Clinical Characteristics and Functional Outcomes After Rehabilitation in Femoral Neuropathy Secondary to Iliopsoas Hematomas: A Case Series Report

Características Clínicas e Resultados Funcionais Após Reabilitação na Neuropatia do Femoral Secundária a Hematomas do Iliopsoas: Uma Série de Casos

Sofia Sousa Moreira[1] | Sandra Assunção[2] | André Ribeiro[3] | Sara Cabete Martins[4] | Inês Morais[5] | Joana Machado Santos[6] | Teresa Rodrigues[7]

Abstract

Iliopsoas haematoma is an uncommon but potentially severe complication, most frequently associated with anticoagulation therapy. When voluminous, it may compress the femoral nerve, leading to disabling motor and sensory deficits. We report three elderly patients, all anticoagulated, who developed femoral neuropathy secondary to iliopsoas haematomas. Clinical presentations ranged from acute abdominal and groin pain to sudden gait impairment and severe motor weakness. Imaging confirmed iliacus and/or psoas haematomas, and electromyography demonstrated significant neurogenic compromise. All patients were managed conservatively, with anticoagulation suspension or reversal, and early rehabilitation. Despite partial recovery in one patient, persistent deficits compromised autonomy, requiring long-term care in the other two. These cases highlight the importance of early recognition, prompt imaging, and multidisciplinary rehabilitation. Given the significant functional consequences but scarce discussion of this diagnosis in the literature, reporting such cases is essential to raise awareness among clinicians.

Keywords: *Psoas muscles; Hematoma; Femoral Neuropathy; Anticoagulants; Elderly; Rehabilitation.*

Introduction

Iliopsoas haematomas are rare but clinically significant events, most commonly associated with anticoagulant therapy, trauma, or underlying coagulopathies. Their clinical relevance lies in the potential compression of the femoral nerve as it passes between the iliacus and psoas muscles, leading to weakness, sensory loss, and severe gait impairment. Despite their impact, the true epidemiology remains uncertain, since available literature is scarce, heterogeneous, and mostly limited to isolated case reports or small series.[1–6]

Clinical suspicion should be raised in anticoagulated patients presenting with groin or lower abdominal pain, weakness, or sudden loss of gait.[1–3] Prompt imaging – computerized tomography (CT) or magnetic resonance imaging (MR) - is crucial for confirming diagnosis and electromyography (EMG) is important in assessing the extent of nerve involvement.[1–4]

Conservative management — including anticoagulation reversal, hemodynamic monitoring, and early rehabilitation — is typically preferred, while surgical or interventional procedures are reserved for ongoing bleeding or progressive

(1) Centro de Medicina de Reabilitação da Região Centro Rovisco Pais, Unidade Local de Saúde de Coimbra https://orcid.org/0000-0003-1904-9093. (2) Centro de Medicina de Reabilitação da Região Centro Rovisco Pais, Unidade Local de Saúde de Coimbra. https://orcid.org/0000-0003-4245-4003. (3) Centro de Medicina de Reabilitação da Região Centro Rovisco Pais, Unidade Local de Saúde de Coimbra. (4) Centro de Medicina de Reabilitação da Região Centro Rovisco Pais, Unidade Local de Saúde de Coimbra. https://orcid.org/0009-0001-6058-0102. (5) Unidade Local de Saúde da Póvoa de Varzim e Vila do Conde. https://orcid.org/0000-0001-8863-8698. (6) Unidade Local de Saúde da Póvoa de Varzim e Vila do Conde. https://orcid.org/0009-0000-9382-7266. (7) Unidade Local de Saúde da Póvoa de Varzim e Vila do Conde. https://orcid.org/0009-0003-6096-7002.

Autores Correspondentes/Corresponding Authors: *Sofia Sousa Moreira. email: sofiasousamoreira@gmail.com. ORCID: https://orcid.org/0000-0003-1904-9093. Serviço de Centro de Medicina de Reabilitação da Região Centro Rovisco Pais, Unidade Local de Saúde de Coimbra, Quinta da Fonte Quente, 3064-908 Tocha.*

Recebido/Received: *08/2025.* ***Aceite/Accepted:*** *11/2025.* ***Publicado online/Published online:*** *12/2025.* ***Publicado / Published:*** *12/2025.*

neurological decline.[7,8] Although some studies report partial neurological improvement, less than half of patients achieve complete or near-complete recovery.[1]

The authors present three cases of femoral neuropathy secondary to iliopsoas haematomas, emphasizing the clinical features, management strategies, and rehabilitation outcomes, highlighting the need for increased awareness and multidisciplinary care.

Case Reports

Case 1

An 81-year-old woman with epilepsy and atrial fibrillation (AF), under anticoagulant therapy, was admitted with *status epilepticus.* She lived alone and ambulated with a cane, but was autonomous in daily activities.

Seven days after admission, she developed generalized weakness, asthenia, and gait loss. Physical examination revealed multiple abdominal haematomas and tenderness. Abdominal CT showed left iliacus and psoas haematomas without active bleeding (Fig. 1 A, B). Laboratory tests revealed rhabdomyolysis and acute anaemia (haemoglobin drop from 10 g/dL to 7 g/dL), requiring transfusion. Anticoagulation was promptly suspended, and other causes of anaemia were excluded.

A Physical and Rehabilitation Medicine (PRM) consult was requested. Examination showed absent left patellar reflex, impaired knee extension, and inability to stand, requiring maximum assistance for transfers. Femoral nerve compression was suspected, and both EMG and ultrasound were ordered; the latter excluded extensor apparatus injury. A rehabilitation program was initiated, focusing on sit-to-stand training, transfers, and active-passive mobilization. The initial Barthel Index score was 25/100 (very dependent).

Radiology attempted ultrasound-guided haematoma drainage, but due to clot formation, it was unsuccessful; conservative management was therefore chosen. Haemoglobin levels stabilized, and low molecular weight heparin (LMWH) was later resumed under close monitoring.

EMG revealed severe neurogenic involvement with denervation and no voluntary motor unit recruitment in the proximal left lower limb, compatible with severe lumbosacral radiculoplexopathy (L2–L4) and moderate involvement of L5–S1. Additionally, decreased sensorimotor conduction velocities indicated a coexisting mild demyelinating polyneuropathy.

Despite comprehensive rehabilitation, she remained unable to regain gait. Owing to her high functional dependence, she was discharged to a Continued Care Facility (CCF), where she remains under follow-up.

Case 2

An 82-year-old man with type 2 diabetes mellitus (DM2), heart failure, and AF under warfarin therapy was admitted with pneumonia, diabetic ketoacidosis, and decompensated heart failure. At admission, his International Normalised Ratio (INR) was 7; warfarin was immediately suspended and vitamin K administered, normalizing INR to 1.99. LMWH was initiated three days later.

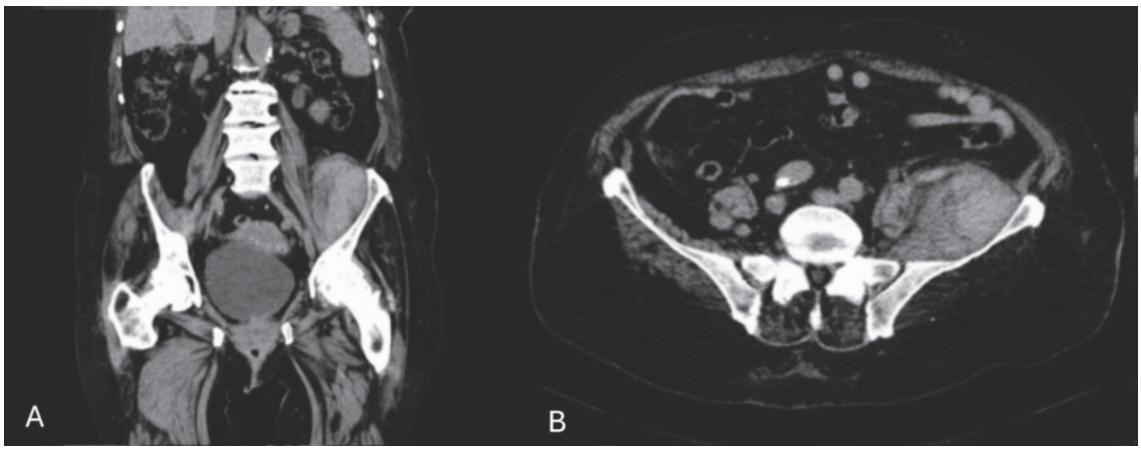

Figure 1 - Left iliopsoas haematomas, coronal (A) and transverse (B) view.

On the tenth day of hospitalization, he developed refractory right hip pain requiring opioids. X-rays showed no musculoskeletal abnormalities. Two days later, he reported worsening abdominal pain, difficulty standing, and inability to extend the right knee. Examination revealed abdominal tenderness and guarding. Haemoglobin dropped from 15.6 g/dL to 10.8 g/dL. Urgent CT revealed a large right iliopsoas haematoma with fresh clots and signs of active bleeding (Fig. 2 A, B). Protamine and plasma were administered, and Interventional Radiology was consulted. Given the spontaneous and usually self-limited nature of muscular haematomas and the achieved anticoagulation reversal, a conservative approach was chosen. Follow-up CT confirmed bleeding cessation, and LMWH was later resumed once haemoglobin stabilized.

When clinically stable, he was evaluated by the PRM team. He complained of anterior thigh pain, with neuropathic characteristics (mentioning a burning sensation) with allodynia and reduced thermo-algic sensitivity in the right lower limb. Physical examination revealed muscular strength grade (G) 2 in hip flexors and G1 in knee extensors (Medical Research Council Scale, MRC), and absence of the right patellar reflex. Pregabalin was prescribed, and a rehabilitation program was initiated, focusing on active-passive mobilization, muscle strengthening, sit-to-stand training, and proprioceptive exercises.

EMG demonstrated chronic sensorimotor axonal and demyelinating neuropathy in the lower limbs — severe for sensory fibers and moderate for motor fibers — associated with moderate axonal injury of the right femoral nerve and evidence of significant reinnervation in distal musculature. These findings supported a pre-existing diabetic polyneuropathy and a superimposed compressive femoral neuropathy secondary to the haematoma. The presence of reinnervation was considered a positive prognostic factor, given the typically poorer outcome of axonal injuries compared with demyelinating ones.

Previously autonomous, the patient lived alone with limited family support. After 41 days of hospitalization, he was transferred to a CCF. Upon admission, he presented a Barthel Index of 55/100. On follow-up, he showed improvement in muscle strength (G4 in hip flexors and knee extensors), remained areflexic at the patellar level, but was able to ambulate with a cane. Neuropathic burning pain persisted, though improved with titrated pregabalin. Continued rehabilitation led to progressive functional recovery, with Barthel Index improving from 55/100 to 95/100.

Case 3

An 82-year-old man with DM2 and chronic alcohol consumption was admitted after a motorcycle accident. Imaging revealed a C6 vertebra spinous process fracture and C7 type B3 fracture. He also presented rib fractures and a scalp wound. Initial laboratory findings were unremarkable, and after cervical immobilization, no motor or sensory deficits were noted.

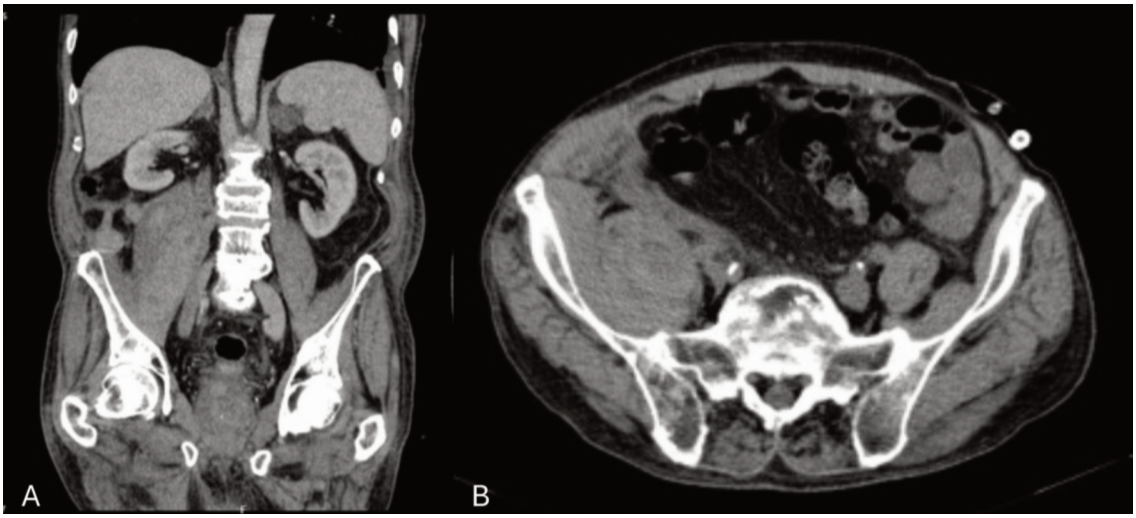

Figure 2 - Right ilio-psoas haematomas, coronal (A) and transverse (B) view.

On day 2, he developed tachycardia, initially attributed to alcohol withdrawal. However, an electrocardiogram revealed new-onset atrial fibrillation, and anticoagulation was initiated. He subsequently developed respiratory symptoms secondary to a respiratory infection and was treated with antibiotics. Worsening of the scalp wound with pus and erythema required initiation of vancomycin and piperacillin-tazobactam after Infectious Diseases consultation. All these factors delayed a decision about surgical intervention.

He remained neurologically stable, and a conservative approach with cervical immobilization was chosen. On day 20, haemoglobin dropped from 11.1 g/dL to 5.5 g/dL, initially attributed to the scalp wound, leading to transfusion and anticoagulation suspension, without further visible bleeding or clinical decline. However, on day 26, he presented sudden bilateral lower limb weakness with complete gait loss. Urgent CT showed thickening and increased density of both psoas muscles, predominantly on the right, and left iliacus involvement, compatible with intramuscular haematomas. Angio-CT confirmed an extensive left psoas haematoma without active bleeding (Fig. 3 A, B). Interventional Radiology opted for conservative management.

Following stabilization, PRM was consulted. On examination, muscle strength (MRC scale) was G4 in the right lower limb; on the left, G2 in hip flexors, G1 in knee extensors, and G4 in other groups. Thermo-algic hypoesthesia was present in the left femoral nerve territory, and the left patellar reflex was absent. Gait was possible only for short distances, requiring a cane and assistance; for longer distances, he was wheelchair dependent. His Barthel Index was 50/100, indicating moderate dependency.

Despite good family support, he lived alone, making discharge home unfeasible. After multidisciplinary discussion, he was placed on the waiting list for a CCF. A rehabilitation program focusing on muscle strengthening and functional mobility was initiated, although delayed due to limited physical therapy availability, negatively impacting recovery.

Follow-up CT showed gradual haematoma resolution. EMG revealed “severe axonal involvement of the left femoral nerve with denervation activity and no voluntary motor unit recruitment in distal musculature, consistent with an active neurogenic process.” Clinical improvement was limited, and he was transferred to a CCF three months later, where he remains under rehabilitation.

Discussion

Iliopsoas haematomas, though uncommon, represent an underdiagnosed and potentially disabling cause of femoral neuropathy, particularly in elderly patients receiving anticoagulant therapy. Reported incidence is highly variable, and no reliable epidemiological data currently exist. This reflects the heterogeneity and scarcity of available literature, emphasizing the need for more systematic research and larger case series to better characterize this condition.

Clinical presentation is often nonspecific — typically including groin, flank or lower abdominal pain, weakness of hip flexion or knee extension, and occasionally sensory loss

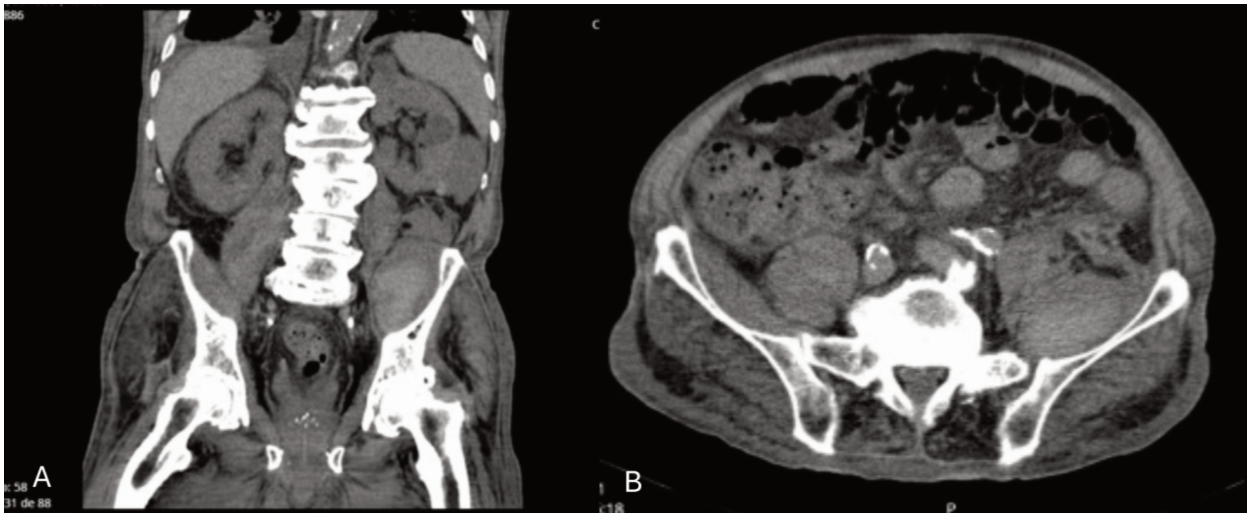

Figure 3 - Bilateral iliacus and psoas muscles haematomas, coronal (A) and transverse (B) view.

or pain in the anterior thigh — which contributes to frequent diagnostic delay. In anticoagulated patients, such findings should immediately raise suspicion of an iliopsoas haematoma and possible femoral nerve compression/injury, especially when accompanied by unexplained anaemia or a sudden decrease in haemoglobin. Therefore, it is crucial to increase awareness among clinicians, including physiatrists, internists, emergency physicians and others, to prevent missed or late diagnoses.

While traumatic events may precipitate bleeding, spontaneous haemorrhage remains the predominant mechanism in anticoagulated or coagulopathic patients. In our series, two patients had traumatic contexts (a seizure and a motor vehicle accident), yet haematomas were most likely spontaneous, triggered by anticoagulation therapy. Neurological symptoms usually develop several days after the bleeding episode, with literature reporting a mean delay between injury and diagnosis ranging from 7,3 to 17,8 days. In our series, the mean delay between admission and diagnosis was 14.3 (±10.2) days, consistent with previously published data.

Electrophysiological studies in all our patients revealed axonal injury, which typically carries a poorer prognosis due to deep nerve fibre involvement. Two patients also had findings of chronic neuropathy likely associated with comorbidities, such as DM2, further limiting functional recovery. Only one patient achieved significant functional improvement, consistent with his EMG that demonstrated signs of reinnervation. These findings highlight the importance of the EMG in assessing nerve injury.

Management depends on clinical stability and neurological severity. Current literature supports a predominantly conservative approach, involving anticoagulation reversal, close haemodynamic monitoring, and physiotherapy-based rehabilitation. Surgical or interventional radiology procedures are reserved for haemodynamically unstable patients, failure of conservative measures, or progressive neurological deficits. In our cases, conservative treatment was sufficient since no active bleeding was detected, and anticoagulation was appropriately managed.

Rehabilitation plays a critical role in functional outcomes. Although no formal guidelines exist for the rehabilitation of femoral neuropathy secondary to iliopsoas haematoma, evidence from recent studies supports early initiation of physical therapy. A 2023 systematic review[9] on the role of physical exercise and neuromuscular electrical stimulation (NMES) in peripheral nerve regeneration demonstrated that timely initiation of light, progressive exercise facilitates axonal regeneration and prevents maladaptive changes. Passive and active-assisted movements, eccentric and moderate-resistance exercises, and low-frequency NMES (typically around 20 Hz) help reduce muscle atrophy and enhance reinnervation. However, these must be applied progressively to avoid overloading regenerating nerves, as excessive early resistance can hinder recovery.

Despite adequate medical and rehabilitation care, 2 of the patients exhibited severe functional impairment and limited recovery. In this case reports, age, comorbidities, and social isolation contributed to poorer outcomes, resulting in transfers to CCF. This highlight the severe consequences of iliopsoas haematoma — including prolonged immobility, gait loss, institutionalization, and secondary cognitive and physical decline — with substantial socioeconomic impact due to increased dependency and long-term healthcare costs.

Given these implications, it is crucial to strengthen clinicians' awareness and training in recognizing and managing such conditions. The creation of a rapid referral pathway for early rehabilitation of patients with femoral neuropathy could help reduce functional decline and improve prognosis. While all rehabilitation patients deserve timely intervention, the evidence and our findings underscore that those with femoral nerve compression have particularly poor outcomes if rehabilitation is delayed.

In conclusion, iliopsoas haematoma–related femoral neuropathy remains a rare but significant cause of morbidity. Early recognition, multidisciplinary collaboration, and prompt initiation of tailored rehabilitation programs are essential to optimize recovery and prevent long-term disability. More structured studies and case series are urgently needed to establish evidence-based protocols for diagnosis, management, and rehabilitation, aiming to reduce the devastating functional and personal impact of this underrecognized condition.

Conflitos de Interesse: Os autores declaram não possuir conflitos de interesse. Suporte Financeiro: O presente trabalho não foi suportado por nenhum subsidio ou bolsa. Proveniência e Revisão por Pares: Não comissionado; revisão externa por pares.

Conflicts of Interest:The authors have no conflicts of interest to declare. Financial Support: This work has not received any contribution grant or scholarship. Provenance and Peer Review: Not commissioned; externally peer-reviewed

Referências / *References*

1. Santilli AR, Martinez-Thompson JM, Speelziek SJA, Staff NP, Laughlin RS. Femoral neuropathy: A clinical and electrodiagnostic review. Muscle Nerve. 2024 Jan;69(1):64-71. doi: 10.1002/mus.27994. Epub 2023 Nov 8. Erratum in: Muscle Nerve. 2024 Apr;69(4):505. doi: 10.1002/mus.28055. PMID: 37941415.
2. Guild TT, Crawford AM, Striano BM, Mortensen S, Wixted JJ. The epidemiology and management of iliopsoas hematoma with femoral nerve palsy: a descriptive systematic review of 174 cases. Injury. 2023 Feb;54(2):280-287. doi: 10.1016/j.injury.2022.11.057.
3. Spargias K, Zacharopoulos A, Gerontitis P, Vavuranakis M. Iliopsoas hematoma: a review of the literature. Eur J Trauma Emerg Surg. 2020 Aug;46(4):719-728. doi: 10.1007/s00068-019-01227-6.
4. Kandemirli SG, Kocak B, Kaya D, Yildirim E, Aralasmak A. Femoral nerve compression secondary to iliopsoas hematoma: imaging findings and clinical implications. Clin Imaging. 2021 Jul;76:64-70. doi: 10.1016/j.clinimag.2021.03.007.
5. Charbonnier A, Benichou J, Kerever S, Abillama B, Chazard E, Duhamel A, et al. Management of iliopsoas hematoma in anticoagulated patients: conservative treatment or intervention? J Thromb Thrombolysis. 2022 Jul;54(1):40-47. doi: 10.1007/s11239-022-02579-8.
6. De Jong A, Molnar C, Oeyen S, Harrold ME. Rehabilitation outcomes after iliopsoas hematoma-induced femoral neuropathy: a retrospective analysis. Disabil Rehabil. 2018 Mar;40(6):698-704. doi: 10.1080/09638288.2016.1261413.
7. Artzner T, Gautier S, Gobert F, Reboul G, Chabanne R, Rambaud C, et al. Iliopsoas hematoma in the intensive care unit: a multicentric study. Ann Intensive Care. 2019 Feb 21;9(1):18. doi: 10.1186/s13613-019-0495-6. ← (Corrected)
8. Lefevre N, Bohu Y, Klouche S, Chemla N, Herman S. Complete paralysis of the quadriceps secondary to post-traumatic iliopsoas hematoma: a systematic review. Eur J Orthop Surg Traumatol. 2014 May;24(4):525-529. doi: 10.1007/s00590-013-1230-6.
9. Chiaramonte R, Pavone V, Testa G, Pesce I, Scaturro D, Musumeci G, Mauro GL, Vecchio M. The role of physical exercise and rehabilitative implications in the process of nerve repair in peripheral neuropathies: A systematic review. Diagnostics (Basel). 2023 Jan 18;13(3):364. doi: 10.3390/diagnostics13030364. PMID: 36766469; PMCID: PMC9914426.