CASE OF THE MONTH

An unusual incidental finding

¹A A O PLUMB, FRCR, ¹R MEHAN, FRCR and ²R W WHITEHOUSE, FRCR

¹Department of Radiology, Royal Bolton Hospital, Farnworth, Bolton, UK, and ²Department of Radiology, Manchester Royal Infirmary, Manchester, UK

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History

A 63-year-old man presented with weight loss and rectal bleeding. He had no significant medical history and was taking no medications. He complained of some minor left hip pain, which had been attributed to

osteoarthritis. Physical examination was normal. The patient's blood count, renal function and liver enzymes were normal. The carcinoembryonic antigen level was elevated. Colonoscopy revealed a small polypoidal tumour in the descending colon. Biopsies were positive for colonic adenocarcinoma. As part of the staging process, CT of the thorax, abdomen and pelvis was performed, which was unable to depict the primary tumour and showed no nodal disease or metastasis. However, the proximal left femur was abnormal. Subsequently, plain radiography and MRI of this region were undertaken (Figures 1–3). What is the diagnosis? Is there any clinical implication?

Figure 1. Anteroposterior radiograph of the hip demonstrates the lucent lesion in the intertrochanteric region of the left femur (arrow) with a well-defined sclerotic margin (arrowheads).

Figure 2. Coronal oblique reformat of the left hip depicts small foci of calcification within the central lucency (arrows).

Address correspondence to: Dr Andrew Plumb, Department of Radiology, Royal Bolton Hospital, Minerva Rd, Farnworth, Bolton BL4 0JR, UK. E-mail: aaoplumb@hotmail.com

Findings

The conventional radiography demonstrated a 9.2×5.5 cm lesion located eccentrically within the intertrochanteric region of the femoral shaft (Figure 1). There was a well-defined lesion with a central lucency and a sclerotic rim of varying thickness. The femoral neck showed some slight expansile remodelling. There was no periosteal reaction or cortical destruction. CT images demonstrated a geographic pattern of lucency with peripheral sclerosis (Figure 2). There were some scattered areas of mineralisation within the central lucency. The non-mineralised areas of the lesion showed a Hounsfield value intermediate between fat and skeletal muscle.

MRI revealed a well-demarcated lesion with a predominantly intermediate signal intensity on T_1 weighted images, with a low-intensity rim corresponding to the sclerotic bone seen at CT and conventional radiography (Figure 3a). Some small foci of T_1 high signal were present, which showed fat suppression on inversion recovery sequences (Figure 3b). There was a heterogeneous appearance on T_2 weighted images, with some areas of high signal intensity (Figure 3c). Fat-suppressed images again showed the central lesion to be isointense to skeletal muscle (Figure 3d) and there was no contrast enhancement with intravenous gadolinium (Figure 3e). The features are consistent with a liposclerosing myxofibrous tumour.

Figure 3. (a) Coronal T_1 weighted MR image of the left hip shows the central lucent lesion to be approximately isointense to skeletal muscle (short arrow), with low signal returned from the sclerotic component (arrowheads). There are foci of high T_1 signal (long arrow), suggestive of fat content. (b) Coronal short tau inversion recovery MR shows the areas that were T_1 hyperintense have suppressed signal (arrow), consistent with macroscopic fat. (c) Axial T_2 weighted MR image reveals the lesion to be modestly heterogeneous with slight expansion of the bone (arrowheads). (d) Axial T_1 weighted MR image with fat saturation again shows approximate isointensity to skeletal muscle. (e) Axial T_1 weighted MR image of the left hip with fat saturation following 0.2 ml kg^{-1} intravenous gadoterate meglumine does not reveal any significant enhancement.

Discussion

Liposclerosing myxofibrous tumours (LSMFTs) are unusual benign fibro-osseous tumours. They have a complex histological appearance and there are no specific diagnostic pathological features. Despite their complexity on histological examination, LSMFTs have a typical radiological appearance and skeletal distribution, with around 85% of cases being located in the intertrochanteric region of the femur [1]. Local pain (48%) or as an asymptomatic incidental finding (41%) are the commonest means of presentation [1]. A well-defined lucent lesion with a sclerotic rim is typical, although the degree of sclerosis can be rather variable [1]. CT is a valuable means of defining the extent and nature of the matrix mineralisation. Furthermore, analysis of the internal attenuation characteristics of the non-calcified material on CT typically shows intermediate Hounsfield values between fat and skeletal muscle. Macroscopic fat can also be seen, particularly with multidetector CT due to thinner slices and resultant minimisation of partial volume effects. MRI shows a well-defined lesion with T_1 isointensity to muscle that corresponds to the areas of lucency on conventional radiographs and low signal in the areas of bone sclerosis. The T_2 appearances are rather heterogeneous, with high signal in the central lucency and areas of signal void from the calcification. Inversion recovery MRI is generally of high signal. Patterns of contrast enhancement have not been widely reported for LSMFT.

The main differential diagnosis is fibrous dysplasia. The relationship between these two entities is complex [2], and indeed LSMFT may represent a subset of monostotic fibrous dysplasia. Although fibrous dysplasia can have very similar or even identical features to this lesion, the degree of sclerosis on the conventional radiographs seen here is somewhat unusual for fibrous dysplasia. A "ground-glass" pattern of attenuation on both conventional radiography and CT would be more typical. Furthermore, fibrous dysplasia tends to enhance with intravenous contrast, although the pattern may be central, rim enhancement, homogeneous or a combination [3]. It has been noted that the two lesions can be very difficult or even impossible to distinguish pathologically, and some even argue that LSMFT represents a post-traumatic response within a focus of fibrous dysplasia [4].

In this case, percutaneous biopsy was performed, as the nature of this lesion would determine the treatment for the colonic cancer. This showed fragmented, thickened basophilic bone trabeculae with no evidence of malignancy. The histology was felt to be consistent with

the radiological diagnosis. The lesion has been imaged as part of follow-up after resection of the colonic cancer for a 2-year period and has had stable appearances.

The treatment of LSFMT depends on the patient's symptoms. Asymptomatic lesions can be observed. Symptomatic lesions can be treated with curettage and bone grafting. Occasionally the lesions lead to pathological fracture, which can be treated with joint arthroplasty [2].

The main importance of recognising this lesion is that the risk of malignancy in LSMFT has been estimated to be approximately 10% [1, 5]. However, the likelihood is that this is an overestimate due to referral bias to the larger centres with expertise in bone tumours. Irrespective of the exact percentage in reality, there does appear to be a genuine risk, and therefore careful investigation and follow-up of these lesions is recommended. Malignant transformation can be to osteosarcoma, malignant fibrous histiocytoma or, more rarely, to other tumour types [1]. Malignancy generally manifests with cortical destruction and/or a soft-tissue mass [4]. If symptoms arise (such as pain or a mass), then re-imaging and biopsy should be performed. It is important to be aware that there is a report of LSMFT undergoing malignant transformation via an intermediate stage of a benign giant cell reactive lesion [6], and therefore a reassuring initial biopsy does not obviate the need for ongoing clinical and imaging follow-up.

References

1. Kransdorf MJ, Murphey MD, Sweet DE. Liposclerosing myxofibrous tumor: a radiologic pathologic-distinct fibro-osseous lesion of bone with a marked predilection for the intertrochanteric region of the femur. *Radiology* 1999;212: 693–8.
2. Murphey MD, Carroll JF, Flemming DJ, Pope TL, Gannon FH, Kransdorf MJ. From the archives of the AFIP: benign musculoskeletal lipomatous lesions. *Radiographics* 2004;24: 1433–66.
3. Shah ZK, Peh WCG, Koh WL, Shek TWH. Magnetic resonance imaging appearances of fibrous dysplasia. *BJR* 2005;78:1104–15.
4. Heim-Hall JM, Williams RP. Liposclerosing myxofibrous tumour: a traumatized variant of fibrous dysplasia? Report of four cases and review of the literature. *Histopathology* 2004;45:369–76.
5. Milgram JW. Malignant transformation in bone lipomas. *Skeletal Radiol* 1990;19:347–52.
6. Campbell K, Wodajo F. Case report: two-step malignant transformation of a liposclerosing myxofibrous tumor of bone. *Clin Orthop Relat Res* 2008;466:2873–7.