



Amyand's Hernia – an Avoidable Patient Presentation

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Abstract

Amyand's hernia is a rare form of inguinal hernia where the vermiform appendix becomes entrapped within the hernial sac; its incidence is less than 1%. We report an elderly gentleman who presented with an irreducible recurrent right-sided inguinal hernia. On surgical exploration we found the non-inflamed appendix, caecum and wall of the urinary bladder as the contents of the inguinal canal, with an atrophic right testicle disconnected from the spermatic cord. The aetiology of Amyand's hernia is often questioned in literature and there is no standard protocol for the management of Amyand's hernia. We discuss a variety of strategies to consider if such a rare presentation is encountered as well as a possible aetiology. Amyand's hernia is usually a diagnosis of first presentation, and so this patient presentation should have been avoided given his previous repairs, highlighting the importance of a good initial repair and proper definition of anatomy.

Background

Amyand's hernia is a rare form of inguinal hernia where the vermiform appendix becomes entrapped within the hernial sac which has an incidence of less than 1%. It is usually asymptomatic and difficult to diagnose preoperatively. If the appendix becomes inflamed within the inguinal canal, it may be confused with a strangulated inguinal hernia. The term Amyand's hernia was first introduced by Creese in 1953 after Claudius Amyand, a military surgeon who amongst many other prestigious titles such as Sergeant Surgeon to King George II of England performed the first successful appendicectomy in 1735 in an 11 year old boy. The child was thought to have a fistula discharging faeces into his groin, but upon surgical exploration, he was found to have an inflamed appendix within an inguinal hernia. The term has since been defined to cover findings of (a) an inflamed appendix within an inguinal hernia, (b) a perforated appendix within an inguinal hernia, or (c) a non-inflamed appendix within an irreducible inguinal hernia. If the appendix becomes inflamed within the inguinal canal, it may be confused with a strangulated inguinal hernia. Bladder wall involvement is also rare, occurring only in 1% to 4% of patients. This presentation is generally also asymptomatic until the bladder becomes entrapped within the scrotum, causing the patient to suffer from 2-stage urination, at which point he needs to manually compress his scrotum to complete urination.

Although Amyand's hernia has been reported in the literature in the past, the case which we describe is interesting as not only should it have been preventable but it also highlights the need for correctly performed effective hernia repairs to prevent avoidable complications.

Case Presentation

A 79 year old male patient presented electively to clinic with right-sided groin pain and lower abdominal pain. He had a history of 2 previous right-sided inguinal hernia repairs. The pain radiated into his scrotum, but was not associated with any features related to obstruction or strangulation. He had also noticed a bulge in his right groin develop approximately 2 years after his previous inguinal hernia repair. Although he has had 2 operations on the right groin to repair his recurrent inguinal hernia, he was unsure whether mesh had been placed as part of the repair each time. The patient was otherwise medically fit and well with no other significant co-morbidities. On examination, he was found to have a right-sided irreducible recurrent indirect inguinal hernia. Clinically, the diagnosis seemed to be evident and so no further investigation was deemed necessary. As a result, the patient was booked onto the surgical waiting list for an elective repair of his recurrent right-sided inguinal hernia.

Treatment

Upon surgical exploration of the right inguinal region via an open approach, his anatomical

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Table: Classification of Amyand Hernia, after Losanoff and Basson.

Classification	Description	Surgical Management
Type 1	Normal appendix within an inguinal hernia	Hernia reduction, mesh repair, appendectomy in a young patient
Type 2	Acute appendicitis within an inguinal hernia, no abdominal sepsis	Appendectomy through hernia, primary repair of hernia with no mesh
Type 3	Acute appendicitis within an inguinal hernia, abdominal wall or peritoneal sepsis	Laparotomy, appendectomy, primary repair with no mesh
Type 4	Acute appendicitis within an inguinal hernia, related or unrelated abdominal pathology	Manage as Type 1-3, investigate or treat second pathology as appropriate

planes were found to be completely distorted. The external oblique aponeurosis could not be identified and there were no sutures or mesh from the previous repairs identified. A mass of approximately 6 cm x 4 cm was found overlying the right inguinal ligament, which was fibrous in nature and strongly adherent to the surrounding tissue. The adhesions were divided which revealed that the mass was indeed the hernial sac that was thickened and fibrosed. Although the edges of the sac were identified, the spermatic cord however could not be recognised and therefore was not isolated. The right testis was found to be atrophied and found 'floating' in the right hemiscrotum, completely detached from the spermatic cord. Neither the ilioinguinal or iliohypogastric nerves were identified despite thorough examination for them. The sac was opened and found to contain the vermiform appendix which was non-inflamed but was closely stuck to the caecum by multiple adhesions, the tip of which was attached to the hernial sac. In addition to the appendix and caecum, a portion of the bladder wall was also found inside the sac and again had multiple adhesions to the sac. All contents were freed of adhesions and reduced through the deep inguinal ring. The sac was transixed and excised but the atrophic testis was not removed. The posterior wall of the inguinal canal and the deep ring were plicated and reinforced using prolene sutures to prevent recurrence. A prolene mesh could not be safely inserted into the repair because the whole anatomy of the inguinal canal was destroyed. Overlying fibrous tissue was therefore approximated to create an external oblique aponeurosis to protect the inguinal canal and the overlying tissue and skin closed with absorbable sutures (Figure 1).

Outcome and follow-up

The patient reviewed in the surgical outpatient clinic 5 weeks post-operatively. He reported that his initial presentation of pain and swelling had completely resolved and that he was able to get back to his normal function of living. Although he did not have an orchidectomy, the non-functional testis had no impact on his daily activities or general health.

Discussion

A hernia is classically defined as the protrusion of an organ or tissue out of the body cavity in which it normally lies. The most common surgical procedure performed for a hernia is the inguinal hernia repair. Clinical examination is sufficient to make a diagnosis of an inguinal hernia in most cases; however clinicians are only 70% accurate in diagnosing direct and indirect inguinal hernia. USS has a sensitivity of 90% in diagnosing herniae in patients performing the Valsalva manoeuvre. Inguinal herniae tend to affect males more often than females, with a 10:1 male to female ratio, and the right side is more commonly affected than the left side. 4.8% of the primary and 8.2% of recurrent herniae will present as an emergency with a risk of strangulation of approximately 3% per annum.

The diagnosis of an Amyand's hernia cannot be made on clinical examination but only on imaging and intra-operatively. Our patient

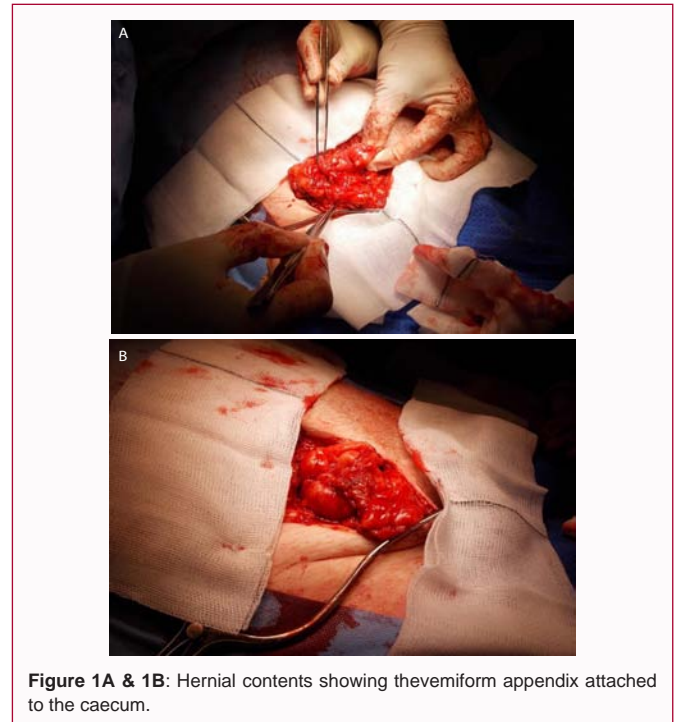


Figure 1A & 1B: Hernial contents showing the vermiform appendix attached to the caecum.

presented with a recurrence in his inguinal hernia despite 2 previous repairs. Depending on the primary repair technique, the rates of recurrence following surgery ranges from 0.2% to 10%. Lichtenstein classified recurrences of hernia as follows:

- 47% at pubic tubercle
- 40% at the deep inguinal ring
- 13% entire posterior wall of inguinal canal

The aetiology of Amyand's hernia is often questioned in literature. A possible explanation is that due to herniation, the appendix becomes more vulnerable to micro-trauma causing fibrosis and adherence to the hernial sac. Muscle contractions and changes in intra-abdominal pressure may cause appendiceal compression, resulting in ischaemia and secondary bacterial translocation. In 1993, Nyhus classified the presentations of Amyand's hernia based on the anatomy example: Size of the internal ring and state of the posterior wall into 4 main types. This classification was further developed by Losanoff and Basson in 2008 to recommend surgical management options for each subtype of hernia described as can be seen in Table 1.

There is no standard protocol for the management of Amyand's hernia. Important determinants for appropriate surgery include the presence of an inflamed appendix, contamination of the surgical field, patient age and anatomical features. However, a normal appendix with some fibrotic adhesions can be pushed back into the peritoneal cavity with the other contents of herniation prior to hernia repair. There

is no clear consensus on mesh repair however mesh insertion can be questioned in the case of an incarcerated non-inflamed appendix as there are multiple adhesions and the possibility of bacterial translocation. The adhesions could be secondary to inflammation (microscopic if not obvious); high friction; and ischaemic tissue, thus increasing the risk of wound infection if mesh was to be inserted. Mesh repair without appendectomy is a favoured option in patients with a normal appendix within the hernia sac unless the patient is of a young age, in which an appendectomy is performed. If the appendix appears inflamed however, then an appendectomy should be performed with a tension-free primary repair of the inguinal hernia and avoidance of the insertion of mesh due to the increased risk of mesh infection.

As our patient case was a recurrent inguinal hernia, on exploration we found a normal adherent appendix as its contents with atrophy of the right testis and an unidentifiable spermatic cord which was not found. As the patient was not young in age, the macroscopically normal appearing appendix was reduced back into the peritoneal cavity and not excised. In 0.05% to 0.5% of the patients testicular pain and swelling occur 2 days following surgery, which heralds to ischemic orchitis. In up to 60% of cases, the condition will resolve and in the remainder testicular atrophy will remain. Testicular atrophy will occur frequently with sliding herniae as the sac has to be excised from the spermatic cord, however the risk increases 10- fold in recurrent herniae To minimize the risk of developing testicular atrophy or ischemic orchitis, the sac should be divided and transfixed at the level of the deep ring rather than excised entirely. It is thought that upon a previous repair in this patient, the testicle did develop ischaemic orchitis however why this did not clinically present itself is unknown.

Learning Points/Take Home Messages

- Careful dissection of the anatomy of the inguinal region is necessary before attempting to repair an inguinal hernia.

- If a complication is identified either intra-op or post-operatively, then full transparency and probity should be ensured with good communication to the patient.

- One of the risks of a hernia repair is recurrence, which sometimes cannot be prevented due to changes in anatomy and forces on the body over time. Equal amounts of care and precision should be taken with each repair attempt.

- If an inflamed appendix is found within the hernial sac, an appendectomy should be performed and mesh should be avoided due to the risk of associated mesh infection.

- If a non-inflamed appendix is found, this can be reduced back into the peritoneal cavity and a mesh repair can be carried out (however if the patient is of a young age then consider appendectomy +/- mesh).

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