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# A Rare Case of a Direct Incarcerated Inguinal Hernia Containing an Epiploic Appendage and a Literature Review

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**Abstract**

Inguinal hernias are a widespread condition, responsible for a large number of acute abdomen cases. Typically, indirect, rather than direct, hernias are the ones leading to complications, as a consequence of their narrower hernial defect. Our case concerns a rather rare incidence of a direct incarcerated hernia in a 71-year-old man who presented with acute pain in the left inguinal area. Upon clinical examination, an irreducible inguinal mass was palpated. Therefore, the existence of a complicated hernia was suspected. The patient underwent an emergency repair, during which it was established that the hernia was direct and incarcerated and that its sac contained an ischemic epiploic appendage. The hernia was successfully repaired with mesh, the patient recovered uneventfully and was discharged five days later. Despite the rarity of complicated direct

inguinal hernias, they should always be included in the differential diagnosis of irreducible groin masses, because they can increase severe complications.

***Keywords*:** Direct inguinal hernia; Appendix epiploica.

## Introduction

Inguinal hernias are the most frequent type of hernia and their repair is among the most common procedures general surgeons perform.[1] Various risk factors can cause a predisposition to the development of hernias, such as male sex, old age, a high body mass index, connective tissue disorders and activity that increases intra-abdominal pressure, like chronic coughing or weight-lifting.[2] Inguinal hernias are divided into two categories depending on the point of protrusion of the tissue. The hernia is indirect, when the protrusion occurs through the internal inguinal ring, whereas direct hernias arise from the posterior wall of inguinal canal, in the Hesselbach triangle.[3] Due to their wider neck, direct hernias are far less prone to complications.[4] An uncomplicated or reducible inguinal hernia typically presents as an inguinal bulge whose contents can return to the abdomen, either spontaneously or by applying pressure.[5] Complications arise when the content becomes trapped or incarcerated, whereas strangulation involves reduced blood supply and can cause obstruction, bowel necrosis and perforation.[6] Treatment options include 'watchful waiting' or elective repair for asymptomatic patients. Reinforcement of the abdominal wall defect through a mesh repair is necessary when complications emerge.[7]

In this case report we describe the case of a patient with a complicated direct inguinal hernia who underwent emergency surgery, at the University General Hospital.

## Case Report

In 2017, a 71-year-old male presented to the surgical emergency department due to pain, located in the left inguinal region. The pain had started 72 hours before his admission, after lifting weight. Clinical examination revealed a moderately distended abdomen, diminished bowel sounds and mild diffuse tenderness, without signs of peritonitis. In the left inguinal region there was a tender hernia. Reduction of the hernia was attempted but

proved impossible. Blood pressure, heart rate, oxygen saturation and body temperature were within normal range. No chronic diseases, past surgeries, allergies of any sort or a history of smoking were mentioned. The laboratory tests were normal except the elevated levels of total white blood cell count (10,56K/μL).

Moreover, the X – ray of the abdomen was clear. Ultrasonography revealed a large hernia in the left inguinal area [Figure 1]. Doppler ultrasonography showed a reduction of blood flow to the hernial content, a finding on which the diagnosis of an incarcerated inguinal hernia was based [Figure 2].

The patient underwent surgery in order to reduce the hernia and repair the abdominal wall defect. A left sided inguinal skin incision was performed to access the inguinal canal. During surgery it was confirmed that the hernia was direct and its content was found to be an ischemic, yet not necrotic epiploic appendage arising from the sigmoid colon [Figure 3]. After the appendage was pushed back into the abdomen and blood flow was restored, the abdominal wall weakening was reinforced using synthetic mesh. Postoperative recovery was smooth, the patient was discharged after 5 days and presented no complications during follow up.

Written informed consent has been obtained from the patient to publish this paper.

**Discussion**

Inguinal hernias constitute quite a common condition, affecting approximately 27% of men and 3% of women across the world, and are typically classified as either direct or indirect, based on differences in anatomy.[2] Usually, inguinal hernias are asymptomatic and do not alarm the patient until a straining event, such as lifting weight, raises the intraabdominal pressure, causing soft tissue to protrude through an anatomical defect.[6] The lifetime risk of dangerous complications following such an event has been found to be rather low, estimated around 1-3%.[5] Nevertheless, an increased risk has been strongly associated with indirect hernias, whereas the less prevalent direct hernias, are about three times less likely to become complicated which can be attributed to their wider neck.[4,8,9]

Specifically, indirect hernias herniate through the internal inguinal ring, which has narrow diameter, while direct hernias protrude through Hesselbach's triangle, medial to the inferior epigastric vessels.[10] However, despite the fact, that the neck of the fascial defect in direct hernias is initially wide and soft, studies have shown that it can become fibrotic and inelastic over time, and the above may multiply the risk of incarceration.[4]

Regarding diagnosis, the physical examination that involves inspection and palpation, usually suffices to confirm the presence of the inguinal hernia.[11] Further diagnostic investigation using imaging methods such as ultrasonography, computed tomography (CT), magnetic resonance imaging (MRI) or herniography is required only in cases of pain and/ or swelling that suggest the presence of a complication. Differentiating between direct and indirect hernias during preoperative care is meaningless and is in fact quite challenging to achieve clinically or even through imaging.[12] Concerning differential diagnosis, if the initial clinical presentation includes edema, then lymph node enlargement, aneurysm, saphena varix, soft-tissue tumor, abscess or genital anomalies (such as ectopic testis) must be excluded. In case of the presence of pain, then adductor tendonitis, pubic osteitis and hip arthritis should be considered likely.[7]

Regarding recommended treatment, options depend on the severity of the patient's symptoms. Asymptomatic or mild symptoms cases, can be managed with the 'watchful waiting' approach or a scheduled repair, while complicated hernias require emergency surgical repair.[7] Moreover, the surgical techniques include tissue, open mesh and laparo-endoscopic mesh repair techniques, with a mesh-based repair being strongly recommended for the majority of cases.[7]

Epiploic appendages are located in the large bowel and can be found in inguinal hernia sacs, though this incident is quite rare and few cases have been reported.[13] These appendages are outpouchings of fatty tissue, covered by serosa that project into the peritoneal cavity and that are supplied by one or two small arteries. Due to the limited arterial blood supply, along with their pedunculated structure that allows increased movement, epiploic appendages are prone to torsion and ischemia or bleeding, which can

also be caused by the thrombosis of the central vein.[14] Epiploic appendagitis is also related to diverticulitis because of the local spread of inflammation. CT scans are the preferred imaging method of diagnosing epiploic appendagitis, which when primary does not necessarily require surgical intervention and can be treated with non-steroidal anti-inflammatory drugs. However, in cases where the appendages become incarcerated in an irreducible inguinal hernia, an emergency surgery can be called for.[15]

Despite the unlikelihood of direct hernia complications, there have been a few documented cases of strangulated direct hernias arising in various ways. One such case involved a life threatening bowel perforation, secondary to ischemic necrosis, which required emergent resection of the necrotic bowel.[16] In addition, incarcerated direct hernias have also been reported as the cause of acute bowel obstruction.[8] Moreover, a complicated direct inguinal hernia containing the urinary bladder has led to obstructive uropathy presenting with severe acute kidney failure, requiring emergency surgery and dialysis.[17] Finally, we describe two cases very similar to ours, one of which concerns an irreducible direct inguinal hernia that was found to contain inflamed and hypertrophic epiploic appendices which had to be resected before the hernia could be repaired.[18] The second one is a case of an incarcerated inguinal hernia which during emergent surgical hernia reduction and herniorraphy was revealed to contain not only epiploic appendices, but also part of the sigmoid colon.[19]

Eventually, after searching for similar cases on international literature, we found few relevant case reports of direct strangulated or incarcerated hernias and even fewer of hernias containing epiploic appendices. Our main findings are summarized in Table 1. It is important to mention that the majority of reported cases of epiploic appendages being found in inguinal hernias concerned indirect hernias.[15] Hence this case report is unique in that it describes a direct hernia.

## Conclusion

Strangulation and incarceration occur scarcely among direct inguinal hernias. General surgeons usually do not repair asymptomatic direct hernias and choose to follow the

'watch and wait approach'. However, the risk of complications increases significantly with age and in the presence of certain concomitant diseases. Consequently, being aware of the fact that elective surgery for groin hernia is known to be a low-risk procedure, patients suspected for groin hernia, should be considered for hernia repair depending on their age, sex and clinical presentation, in order to avoid severe complications.

## Authors' Contributions

EK, PM, AZ, AI, Span and DP managed the patient. SPap and PM performed the investigation. SPap provided the required resources. SN and DP curated the data. SN and DP supervised the work. SPap and EK drafted the initial manuscript. EK, AZ and DP reviewed and edited the manuscript. All authors approved the final version of the manuscript.

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**Figure 1:** Ultrasonography of left inguinal region, revealing hernia (white arrow)

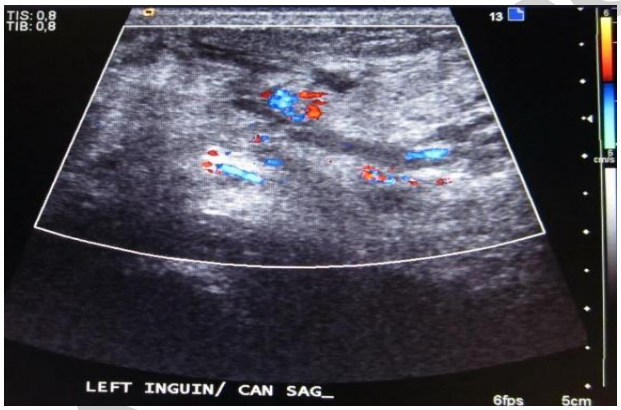


**Figure 2:** Doppler ultrasonography revealing reduced blood flow of the hernia content.

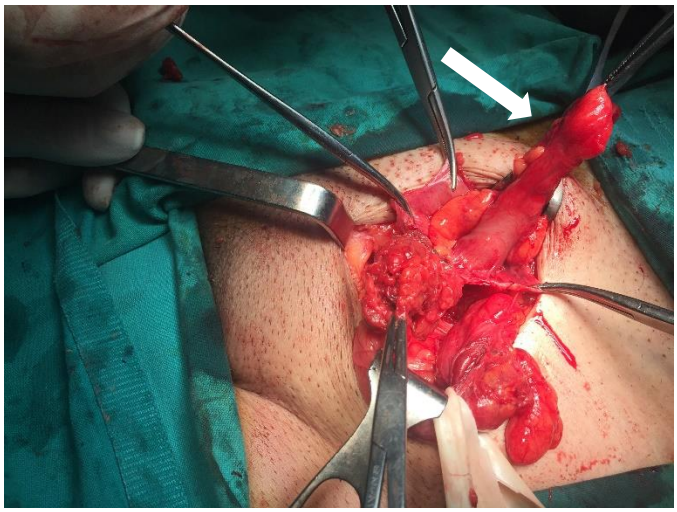

**Figure 3:** Direct inguinal hernia containing an ischemic epiploic appendage (white arrow); image taken during surgery.

**Table 1:** Examples of cases of complicated direct inguinal hernias.

| **Author** | **Content** |
|---|---|
| Sherif Monib et al. 2020 | 58-year-old man with a direct strangulated hernia, complicated with a small bowel perforation. |
| Jacob Levi et al. 2020 | 72-year-old man presenting with hematuria, urinary retention and severe acute kidney failure who was diagnosed with a direct incarcerated hernia containing the urinary bladder. |
| Manmohan Kamat et al. 2018 | 83-year-old male with a direct obstructed hernia of sliding type containing congested loops of ileum as well as part of the urinary bladder. |
| Mayank Jain et al. 2008 | 52-year-old man whose irreducible direct hernia contained inflamed epiploic appendices. |
| Ahmadullah Danish 2022 | 65-year old man with an incarcerated inguinal hernia containing sigmoid colon and epiploic appendices. |