

# Three stripes sign: muscle involvement with internal fibrosis in a patient with sarcoidosis

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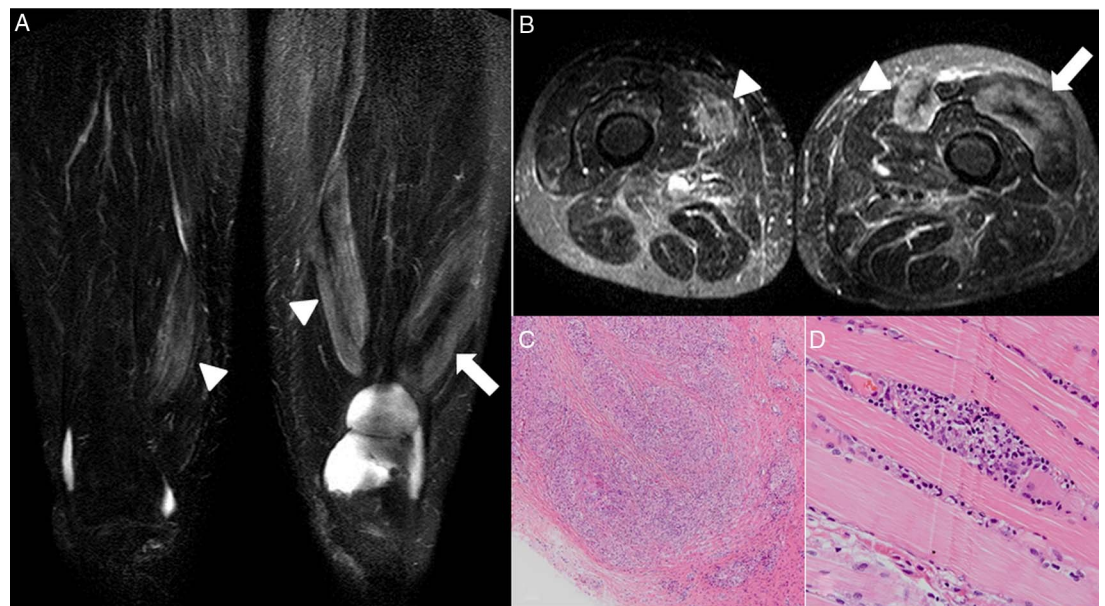
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## DESCRIPTION

A 62-year-old previously healthy woman was referred to the orthopaedic department because of bilateral thigh pain accompanied by palpable subcutaneous nodules in both thighs. The extremity coronal MRI with fat-suppressed T2-weighted images showed an inner stripe of decreased signal intensity with outer stripes of increased signal intensity, the so-called three stripes sign, both in the left vastus lateralis (figure 1A, arrow) and bilateral vastus medialis muscles (figure 1A, arrowheads), while, on axial image, decreased signal intensity, a 'dark star' sign was seen both in the left vastus lateralis (figure 1B, arrow) and bilateral vastus medialis muscles (figure 1B, arrowheads). Furthermore, on H&E staining, the biopsied specimens obtained from the left vastus lateralis demonstrated non-caseating epithelioid cell granulomas (figure 1C) or epithelioid cells (figure 1D). Thus,

she was diagnosed with muscular sarcoidosis. The frequency of involvement of the mediastinal lymph nodes, lungs and muscle is 85%, 20% and 20–75%, respectively. However, the frequency of symptomatic muscle involvement, such as pain, nodular swelling and muscle weakness, is less than 0.5%. In this regard, the present case had the former two findings as an atypical initial presentation. Muscular sarcoidosis is a rare condition which is clinically divided into nodular and myopathic types. The three stripes sign is a specific sign for nodular type of muscular sarcoidosis<sup>1</sup> and is characterised by (1) a star-shaped central structure of decreased signal intensity, a 'dark star' sign on axial images which correspond to a dense fibrotic tissue and (2) inner stripe of decreased signal intensity (fibrotic tissue) and outer stripes of increased signal intensity (active inflammatory granuloma containing epithelioid cells) on coronal or sagittal images.<sup>2,3</sup>



**Figure 1** The extremity coronal MRI with fat-suppressed T2-weighted images showing an inner stripe of decreased signal intensity with outer stripes of increased signal intensity, the so-called three stripes sign, both in the left vastus lateralis (A, arrow) and bilateral vastus medialis muscles. (A, arrowheads). The extremity axial MRI with fat-suppressed T2-weighted images showing decreased signal intensity, a 'dark star' sign both in the left vastus lateralis (B, arrow) and bilateral vastus medialis muscles. (B, arrowheads). On H&E staining, the biopsied specimens obtained from the left vastus lateralis demonstrated non-caseating epithelioid cell granulomas (C) or epithelioid cells (D).



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## Learning points

- ▶ The frequency of symptomatic muscular sarcoidosis, such as pain, nodular swelling and muscle weakness, is less than 0.5%.
- ▶ On MRI, the three stripes sign is a specific sign for nodular type of muscular sarcoidosis, which is characterised as inner stripe of decreased signal intensity and outer stripes of increased signal intensity on coronal or sagittal images, and dark star sign on axial images.
- ▶ The pathological findings for three stripes sign is that the centre area of a sarcoid nodule with decreased signal intensity is corresponded to a dense fibrotic tissue, and outer area of increased signal intensity is made up of an active inflammatory granuloma containing epithelioid cells.

**Contributors** NT, TS, MS and HG managed the patient in outpatient and inpatient settings.

**Competing interests** None.

**Patient consent** Obtained.

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