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Case Report

Inguinal Hernia

Identification and Gross Anatomical Study of An Inguinal Hernia: Through A Cadaveric Case Study

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Introduction: Groin hernias are the most common reason for primary care physicians to refer patients for surgical management. Patients often present with a bulge in the groin that is associated with pain in two-thirds of cases. Diagnosis is typically clinical, with a physical examination and a thorough medical history often sufficient to confirm the diagnosis without the need for imaging. Groin hernias may be associated with morbidity and can become complicated by incarceration or strangulation, requiring emergent surgical repair.

Methodology: A 73-year-old male cadaver was noticed with a left inguinal hernia (IH). Although IHs are a widespread pathology, the size and extent of this IH make it a unique one. The methodology to dissect the hernia in a cadaver is framed as per the Lichtenstein tension-free mesh repair procedure. The skin incision and method of approaching the hernial sac and its contents are only included in the cadaveric methodology of hernia dissection for its deeper understanding of gross anatomical features.

Results: Upon gross dissection of the abdominal and pelvic cavities, the distal part of the descending colon was found to be herniated through the posterior wall of the inguinal canal, pushing the scrotum slightly to the right side. The pattern of herniation medial to the inferior epigastric artery through Hesselbach's triangle confirms the type of hernia as a direct one during methodical dissection. The extent of the herniation had enlarged the left inguinal region to over 4 cm in width and over 5 cm in depth.

Conclusion: The need for dissecting inguinal hernia is purely and completely for the purpose of academic pursuit. The undergraduate and postgraduate students are the main beneficiaries. Theoretically and practically, the anatomy of inguinal hernia, regarding its position, pattern of herniation, hernial sac, its body, neck of hernial sac, and the content herniated, are studied practically during dissecting inguinal hernia.

Keywords: Scrotal swelling, left direct inguinal hernia, cadaver dissection, cadaver case report

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Introduction

Inguinal hernias (IHs) are common pathology where contents from peritoneal cavity migrate inferiorly towards inguinal canal. They are separated into various groups according to where migration took place. Direct and indirect are two most prevalent. Direct IHs migrate medially to inferior epigastric vessels in Hesselbach's triangle. The more prevalent indirect IHs push through deep inguinal ring and migrate laterally to inferior epigastric vessels to enter inguinal canal. Herniations can cause severe pain and discomfort after they move further inferiorly into scrotal sac after entering inguinal canal. Some hernias, such as one explored in this case, are classified as indirect inguinal hernias or irreducible hernias; this refers to hernias that cannot be put back in place by external manipulation. IHs are thought to have both congenital and acquired component, resulting in bimodal distribution, peaking with children five years of age and with adults over 70 years of age, and are more common in males (90%) than females (10%). The lifetime incidence of IHs in men is nearly 25%. In present cadaveric study of inguinal hernia, an effort has been made to understand gross anatomical structures better practically by executing layer-by-layer dissection over inguinal hernia.

Need For Dissection of Cadaveric Inguinal Hernia

The need for dissecting inguinal hernia is purely and completely for the purpose of academic pursuit. The undergraduate and postgraduate students are the main beneficiaries. Theoretically and practically, the anatomy of inguinal hernia, regarding its position, pattern of herniation, hernial sac, its body, neck of hernial sac, and the content herniated, are studied practically during dissecting inguinal hernia.

Causes

In adults, increased intra-abdominal pressure from obesity, chronic cough, chronic obstructive pulmonary disease (COPD), heavy lifting, or straining can also contribute to the development of an IH. His are caused by a weak spot in the abdominal wall that permits the passage of peritoneal contents through it. Some diseases that affect connective tissue, such as Ehlers-Danlos syndrome and Marfan syndrome, have been observed to contribute to HI.[1]

Signs and Symptoms

IH symptoms can start suddenly or develop gradually over time. It may not be possible to identify congenital defects that raise the risk of an IH until symptoms appear.[2] Increasing physical activity and coughing can exacerbate symptoms, which are frequently accompanied by a burning or pinching feeling. IHs can produce pain that travels down the leg or inferiorly into the scrotum. IHSs that are categorized as strangulation or imprisonment may exhibit obstructive symptoms related to herniated contents or excruciating pain. A physical examination is usually enough to make a diagnosis.

Hernias can cause problems for the patient, particularly if they become incarcerated. They may develop into strangulated hernias if treatment is not received, which could result in intestinal ischemia and death. Despite having a high mortality rate, the majority of patients with incarcerated hernias require emergency treatment within 24 hours to lower the risk of intestinal necrosis.[3] Due to intestinal strangulation and ischemia, approximately 15% of patients with incarcerated hernias need colon resection.[4]

Torsion of the larger omentum is another uncommon consequence that has been documented, and it can result in excruciating acute abdominal discomfort.[5] In the present case, the patient was suffering from chronic health problems like leukoderma, hyperlipidemia, diabetes, and hypertension. During pectoral region dissection, the cadaver was found with an implanted pacemaker.

History of Cause of Death

A 73-year-old male cadaver was selected for dissection. The cause of death, as per the knowledge of the attendees, was cardiac arrest.

Gross Examination of Cadaver

A big swelling was seen in most parts of the left inguinal region and the left scrotal region. The extent of the herniation had enlarged the left inguinal region to over 5 cm in width and over 6 cm in depth (Figure 10). Hypopigmented skin patches over the lower abdominal area; the penile part of the external genital organ is pushed to the right side due to swelling in the left inguinal region; the penis was somewhat buried in the scrotal region due to swelling of the scrotum.

Methodology of Cadaveric Dissection of Inguinal Hernia

1. Before embalming, aseptic precautions were ensured, and the herniated left inguinal region was photographed. After 8 months of preservation of the cadaver, it has been taken for academic purposes.

2. The methodology to dissect the hernia in a cadaver is framed as per the Lichtenstein tension-free mesh repair procedure. The skin incision and method of approaching the hernial sac and its contents are only included in the cadaveric methodology of hernia dissection for its deeper understanding of gross anatomical features.

3. The method of the Lichtenstein tension-free mesh repair procedure. The Lichtenstein tension-free repair remains one of the most common methods, though laparoscopic options like TAPP and TEP are gaining popularity due to their minimally invasive nature.**[6]** The Shouldice technique is another established method, often favored for its repair of the posterior wall using natural tissue rather than mesh. Speaking of mesh, its use in repair is critical, as it has been proven to significantly lower the risk of recurrence and the need for reoperation.**[7]** These benefits have led many parts of the world to adopt mesh-supported repairs as the standard procedure. The first step of a skin incision and an external aponeurosis incision was only included for cadaveric dissection.

Method of the first step of Lichtenstein mesh repair:

1. A skin incision approximately 5cm long is made obliquely, 2 fingerbreadths above inguinal ligament.

2. Subsequently, the subcutaneous tissue is incised down to the external oblique aponeurosis.

Regular Abdominal Dissection Method

This is included under methodology to reconfirm the pattern of herniation and to observe the content, its length, and other related features.

Results

Findings Of Cadaveric Dissection

1. After taking a 5cm incision over the skin, which is 1cm above and parallel to the inguinal ligament, the superficial fatty layer and deep membranous layer (Scarpa's fascia) are observed (Figure 2).

2. Below observed external oblique aponeurosis (Figure 3).

3. After clearing the fascia and aponeurosis, the superficial inguinal ring is visible (black circle), and also the roof of the inguinal canal is visible (yellow arrow) (Figure 4).

4. Through the incised area over the external oblique aponeurosis, the part of herniated content is lifted, and it confirms the direct herniation of the loop of intestine behind the posterior wall of the inguinal canal (Figure 5).

5. After opening the abdominal part and tracing the herniated content of the intestine, an incision was made over the left inguinal region up to the left side of the scrotum (yellow circle). This step is followed to reconfirm the type of inguinal hernia; it was found to be a direct inguinal hernia (Figure 6).

6. The blue arrow shows transversalis fascia, and black arrow shows parietal peritoneum (Figure 7).

7. The black arrow shows part of the rectus abdominis muscle, the yellow arrow shows the external iliac artery, the red arrow shows the inferior epigastric artery, and the blue arrow shows the hernia sac (Figure 8).

8. Due to the herniation of the distal part of the descending colon and the proximal part of the sigmoid colon, the position of the cecum, ascending colon, and transverse colon moves upwards and forwards, and the shape of the descending colon becomes a band-like structure (Figure 9).

Figure 1

Figure 2

Figure 5

Figure 3

Figure 6

Figure 4

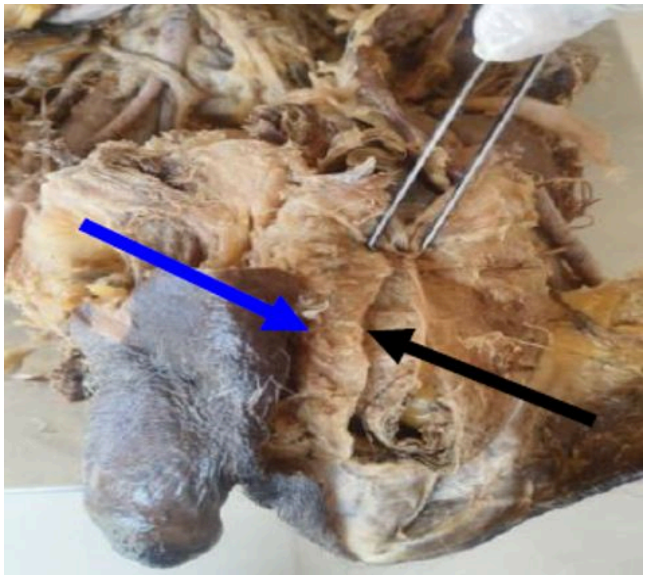

Figure 7

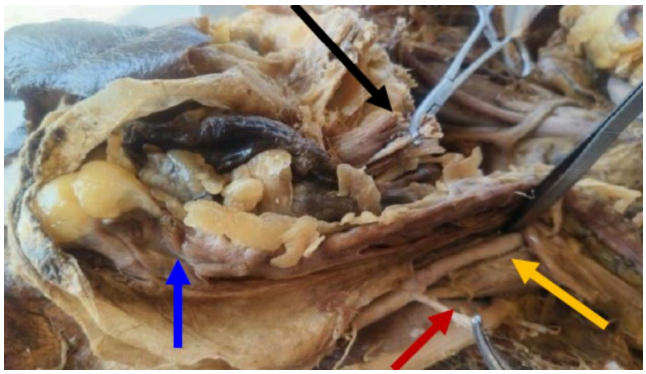

Figure 8

Figure 9

Dimensions of Hernial Sac

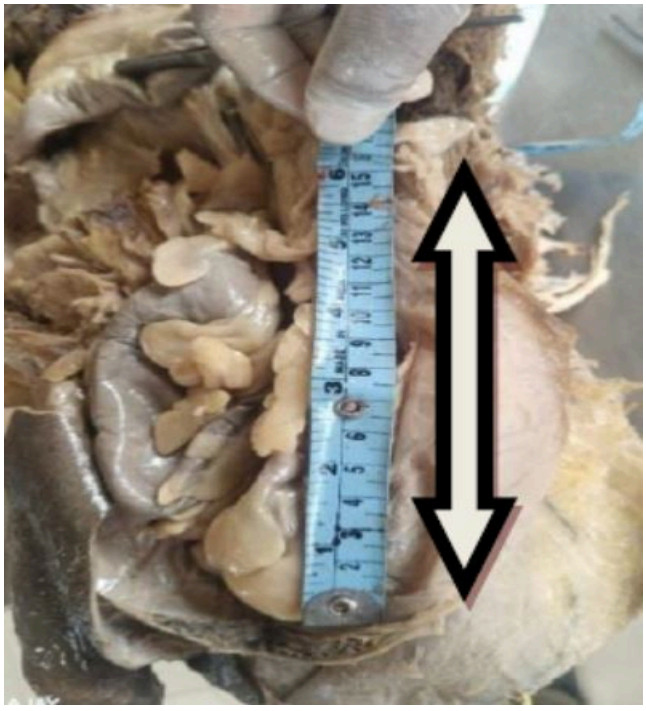

Figure 10

Figure 11

Figure 10: Length is 5cm Figure 11: Breadth is 6cm

Discussion

Inguinal hernia (IH) repair is indeed a common procedure, with millions of surgeries performed annually across the globe. The diagnosis is often made through a physical examination, and it tends to be more frequent in males. The various risk factors, such as family history, previous hernias, and conditions like abnormal collagen metabolism, give us insight into why some individuals may be more prone to developing IHs. Groin hernias are the most common reason for primary care physicians to refer patients for surgical management. Patients often present with a bulge in the groin that is associated with pain in two-thirds of cases. Diagnosis is typically clinical, with a physical examination and a thorough medical history often sufficient to confirm the diagnosis without the need for imaging. Groin hernias may be associated with morbidity and can become complicated by incarceration or strangulation, requiring emergent surgical repair. A 73-year-old male cadaver was noticed with a left inguinal hernia (IH). Although IHs are a widespread pathology, the size and extent of this IH make it a unique one. As per the bystanders' words patient had a long-standing history of Diabetis, Hypertension, and Hyperlipidemia.

The methodology to dissect the hernia in a cadaver is framed as per the Lichtenstein tension-free mesh repair procedure. The skin incision and method of approaching the hernial sac and its contents are only included in the cadaveric methodology of hernia dissection for its better understanding of gross anatomical features. Upon gross dissection of the abdominal and pelvic cavities, the distal part of the descending colon was found to be herniated through the posterior wall of the inguinal canal, pushing the left side of the scrotum slightly to the right side. The pattern of herniation medial to the inferior epigastric artery through Hesselbach's triangle confirms the type of hernia as a direct one. The extent of the herniation had enlarged the left inguinal region to over 5 cm in width and over 6 cm in depth. During methodical dissection after skin incision the superficial fatty layer and deep membranous layer are exposed followed by external oblique aponeurosis.

The superficial inguinal ring was visible, the part of herniated content was lifted and it confirms the direct herniation of the loop of intestine behind the posterior wall of the inguinal canal. Through the regular abdominal dissection, the type of hernia was reconfirmed as direct one, as the herniated descending colon was found to be medial to inferior epigastric artery i.e. in Hesselbach's triangle. Due to this herniation of the distal part of the descending colon and the proximal part of the sigmoid colon, the position of the cecum, ascending colon, and transverse colon moves upwards and forwards, and the shape of the descending colon becomes a band-like structure. Along with direct inguinal hernia, leukoderma over the lower abdomen and the implanted pacemaker were found in the cadaver. Because of the limited information and medical history given about the cadaver due to confidentiality, only speculations can be made about the causes of the IH and the reasons for not undergoing hernial repair.

Conclusion

In the present cadaveric study of inguinal hernia, a unique methodology has been implemented to found out the pattern of herniation as direct or indirect through dissection. The need for dissecting an inguinal hernia is purely and completely for the purpose of academic pursuit. The undergraduate and postgraduate students are the main beneficiaries.

Usually, students used to learn about the anatomical features of hernia, its pattern of herniation etc. only theoretically. But the present cadaveric case report had given a good opportunity for the students to study anatomy of hernia practically also in the beginning days of their curriculum itself. They could able to have better idea regarding the anatomy of inguinal hernia, its position, pattern of herniation, hernial sac, its body, neck of hernial sac, and the content herniated, are studied practically during dissection of inguinal hernia.

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