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CORRESPONDENCE

Superficial spindle cell tumour with *TNC::PDGFD* fusion is a distinct entity from dermatofibrosarcoma protuberans

To the Editor,

Dermatofibrosarcoma protuberans (DFSP) is a locally aggressive and infiltrative dermohypodermal spindle cell neoplasm, genetically characterised by *COL1A1::PDGFB* fusion in most cases.[1] Alternative fusion transcripts with *PDGFD* have been detected in a minority of cases.[2] Recently, Chen *et al.* reported an undescribed *TNC::PDGFD* fusion transcript in a well-circumscribed and nodular subcutaneous spindle cell neoplasm and discussed the possibility of a DFSP subtype.[3] Here we report another case of spindle cell neoplasm with *TNC::PDGFD* and discuss its relationship with the DFSP spectrum.

The local Ethics Committee in Human Research of Tours (France) approved the study (no. ID RCB2009-A01056-51).

A 49-year-old woman presented with a slowly growing infracentimetric tumour at the tip of the nose. A clinical differential was a basal cell carcinoma and surgical resection was performed. Histopathological examination revealed a well-circumscribed mesenchymal neoplasm, measuring 5 mm in diameter and located in the dermis and subcutis without connection to the epidermis (Fig. 1A,B). The neoplasm was composed of small monomorphous spindle-shaped cells with regular small folded or indented nuclei and a moderate amount of eosinophilic cytoplasm (Fig. 1C). Pleomorphism, mitotic activity, and necrosis were not seen. These cellular fields were centred by large hyaline lobulated areas composed of dense collagen bundles with scattered small nuclei and inconspicuous cytoplasms (Fig. 1D). These features were reminiscent of immature cartilage while no lamellar bone or fibrillar ossification was seen.

Immunohistochemical investigation of the case showed negativity for CD34 (Fig. 2A), CKAE1/AE3, EMA, BerEP4, p63, SOX10, PS100, Melan-A, GFAP, SMA, Desmin, CD31, neuron-specific enolase (NSE), neurofilament (NF), MUC4, pan-TRK, ALK5A4 and β-catenin (Fig. 2B). Therefore, RNA sequencing was performed on formalin-fixed, paraffin-embedded (FFPE) tissue using the Archer FusionPlex Sarcoma Panel (ArcherDX, USA) on a MiSeq (300 cycles; Illumina USA). Sequencing data were analysed via the Archer automated analysis pipeline, which revealed a *TNC::PDGFD* fusion transcript.

Platelet Derived Growth Factor D (PDGFD) is located on chromosome 11q22.3 and encodes a platelet-derived growth factor family protein. Binding and activation of its homologous receptor PDGFR-β can regulate cell proliferation, migration, invasion, and angiogenesis by the crosstalk of many signalling pathways.[4]

Recently, fusions involving *PDGFD* have been reported in DFSP cases lacking *COL1A1::PDGFB* fusion. In these cases, a fusion was observed between *PDGFD* and *COL6A3* or *EMILIN2* in 40% of the cases. Similarly to *COL1A1::PDGFB* fusions, *PDGFD* rearrangements can result in autocrine activation by signalling of the PDGFR-β receptor tyrosine kinase.[5]

Tenascin-C (TNC) is located on chromosome 9q33.1 and is a member of the tenascin gene family which encodes extracellular matrix proteins with a wide range of different functions with a spatially and temporally restricted tissue distribution.[6] Its expression is induced by stress or mechanical and chemical injury and has oncogenic properties through the promotion of cell proliferation, migration and angiogenesis, which has been described as an important

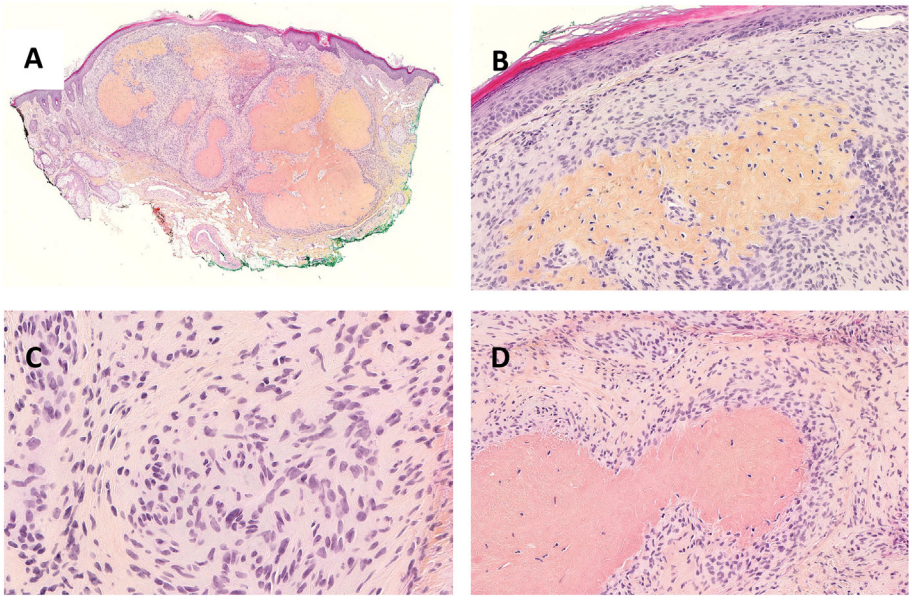

Fig. 1 (A) The lesion consists of a well-circumscribed and poly-lobed dermal mass; (B) any connection to the epidermis is observed; (C) neoplastic spindle cells have oval, folded or indented nuclei and palely eosinophilic cytoplasm; (D) tumours cells are arranged around dense hyalin collagen (H&E stain).

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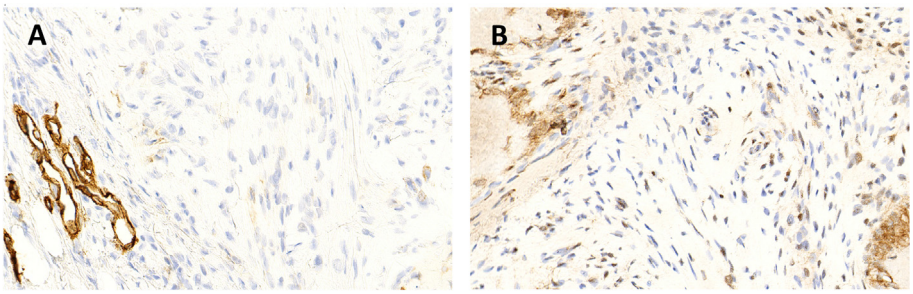

Fig. 2 (A) Tumour cells are negative for CD34 (endothelial cells positive control). (B) No nuclear expression of β-catenin is observed.

factor of metastatic spread by providing protection against apoptosis.[7]

In a recent study, *TNC* was found as a fusion partner of the *NRG1* gene in non-small cell lung cancers and in papillary renal cell carcinomas,[8] which could promote pathological signalling through activation of MAP-kinase and other canonical pathways.[9] Furthermore, the *TNC::USP6* fusion has also been documented in a primary aneurismal bone cyst.[10]

Recently, Chen *et al.* reported a subcutaneous spindle cell tumour with *TNC::PDGFD* fusion and proposed that it could represent a subtype of fibrosarcomatous DFSP.[3] The tumour was well-circumscribed, a feature recently described in *PDGFD*-rearranged DFSP.[11] However, in our observation, the well-delimitated nodular silhouette, the lack of infiltration, the hyaline hypocellular areas and the negativity of CD34 were not in keeping with the diagnosis of DFSP. Therefore, although confirmation of more cases is required for further characterisation, the morphological and immunohistochemical characteristics observed in these two cases suggest that superficial *TNC::PDGFD*-rearranged spindle cell tumours may constitute a distinct entity.

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