

# Nonhemophilic musculoskeletal pseudotumor

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A 24-year-old man presented with impending ulceration of a large thigh swelling which appeared after minor trauma. Imaging revealed a large well-encapsulated lesion with no vascularity. He was diagnosed to have a pseudotumor and underwent successful excision of the mass under blood and cryoprecipitate cover. The unusual presentation was suspected to be secondary to a transient drug-induced factor XIII deficiency because the result of the final coagulation study was normal. (*J Vasc Surg Cases* 2015;1:187-90.)

We report the management of a pseudotumor occurring due to a transient factor XIII deficiency. A pseudotumor is a chronic progressive swelling due to recurrent hemorrhage into soft tissue. Although benign, it mimics a sarcoma, hence the name. A high degree of suspicion is necessary to diagnose these slow-growing masses. Operative management requires a multidisciplinary team with experience in the management of rare bleeding disorders. The patient consented to the publication of this report.

## CASE REPORT

A 24-year-old man presented with a gradually increasing swelling of the right thigh for 1 year, with skin ulceration for 1 month. He sustained minor trauma (fall onto his right leg) 1 year previously. He received empirical antituberculous treatment (ATT) elsewhere for a year. He did not have family history of bleeding disorders.

On examination there was a 24-cm × 16-cm × 12-cm right upper thigh swelling with skin ulceration (Fig 1). There was no abnormal pulsation or bruit. Magnetic resonance imaging revealed a complex heterogeneous well-encapsulated lesion in the anterolateral aspect of the right thigh (Fig 2). Comparison with earlier imaging revealed an increase in the size. Adjacent bones were normal, and there were no air pockets. Duplex screening ruled out a pseudoaneurysm. Differentials considered were schwannoma or neurofibroma with necrosis, soft tissue sarcoma, or pseudotumor.

Coagulation profile testing revealed a hemoglobin value, total counts, and platelet counts within normal reference ranges. There was a prolonged prothrombin time, activated partial thromboplastin time (aPTT) and thrombin time, which corrected with control plasma. The prolonged aPTT did not correct with aged serum or adsorbed plasma. Factor XIII levels were 37.5%. Concentrations

of Factor VII, VIII, IX, von Willebrand factor, and fibrinogen, platelet aggregometry results were within normal reference ranges.

The mass was diagnosed to be a pseudotumor. Management involved a multidisciplinary team that included vascular and orthopedic surgeons, hematology and transfusion medicine physicians, and interventional radiology.

After arterial embolization of branches from the internal iliac and profunda (Fig 3), the pseudotumor was excised with the patient under general anesthesia. The mass was approached by an anterolateral thigh incision from the anterior-superior iliac spine to the patella. There was no definite intermuscular plane, and an incision was made into the capsule. Two liters of altered blood and clots were suctioned out. After this decompression, the pseudotumor capsule was excised with ligation of all adherent vessels circumferentially. The surgical wound was packed, and hemostasis of the muscle bed was achieved by surgical ligation and cautery along with the use of fibrin glue and topical hemostats. The total operative blood loss was 3.51 L. Perioperative concentrations of hemoglobin, platelets, fibrinogen, prothrombin time, aPTT, and thromboelastography were used to guide replacement therapy, and 5 units of packed cells, 4 units of platelet-rich concentrates, 15 units of cryoprecipitate, and 4 units of fresh frozen plasma were administered. The excess redundant skin was excised and the wound closed in layers over a closed suction drain.

Postoperatively, the patient did not require continued support with blood or blood products. The drain contained serosanguineous fluid for the first 2 days, after which contents were serous. It was removed in a week, after the volume reduced to <10 mL. The pathology report was consistent with an organized hematoma.

## DISCUSSION

Hemophilic pseudotumor is an encapsulated hematoma with calcification and ossification caused by recurrent bleeding in patients with coagulation disorders. It was first described by Valderrama and Matthews.<sup>1</sup> Soft tissue chronic expanding hematomas are a similar condition where there is an increasing hematoma present >1 month after the inciting trauma. However, these lack a definitive etiology, and patients have no underlying coagulation abnormality.<sup>2</sup>

We searched all available MEDLINE, Science Direct, and Ovid records using “hemophilia, hemophilic, pseudotumor, cyst, factor XIII, acquired, chronic hematoma, and surgery” as search words. This is the first report of

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Fig 1. Clinical presentation: swelling in the right thigh with an area of ulceration (red arrow).

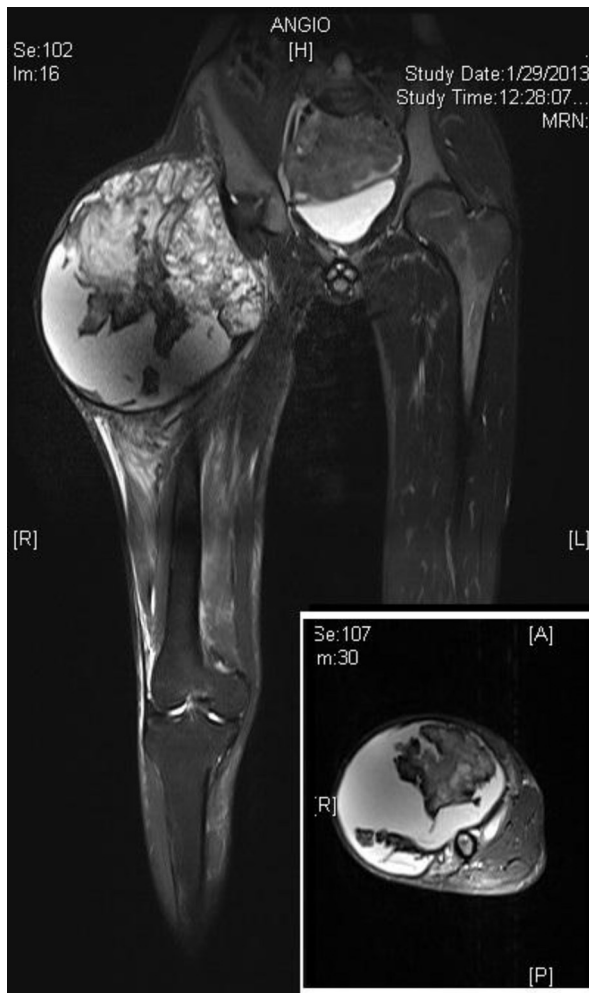


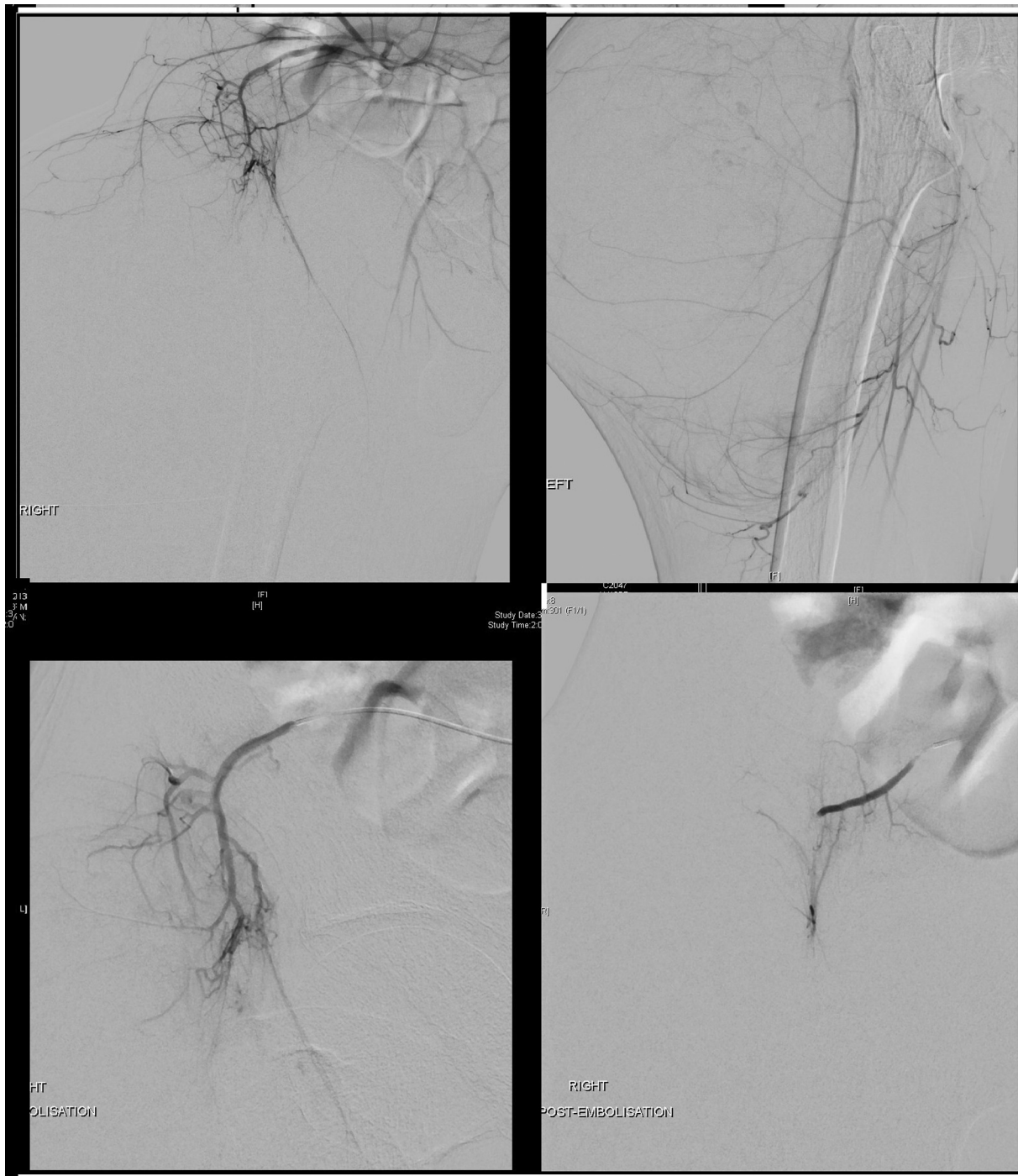
Fig 2. Preoperative magnetic resonance imaging shows a pseudotumor of the right thigh.

successful operative management of a large pseudotumor with an acquired transient coagulation disorder.<sup>3-17</sup>

Pseudotumors occur in 1% to 2% of patients with hemophilia, platelet disorders, or other factor deficiencies.<sup>2</sup> With early detection of muscle bleeding in patients with hemophilia, occurrence of life-threatening pseudotumors are rare but may still be seen where factor and blood product support is not easily available. Clinically, they present with a slow-growing localized mass present for many years. There are two subtypes. Proximal pseudotumors occur due to subperiosteal, intraosseous, or intramuscular bleeding in the adult femur or pelvic areas prone to repetitive trauma. These do not respond to conservative treatment. Distal pseudotumors occur in epiphyseal growth plates in children and may resolve with replacement therapy and immobilization.<sup>2</sup> Pressure effects on adjacent soft tissue may lead to skin necrosis, bleeding, pain, neurologic deficits, contractures, and impaired mobility. Secondary infection or ruptures into an adjacent viscus are rare complications.

Imaging is the mainstay of diagnosis. A pseudotumor in soft tissue can be classified as intramuscular or extramuscular (interfascial, subcutaneous, osseous, and subperiosteal). Ultrasound imaging helps in the diagnosis, differentiation from a pseudoaneurysm, and follow-up of a smaller lesion. Computed tomography reveals mass lesions of variable density, calcification, focal bone formation, erosion, periosteal reaction, or medullary destruction. The presence of gas indicates secondary infection. Enhanced computed tomography defines the outlines and wall thickness of the peripheral enhancing capsule, relation to the vascular structures, and rules out a pseudoaneurysm.

Magnetic resonance imaging can distinguish between acute (1-6 days) and chronic hemorrhage and differentiate the mass from soft tissue sarcomas, parasitic cysts, or other tumors. Management is guided by the site, size, rate of growth, or presence of pressure effects. The risk of blood loss and need for blood/product support makes



**Fig 3.** Embolization for pseudotumor of the right thigh. Branches from the internal iliac (*top left*) and profunda (*top right*). Arterial embolization with reduction in capsule vascularity (*bottom row*).

preoperative diagnosis a must. Differentiation from a soft tissue tumor may rarely necessitate a biopsy.

Conservative measures—factor replacement, monitoring with radiologic imaging, and drainage or aspiration—are indicated in small acute lesions, with repeat

imaging to guide duration of treatment. Aspiration/drainage in chronic lesions is usually unsuccessful because of the presence of organized hematoma, which cannot be evacuated without operative intervention.<sup>1,2</sup> Fibrin glue injection, bone graft, hydroxyapatite filling, arterial

embolization, or radiotherapy are used as adjuncts. Incision and drainage is contraindicated in large lesions due to the risk of massive hemorrhage, persistent oozing from the remnant capsule, and infection.<sup>1,2</sup> Embolization reduces the blood supply to the densely adherent capsule in large tumors, reducing bleeding from the muscle bed.<sup>18,19</sup> Surgical excision under blood/product cover is indicated for larger lesions or when complications occur. Amputation may be necessary in patients who have a nonfunctional limb, long-bone fracture, uncontrollable hemorrhage, or a massive lesion with unacceptable risk from excision.

Pseudotumors occurring in patients with coagulopathies other than hemophilia, such as acquired factor XIII deficiency,<sup>3-6</sup> are even rarer. Acquired factor XIII deficiency can occur due to decrease protein synthesis or autoantibodies in malignancy, irritable bowel disease, autoimmune disorders, pulmonary thromboembolism, stroke, cirrhosis, sepsis, disseminated intravascular coagulation, major surgery, or medications. Medications can cause acquired XIII deficiency. Use of isoniazid, penicillin, phenytoin, or practolol is associated with this complication, and patients present with intramuscular/retroperitoneal bleeding occurring 1 to 8 years after the initiation of medication. It can be fatal if not treated promptly. Stopping the causative medication reverses the coagulopathy in weeks to months. Other medications, such as prednisolone, cyclophosphamide, and rituximab are used for treatment when indicated.<sup>8,9</sup> Operative intervention is necessary in large lesions or when complications occur.

## CONCLUSIONS

Successful surgical management of pseudotumors requires a multidisciplinary team with experience in management of rare bleeding disorders.

## REFERENCES

- Ahlberg AK. On the natural history of hemophilic pseudotumor. *J Bone Joint Surg Am* 1975;57:1133-6.
- Rodríguez-Merchan EC. Haemophilic cysts (pseudotumours). *Haemophilia* 2002;8:393-401.
- Otis PT, Feinstein DI, Rapaport SI, Patch MJ. An acquired inhibitor of fibrin stabilization associated with isoniazid therapy: clinical and biochemical observations. *Blood* 1974;44:771-81.
- Krumdieck R, Shaw DR, Huang ST, Poon MC, Rustagi PK. Hemorrhagic disorder due to an isoniazid-associated acquired factor XIII inhibitor in a patient with Waldenström's macroglobulinemia. *Am J Med* 1991;90:639-45.
- Lopaciuk S, Bykowska K, McDonagh JM, McDonagh RP, Yount WJ, Fuller CR, et al. Difference between type I autoimmune inhibitors of fibrin stabilization in two patients with severe hemorrhagic disorder. *J Clin Invest* 1978;61:1196-203.
- McDevitt NB, McDonagh J, Taylor HL, Roberts HR. An acquired inhibitor to factor XIII. *Arch Intern Med* 1972;130:772-7.
- Milner GR, Holt PJ, Bottomley J, Maciver JE. Practolol therapy associated with a systemic lupus erythematosus-like syndrome and an inhibitor to factor XIII. *J Clin Pathol* 1977;30:770-3.
- Gregory TF, Cooper B. Case report of an acquired factor XIII inhibitor: diagnosis and management. *Proc (Bayl Univ Med Cent)* 2006;19:221-3.
- Kessel R, Hu C, Shore-Lesserson L, Rand J, Manwani D. A child with acquired factor XIII deficiency: case report and literature review. *Haemophilia* 2013;19:814-26.
- Boehlen F, Casini A, Chizzolini C, Mansouri B, Kohler HP, Schroeder V, et al. Acquired factor XIII deficiency: a therapeutic challenge. *Thromb Haemost* 2013;109:479-87.
- Franchini M, Frattini F, Crestani S, Bonfanti C. Acquired FXIII inhibitors: a systematic review. *J Thromb Thrombolysis* 2013;36:109-14.
- Saotome K, Koguchi Y, Tamai K, Sakai H, Ohno W, Yamato M. Enlarging intramuscular hematoma and fibrinolytic parameters. *J Orthop Sci* 2003;8:132-6.
- Lorand L, Velasco PT, Rinne JR, Amare M, Miller LK, Zucker ML. Autoimmune antibody (IgG Kansas) against the fibrin stabilizing factor (factor XIII) system. *Proc Natl Acad Sci U S A* 1988;85:232-6.
- Hsieh L, Nugent D. Factor XIII deficiency. *Haemophilia* 2008;14:1190-200.
- Kashyap R, Saxena R, Choudhry VP. Rare inherited coagulation disorders in India. *Haematologia (Budap)* 1996;28:13-9.
- Online Mendelian Inheritance in Man (OMIM). Factor XIII, a subunit, deficiency of. Available at: <http://www.omim.org/entry/613225>. Accessed January 26, 2015.
- Srivastava A, Brewer AK, Mauser-Bunschoten EP, Key NS, Kitchen S, Llinas A, et al; The World Federation Of Hemophilia. Guidelines for the management of hemophilia. *Haemophilia* 2013;19:e1-47.
- Alcalay M, Deplas A. Rheumatological management of patients with hemophilia. Part II: muscle hematomas and pseudotumors. *Joint Bone Spine* 2002;69:556-9.
- Espandar R, Heidari P, Rodríguez-Merchan EC. Management of haemophilic pseudotumours with special emphasis on radiotherapy and arterial embolization. *Haemophilia* 2009;15:448-57.

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