



## Case Series

## Lipoma of the fossa femoralis mimicking a femoral hernia. Report of 2 cases

G. Amato<sup>a,\*</sup>, G. Romano<sup>b</sup>, A. Agrusa<sup>b</sup>, V. Rodolico<sup>c</sup>, L. Gordini<sup>d</sup>, P.G. Calò<sup>d</sup><sup>a</sup> Postgraduate School of General Surgery, University of Cagliari, Monserrato, Cagliari, Italy<sup>b</sup> Department of General Surgery and Urgency, University of Palermo, Italy<sup>c</sup> Department of Pathologic Anatomy and Histology, University of Palermo, Italy<sup>d</sup> Department of Surgical Sciences, University of Cagliari, Monserrato, Cagliari, Italy

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## ABSTRACT

**INTRODUCTION:** Lipoma of the femoral fossa is uncommon. Often asymptomatic, femoral lipoma may growth within the circumscribed space of the femoral fossa causing pain and discomfort. A worsening pain caused by a lipomatous mass in the femoral area is a clinical feature that can mislead the diagnosis, resembling the more common condition of femoral hernia.

**METHODS:** Two cases of symptomatic lipomas of the femoral fossa mimicking an incarcerated femoral hernia are presented. In both, Caucasian female, patients clinical examination and ultrasound of the femoral region revealed a painful neoplasm suspected for incarcerated femoral hernia.

**RESULTS:** Intraoperatively, a mass of encapsulated fat arising from the bottom of the fossa femoralis was found. No visceral protrusion through the femoral ring could be documented. The neoplasms were removed in toto. Histology of the excised specimens evidenced the diagnosis of femoral lipomas suffering by chronic compressive damages. In a midterm postoperative follow up, both patients were symptom-free.

**DISCUSSION:** A correct preoperative diagnosis of femoral lipoma is challenging, even following an accurate diagnostic pathway. The cases highlighted herewith seem to confirm that lipoma of the femoral fossa can be mistaken with a femoral hernia.

**CONCLUSIONS:** The clinical and histological features evidenced could result helpful in the differentiation of a lipomatous mass of the femoral fossa from a genuine femoral hernia.

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## 1. Introduction

Groin pain could be a challenging diagnostic dilemma for the anatomical complexity of the region and could arise from multiple underlying pathological processes.

The groin may be affected by a wide range of pathologic entities; therefore the clinician, the radiologist and the surgeon need to master the anatomy, the pathology for a correct management of this complex region [1].

Lipoma is a benign neoplasm constituted by mature adipocytes [2]. It represents one of the most common mesenchymal tumors and occurs in around 10% of the population in particular between the fifth and the seventh decade without gender predilection [3].

Frequently asymptomatic, lipoma may show a specific misleading symptoms hiding a correct preoperative diagnosis. Generally, its excision is required for cosmetic reasons, for the exclusion of malignancy, and for compression on adjacent organs or structures [4,5]. Further indications for excision include size (greater than 5 cm), subfascial location, rapid growth, clinical features such as pain, firmness, or irregularity [6].

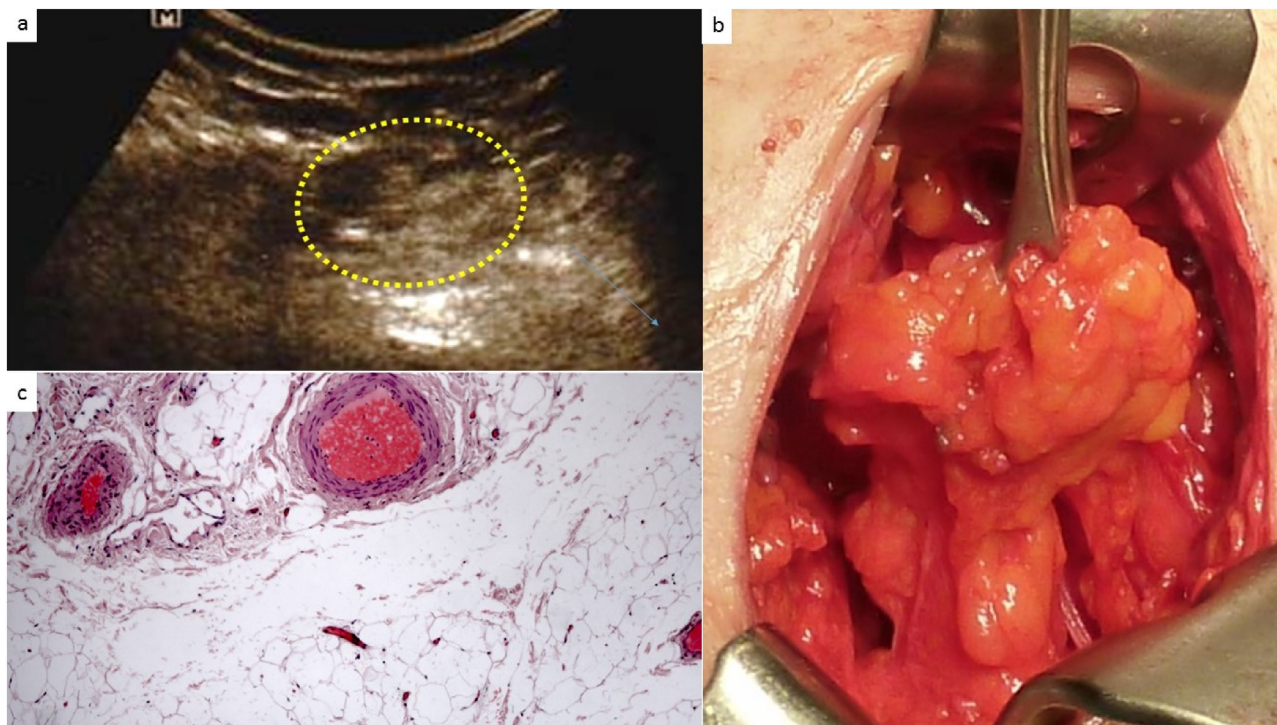
Although lipoma of the inguinal canal is not rare, its localization in the fossa femoralis is uncommon and may lead to erroneous interpretations being sometimes clinically indistinguishable from a groin hernia [7,8].

Women present a lifetime occurrence of groin hernia between 3 and 6% [9]. Femoral hernia is about four times more common in women, in particular, aged over 50 years and represents approximately 5–10% of all groin hernias in adults [10,11].

The high risk of complications such as strangulation and bowel resection discourages a watchful waiting strategy, supporting surgery as the treatment of choice [12].

\* Corresponding author at: Via Rapisardi 66, I - 90144, Palermo, Italy.

E-mail addresses: [amatomed@gmail.com](mailto:amatomed@gmail.com) (G. Amato), [giorgio.romano@unipa.it](mailto:giorgio.romano@unipa.it) (G. Romano), [agrusa.antonino@unipa.it](mailto:agrusa.antonino@unipa.it) (A. Agrusa), [vtorodolico@gmail.com](mailto:vtorodolico@gmail.com) (V. Rodolico), [lucagordini@aol.com](mailto:lucagordini@aol.com) (L. Gordini), [pgcalo@tiscali.it](mailto:pgcalo@tiscali.it) (P.G. Calò).



**Fig. 1.** a) Ultrasound image of the femoral area showing a mass with undefined contour surrounded by fluid suspected for incarcerated femoral hernia. b) Lipoma of the fossa femoralis before removal. c) Histological capture of the specimen: lobules of mature adipocytes with minimal variation in size and shape; slight ectasia of the vascular structures; scattered inflammatory cells (HE  $\times 20$ ).

An incorrect diagnosis may lead to a wrong treatment or the development of intraoperative complications [8].

Lipoma of the fossa femoralis is a poorly recognized entity that may mimic a femoral hernia. Two cases worth of note are highlighted herewith.

## 2. Material and methods

The study was registered at ResearchRegistry. The research work has been reported in line with the PROCESS criteria [13].

### 2.1. Presentation of cases

#### 2.1.1. Case 1

A 63 years old Caucasian female presented with severe pain in correspondence of the right fossa femoralis. The pain was perceived as spontaneous and exacerbated with movements. No comorbidities were present. Clinically a small swelling was found. Digital examination of the femoral region confirmed the painful bulge with a positive cough impulse. Ultrasound revealed a mass surrounded by fluid leading to a diagnosis of incarcerated femoral hernia (Fig. 1a) and, consequently, to an emergent surgical revision of the fossa femoralis. Intraoperatively, a  $2 \times 4$  cm mass constituted encapsulated by bright yellow fat arising from the bottom of the fossa was found without any visceral protrusion through the femoral ring (Fig. 1b). An in toto excision of the neoplasm was carried out, then the wound sutured.

The specimen was fixed in 10% buffered formalin, dehydrated in ethanol and paraffin-embedded according to standard technique;  $4\text{--}5$   $\mu\text{m}$  sections were cut and staining with Hematoxylin & Eosin (H&E) and immunostaining was performed [14]. Histopathological examination of surgical specimen showed mesenchymal tissue constituted by lobules of mature adipocytes presenting a slight variation in size and shape and minimal fibrous septa interposed. No necrosis or mitosis were witnessed. Only few lipoblasts

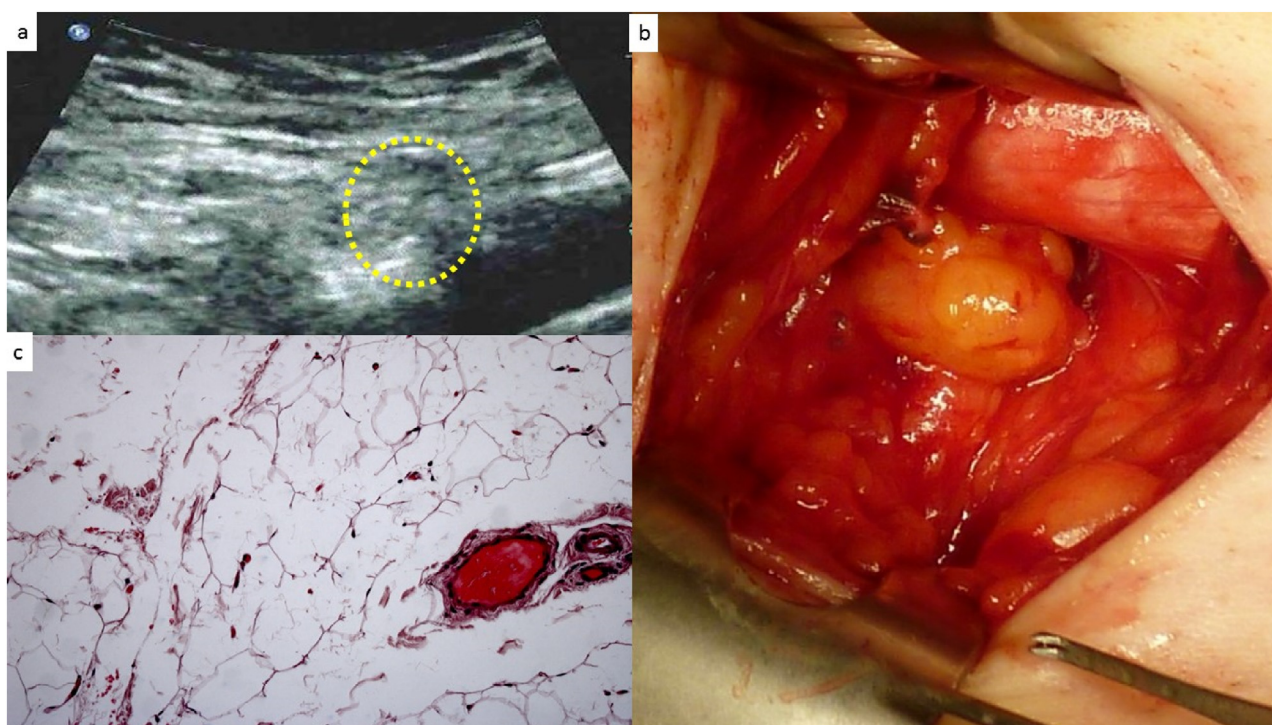
and scattered inflammatory cells, mainly lymphocytes and plasma cells, were also observed (Fig. 1c). Vascular and lymphatic structures showed slight ectasia and, occasionally, signs of congestion supporting the hypothesis of ischemic suffering due to compression. Immunohistochemistry showed positivity for vimentin and S100 protein and negativity for MDM2 (Fig. 1d), p16 and CD34, excluding atypical lipomatous tumor or well-differentiated liposarcoma. Histological and immunohistochemical features supported the diagnosis of lipoma.

At short-term follow-up, no more pain was reported, and even 15 months after the surgical procedure, the patient is still pain-free.

#### 2.1.2. Case 2

A 62-year-old Caucasian female reported sudden painfulness in the right femoral region. The pain was worsening and the discomfort in her right thigh affected the walking. The patient had a left Spigelian hernia repair but no history of comorbidities. Clinical examination could not reveal the origin of the pain. Ultrasonography of the right femoral region showed a small mass in the femoral fossa surrounded by a slight exudative contour raising the suspicion of incarcerated femoral hernia (Fig. 2a). The surgical exploration of the fossa femoralis revealed the presence of a small ( $1,5 \times 3$  cm) encapsulated neoformation constituted by bright yellow fat and covered by a thin film of exudate (Fig. 2b). The tumor was in toto excised. No evidence of femoral hernia was found.

The histological and immunohistochemical analysis were conducted in a similar manner of the previous case with comparable findings. Histopathological examination of surgical specimen showed mesenchymal tissue constituted by lobules of mature adipocytes. Edema and chronic inflammatory infiltrate were found. Vascular structures showed a discreet ectasia, probably due to compression. Ischemic injuries were observed as some adipocytes presented focal disruption of the cytoplasmic membranes (Fig. 2c). The immunohistochemical pattern showed similar results of the previous case, with positivity for vimentin and S100 protein and



**Fig. 2.** a) Ultrasound image of the femoral area showing a mass contoured by a film of exudate suspected for femoral hernia. b) Lipoma of the fossa femoralis arising below the Cooper's ligament. The surface of the mass seems to be covered by a thin film of exudate that gives to the mass a translucent aspect that contrasts with the normal appearance of the surrounding subcutaneous fat. c) Histology of the specimen: ischemic injury of some adipocytes showing focal fragmentation of cytoplasmic membranes associated with discreet ectasia of the vascular structures, edema and chronic inflammatory infiltrate (HE  $\times 20$ ).

negativity for MDM2, p16 and CD34. On the basis of these findings, diagnosis of lipoma was confirmed. One year after the surgical removal of the lipoma, the patient is pain-free.

### 3. Discussion

The high variety of pathologic conditions that may affect the groin can be classified into five major groups:

- congenital abnormalities (hernias, cysts, undescended testis, and retractile testes);
- noncongenital inguinal and femoral hernias;
- vascular conditions (haematomas and false aneurysm, true aneurysm, varicoceles, varices of the large saphenous vein, and post-traumatic arteriovenous fistulas);
- infectious or inflammatory processes (inflammation of the iliopsoas bursa, synovial osteochondromatosis and abscesses);
- neoplasms (benign and malignant lesions) [1,15,16].

The aforementioned pathologic conditions are sometimes asymptomatic and often clinically indistinguishable to the extent that they make a correct preoperative diagnosis a real challenge. This polymorphic presentation puzzles the clinician facing the groin pathology.

Lipoma is a common benign neoplasm that may be either superficial or deep [17]. It is usually asymptomatic unless it compresses adjacent structures or organs. Its "benign" behaviour becomes fickle and insidious when localized in critical areas such as inguinal canal, femoral triangle or popliteal region [3,16]. In these anatomical minefields, lipoma can mimic hernias, cause venous insufficiency and may mislead the clinician from a correct diagnosis [4,5,8,18].

Usually, a detailed knowledge of anatomy combined with clinical acumen could lead to a straightforward preoperative diagnosis of a groin complaint without any diagnostic imaging.

A clinically evident groin hernia is usually confirmed on clinical grounds, but sometimes physical examination alone can miss hernias especially if small, multiple and in obese patients and be inaccurate in differentiating groin swellings [18,19].

However, when patient history is unclear or uneventful and physical examination is obscured by obesity, previous surgery, radiation or trauma, imaging is crucial in the assessment of the correct diagnosis and, consequently, in the establishment of the optimal management [20,21].

Imaging has four goals: finding the exact localization of the lesion, finding evidence for underlying causative disease, differentiating solid from fluid-containing cystic lesions, performing US or CT-guided aspiration in case of fluid-containing lesions [20].

Ultrasonography as an initial diagnostic imaging modality for groin hernias is widely available, non-invasive, repeatable, useful in diagnosing other conditions, cost-effective, well-accepted by patients, and shows a high sensitivity and positive predictive value in doubtful cases [20–23].

However, while ultrasonography in the diagnosis of groin hernias shows high accuracy, it has been demonstrated to have low accuracy in the diagnosis of soft tissue lipomas (sensitivity 52%, specificity 86%) [24].

The operator dependence of clinical examination and ultrasonography in detecting and interpreting the pathologic conditions of the groin should be taken into account. Sonographic findings are typically interpreted in conjunction with clinical judgement, and sometimes it is precisely this interaction that may bias the radiologist's opinion.

It may be necessary to expand the diagnostic methods with CT or MRI whether the diagnosis is unclear or unreliable on clinical and sonographic grounds, thus further diagnostic investigations such as

Computer Tomography and Magnetic Resonance are required for groin pain or groin swelling of unknown origin or any diagnostic doubts [1,22,25].

Ultrasonography plays a fundamental role in the diagnostic pathway of groin pathologic conditions, but in some cases, it cannot be the conclusive diagnostic tool [18].

Notwithstanding notable enhancement of diagnostic tools investigating the groin region, sometimes is in the operating theatre that the last scene of the diagnostic play can be revealed [25].

The surgeon must be aware that misdiagnosis may lead to wrong treatment strategy; therefore meticulous and careful surgical exploration is mandatory to reach the correct diagnosis and avoid complications on the table [18,26].

Reaching a comprehensive preoperative evaluation is a challenge for the clinician and diagnostic imaging may assist in pursuing this aim but often the surgeon is pivotal in the diagnostic pathway [17].

The two cases of lipoma of the femoral area with its intriguing clinical features presented herewith undoubtedly represented a challenge for our diagnostic efforts. It was not easy preoperatively diagnose such infrequent pathological entity. The only way to definitely resolve the clinical dilemma was the intraoperative inspection. Actually, assuring the right diagnosis and excluding the presence of an incarcerated femoral protrusion was the first scope of the surgical procedure. This included the careful dissection of the femoral fossa to exclude the occurrence of a small hernia arising from the femoral ring. Once the right diagnosis was well defined the removal of the mass could be safely carried out.

#### 4. Conclusions

The two cases reported above seem to further confirm that, despite an accurate preoperative diagnostic pathway, the occurrence of a lipoma expanding within the femoral fossa can lead to a misinterpretation of the diagnostic findings. Among symptoms that characterize this condition, a fundamental and misleading role is played by the pain localized in the femoral area that may irradiate cranially towards the abdominal wall and caudally to the thigh. Local pain and discomfort appear to be strictly connected with the enlargement of the lipoma within the narrow space of the femoral triangle suffering from compressive damage. The histological features seem to confirm that the injury affecting the lipomatous mass is due to chronic compression. The occurrence of femoral pain, often worsening, is the most important factor that leads to the misinterpretation of the clinical status in favor of the more common visceral protrusion through the femoral ring. Although a preoperative diagnosis of femoral lipoma is hard to achieve, it should be kept in mind in case of uncertain diagnostic evidence connected with pain in the femoral area.

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All authors have no conflict of interest.

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#### Ethical approval

Being a retrospective study, the investigation is exempted from approval by Ethics Committee.

#### Consent

Written informed consent was obtained from the patients for publication of this case report and any accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal.

#### Author contribution

Giuseppe Amato: made substantial contributions to study conception and design as well as interpretation of data.

Giorgio Romano: made substantial contributions to acquisition and analysis of data.

Antonino Agrusa: made substantial contributions to interpretation of data.

Vito Rodolico: made substantial contributions to analysis and interpretation of data.

Luca Gordini: has been involved in drafting the manuscript and revising it critically for important intellectual content.

Piergiorgio Caldò: made substantial contributions to interpretation of data and gave the final approval of the version to be published.

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#### Guarantor

Giuseppe Amato.

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