

## Case Series

# Differential Diagnoses of Inguinal Swellings: A Case Series of Atypical Diagnoses

Ilgeldiev, Tabidze, Soeren Stoeckel\*, Diab, Labadze, Cipolla, Trifone, Hagen Rudolph and Lutz Mirow

Klinik für Allgemein- und Viszeralchirurgie, Klinikum Chemnitz gGmbH, Germany

## Abstract

**Background:** The inguinal region is an anatomically complex area where swellings are often interpreted as inguinal hernias. Inguinal hernia is one of the most common diagnoses in patients presenting with groin swelling. However, other pathologies can produce similar symptoms.

**Objective:** This case series aims to emphasize the importance of thorough differential diagnosis in patients with groin swelling and to present various pathologies that can be misdiagnosed as inguinal hernias.

**Methods:** We present three patients who presented with groin swelling and were initially suspected to have inguinal hernias. Further diagnostics, however, revealed different diagnoses.

**Results:** All three patients, despite similar initial suspicions, were diagnosed differently. Patient 1 was found to have a recurrence of a moderately differentiated endometrioid adenocarcinoma of the endometrium in the right groin area. Patient 2 was diagnosed with penile carcinoma with left inguinal metastasis. Patient 3 had a metastasis of a known prostate carcinoma in the left groin area.

**Conclusion:** Our case series highlights the importance of thorough differential diagnosis in patients with groin swelling. It is crucial to think beyond the most common diagnosis of inguinal hernia and consider other possible pathologies. A careful clinical examination, supported by appropriate diagnostic tools, is necessary to make an accurate diagnosis and ensure appropriate treatment.

**Keywords:** Groin swelling; Groin mass; Inguinal hernia; Penile carcinoma; Inguinal pathology; Endometrioid adenocarcinoma; Inguinal metastasis

## Introduction

The inguinal region is an anatomically complex area containing a multitude of structures. Swellings in this region are often interpreted as inguinal hernias, especially when they clinically present with typical symptoms of a hernia. Inguinal hernia is one of the most common diagnoses in patients presenting with groin swelling, leading to over 800,000 surgeries worldwide annually [1]. However, other pathologies can also produce similar clinical symptoms and should be considered in the differential diagnosis.

The literature reports various pathologies misdiagnosed as inguinal hernias. For example, Kojima et al. [2] highlight the importance of ultrasound examination in assessing patients with a groin mass, noting that such examination can help avoid unnecessary surgeries and identify latent inguinal hernias. Another report by Hwang et al. [3] identified a Nuck canal cyst as a rare anomaly of the female inguinal canal that can present similarly to a hernia.

In this case series, we present three patients who presented with symptoms of groin swelling. All were initially suspected of having inguinal hernias. However, further diagnostics led to three different

diagnoses: an endometrioid adenocarcinoma, a penile carcinoma with inguinal metastasis, and a bone metastasis of a prostate carcinoma. These cases underscore the importance of thorough differential diagnosis and the use of appropriate diagnostic tools to make an accurate diagnosis and ensure appropriate treatment.

## Case Presentation

We present a case series of three patients who presented at the Chemnitz Hospital with groin swelling and suspected inguinal hernias. A summary of the diagnostic and therapeutic timeline, as well as demographic characteristics, can be found in Table 1. The study was conducted in accordance with the Declaration of Helsinki and the ethical standards of the Chemnitz Hospital. The presentation and discussion of the cases, as well as the conclusions drawn, were guided by the CARE guidelines.

### Patient 1

The 70-year-old patient N presented in February 2022 at the surgical consultation. She presented with a protrusion in the right groin area, initially suspected to be an inguinal hernia. During abdominal examination, a 10 cm × 15 cm non-reducible mass was detected in the right groin area. An ultrasound examination revealed a fluid-filled mass. The patient had a history of a moderately differentiated endometrioid adenocarcinoma of the endometrium, for which she had undergone Wertheim surgery in March 2020.

Further clarification was sought through a CT scan of the entire abdomen (Figure 1). The CT from 25.02.2022 showed an oval, encapsulated structure in the right groin area, most likely interpreted as a soft tissue hematoma. No active bleeding was observed. An enlarged lymph node was considered as a differential diagnosis. A follow-up CT on 01.08.2022 showed a size-progressive formation within the suspected right inguinal hernia compared to the previous

**Citation:** Ilgeldiev, Tabidze, Stoeckel S, Diab, Labadze, Cipolla, et al. Differential Diagnoses of Inguinal Swellings: A Case Series of Atypical Diagnoses. *World J Clin Case Rep Case Ser.* 2023;3(2):1020.

**Copyright:** © 2023 Ilgeldiev

**Publisher Name:** Medtext Publications LLC

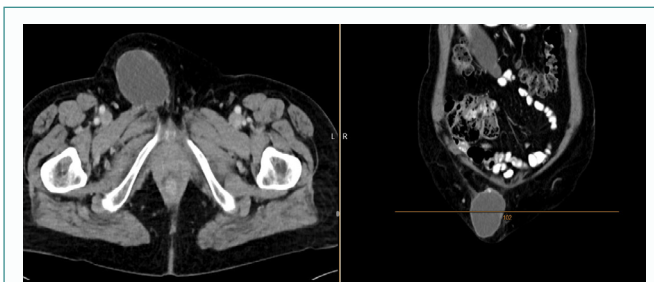
**Manuscript compiled:** Dec 23<sup>th</sup>, 2023

\***Corresponding author:** Soeren Stoeckel, Klinik für Allgemein-Und Viszeralchirurgie, Klinikum Chemnitz gGmbH, Saxony, Germany

examination in February (Figure 2). There was no evidence of tumor recurrence or metastasis-suspect lesions intra-abdominally. A previous hysterectomy was also noted.



**Figure 1:** CT of the abdomen from 25.02.22: Oval encapsulated structure in the right groin area, most likely soft tissue hematoma, no active bleeding, DD enlarged lymph node.



**Figure 2:** CT of the abdomen from 01.08.2022 - Size-progressive formation within the right inguinal hernia compared to the previous examination from 25.02.2022, - No indication of tumor recurrence or metastasis-suspect lesions intra-abdominally. Post-hysterectomy.

In September 2022, the case was discussed at the tumor board. There was no evidence of a tumor, and hernia surgery was recommended. The operation took place in December 2022. Intraoperatively, a cystic mass was identified. After incision of the cyst, a cytological examination was conducted. Cytology revealed a protein-rich aspirate with preserved squamous epithelial cells, including occasional atypical cells. Due to the low number of atypical cells, no further immunohistochemical examination was deemed necessary. Upon recurrence of the cyst, another operation was performed, where the cyst was drained and cytologically examined again. Cytology showed a hematoma with signs of erythrocyte fragmentation and karyorrhexis of granulocytes. There was no evidence of malignancy in the examined material.

In April 2023, a cyst excision was performed. Histological examination revealed a fatty connective tissue portion with extensive infiltrates of a large adenocarcinoma in the right groin area. The carcinoma extended to the resection margin. Lymphangiosis carcinomatosa was also detected. The final diagnosis was a recurrence of a moderately differentiated endometrioid adenocarcinoma of the endometrium in the right groin area.

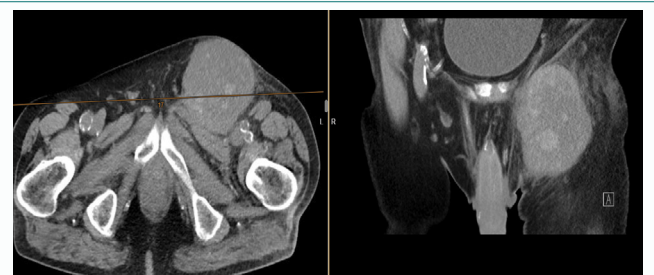
### Patient 2

The 73-year-old patient M presented in May 2022 in our Central Emergency Department. He presented with a swelling in the left groin area that had been present for about 3 weeks. He reported normal bowel movements and micturition, and no B-symptoms were present. Physical examination in the emergency department revealed an irregular, indolent tumor in the left groin area. Based on these

findings, a CT scan of the abdomen was ordered, and the patient was admitted for further diagnostics.

The CT of the abdomen showed a highly suspicious malignant mass in the left groin area (Figure 3). Additionally, nearby satellite lesions were detected, interpreted as lymph nodes. During a more thorough physical examination, a hazelnut-sized, highly suspicious malignant lesion was identified on the glans penis. Upon detailed anamnesis, the patient reported a previous circumcision surgery with carcinoma detection.

Based on these findings, the patient was referred to urology. The diagnosis was penile carcinoma with left inguinal metastasis.



**Figure 3:** Finding from CT of the abdomen: Highly suspicious malignant mass in the left groin area, with nearby satellite lesions, DD lymph nodes.

### Patient 3

The 67-year-old patient P was admitted to our clinic in June 2023 due to a mass in the left groin area. The referral came from an outpatient urologist. The patient had a known history of prostate carcinoma from 2021, which had already metastasized and led to secondary malignant neoplasm of the bone. The patient had received radiotherapy in 2021 and had a history of appendectomy.

During the admission examination in June 2023, a ca. 10 cm non-movable mass was detected against the underlying tissue in the left groin area. An excision biopsy was conducted for histological clarification. Histological examination showed signs of a nodular, cell-rich scarring from the area of the left inguinal ligament. No evidence of malignancy, especially no evidence of carcinoma infiltrates, was found.

A month later, the patient presented again as the mass in the left groin area had increased in size. A computed tomography (Figure 4) and another excision biopsy were performed. Histological examination revealed parts of a pleomorphic, most likely mesenchymal differentiated neoplasm. It was determined that the presence of a metastasis of the known prostate carcinoma could be ruled out. A myxofibrosarcoma was considered as a differential diagnosis, although the proliferation rate was rather low for this. Therefore, a reference pathology review was initiated.

The reference pathology confirmed the metastasis of an adenocarcinoma. The immunohistochemical profile of the tumor fit well in the clinical context with a metastasis of prostate carcinoma. Thus, the final diagnosis of a metastasis of the known prostate carcinoma in the left groin area was made.

## Discussion

The inguinal region is an anatomically complex area that houses a variety of structures. Swellings in this region are often interpreted as inguinal hernias. However, our case series emphatically demonstrates that not every swelling in the inguinal region is attributable to a hernia.



**Figure 4:** CT of the abdomen from 26.07.2023: Size-progressive metastasis in the left groin with infiltration of the adductor muscles. No dynamics in the primarily osteoplastic diffuse osseous metastasis.

The differential diagnosis of inguinal masses can be divided into five main groups: congenital anomalies, non-congenital hernias, vascular diseases, infectious or inflammatory processes, and neoplasms [4]. This spectrum of possible diagnoses underscores the importance of a thorough differential diagnosis.

Penile cancer is a rare malignancy occurring in Europe with an incidence of 0.1 to 0.9 per 100,000 male populations [5]. In Germany, a total of 950 new cases were diagnosed in 2014 [6]. Most of these tumors are squamous cell carcinomas, with other cancer types such as malignant melanoma and basal cell carcinoma being less common [4]. Metastasis of penile cancer to other organs such as the bladder, prostate, and intestine has been described [2]. In patients with penile cancer, enlargement of the inguinal lymph nodes is often observed, which can be attributed to either metastases or infectious lymphadenitis. Disturbed lymphatic drainage from the lower extremities can lead to edema [7]. The diagnostic phase in cases of suspected penile cancer requires a thorough physical examination and cytological or histological confirmation of the diagnosis [5].

Prostate adenocarcinoma is the most common cancer in men, with about 50% of patients presenting with metastases at diagnosis [8]. Prostate adenocarcinomas metastasizing to inguinal lymph nodes without pelvic lymphadenopathy or other metastases are very unusual [9]. Therefore, prostate adenocarcinoma should be considered an important cause of an inguinal mass.

Endometriosis is a condition where benign tissue growth occurs outside the uterine cavity, similar to the endometrium [10]. The groin area is a rare site of endometriosis, with a frequency of 0.3% to 0.6% of all endometriosis patients [11]. The etiology of Inguinal Endometriosis (IEM) is unclear, and it can be easily misdiagnosed as it often coexists with an inguinal hernia [12].

In summary, our case series highlights the importance of a thorough differential diagnosis in patients presenting with a swelling in the inguinal region. It is crucial to think beyond the most common diagnosis of an inguinal hernia and to consider other possible pathologies. This requires a careful clinical examination, supported by appropriate diagnostic tools, to establish an accurate diagnosis and ensure appropriate treatment.

## Conclusion


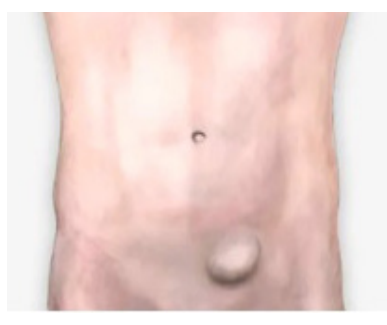

This case series underscores the critical importance of thorough differential diagnosis in patients presenting with inguinal swellings. While inguinal hernias are a common diagnosis in such cases, our findings compellingly demonstrate that other, less obvious pathologies can also be present. The three cases presented, each with different diagnoses - a recurrence of endometrioid adenocarcinoma, penile carcinoma with inguinal metastasis, and a metastasis of a known prostate carcinoma - highlight the variety of potential causes for inguinal swellings.

Overall, this case series emphasizes the necessity of careful, individualized patient assessment in clinical practice, especially in areas where misdiagnoses are common. Future research should aim to raise awareness of atypical presentations of inguinal swellings and further refine diagnostic strategies to continually improve patient care.


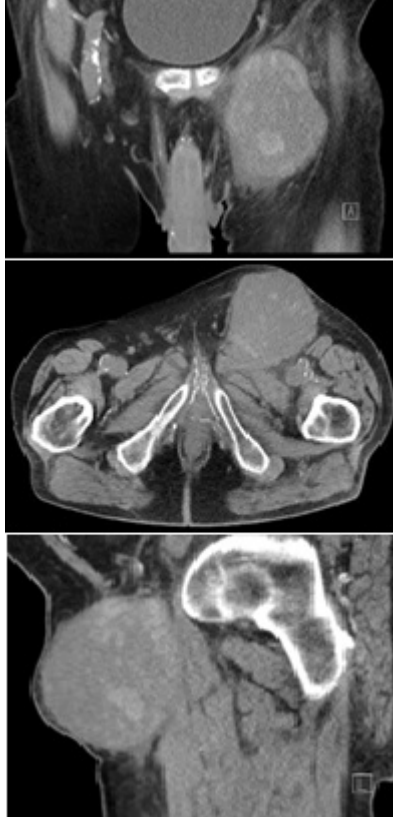

## References

1. Hammoud M, Gerken J. Inguinal Hernia. Treasure Island: StatPearls Publishing; 2023.
2. Kojima Y, Maeoka E, Nisaka Y, Hashimoto T, Sato A, Morimoto H, et al. Significance of ultrasonography in the assessment of patients with a groin mass: a large, single-center case series. *Med Ultrason.* 2022;24(3):314-22.
3. Hwang B, Bultitude J, Diab J, Bean A. Cyst and endometriosis of the canal of Nuck: rare differentials for a female groin mass. *J Surg Case Rep.* 2022;2022(1):rjab626.
4. Harper GB, Awbrey BJ, Thomas CG, Askin FB. Mesothelial cysts of the round ligament simulating inguinal hernia. Report of four cases and a review of the literature. *Am J Surg.* 1986;151(4):515-17.
5. Fu L, Tian T, Yao K, Chen XF, Luo G, Gao Y, et al. Global Pattern and Trends in Penile Cancer Incidence: Population-Based Study. *JMIR Public Health Surveill.* 2022;8(7):e34874.
6. Leitlinienprogramm Onkologie. S3-Leitlinie Diagnostik, Therapie und Nachsorge des Peniskarzinoms (Version 1.0). AWMF online; 2020.
7. Solsona E, Algaba F, Horenblas S, Pizzocaro G, Windahl T. EAU Guidelines on Penile Cancer. *European Urol.* 2004;46(1):1-8.
8. Komeya M, Sahoda T, Sugiura S, Sawada T, Kitami K. A case of metastatic prostate adenocarcinoma to an inguinal lymph node. *Cent European J Urol.* 2012;65(2):96-7.
9. Greenlee RT, Hill-Harmon MB, Murray T, Thun M. Cancer statistics, 2001. *CA Cancer J Clin.* 2001;51(1):15-36.
10. Niitsu H, Tsumura H, Kanehiro T, Yamaoka H, Taogoshi H, Murao N. Clinical Characteristics and Surgical Treatment for Inguinal Endometriosis in Young Women of Reproductive Age. *Dig Surg.* 2019;36(2):166-72.
11. Hagiwara Y, Hatori M, Moriya T, Terada Y, Yaegashi N, Ehara S, et al. Inguinal endometriosis attaching to the round ligament. *Australas Radiol.* 2007;51(1):91-4.
12. Li SH, Sun HZ, Li WH, Wang SZ. Inguinal endometriosis: Ten case reports and review of literature. *World J Clin Cases.* 2021;9(36):11406-18.

**Table 1:** Summary of the chronological sequence of diagnostics and therapy, as well as demographic characteristics.

	Case 1		Case 2		Case 3	
Age	70		73		67	
BMI	26.1		22		26.9	
Previous Illnesses	Moderately differentiated endometrioid adenocarcinoma of the endometrium, diagnosed 11.03.2020; atrial fibrillation, hypertension, epilepsy, history of appendectomy, history of tonsillectomy		Dialysis-dependent renal insufficiency, hypertension, vitamin D deficiency, shrunken kidneys, hyperuricemia, and bladder diverticula		Prostate carcinoma (first diagnosed in 2021), secondary malignant neoplasm of the bone, history of radiotherapy in 2021; history of appendectomy	
						
Medical History	Protrusion in the groin area, 10*15cm, suspected inguinal hernia, differential diagnosis hematoma due to fall		Protrusion in the groin area, suspected inguinal hernia		Protrusion in the groin area, approx. 10cm, suspected inguinal hernia	
Local Status	During the examination of the abdomen, a non-reducible mass of approx. 10 x 15 cm in the right groin area was diagnosed		During the physical examination, an irregular, indolent tumor in the left groin was noted		During the admission examinations, a non-movable mass of approx. 10 cm against the underlying tissue in the left groin area was diagnosed	
Course of Therapy/ Diagnostics	Feb 22	Surgical consultation: ultrasound, CT abdomen	Mar 21	Inpatient surgical diagnostics: CT abdomen, urological consultation, ultrasound	Jun 23	Inpatient surgical diagnostics: excision biopsy
	Apr 22	Gynecological consultation			Jul 23	Inpatient surgical diagnostics: CT thorax/abdomen with contrast, excision biopsy
	Jul 22	Inpatient surgical diagnostics: CT abdomen, colonoscopy, puncture and core biopsy			Aug 23	Inpatient staging: FDG/PET-CT, MRI pelvis, MRI head, spine MRI
	Sep 22	Surgical consultation				
	Oct 22	Surgical consultation				
	Des 22	Inpatient surgical treatment: incision of the cyst with drainage				
	Jan 23	Surgical consultation				
	Feb 23	Inpatient surgical treatment: puncture and drainage of the cyst				
	Mar 23	Surgical consultation				
	Apr 23	Surgical consultation				
	Apr 23	Inpatient surgical treatment: Radical removal of the lymph cyst in the right groin area				



<p>CT of the entire abdomen</p>			
<p>Histology: Feb 22</p>	<p>Biopsy cylinder: Sparse components of mature connective tissue with edema and minimal chronic inflammation. No evidence of malignancy.</p>		<p>Jun 23 No evidence of malignancy in nodular scar tissue below the left inguinal ligament</p>
	<p>Aspirate from the right groin mass: Cell- and protein-rich aspirate with signs of a benign epithelial cyst with acute purulent inflammatory reaction. No evidence of malignancy.</p>		<p>Material from lymph node components inguinal left: Components of a pleomorphic, most likely mesenchymal differentiated neoplasm inguinal left. Comment: The presence of a metastasis of the known prostate carcinoma can be excluded here. Among other things, a myxofibrosarcoma is considered, although the proliferation rate is rather too low for this. We initiate a reference pathology assessment.</p>
<p>Dec 22</p>	<p>Protein-rich aspirate with evidence of preserved squamous epithelial cells, including some atypical ones. Due to the low number of atypical cells, further immunohistochemical examination of this material is not purposeful; Excision of cyst wall right groin: Portion of mature adipose connective tissue with fat necrosis, scar fibrosis, chronic inflammation, and bleeding residues. No evidence of malignancy.</p>		
<p>Feb 23</p>	<p>Hematoma with signs of fragmentation of erythrocytes as well as karyorrhexis of granulocytes in the fine-needle aspiration material from the groin. No evidence of malignancy in the examined material.</p>		
<p>Apr 23</p>			

	Right groin: Portion of adipose connective tissue with extensive infiltrates of a 20 mm large adenocarcinoma. Extension of the carcinoma into the resection margin. Also, lymphangiosis carcinomatosa. The histological picture fits the further manifestation of the previously diagnosed endometrioid adenocarcinoma.		
Diagnosis:	Recurrence of an endometrioid adenocarcinoma with lymphangiosis carcinomatosa in the right groin area	Penile carcinoma with left inguinal metastasis	Myxofibrosarcoma inguinal left