CASE TWO

Short case number: 3_11_2
Category: Gastrointestinal & Hepatobiliary
Discipline: Surgery
Setting: General Practice
Topic: Umbilical hernias

Case

Ron Camper, aged 21 years presents complaining of a painful 2cm nodule in the periumbilical region. He advises that he has had a nodule that has "come and gone" since birth but it has never been painful. He now feels nauseous.

Questions

1. Outline your assessment and management of Ron.
2. What are the 3 common types of umbilical hernia and what is the pathophysiology of each type.
3. How does the common type of umbilical hernia typically present.
4. Summarise the treatment of umbilical hernias.
5. Briefly describe the cutaneous nerve supply of the abdominal wall.
6. Briefly describe the anatomy and pathophysiology of incisional hernias.
7. Briefly describe the treatment options of incisional hernias.
8. Briefly describe the following: Obturator hernia, epigastric hernia and diastasis recti.

Suggested reading:

- Henry MM, Thompson JN, editors. Clinical Surgery. 3rd edition. Edinburgh: Saunders; 2012. Chapter 27.
- Garden OJ, Bradbury AW, Forsythe JLR, Parks RW, editors. Davidson's Principles and Practice of Surgery. 6th edition. Philadelphia: Churchill Livingstone Elsevier; 2012. Chapter 11.

ANSWERS

1. Outline your assessment and management of Ron.

- Need to determine if this is an urgent situation – is there evidence of strangulation? Is the hernia reducible?
- Is the nausea related to the lump, or is there another cause?
- Examination of the lump
- Investigation of this patient will be determined by the urgency of the situation

2. What are the 3 common types of umbilical hernia and what is the pathophysiology of each type.

Umbilical Hernia

Congenital (infantile) umbilical hernia
This condition is caused by a widening of the natural defect in the linea alba at birth.
The complex folding of the developing embryo results in the formation of the coelomic cavity, and the apices of the folds form the umbilical ring through which the midgut communicates with the yolk sac and the connecting stalk (containing the umbilical vein and arteries) passes to the placenta.
The developing gut grows more rapidly than the coelomic capacity and so prolapses into the wide base of the umbilical cord-the extra-embryonic coelom-as a temporary hernia. The abdominal cavity subsequently enlarges, and by the 12th week the herniated intestinal loops return, undergoing rotation as they do so. In normal circumstances, after the return of the gut, the umbilical ring constricts, but a defect persists until birth for the passage of the umbilical vessels. After delivery, the umbilical vessels thrombose, and fibrous tissue forms and condenses to plug the defect. A congenital umbilical hernia results if the sequence is incomplete.

True umbilical hernia
Protrusion through the umbilical scar, everting the umbilicus, whose attenuated fibres are at the apex of the hernial sac. The cause is often secondary to an increase in the volume of contents of the abdominal cavity-e.g. due to obesity, ascites or large benign or malignant intra-abdominal tumours.

Para-umbilical hernia
The weakest area of the umbilical scar is at the superior aspect between the umbilical vein and the upper margin of the umbilical ring. It is at this point that a para-umbilical hernia develops. The emerging sac displaces the umbilical scar, which lies below and slightly to one side.

These hernias are more common than true umbilical hernias and typically are found in the obese middle-aged patient.

The neck of the hernia is often narrow. In consequence, tissues that enter have great difficulty leaving; adhesions form and the hernia becomes irreducible. The sac progressively acquires more contents and may become very large. The contents are usually omentum, often with small bowel or transverse colon. Frequently the sac becomes loculated when adhesions form between the omentum and the peritoneum. Not surprisingly, these hernias are at risk of strangulation.

3. How does the common type of umbilical hernia typically present.

   There is local pain and a swelling at the navel. Non-specific gastrointestinal symptoms are common, and features of recurrent intestinal obstruction may have occurred.
   The umbilicus assumes a crescent shape. Inspection and palpation reveal a swelling just above the umbilicus whose centre (in contrast to true umbilical hernia) is not attached to the apex of the protrusion. However, in grossly obese patients, the swelling may not be obvious to the naked eye and moreover is barely palpable. In others the hernia may be enormous. Usually it is reducible (at least in part) and there is a cough impulse. If reduction is possible, the palpable defect can be of any size, from one fingertip to admitting the fist.

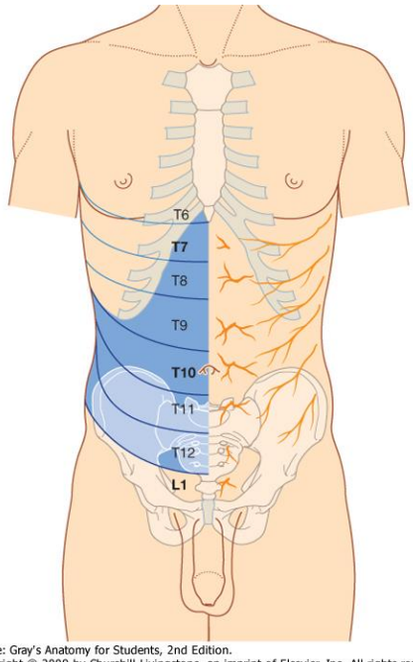
4. Summarise the treatment of umbilical hernias.

   <u>True umbilical hernia</u>
   Any underlying cause should be sought and dealt with. In the rare event that nothing is found and the hernia is causing symptoms, it is treated as a para-umbilical hernia.

   <u>Para-umbilical hernia</u>
   Symptomatic hernias require treatment. There is a high risk of strangulation, and repair should be advised, even in the absence of symptoms. The usual procedure is to mobilise the sac and its contents, return the latter to the abdomen, close the neck and repair the abdominal wall by overlapping its layers. In herniae less than 5mm, fascial closure; others consider onlay or sublay mesh, plug mesh, sandwich mesh if recurrent.

   <u>Strangulated umbilical hernia</u>
   The patient with severe abdominal pain and vomiting and a soft non-tender umbilical hernia is a diagnostic trap. The loculated nature of the hernia allows a strangulated portion of bowel to go unnoticed clinically. In other instances, the local features of strangulation may be obvious. The operative approach is as for an elective case, and the strangulating contents are dealt with according to their state.

5. Briefly describe the cutaneous nerve supply of the abdominal wall.



The anterior rami of thoracic spinal nerves T7 to T12 follow the inferior slope of the lateral parts of the ribs and cross the costal margin to enter the abdominal wall. Intercostal nerves T7 to T11 supply skin and muscle of the abdominal wall, as does the subcostal nerve T12. In addition, T5 and T6 supply upper parts of the external oblique muscle of the abdominal wall; T6 also supplies cutaneous innervation to skin over the xiphoid.

6. Briefly describe the anatomy and pathophysiology of incisional hernias.

An incisional hernia is one that occurs through the wound of a previous operation. It has the same features as a hernia that is caused by non-surgical injury to the abdominal wall.
Partial dehiscence of all or part of the deeper fascial layers occurs, but the skin remains intact or eventually heals.

Preoperative factors

- *Age*-the tissues of the elderly do not heal as well as those of the young.
- *Malnutrition*-protein-calorie malnutrition, vitamin deficiency (vitamin C is essential for collagen maturation) and trace metal deficiency (zinc is required for epithelialisation).
- *Sepsis*-worsens malnutrition and delays anabolism.
- *Uraemia*-inhibits fibroblast division.
- *Jaundice*-impedes collagen maturation.
- *Obesity*-predisposes to wound infection, seroma and haematoma.
- *Diabetes mellitus*-predisposes to wound infection.
- *Steroids*-have a generalised proteolytic effect.
- *Peritoneal contamination (peritonitis)*-predisposes to wound infection.

Operative factors

- *Type of incision*-vertical incisions are more prone to hernia than are transverse ones.
- *Technique and materials*-tension in the closure impedes blood supply to the wound; badly tied knots can work loose; closure with rapidly absorbable suture material fails to support the abdominal wall for a sufficient time to permit sound union.
- *Type of operation*-operations involving the bowel or urinary tract are more likely to develop wound infection.
- *Drains*-a drain passing through the wound often results in a hernia.

Postoperative factors

- *Wound infection*-equal in importance with the wrong choice of suture material: there is enzymatic destruction of healing tissues; inflammatory swelling raises tissue tension and impedes blood supply; 5-20% of wound infections result in a hernia.
- *Abdominal distension*-postoperative ileus increases the tension on a wound; stitches may cut out.
- *Coughing*-generates wound tension.

Pathological features
Most incisional hernias develop within 1 year of an operation, and it is unusual for a previously sound closure to become herniated after 3 years. Once a hernia has formed, mechanical forces ensure that it inexorably enlarges.
Incisional hernias are extremely variable. They may be wide or narrow-necked; often, as contents accumulate, adhesions develop in the sac, and just deep to the neck, so that the hernia becomes both irreducible and loculated. Incarceration and strangulation then become real dangers. The sac can assume huge proportions, eventually housing much of the normal intraperitoneal contents.

7 Briefly describe the treatment options of incisional hernias.

Even small symptomatic hernias should be repaired early. In asymptomatic hernias the risks of intestinal obstruction, strangulation and skin ulceration are such that repair, even in older patients, is also recommended. Protracted observation simply allows the hernia to increase in size, and subsequent repair is rendered more difficult and hazardous. The surgical technique is the same as for para-umbilical hernias, but larger hernias may require prosthetic mesh reconstruction of the abdominal wall.

8 Briefly describe the following: Obturator hernia, epigastric hernia and diastasis recti.

Obturator hernia

In this condition, herniation occurs along the obturator canal, which carries the obturator nerve and vessels out of the pelvis. It is most commonly seen in frail old ladies. The hernia starts as a pre-peritoneal plug and gradually enlarges, taking a sac of peritoneum with it. A loop of bowel may enter the sac and reduce spontaneously. Eventually a knuckle fails to reduce. Further loops can then be incorporated.

Symptoms: Lying deep to the pectineus, these hernias are largely asymptomatic until complicated by intestinal obstruction or strangulation. There is often a past history of intermittent symptoms of obstruction. In about 50% there may be the complaint of pain along the upper medial side of the thigh which radiates down to the knee, caused by pressure on the obturator nerve.
There are rarely any signs, except those of obstruction or strangulation. The diagnosis is made in most instances at the time of laparotomy for small-bowel obstruction of unknown cause. With pressure on the obturator nerve, the patient holds the leg flexed to reduce the pain. In 20% of patients, the hernial sac protrudes medially around the pectineus and presents as a palpable swelling in the femoral triangle. Rectal and especially vaginal examination can reveal a swelling in the region of the obturator foramen.

Epigastric hernia

The linea alba is the raphe formed by the junction of the rectus sheaths and the decussation of their fibres across the midline; it extends from the xiphoid process to the symphysis pubis. In its upper half, it is 1-3 cm wide and fibrous, but below the umbilicus it is a narrow cord.
Pathological features: The linea may be attenuated because of a congenital weakness in its lattice structure. Small neurovascular bundles that penetrate are also points of diminished resistance. Herniations of extraperitoneal fat through the linea usually occur in its upper half

Symptoms: Three-quarters of epigastric hernias are asymptomatic and found incidentally on physical examination. When symptoms are present they are of two types:

- local pain-often exacerbated by physical exertion
- Ill-defined pain-epigastric in site, often worse after meals (abdominal distension may strangulate the contents), and the clinical picture may mimic that of peptic ulceration.

The hernia may be visible if the patient is placed in an oblique light. The swelling is palpable in the midline and is usually tender and irreducible.
A patient who presents with vague upper-abdominal symptoms and in whom an epigastric hernia is found should be fully investigated for the possibility of peptic ulcer, gallbladder or pancreatic disease before symptoms are attributed to the hernia.

Diastasis Recti

- Separation of the rectus abdominis, may occur anywhere from the xiphoid process to the umbilicus
- Principally occurs in neonates and during pregnancy
- Treatment options: observe during pregnancy, physiotherapy, surgery