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Usefulness of ultrasonography in the diagnosis of ischaemic fasciitis

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Summary

We present the case of a 68-year-old woman who developed a painful subcutaneous tumour in the sacral region. Histological examinations revealed a characteristic zonal pattern with a central zone of liquefactive necrosis, surrounded by proliferated atypical fibroblasts and prominent vessels, indicating ischaemic fasciitis. We demonstrate that the characteristic features of ischaemic fasciitis revealed by ultrasonography are strongly associated with those revealed by pathological findings. We thus believe that ultrasonography is a valid tool for making an accurate diagnosis of ischaemic fasciitis.

Ischaemic fasciitis is a rare pseudosarcomatous proliferation of fibroblasts/myofibroblasts, occurring primarily on pressure points or bony prominences in immobile elderly or debilitated patients. Ischaemic fasciitis can be confused with malignant soft-tissue tumours in clinical and histological examinations. A noninvasive examination that prevents the possibility of misdiagnosis would be greatly beneficial to patients with ischaemic fasciitis. We discuss the case of a patient with ischaemic fasciitis who underwent ultrasonography, and explore the diagnostic utility of ultrasonography for this disease.

Report

A 68-year-old woman presented with a 3-month history of a painful subcutaneous tumour on her sacrum. The patient was very thin. Although she had experienced lacunar infarction 25 years previously, she was not bedridden or confined to a wheelchair by physical debilitation.

On physical examination, a red, elastic, firm mass, without ulceration and approximately 35 mm in diameter, was noted on the patient's sacrum (Fig. 1a). Mobility around the tissue was poor.

Ultrasonographic examination revealed that the lesion extended from the dermis into the deep subcutaneous tissue. The mass consisted of a biphasic zonal architecture with a hypoechoic central zone, and a hyperechoic external zone with abundant blood flow (Fig. 1d,g).

Histologically, the lesion mainly involved subcutaneous tissue with slight expansion to the overlying dermis, and demonstrated a zonal pattern, with a central zone of liquefactive necrosis with fibrinoid degeneration, surrounded by proliferative fibroblasts and prominent vessels (Fig. 2a). The fibroblasts were cytologically atypical, with large, eccentric and hyperchromatic nuclei (Fig. 2b). The proliferative vasculature was thin-walled and ectatic. The stroma was slightly myxoid.

Immunohistochemical examination revealed that the atypical fibroblasts stained wholly and strongly for vimentin and CD68.

Although we considered some soft-tissue tumours originating from fibroblasts in the differential diagnosis, we diagnosed this case as ischaemic fasciitis on the basis of the clinicopathological features.

At the patient's request, she did not undergo any surgical or topical treatment, but we have continued to monitor her condition. Over the last 2 years, the lesion has gradually decreased in size without exacerbation. Ultrasonographic examination has also revealed a reduction in the mass's volume and blood flow, and

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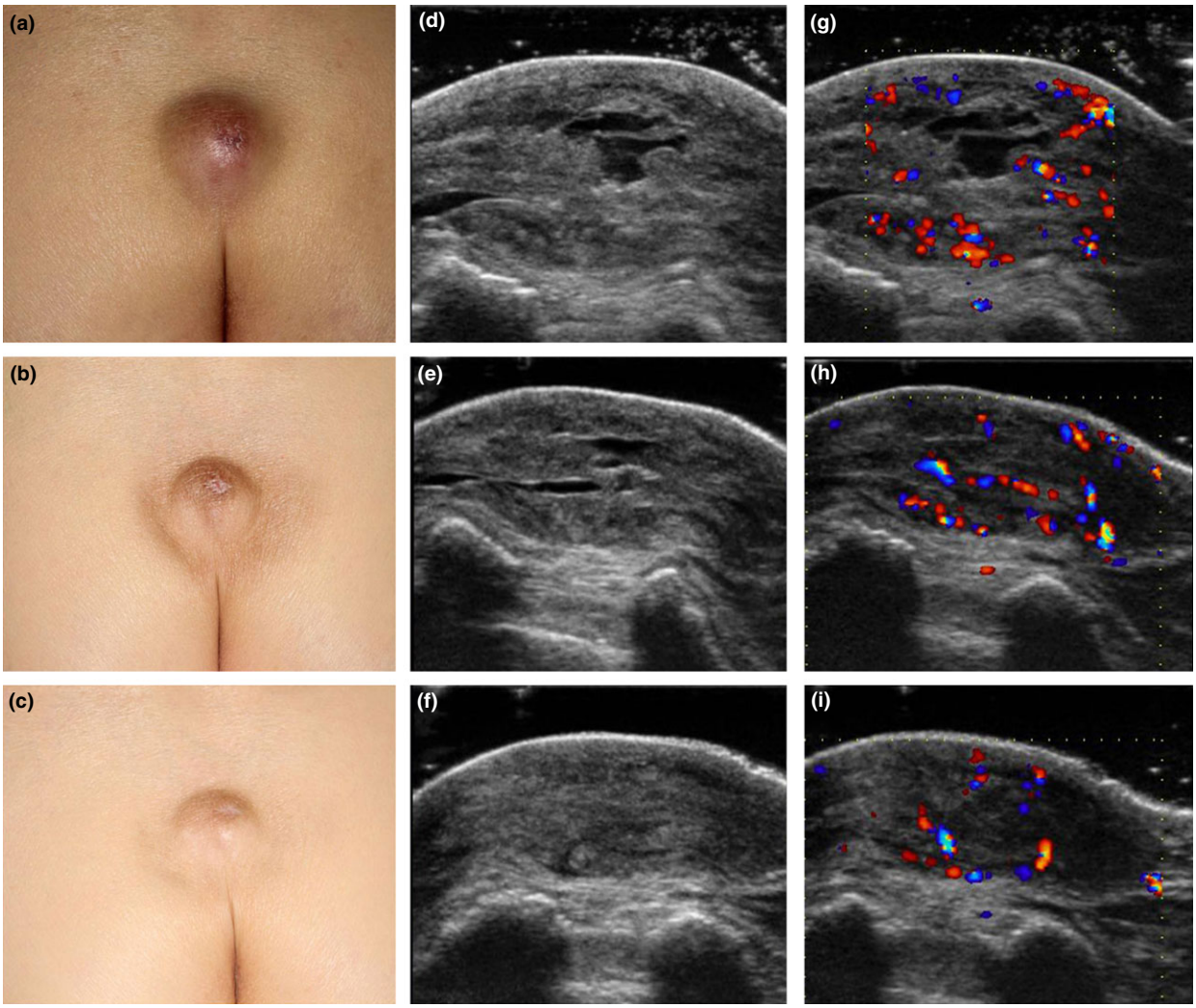

Figure 1 Changes in the clinical appearance and findings of a patient with ischaemic fasciitis over time. (a,d,g) Initial visit. (a) The patient had (a) a red, elastic, firm mass on the sacrum, approximately 35 mm in diameter. (d) Ultrasonographic examination revealed a biphasic zonal architecture with a hypoechoic central zone and a hyperechoic external zone, with (g) abundant blood flow in a hyperechoic external zone. (b,e,h) At 1 year after the initial visit. (c,f,i) At 2 years after the initial visit, the mass had gradually decreased in size, and ultrasonography also revealed a reduction in the volume and blood flow, while the biphasic zonal echoic areas had started to disappear.

disappearance of the biphasic zonal architecture over time (Fig. 1). No exacerbation has been found.

Ischaemic fasciitis, also termed 'atypical decubital fibroplasia' was first described by Montgomery *et al.* in 1992.[1] The condition is a rare pseudosarcomatous fibroblastic/myofibroblastic proliferation that usually involves soft tissue at pressure points or overlying bone prominences in patients, most of whom are elderly, physically debilitated, bedridden, immobilized or wheelchair-bound. However, Liegl *et al.* analysed 44 cases of ischaemic fasciitis, and reported that a history of physical debilitation could be found in only 7 patients.[2] They therefore suggested that this distinct entity occurs irrespective of the presence of debilitation. As our patient also had no physical debilitation, we theorized that her small and thin body frame was a trigger for the onset of ischaemic fasciitis. Most lesions tend to occur in the soft tissue overlying the shoulder, rib, great trochanter or sacrococcygeal region. The pathogenesis of this lesion is presumed to be caused by mechanical pressure-induced ischaemia with aberrant wound healing.[1]

Histologically, ischaemic fasciitis has a zonal pattern, that is, a central zone of liquefactive or focally coagulative necrosis, and an outer zone of proliferative

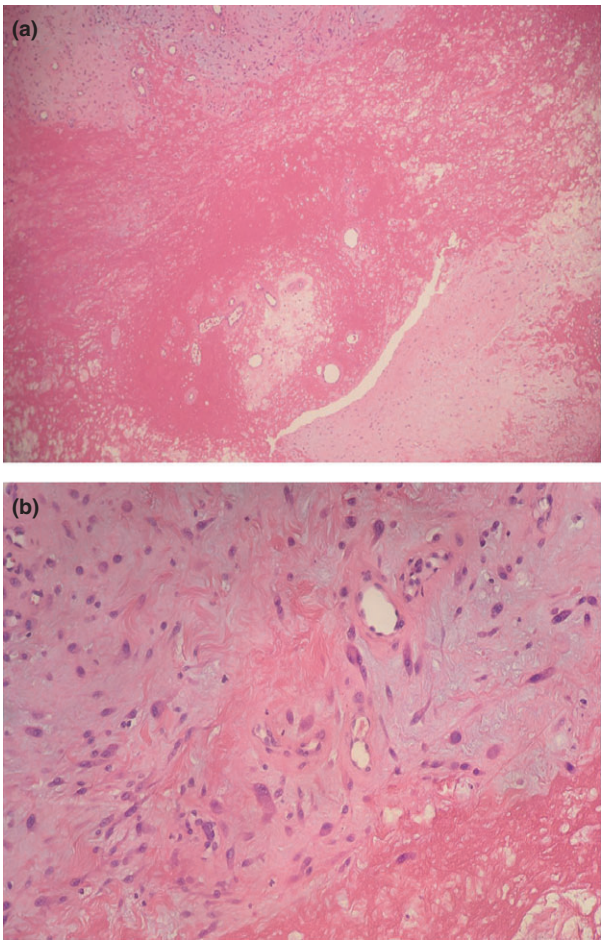

Figure 2 (a) Central zone of liquefactive and coagulative necrosis surrounded by proliferative fibroblasts and vessels; (b) atypical fibroblasts in the cellularity zone. Haematoxylin and eosin, original magnification (a) × 40; (b) × 400.

ectatic vessels and fibroblasts. This characteristic zonal pattern is a useful diagnostic clue, especially when it occurs in conjunction with the anatomical location in which ischaemic fasciitis commonly occurs.[1,3] Despite these clinicopathological features, malignant conditions such as malignant soft-tissue tumours are often seriously considered in more than one-third of reported cases of ischaemic fasciitis.[4]

For histological examination of soft-tissue tumours, fine-needle aspiration biopsy is preferred, because of its ease, low cost, nontraumatic nature and low complication rate.[5] However, this technique can take only a small sample of the tumour, thus the sample is limited in cellularity, often making it difficult to distinguish between benign cellular conditions and low-grade sarcomas.[6] Unfortunately, the proliferative fibroblasts in ischaemic fasciitis are usually cytologically atypical with large, eccentric nuclei. Because of these pitfalls, ischaemic fasciitis tends to be misdiagnosed as malignant soft-tissue tumour.

Diagnostic imaging has the potential to exclude malignancies and avoid unnecessarily invasive approaches. Ultrasonography is a useful, noninvasive imaging method that can be performed easily at the bedside. Using ultrasonography, the sacral mass in our patient was seen to have a characteristic biphasic zonal pattern, with a hypoechoic central zone with no blood flow and a hyperechoic external zone with abundant blood flow. We suggest that these ultrasonographic findings are strongly associated with the distinctive zonal histological appearance. To our knowledge, no previous report has described ultrasonographic findings of ischaemic fasciitis.

In conclusion, we believe that careful clinical examination with noninvasive ultrasonography could decrease the rate of misdiagnosis of ischaemic fasciitis as a malignant neoplasm.

Learning points

- Ischaemic fasciitis is a rare pseudosarcomatous fibroblastic/myofibroblastic proliferation.
- The condition is often misdiagnosed as a malignant soft-tissue tumour, but its characteristic pathological zonal pattern is a useful diagnostic clue, especially when it occurs in conjunction with the anatomical location in which ischaemic fasciitis commonly occurs.
- In this report, we show that the ultrasonographic findings are strongly associated with the distinctive histological zonal appearance of ischaemic fasciitis.
- We recommend that ultrasonographic examination should be performed in patients with such lesions in order to ascertain if they are ischaemic fasciitis.

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