacity –

The consent process would involve:

- At the consent discussion, provide information on the procedure and its implications. In particular, you should discuss information about:
  - The patient's diagnosis and prognosis
  - Options for treatment, including non-operative care and no treatment
  - The purpose and expected benefit of the treatment
  - The likelihood of success
  - The clinicians involved in their treatment
  - The risks inherent in the procedure, however, small the possibility of their occurrence, side effects and complications. The consequences of non-operative alternatives should also be explained
  - Potential follow-up treatment

In relation to the patient's inguinal hernia an explanation as to the nature of the hernia and its natural history.

All options for treatment would include:

- Non-operative – conservative approach
- Surgical intervention – open versus laparoscopic versus endoscopic

Conservative approach

The risk of hernia strangulation with a watchful wait approach is relatively low (*after 3 months, the cumulative probability of strangulation for inguinal hernias was 2.8%, rising to 4.5% after 2 years*) and therefore, a conservative non-operative approach is a safe option.

The patient must be made aware of the risks of a non-operative approach – increasing size and discomfort within the hernia causing limitation in activities, irreducibility, obstruction due to incarceration, and strangulation – with its serious risk to life.

The patient should be made aware that with increasing symptoms – an operative approach may have to be considered if on a conservative pathway.

'To quantify the risk of obstruction in groin hernia, the cumulative probability of strangulation in relation to the length of history has been calculated for inguinal and

femoral hernias in a study of 476 patients (439 inguinal and 37 femoral). There were 34 strangulations (22 inguinal and 12 femoral). After 3 months, the cumulative probability of strangulation for inguinal hernias was 2.8%, rising to 4.5% after 2 years. For femoral hernias, the cumulative probability of strangulation was 22% at 3 months and 45% at 21 months.'

Surgical intervention

The techniques of open surgical repair, laparoscopic repair (TAPP and TEP) should be explained and a detailed explanation of the risks of each procedure, including recovery after surgery.

The risks to discuss would also include an approximate incidence of the specific complication and the treatment that each complication might involve.

Risks to include:

- *General complications*: Venous thromboembolism (VTE), anaesthetic complications, respiratory problems

Specific complications related to hernia repair:

Significant complications associated with groin hernia repair

- *Self-limited neuralgia:* 10–20%
- *Chronic pain:* 10–12%
- *Haematoma:* 5–16%
- *Seroma:* 1–12%
- *Recurrence:* 1–5%/5 years
- *Urinary retention:* LA: 0.37%, GA: 2–3%
- *Wound infection:* 1–3% open, 0.32–0.65% lap
- *Testicular complication:* 0.5–1%
- *Bladder damage:* Uncommon, open/lap, 0.2%
- *Vas injury:* 0.3–2%
- *Mortality:* (same as general population) 0–0.02%
- *Mesh infection:* <0.5%
- *Numbness:* Less after lap

Complications specific to laparoscopic repair

Intestinal obstruction (TAPP): 0.07–0.4%; port site hernia: 1% intestinal/visceral injury: 0–0.21%; Vascular injury: 0.06–0.13

Further reading

Gallegos NC, Dawson J, Jarvis M, Hobsley M. Risk of strangulation in groin hernias. Br J Surg 1991; 78:1171–1173.

Scenario 3

Incisional hernia: Part 1

A 50-year-old male patient with no comorbidities undergoes an emergency laparotomy and Hartmann's procedure for perforated diverticulitis. After he is discharged, he re-attends a few weeks later with a tender swelling from the midline scar.

Q. 3.1 What measures can be taken to reduce the risk of incisional hernia occurrence?

- Patient factors
- Operative factors
- Perioperative factors

Patient factors (in elective, non-cancer patients):

- Obesity – weight reduction programmes. Aim to get BMI < 35 kg/m^2, and <30 if possible. Weight reduction of 25% body weight is possible. If not possible, consider Bariatric surgery for weight reduction prior to elective procedures
- *Smoking:* Smoking cessation
- *Type 2 diabetes mellitus:* Optimisation
- *Chronic obstructive pulmonary disease (COPD)/Asthma:* Optimisation
- *Prehabilitation programmes:* To improve exercise tolerance and nutritional state

Operative factors:

- Laparoscopic approach, if feasible
- Paramedian/non-midline approaches
- Midline closure suture techniques–suture length (wound to suture ratio 1:4), short stitch – bite and length (0.5 cm)
- Prophylactic mesh to augment midline closure (elective, low infective risk cases)
- Port-site closure devices in laparoscopic surgery
- Prophylactic mesh in stoma formation

Perioperative factors:

- Prophylactic antibiotics – reduction in surgical site infections (SSIs)
- Pre-/peri-/postoperative optimisation of nutrition
- Measures to reduce increased abdominal pressure:
  - Regional analgesia – epidural, TAP block, rectus sheath block/catheter infusion – to reduce opiate requirements

- Avoidance of constipation – laxatives
- Chest physiotherapy

Suture length to wound length ratio of at least 4, stitch length 10 mm versus longer length. 737 patients, incisional hernias: Long-stitch length 18%, short-stitch length 5.6%, $p < 0.001$.

Small bites suture technique (5 mm bites and 5 mm length) is more effective than the traditional large bites technique (10 mm bites and 10 mm length) for prevention of incisional hernia in midline incisions. 560 patients, 1-year follow-up, incisional hernias: Small bites 13%, large bites 21%, $p = 0.022$.

Elective abdominal aortic aneurysm (AAA) repairs. Prophylactic retromuscular mesh-augmentation of midline closure. 120 patients. 2-year follow-up. Incisional hernias: Non-mesh 28%, mesh-augmentation 0%, $p < 0.0001$.

Onlay mesh versus sublay mesh versus primary suture, elective AAA patients – 480, 2-year follow-up,

Incisional hernia:

- *Onlay mesh:* 13%
- *Sublay mesh:* 18%
- *Suture:* 30%

Meta-analysis of 11 randomised controlled trials (RCTs), 907 patients, concluded: Reinforcing elective stomas with mesh (primarily synthetic) reduces subsequent parastomal hernia rates, complications, repairs and saves money.

Further reading

Deerenberg EB, Harlaar JJ, Steyerberg EW, et al. Small bites versus large bites for closure of abdominal midline incisions (STITCH): A double-blind, multicentre, randomised controlled trial. Lancet 2015; 386:1254–1260.

Findlay JM, Wood CPJ, Cunningham C. Prophylactic mesh reinforcement of stomas: a cost-effectiveness meta-analysis of randomised controlled trials. Tech Coloproctol 2018; 22:265–270.

Jairam A, Timmermans L, Eker H, et al. Prevention of incisional hernia with prophylactic onlay and sublay mesh reinforcement versus primary suture only in midline laparotomies (PRIMA): 2-year follow-up of a multicentre, double-blind, randomised controlled trial. Lancet 2017; 390:567–576.

Millbourn D, Cengiz Y, Israelsson LA. Effect of Stitch Length on Wound Complications After Closure of Midline Incisions: A Randomized Controlled Study. Arch Surg 2009; 144:1056–1059.

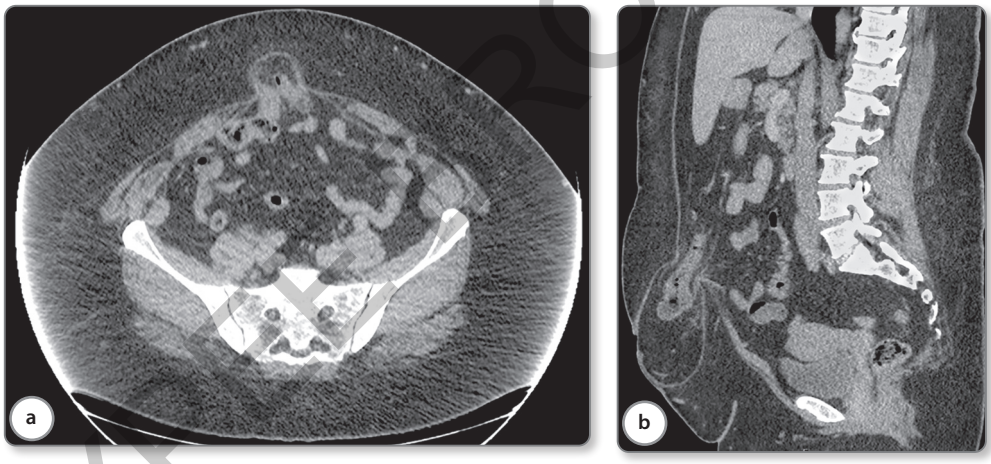
Muysoms FE, Detry O, Vierendeels T, et al. Prevention of Incisional Hernias by Prophylactic Mesh-augmented Reinforcement of Midline Laparotomies for Abdominal Aortic Aneurysm Treatment: A Randomized Controlled Trial. Ann Surg 2016; 263:638–645.

Scenario 4

Recurrent umbilical hernia

A 42-year-old female with a, obese, BMI of 44 kg/m^2, has a background of type 2 diabetes mellitus. She is having intermittent obstructive symptoms – with vomiting and abdominal distension. On examination there is an irreducible, tender umbilical hernial with a large sac and a 5-cm diameter defect.

CT abdomen/pelvis shows a loop of small bowel within the hernial sac. The small bowel loop is well perfused with no signs of strangulation. The remaining small bowel is not distended.



Q. 4.1 How would you manage the patient?

This patient is a 'high risk' patient related to morbid obesity, smoker, type 2 diabetes mellitus, recurrent nature of hernia, features of intermittent small bowel obstruction, tenderness on palpation, bowel loops within hernia sac confirmed on the CT scan, and the need for urgent surgery (lack of time for optimisation).

Despite these risks the patient does need urgent operative intervention as there is significant risk of strangulation.

A conservative approach would be high risk – strangulation requiring emergency surgery would carry a higher morbidity and mortality risk.

There is little time to wait to optimise the patient: Weight loss reduction/bariatric surgery, smoking cessation, diabetic optimisation.

Detailed assessment of cardiopulmonary function [cardiopulmonary exercise testing (CPET)] may be possible but the patient does need urgent surgery and will need a high-dependency unit/ITU bed postoperatively.

The same risk factors are predictive of a higher risk of postoperative complications for this patient:

- Respiratory problems
- Surgical site infections
- Seroma formation
- Hernia recurrence
- Mortality risk

Q. 4.2 What operative approach for this high-risk patient?

Laparoscopic versus open repair

- *Laparoscopic repair*: Intraperitoneal onlay mesh repair (IPOM) + – defect closure and intraperitoneal onlay mesh augmentation or E-TEP repair (laparoscopic Rives–Stoppa) with defect closure and retrorectus mesh augmentation
- *Open repair*: Sutured repair (Mayo) or sublay retrorectus mesh augmentation with defect closure

In favour of laparoscopic approach/against open repair:

- Recurrent hernia lower risk of recurrence in laparoscopic repair
- Reduced risk of SSI in laparoscopic repair
- Defect diameter is 5 cm – the laparoscopic approach is feasible with defect closure and intraperitoneal onlay mesh augmentation (IPOM+ associated with lower risk of seroma and recurrence)
- The defect is too large to carry out as an open technique under local anaesthesia

Against laparoscopic/in favour of open repair:

- GA/pneumoperitoneum associated with higher morbidity in high-risk patients
- Large hernial sac – difficult to excise laparoscopically – higher risk of seroma
- Contents of sac – small bowel may be difficult to dissect free laparoscopically – increased risk of small bowel injury requiring resection

Further reading

Henriksen NA, Montgomery A, Kaufmann R, et al. European and Americas Hernia Societies (EHS and AHS). Guidelines for treatment of umbilical and epigastric hernias from the European Hernia Society and Americas Hernia Society. Br J Surg 2020; 107:171–190.

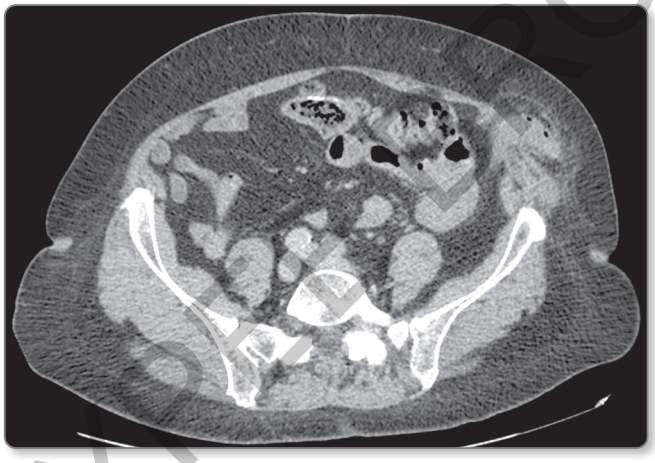
Scenario 5

Spigelian hernia

An 83-year-old female presents with an uncomfortable left iliac fossa (LIF) lump which does not reduce when supine.

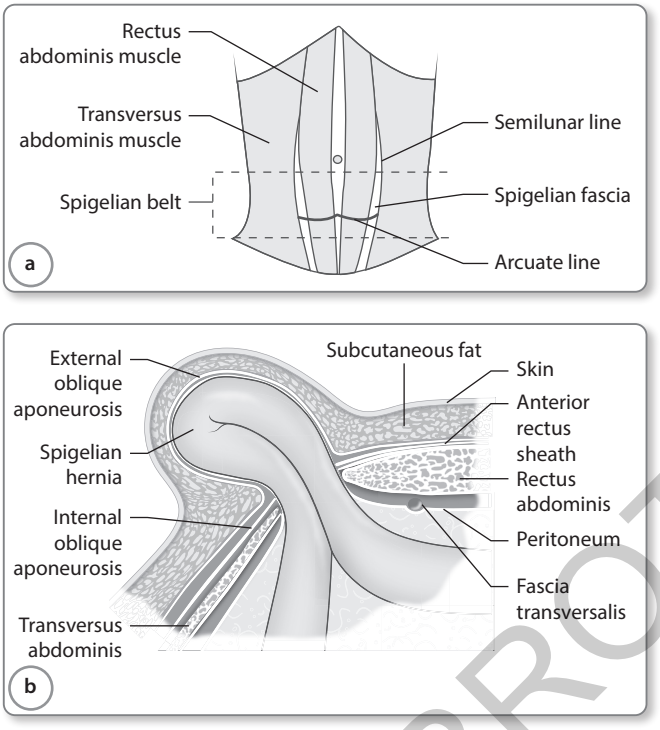
- She has a background of hypertension and high BMI, and has not had any previous abdominal surgery.
- On examination there is a vague, diffuse swelling in the LIF which is irreducible and non-tender

CT scanning confirms a LIF hernia containing a loop of small bowel. There are no features to suggest small bowel obstruction.



Q. 5.1 What is a spigelian hernia? What is the nature of the defect? How would you manage this patient?

A spigelian hernia (or lateral ventral hernia) is a hernia through the spigelian fascia, which is the aponeurotic layer between the rectus abdominis muscle medially, and the semilunar line laterally. Spigelian hernia occurs through slit-like defect in the anterior abdominal wall adjacent to the semilunar line. Most of spigelian hernias occur in the lower abdomen (below the arcuate line) where the posterior sheath is deficient. The hernia ring is a well-defined defect in the transversus aponeurosis. These are generally interparietal hernias, meaning that they do not lie below the subcutaneous fat but penetrate between the muscles of the abdominal wall; therefore, there is often no notable swelling.



The patient is in high risk for surgery related to her age (83 years), obesity, irreducibility, and the presence of small bowel loop within the hernial sac.

However, spigelian hernias have a high risk of strangulation and this patient should undergo urgent surgery.

Laparoscopic versus open repair

Laparoscopic repair has the benefit of confirming the diagnosis and can be repaired with a preperitoneal prosthetic mesh placement without the need for defect closure via a transabdominal preperitoneal (TAPP) or totally extraperitoneal (TEP) technique. It can also be repaired with an IPOM technique.

Open repair can be carried out with a simple sutured repair with or without a sublay prosthetic mesh augmentation. It can be done under local anaesthetic in high-risk patients.

Morbidity and recurrence risk are lower for laparoscopic repair. Hospital stay is also reduced.

Further reading

Henriksen NA, Kaufmann R, Simons MP, et al. EHS and AHS guidelines for treatment of primary ventral hernias in rare locations or special circumstances. BJS Open 2020; 4:342–353.

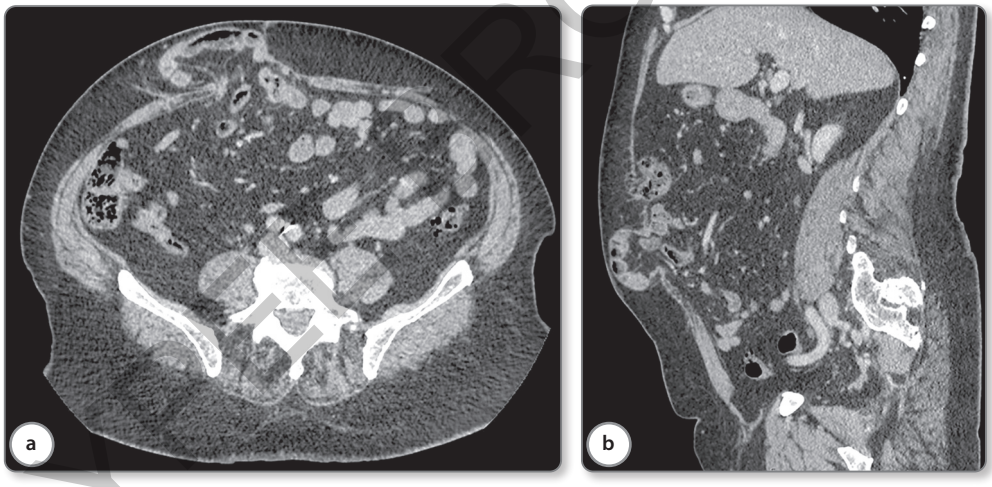
Scenario 6

Incisional hernia: Part 2

A 68-year-old male presents with a symptomatic (painful) midline incisional hernia following a previous midline laparotomy in 2016 with small bowel resection for a strangulated umbilical hernia.

- *Comorbidities*: Current smoker, obese (BMI: 33 kg/m^2), sleep apnoea.
- *On examination*: There is a recurrent umbilical defect (measuring 7 cm in transverse diameter), and smaller epigastric incisional defects. All are reducible and non-tender.

CT scanning confirms multiple defects.



Q. 6.1 In the management of incisional hernias what measures can be taken to reduce tension and to allow closure of the midline defect?

- Weight reduction
- *Component relaxation:* Preoperative botulinum A toxin (BOTOX 400 IU) to lateral abdominal wall – ultrasound guided – 4 weeks prior to surgery
- Component separation – anterior (open/endoscopic) – external oblique release, posterior (open/laparoscopic) – transversus abdominis release (TAR)
- Progressive CO_2 pneumoperitoneum – 500 mL daily via laparoscopic port, as an in-patient – until target volume achieved – to increase the size of the abdominal cavity

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"FRCS General Surgery Section 2: Comprehensive Vivas" is an indispensable revision guide, designed to thoroughly equip trainees with the necessary knowledge and skills to excel in the FRCS (General Surgery) Section 2 examination. This comprehensive text is aligned with the examination syllabus as prescribed by the Joint Committee on Higher Surgical Training (JCHST), ensuring it is a valuable resource throughout the higher surgical training rotations. The book meticulously covers a wide array of critical topics, including those in critical care, emergency surgery, general surgery, research methodologies, basic statistics, and data analysis.

What sets this guide apart is its inclusion of hundreds of well-conceived hypothetical scenarios, many of which incorporate useful images to enhance explanation and interpretation, thereby reflecting the clinically oriented nature of the FRCS examination. The scenarios are presented in a concise, structured manner, adhering to a question-and-answer format that is particularly conducive to both solo and group study sessions. This format encourages active engagement, allowing candidates to articulate their knowledge effectively while identifying areas requiring further study.

The content has been carefully revised to reflect the most recent changes in the examination format, including newer cases that candidates may encounter, such as those relevant to the clinical challenges posed by the coronavirus disease 2019 (COVID-19) pandemic. The text is further enriched by drawing on the latest research and providing extensive recommendations for further reading across a broad spectrum of resources.

This guide is the result of contributions from a team of highly experienced surgical trainers and educators, all of whom are actively involved in postgraduate medical education and have a wealth of experience in preparing candidates for this demanding examination. It is, therefore, a crucial tool for anyone committed to achieving success in the FRCS General Surgery examination.

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