CASE REPORT

Intramuscular haemangioma of the thigh in a basketball player

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Haemangioma is a common benign soft tissue tumour. Intramuscular haemangiomas may present as a perceived sporting injury. Magnetic resonance imaging is the investigation of choice. Intramuscular haemangioma should be considered in the differential diagnosis of unexplained pain and swelling in a muscle.

Haemangiomas are common benign soft tissue tumours, comprising 7–10% of all soft tissue tumours.¹ Cutaneous haemangiomas, the most common,¹ are usually found in childhood. Intramuscular haemangiomas may present later in life as a cause of persistent symptoms and may present as a perceived sporting injury. Diagnostic ultrasound is an appropriate initial imaging modality for suspected haemangioma, although magnetic resonance imaging is the investigation of choice. Intramuscular haemangioma should be considered in the differential diagnosis of unexplained pain and swelling in a muscle.

CASE REPORT

A 14 year old boy presented with persistent right suprapatellar pain and swelling during basketball. It was most noticeable when he was performing lay ups and after direct trauma. The symptoms had been present for about two years. The pain had never forced him to stop playing but he would noticeably limp. The signs and symptoms would settle with rest. There was no history of major trauma, instability, or locking. His medical history was unremarkable apart from discolouration/bruising on his right lateral thigh. It was noted that over the preceding year he had been through a growth spurt.

On the day of presentation, his knee was minimally symptomatic. There was tenderness over the quadriceps tendon proximal to the insertion. There was no pain with resisted quadriceps contraction, no effusion, and ligament testing was stable. There were no signs of patellofemoral irritability. On examination of the right lateral thigh, superficial dilated veins were noted.

The differential diagnosis included suprapatellar bursitis, quadriceps tendinopathy, synovial dysplasia, and extra-articular soft tissue tumour.

The patient was advised to present for an x ray examination and diagnostic ultrasound of the area when it was swollen. The radiographic results were unremarkable. An ultrasound revealed a 14 cm×8 cm venous haemangioma in the distal vastus medialis and rectus femoris which was thought not to communicate with the lateral thigh haemangioma, which was beneath the lateral thigh discolouration.

The patient was referred to a vascular surgeon whose opinion was that the lesion was too big to excise. The patient

was then referred for compression sclerotherapy of both lesions with foamed sclerosant (sodium tetradecyl sulphate (STS)).

DISCUSSION

Haemangiomas are either a neoplasm or a hamartoma. A neoplasm is a new growth of cells. Most believe that haemangiomas are hamartomas, which are developmental anomalies, the cells being natural to the area and presenting in abnormal numbers.

Haemangiomas can be divided into seven types¹ and may be localised or diffuse (more common²):

- Capillary—50%³
- Cavernous
- Venous
- Arteriovenous
- Epithelioid
- Granulation tissue type
- Miscellaneous

In a 570 case series by Geschickter and Keasbey referred to by McNeill and Ray,⁴ 370 were cutaneous or mucosal and 10 were intramuscular. Intramuscular haemangiomas make up 0.8% of all haemangiomas.⁵

The natural history of haemangiomas is to enlarge slowly. Their growth may be accelerated with a growth spurt or trauma. They can spontaneously regress. Malignant transformation is rare.¹ They are usually detected early. Despite intramuscular lesions being concealed, 94% present before the age of 30.^{2,6} Some reports suggest that both sexes are equally affected^{2,6} although others indicate that the incidence is higher in women and girls.⁷ Intramuscular haemangiomas are more common in the lower limbs (42–45%).^{2,6} The thigh is the most common intramuscular site (17–19%).^{2,6} Wild *et al*⁸ found the quadriceps to be affected in five out of 11 cases of intramuscular haemangioma. Some 72% were found to involve one muscle with an average diameter of 5.5 cm.² Watson *et al*⁹ found that 16% of all haemangiomas had more than one site.

Clinically, intramuscular haemangiomas usually present with pain (55%)³ and swelling, with symptoms usually lasting one to five years (range 0–70 years).² Haemangiomas may have a purpuric discolouration overlying (from cutaneous extension) the lesion. Superficial dilated veins may also be seen with cutaneous extension. A mass is found in 98% of cases.⁸ The mass may be pulsatile or have a bruit. Contraction of the muscle may increase the size of the lesion. The mass is usually moveable transversely but not in the line of the fibres. A history of trauma is uncommon (17%), with tenderness and functional impairment found in about 25%.² Over 90% are misdiagnosed before surgery (this was noted in 1957; advances in investigative techniques may have altered this figure).⁶ Complications may include a mass

(direct pressure) effect, cardiac failure from arteriovenous shunting, and a consumptive coagulopathy (Kasabach-Merritt syndrome).

Calcified phleboliths may be seen on radiographs in 25% of cases.³ In one study by Derchi *et al* reported by Greenspan *et al*,⁹ ultrasound was effective in seven out of seven cases in diagnosing the intramuscular mass, with Doppler ultrasound not being very useful as the flow is usually too slow. It is sometimes difficult to assess the extent of the lesion with ultrasound. Magnetic resonance imaging has superseded other investigations, especially before surgery as it is non-invasive, can delineate the extent of the lesion, and can differentiate haemangioma from an invasive malignant process.¹⁰ Angiography is helpful in delineating whether there may be a vascular feeder that can be embolised.¹¹ A group of patients investigated with computed tomography revealed that nine out of 12 lesions were more extensive when explored at surgery.¹²

A review by McNeill and Ray⁴ in 1974 of intramuscular haemangioma revealed:

- better outcome if lesion localised
- good results with complete excision
- partial excision resulted in continued symptoms
- limited success if treated non-operatively
- amputation is a last resort

Partial excision is associated with an 18% recurrence rate¹³ because of the infiltrative growth pattern. None metastasised.¹³

Some have stated that radiation treatment may be associated with malignant transformation.

Compression sclerotherapy is another option in the treatment of intramuscular haemangioma. Agents that have been used include STS, ethanol, polidocanol, hypertonic saline, and sodium morrhuate. Studies comparing STS with ethanol and polidocanol in gastric varices indicate a similar efficacy.^{14 15} Sclerotherapy is aimed at obliterating the lumen, with replacement of the patent vessel by fibrosis. Success of the treatment depends on many variables including extent of mural damage, thickness of vessel wall, amount of blood in the vein, duration of compression after treatment, sclerosing agent, and technique used. In a review of 40 patients with craniofacial venous malformations, sclerotherapy resulted in clear improvement or cure in 75% and no or slight change in 25%.¹⁶ Winter *et al*¹⁷ treated 157 patients with haemangioma or vascular malformation with sclerotherapy (one to three injections in 86% of cases); 100% subjective satisfaction was reported. Potential complications include skin necrosis (blistering or ulceration), allergic reaction, bruising, hyperpigmentation, thrombosis of normal veins, neurolysis, and intra-arterial injection. Most complications are the result of extravasation of the sclerosant.¹⁸ Most complications are minor with a rate of less than 10%.¹⁹ It is possible for the vessels to re-form channels.

Foamed sclerosant (formed by mixing liquid sclerosant 1:4 with air or carbon dioxide) is thought to produce better results than liquid sclerosant. Foamed sclerosant displaces blood from the vein, allowing a larger contact area, higher concentration, and longer contact time with the endothelium, which causes more intimal damage. With a more efficacious solution, the sclerosant concentration and therefore complications can be reduced. Foamed sclerosant has another advantage of being detectable by ultrasound, allowing visualisation of sclerosant placement closer to venous junctions. Using ultrasound guidance, the clinician can assess the extent of sclerosis (treatment success) as well as decreasing the risk of perivascular or unintentional intra-arterial injection.

Take home message

- Differential diagnosis of pain and swelling in a muscle includes intramuscular haemangioma
- Ultrasound can diagnose the lesion but may not be able to delineate its extent
- The treatment of choice is total excision
- Sclerotherapy has a role in the management of intramuscular haemangioma when excision is not possible

Sclerotherapy may be used when:

- excision is not possible—for example, lesion is too large or where excision will destroy important tissue
- patient does not want surgery
- there is a need to debulk the tumour before surgery or cosmesis

STS exerts its effects by destroying the endothelium and exposing the highly thrombogenic factor VIII rich sub-endothelium to the circulation.²⁰ It may also produce a hypercoagulable state by decreasing protein C and inducing platelets to aggregate.²⁰ STS generally requires one to three injections²¹ usually more than two weeks apart.²² Unlike ethanol, STS injection causes only minor pain and does not need a general anaesthetic.¹⁶

OUTCOME

In our patient, compression sclerotherapy (with STS under ultrasound guidance) was performed to both the symptomatic suprapatellar haemangioma and the lateral thigh haemangioma. Four injections were necessary. Currently he can participate in heavy training and competition without pain. The suprapatellar swelling and lateral thigh discolouration persists. The sclerosant therapy revealed that the two lesions actually communicated. There is an option for repeated injections.

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