Other full case

Femoral nerve palsy secondary to traumatic iliacus haematoma—a young athlete's injury

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Summary

Femoral neuropathy secondary to iliacus haematoma in the absence of a bleeding diathesis is rare. Of the few documented cases in the literature, most have occurred in adolescents participating in sport. We report a case of femoral nerve palsy complicating an iliacus haematoma occurring in a young person with minimal trauma that resolved with non-operative management. Although rare, iliacus haematoma should be included in the differential diagnosis of groin pain as the number of children and young adults participating in sport increases.

BACKGROUND

The majority of reported cases of femoral neuropathy secondary to an iliacus haematoma occur in patients receiving anticoagulant agents or suffering from clotting disorders.^{1–6} Femoral nerve palsy secondary to a traumatic iliacus haematoma is a rare condition in patients without clotting disorders with only 16 cases reported in the English literature in the last 40 years (table 1).^{7–19} All patients were aged between 12 and 24 y with the vast majority resulting from a sports-related injury. Patients commonly report groin pain and numbness of the anterior thigh with weakness of the knee extensors.¹⁶ Traditionally, non-operative treatment has been recommended in patients with blood dyscrasias with surgical decompression of the haematoma advocated for cases of iliacus haematoma resulting from trauma.^{10 12 20} However, there is no large series of patients from which to base treatment decisions.

We present a case of femoral nerve palsy complicating a haematoma deep to the iliacus muscle occurring following trauma in a patient without an identifiable bleeding disorder that resolved with non-operative management. We review current literature available on this subject highlighting the importance of acute clinical awareness of this condition in young athletes presenting with groin pain following trauma.

CASE PRESENTATION

A 19-year-old woman presented to our emergency department with a 4 h history of severe right groin pain that started while running up stairs associated with a 1 h history of altered sensation over her right thigh with marked weakness of the right knee. On further questioning, the patient recalled a fall onto her back 5 days previously but had remained entirely asymptomatic until the day of presentation. Although on no regular medication, she was studying for university exams and had taken two ECA tablets (over-the-counter medication containing ephedrine 30 mg, caffeine 210 mg, aspirin 25 mg, naringin 100 mg and

dicalcium phosphate 55 mg) after the fall, but prior to the onset of her symptoms (one tablet 3 days and 4 days prior to admission). She had no personal or family history of bruising easily or bleeding excessively, no features to indicate underlying malignancy and no significant past medical history.

Clinical findings on examination in the emergency department included reduced power of right hip flexion (Medical Research Council (MRC) grade 3/5) and knee extension (MRC grade 3/5), reduced quadriceps tendon reflex and a sensory deficit in the antero-medial aspect of the thigh. She was unable to weight bear through the right lower limb.

INVESTIGATIONS

An urgent MRI scan of her pelvis and hips demonstrated a 16 × 6.5 × 3.5 cm haematoma lying between the iliacus and the ilium (figure 1A). The haematoma extended inferiorly surrounding the iliopsoas musculo-tendinous junction and displacing the femoral neurovascular bundle medially (figure 2). No fracture or underlying vascular lesion was identified. There was no evidence of an underlying bleeding disorder on coagulation screening and factor testing.

TREATMENT

Following discussion between the treating trauma surgeons and radiologists it was elected to treat her condition expectantly. While the majority of the haematoma was deep to iliacus, there was evidence of inferior extension of haematoma/free-fluid in contact with the neurovascular bundle. Thus, it was considered best not to attempt percutaneous drainage.

OUTCOME AND FOLLOW-UP

Serial neurological examinations did not demonstrate any progression of motor weakness or change in sensory deficit. Serial coagulation blood tests remained unchanged.

Figure 1 Axial T1-weighted MRI images of the pelvis at 12 h (A) and 6 weeks (B) following onset of neurological symptoms. On the initial scan, the mass in the right iliacus muscle (short arrow) is slightly hyperintense to muscle due to deoxyhaemoglobin. The external iliac vessels are displaced medially (long arrow). At 6 weeks, the haematoma (wide arrow) is mostly hyperintense to muscle due to methaemoglobin and has decreased substantially in size.

Haematologists reviewed the patient and no bleeding diathesis was identified. She was discharged from hospital at 2 days having demonstrated clear clinical evidence of improvement. Six weeks following injury, there was complete resolution of her symptoms. On clinical examination, she had no evidence of paraesthesia and demonstrated full power in all movements of the affected limb (MRC grade 5/5). The patient had returned to full sporting activities with no functional limitations. Repeat MRI at 6 weeks demonstrated residual haematoma measuring $4 \times 1.5 \times 6.5$ cm haematoma with normal appearance of the neurovascular bundle (figure 1B).

DISCUSSION

Compression of the femoral nerve secondary to iliacus haematoma is widely reported in patients with blood

coagulation disorders and those on anticoagulant treatment. Femoral nerve palsy caused by traumatic iliacus haematoma in the absence of bleeding diathesis has not been reported widely in the literature. All published reports occurred in young patients aged between 12 and 24 years and most cases were precipitated by a traumatic injury while participating in sport (table 1). Haematomas in this region present insidiously and are not heralded by an obvious lesion or ecchymosis.¹⁷ Patients initially complain of groin pain with the onset of neurological symptoms occurring as late as 10 days following the injury.¹⁴ The differential diagnosis for this syndrome is large and early recognition requires a high level of suspicion. A simple muscular strain is a common diagnosis in young athletes and can mimic iliacus haematoma in the early stages, and is regularly treated with non-steroidal anti-

Figure 2 Axial short T1 inversion recovery (STIR) MRI scan showing haematoma enveloping the iliopsoas muscle (short arrow) and femoral neurovascular bundle (long arrow). There is also involvement of obturator internus (wide arrow).

Table 1 Summary of reported cases of traumatic iliacus haematoma resulting in femoral nerve palsy in the absence of bleeding disorder or anticoagulation*

Author	Year	Age	Sex	Mechanism	Sport	Injury onset of neurological symptoms	Treatment	Resolution
Gertzbein and Evans ⁷	1972	15	Male	Fall on back	Not applicable	4 days	Operative	6 y
Gertzbein and Evans ⁷	1972	17	Female	Fall on back	Gymnastics	Not known	Operative	>1 y
Gertzbein and Evans ⁷	1972	14	Male	Fall on back	Gymnastics	1 day	Non-operative	Not known
Green ⁸	1972	16	Female	Somersault	Gymnastics	1 day	Operative	1 y
Ramirez <i>et al</i> ⁹	1983	18	Male	Vaulting	Gymnastics	12 h	Operative	1 y
Takami <i>et al</i> ¹⁰	1983	22	Male	Splits	Skiing	Not known	Operative	Not known
Takami <i>et al</i> ¹⁰	1983	15	Male	Fall on back	Gymnastics	Not known	Operative	Not known
Giuliani <i>et al</i> ¹¹	1990	14	Female	Somersault	Gymnastics	2 days	Operative	6 months
Kumar <i>et al</i> ¹²	1992	22	Male	Direct blow	Obstacle course	Not known	Operative	Not known
Fealy and Paletta ¹³	1999	15	Male	Fall on back	Not applicable	1 day	Non-operative	6 weeks
Pirouzmand and Midha ¹⁴	2001	15	Male	Fall on back	Ice skating	10 days	Operative	2 y
Tamai <i>et al</i> ¹⁵	2002	15	Female	Fall on back	Gymnastics	3 days	Operative	12 months
Seijo-Martínez <i>et al</i> ¹⁶	2003	17	Male	Getting up from chair	Not applicable	Not known	Non-operative	Not known
Sanders <i>et al</i> ¹⁷	2006	24	Male	Abdominal extension exercises	Gym	1 day	Non-operative	6 months
Weiss and Tolo ¹⁸	2008	12	Female	Double kick	Karate	1 week	Non-operative	2 months
Patel <i>et al</i> ¹⁹	2008	15	Male	Hip hyperextension	Basketball	2 days	Non-operative	2 months

*Only English language publications or publications with English translations appearing in peer-reviewed journals in the past 40 years.

inflammatory drugs. These drugs have been implicated in the progression of the haematoma in a number of published cases.¹³

The most common mechanism of injury in reported cases is a fall onto the back or buttocks, although more indolent precipitating injuries are described. Direct trauma to the pelvis or hyperextension of the hip may result in muscular tears leading to iliacus haematoma. Two separate syndromes of lumbosacral plexus compression are recognised.²¹ The entire plexus can be compressed within the psoas muscle resulting in weakness of those muscles supplied by the obturator and femoral nerves. Alternatively, the femoral nerve is compressed as it passes through the closed fibrous compartment formed by the iliac fascia and the ileum. As haematoma expands within this compartment, the femoral nerve becomes compromised.²⁰ Goodfellow *et al*²⁰ injected fluid into this compartment,

successfully demonstrating subsequent compression of the femoral nerve. They also showed that maximal iliac compartment volume is associated with flexion and external rotation of the hip. These deformities have been reported in cases in the literature but are frequently absent even in patients with marked neuropathy.

Although infrequent in children and young adults, the possibility of intra-tumoural haemorrhage should be considered in patients presenting with spontaneous haematomas. The most frequent underlying diagnosis is malignant fibrous histiocytoma with cases being described in the iliopsoas muscle.^{22 23} Patients with spontaneous haematomas that do not follow the expected course of resolution should be treated with particular suspicion. It is good practice to monitor patients with spontaneous haematomas to ensure complete resolution to confirm the absence of the underlying tumour.

In the present case, the cause of the haematoma is unclear. The patient recalled a fall onto her buttocks 5 days prior to the onset of any neurological symptoms. However, the progression of neurological symptoms was rapid occurring 1 h after onset of groin pain precipitated by running and 5 days following the initial fall. It is feasible that running may have enlarged a haematoma initially caused by a fall. The use of an aspirin-based tablet may have exacerbated the problem. We plan to monitor the patient until radiographical resolution of the haematoma to exclude an underlying tumour, although no other clinical features suggestive of malignancy were evident.

Haematomas have been successfully managed with both non-operative treatment and surgical evacuation of the clot. The majority of reported cases of iliacus haematoma producing femoral nerve palsy have been managed operatively. Non-operative treatment has been recommended in patients on anticoagulation or with bleeding disorders with surgical decompression of the haematoma advocated in cases of iliacus haematoma resulting from trauma.^{10 12 20} Kumar *et al*¹² recommended evacuation of the iliacus haematoma before the onset of femoral nerve palsy to ensure early recovery and stop the potential pressure effect of the haematoma on the lumbar nerve roots. Takami *et al*¹⁰ stated that operative decompression is indicated in cases of large iliacus haematomas, although parameters defining haematoma size have not been reported. Surgical exploration and haematoma evacuation carry a risk of immediate neurovascular injury, further bleeding once the clot is removed and infection. The major surgery required to expose these deep structures has a significant impact on rehabilitation and return to sport. Decompression should be considered in the presence of progressing signs and symptoms. If non-operative management is chosen, serial neurological examinations and haematological parameters reflecting ongoing blood loss must remain stable.¹⁷

In the case presented, non-operative treatment was considered along with radiologically guided minimally invasive drainage and open surgical drainage. Non-operative treatment was elected in our case as the patient demonstrated early signs of improvement. Percutaneous drainage was not undertaken because, although the majority of the haematoma was deep to iliacus, there was evidence of inferior extension of haematoma/free-fluid in contact with the neurovascular bundle that may have not been amenable to percutaneous draining. In addition, due to the presumed viscosity of the clot, it was questionable whether adequate decompression could be achieved percutaneously. In the presence of progressing neurological signs, we would have proceeded with open surgical decompression. There was a dramatic reduction in the size of the haematoma at 6 weeks with complete resolution of the femoral nerve paralysis, although variable lengths of recovery have been reported in the literature.

Learning points

- Femoral neuropathy resulting from traumatic iliacus haematoma is a rare condition occurring in young athletes.
- Sports physicians should have a high level of suspicion in patients presenting with groin pain and neurological findings.
- Diagnosis should prompt a thorough search for underlying bleeding disorder.
- Non-steroidal inflammatory medication should be avoided in the initial stages of the condition.
- Initial non-operative management is reasonable for those patients whose signs and symptoms are not progressing, and may lead to a more rapid return to sport.

Competing interests None.

Patient consent Obtained.

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