Quiz

Correct answer to the quiz. Check your diagnosis

Case report

Cellular dermatofibroma

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Dermatofibroma (DF), also known as fibrous histiocytoma, is one of the most common cutaneous soft-tissue lesions, accounting for approximately 3% of skin lesion specimens received by dermatopathology laboratories. Dermatofibroma is a benign growth of oval cells in the dermis which resemble histiocytes and spindle cells that resemble fibroblasts. Clinically, DF can present as solitary, firm nodules to multiple papules with a relatively smooth surface. The aim of our study is to emphasize the crucial role of histopathology, which is the gold standard for diagnosis in suspicious and difficult cases, and sometimes requires the use of additional immunohistochemical staining.

Key words: tumor, cellular dermatofibroma, fibrous histiocytoma, pathomorphology.

Introduction

Dermatofibroma (DF), also known as fibrous histiocytoma, is one of the most common cutaneous soft-tissue lesions, accounting for approximately 3% of skin lesion specimens received by dermatopathology laboratories. Dermatofibroma is a benign growth of oval cells in the dermis which resemble histiocytes and spindle cells that resemble fibroblasts. Clinically, DF can present as solitary, firm nodules to multiple papules with a relatively smooth surface. However, many clinically and pathomorphologically atypical variants of DF have been reported, making clinical diagnosis difficult, which consequently sometimes leads to misdiagnosis. The aim of our study is to emphasize the crucial role of histopathology, which is the gold standard for diagnosis in suspicious and difficult cases, and sometimes requires the use of additional immunohistochemical staining.

Case report

We present the case of a 72-year-old, otherwise healthy female who was admitted to the General Surgery Department for the excision of a skin lesion located on the left upper arm. On physical examination, an ulcerated, grey-brown skin lesion with irregular borders in some areas, measuring 6 × 5.5 × 4.5 cm, was observed. The lesion was painless and had been growing for approximately one year. The patient denied any history of trauma to the affected area. Palpation revealed no axillary lymphadenopathy. The lesion was completely excised. Histopathological examination confirmed cellular DF (Figures 1–5), which was supported by immunohistochemical reactions: CD34 (–) (Figure 6), CD68 (+) (Figure 7), Ki-67 (10%) (Figure 8). Cellular dermatofibromas (CDF) are uncommon benign fibrous histiocytomas with histologic patterns resembling malignancies. Despite their benign na-

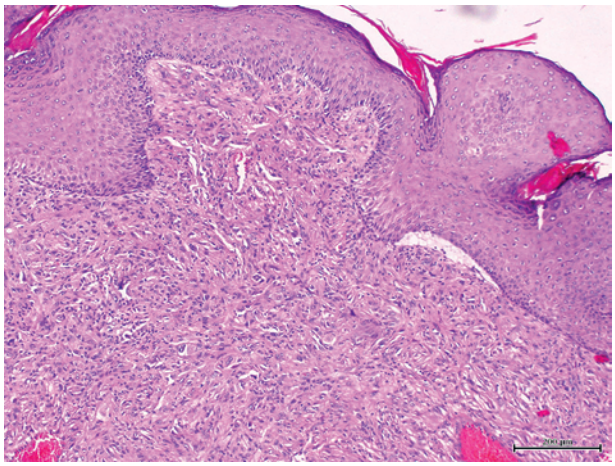

Figure 1. A hypercellular proliferation of oval cells, some with 2–3 nuclei, demonstrating a pleomorphic morphology with prominent nucleoli and abundant eosinophilic cytoplasm. No evident mitotic figures or foci of necrosis are observed (HE, 10× magnification)

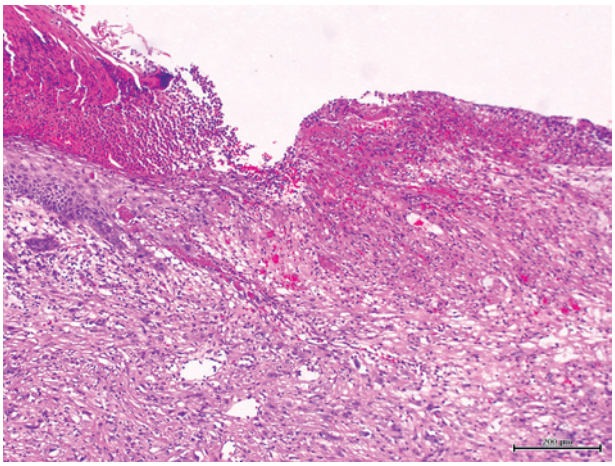

Figure 2. A hypercellular proliferation of oval cells, some with 2–3 nuclei, demonstrating a pleomorphic morphology with prominent nucleoli and abundant eosinophilic cytoplasm. No evident mitotic figures or foci of necrosis are observed (HE, 10× magnification)

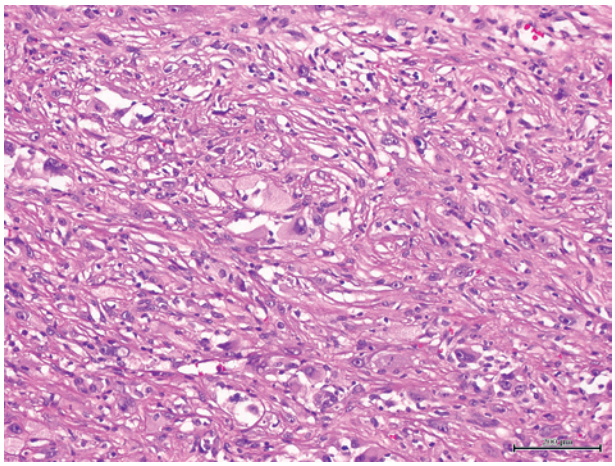

Figure 3. A hypercellular proliferation of oval cells, some with 2–3 nuclei, demonstrating a pleomorphic morphology with prominent nucleoli and abundant eosinophilic cytoplasm. No evident mitotic figures or foci of necrosis are observed (HE, 20× magnification)

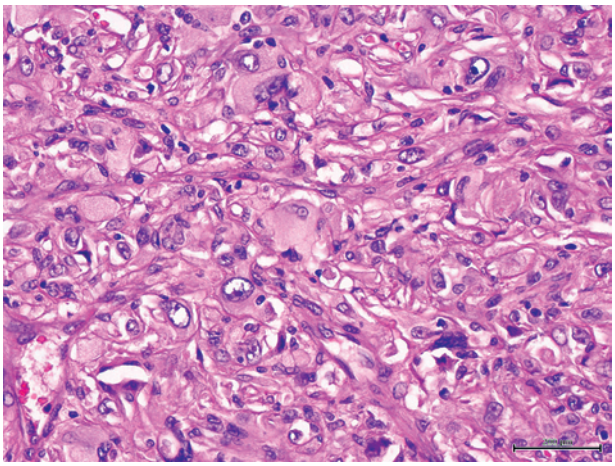

Figure 4. A hypercellular proliferation of oval cells, some with 2–3 nuclei, demonstrating a pleomorphic morphology with prominent nucleoli and abundant eosinophilic cytoplasm. No evident mitotic figures or foci of necrosis are observed (HE, 20× magnification)

ture, CDF can recur and metastasize. Physicians are uncertain about the management of CDF, given its resemblance to dermatofibrosarcoma protuberans [1]. Dermatofibroma is a common benign tumour also known as fibrous histiocytoma (Figure 9–13).

Discussion

Dermatofibromas are dermal tumours characterised by a poorly defined proliferation of fibrohistiocytic cells within the dermis with an overlying grenz zone of sparing. Cellular dermatofibromas are a type of DF (noncancerous tumour). They appear as firm bumps (nodules), commonly located on the lower extremities. As demonstrated by the described case, their location may also vary. Cellular dermatofibromas extend deeper into the skin layers compared to other DF. Typically, DF are superficial, meaning they grow on the top layer of the skin. Cellular DF frequently extend into the subcutaneous tissue. These lesions originate from connective tissue. Compared to other DF, cellular DF have a higher likelihood of recurrence following treatment. In about 1 in 10 people, cellular DF cause necrosis in the tumour [1–3]. Dermatofibromas are most commonly observed in individuals aged 20–49, although they can occur in older populations. Dermatofibromas are twice as common in women as in men. As indicated in the literature, approximately 1 in 5 individuals with a DF reports a history of trauma or injury at

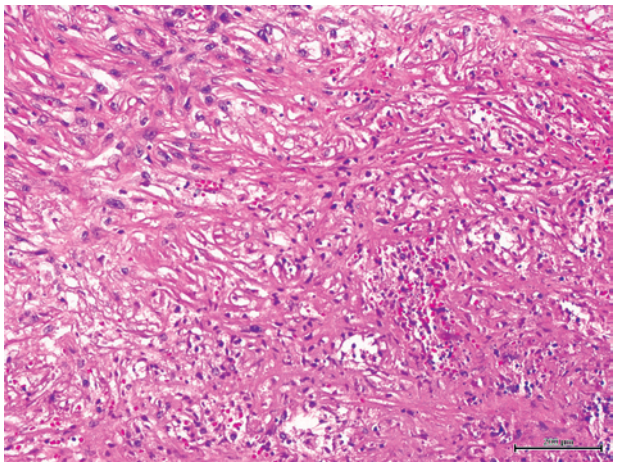

Figure 5. A hypercellular proliferation of oval cells, some with 2–3 nuclei, demonstrating a pleomorphic morphology with prominent nucleoli and abundant eosinophilic cytoplasm. No evident mitotic figures or foci of necrosis are observed (HE, 40× magnification)

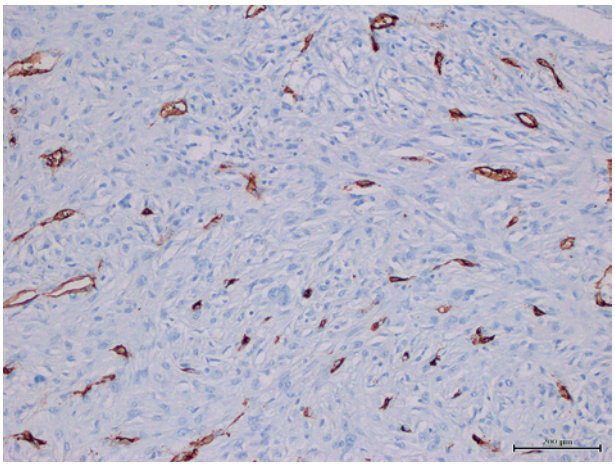

Figure 6. Immunohistochemical stain (HE, 20× magnification), CD34 negative reaction in tumour cells

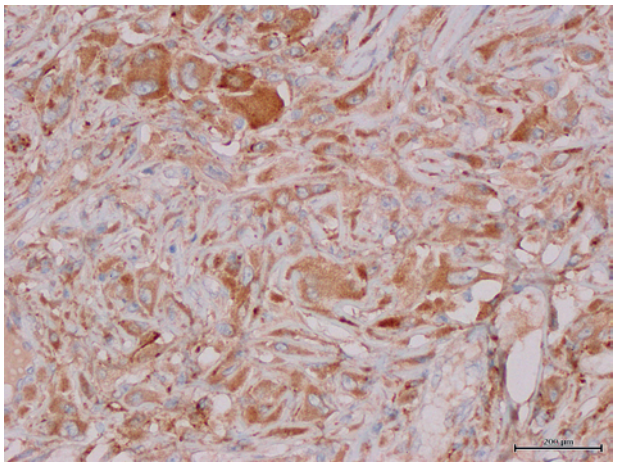

Figure 7. Immunohistochemical stain (HE, 20× magnification), CD68 positive reaction in tumour cells

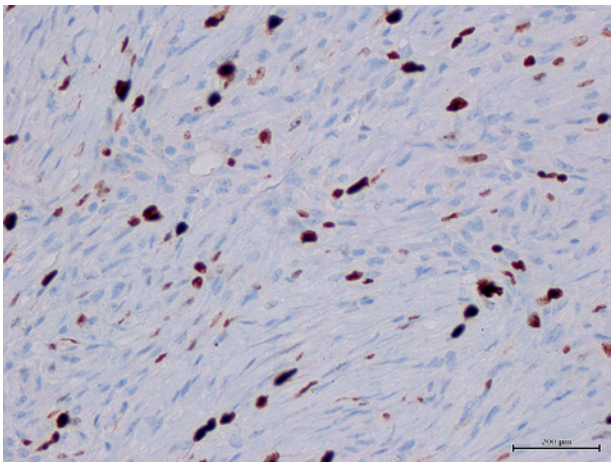

Figure 8. Immunohistochemical stain (HE, 20× magnification), Ki-67 (10%) – cellular proliferation

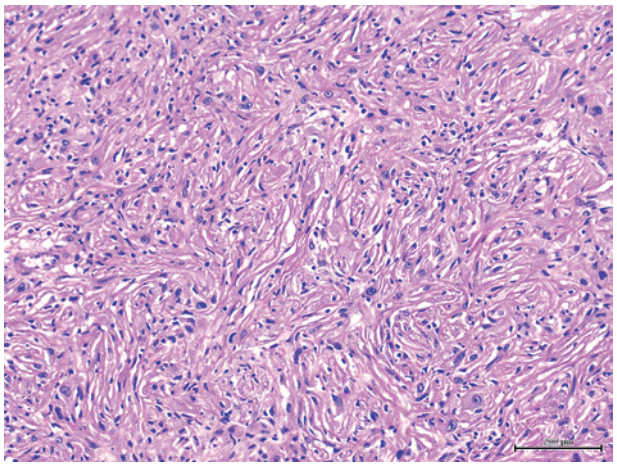

Figure 9. The areas of the tumour are highly cellular with a characteristic whorled arrangement of spindle-shaped fibroblasts and histiocytic cells – which is typical of the classic appearance of dermatofibroma

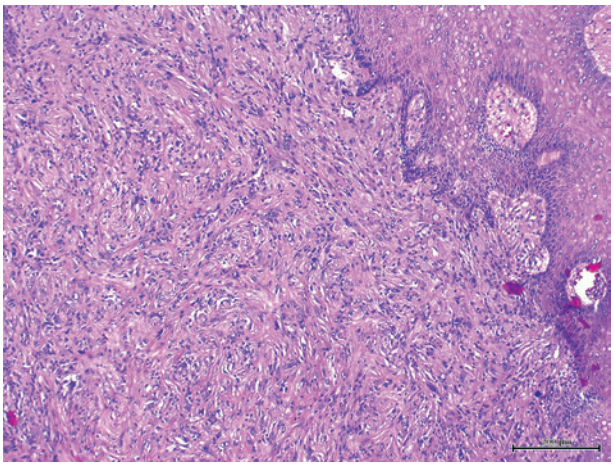

Figure 10. The areas of the tumour are highly cellular with a characteristic whorled arrangement of spindle-shaped fibroblasts and histiocytic cells – which is typical of the classic appearance of dermatofibroma

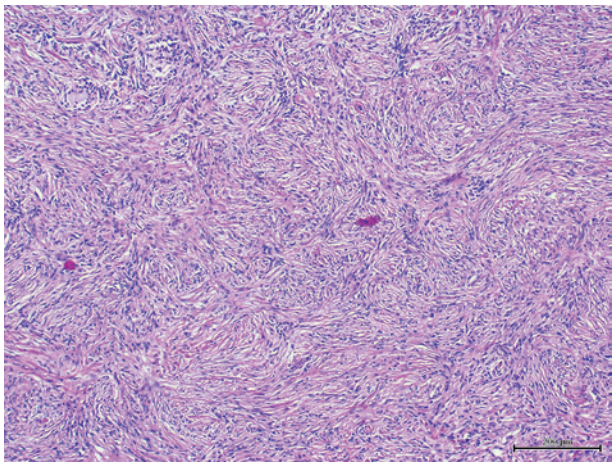

Figure 11. The areas of the tumour are highly cellular with a characteristic whorled arrangement of spindle-shaped fibroblasts and histiocytic cells – which is typical of the classic appearance of dermatofibroma

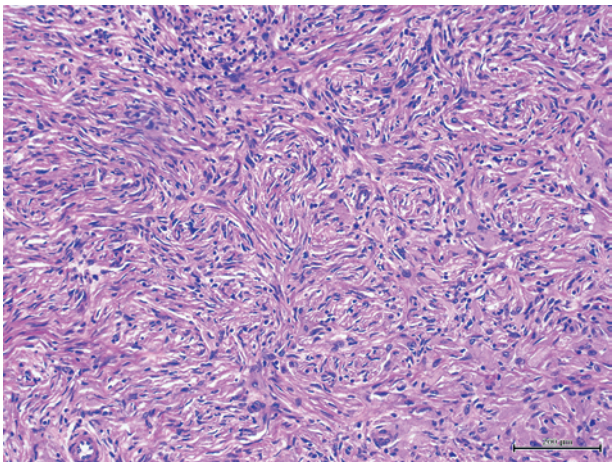

Figure 12. The areas of the tumour are highly cellular with a characteristic whorled arrangement of spindle-shaped fibroblasts and histiocytic cells – which is typical of the classic appearance of dermatofibroma

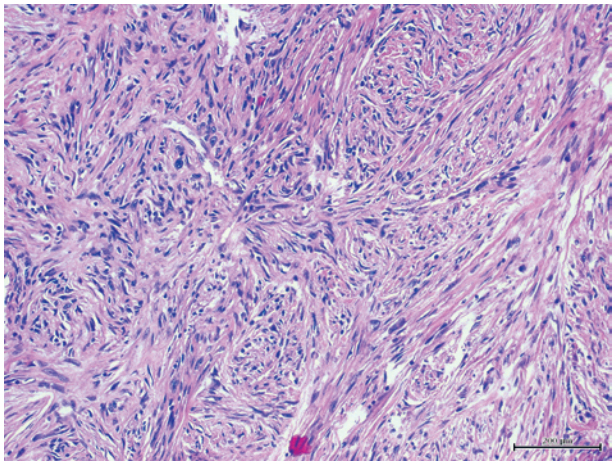

Figure 13. The areas of the tumour are highly cellular with a characteristic whorled arrangement of spindle-shaped fibroblasts and histiocytic cells – which is typical of the classic appearance of dermatofibroma

the site of tumour development. Occasionally, DF develop spontaneously, without a known cause [4, 5]. A significant proportion of DF are associated with previous minor local trauma, especially insect bites. Eruptive lesions have been observed in the context of immunosuppression, HIV infection, highly active antiretroviral therapy, and pregnancy. Simple excision is usually curative, and local recurrence is rare, generally with rates of less than 2% [6].

Cellular dermatofibromas typically present as small, round, or oval nodules, usually measuring less than 1 centimetre (cm) in diameter. While most lesions are within this size range, larger tumours have been rarely described in the literature. They may exhibit a flesh-coloured, brown, or reddish-brown hue. Commonly, DF develop on arms and legs. Their growth is generally slow. They may be firm to palpation and can be itchy, tender or painful. In some cases, they demonstrate a dimpled appearance – the centre of the lesion falls in, and the edges of the lesion pucker around it [6–8].

In the differential diagnosis of DF, considerations include histiocytoma, angiofibroma, and keloids [9, 10].Cellular DF may resemble dermatofibrosarcoma protuberans, which can be distinguished by its larger size, increased mitotic figures, and marked involvement of the subcutis. CD34 is positive in dermatofibrosarcoma protuberans and is usually negative in DF, although the cellular variant may have focal positivity, especially at the periphery of the lesion. A study of clonal karyotypic abnormalities in DF revealed that cellular DF were more likely to demonstrate karyotypic abnormalities compared to common DF [1, 6, 11, 12].

Dermatofibroma is usually easy to diagnose clinically, supported by dermoscopy. The most common dermoscopic pattern consists of a central white area surrounded by a faint pigment network. However different patterns may be observed in the skin of colour. The pathology of DF reveals whirling fascicles of spindle cell proliferation with excessive collagen deposition within the dermis. A crucial aspect of diagnosis involves the performance of immunohistochemical stains, including CD34, CD68 or CD163, and Ki-67 (a marker of cellular proliferation). Dermatofibroma is benign and rarely causes any symptoms. If it is a nuisance or causing concern, the lesion can be surgically removed. This also applies to very large lesions [13–18]. Lesions exceeding 1 cm in diameter, especially those that extend below the epidermal level, and tumours that change colour (cyanosis, erythema) without a history of trauma, necessitate surgical intervention [17, 18]. Rare reports of metastases and malignant transformation exist, leading some au-

thors to recommend complete excision. Observation is considered acceptable by other authors, especially if immunostaining supports the diagnosis of a benign lesion [17, 18].

Conclusions

Cellular DF is considered a benign tumour. Dermatofibroma is a benign fibrohistiocytic tumour that is typically asymptomatic. There is an ongoing debate regarding treatment approaches; some reduce the chance of recurrence to 10%. To date, there have been no reported cases of metastatic or fatal lesions, and the patient may still be reassured with follow-up. The pivotal aspect remains the pathomorphological diagnosis, which is paramount in guiding further therapeutic decisions.

Disclosures

1. Institutional review board statement: None.
2. Assistance with the article: None.
3. Financial support and sponsorship: None.
4. Conflicts of interest: None.

References

1. Le NT, Fung MA, Eisen DB. Updated review of cellular dermatofibroma: benign or not? Dermatol Surg 2025; 51: 588-592.
2. Kimyai-Asadi A, Goldberg LH, Greenberg C, Rabin V, Parry R, Batres E, et al. Cellular, atypical, and indeterminate dermatofibromas: benign or malignant? Dermatol Surg 2008; 34: 1264-1272.
3. Evans T, Lee E, Sutton A. Cellular dermatofibromas: getting it right the first time. Grad Med Educ Res J 2021; 3: 37-38.
4. Calonje E, Brenn T, Lazar A, McKee PH. McKee's pathology of the skin: with clinical correlations. Elsevier Saunders 2012.
5. Franquemont DW, Cooper PH, Shmookler BM, Wick MR. Benign fibrous histiocytoma of the skin with potential for local recurrence: a tumor to be distinguished from dermatofibroma. Mod Pathol 1990; 3: 158-163.
6. Alves JVP, Matos DM, Barreiros HF, Felgueira EA, Bártolo LF. Variants of dermatofibroma – a histopathological studY. An Bras Dermatol 2014; 89: 472-477.
7. Zelger B, Zelger BG, Burgdorf WH. Dermatofibroma-a critical evaluation. Int J Surg Pathol 2004; 12: 333-344.
8. LeBoit PE, Barr RJ. Smooth-muscle proliferation in dermatofibromas. Am J Dermatopathol 1994; 16: 155-160.
9. Sánchez Yus E, Soria L, de Eusebio E, Requena L. Lichenoid, erosive and ulcerated dermatofibromas. Three additional clinicopathologic variants. J Cutan Pathol 2000; 27: 112-117.
10. Calonje E, Brenn T, Lazar A, Mckee P, Calonje E, Brenn T, et al. McKee's pathology of the skin with clinical correlations. Fibrohistiocytic tumors. 4th ed. Elsevier Saunders, Edinburgh 2012, 1643-1662.
11. Sanmartín O, Llombart B, López-Guerrero JA, Serra C, Requena C, Guillén C. Dermatofibrosarcoma protuberans. Actas Dermosifiliogr 2007; 98: 77-87.
12. Kazlouskaya V, Malhotra S, Kabigting FD, Lal K, Elston DM. CD99 Expression in dermatofibrosarcoma protuberans and dermatofibroma. Am J Dermatopathol 2014; 36: 392-396.
13. Charli-Joseph Y, Saggini A, Doyle LA, Fletcher CD, Weier J, Mirza S, et al. DNA copy number change in tumors within the spectrum of cellular, atypical, and metastasizing fibrous histiocytoma. J Am Acad Dermatol 2014; 71: 256-263.
14. Busam KJ. Desmoplastic melanoma. Clin Lab Med 2011; 31: 321-330.
15. Petter G, Haustein UF. Histologic subtyping and malignancy assessment of cutaneous squamous cell carcinoma. Dermatol Surg 2000; 26: 521-530.
16. Kaddu S, Beham A, Cerroni L, Humer-Fuchs U, Salmhofer W, Kerl H, et al. Cutaneous leiomyosarcoma. Am J Surg Pathol 1997; 21: 979-987.
17. Doyle LA, Fletcher CD. Metastasizing "benign" cutaneous fibrous histiocytoma: a clinicopathologic analysis of 16 cases. Am J Surg Pathol 2013; 37: 484-495.
18. Yan AC, Hoeger PH, Kinsler V. Harper's textbook of pediatric dermatology. 2 Volume Set, 4th ed. Wiley 2020; 2: 1318-1319.

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