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Intraoperative touch imprint cytology of sacro-coccygeal chordoma

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Chordoma is a neoplasm that originates from the notochord, usually in the sacrum, clivus or vetebrae, and although it grows slowly it can lead to local recurrences and metastases; its treatment of choice is radical surgery.

Pre-operative diagnosis is therefore very important and it is based on microscopic features: physaliphorous cells in a chondromyxoid matrix and immunohistochemical positivity for Brachyury. Such main features are usually seen histologically on biopsy and sometimes on fine needle aspiration cytology (FNAC), but is only rarely reported intraoperatively [1]. A 56 years-old woman presented with an expansive sacrococcygeal mass of 15 cm in diameter. Radiology showed a lesion of multiloculated appearance, hyperintense in T2 and hypointense in T1, suspected to be a chordoma. During surgery, a biopsy was sent for rapid pathological examination to quickly decide whether to proceed with radical excision: the sample was too small for histology on frozen sections, and it was therefore decided to examine it cytologically with the touch imprint. Microscopy showed cells of medium and large size, also in aggregates, with vesicular and sometimes nucleated nuclei and granular cytoplasms even pigmented; these elements were loosely distributed in a myxoid matrix (fig. 1A–1C). Such cytological features were consistent with a chordoma [1].

After surgery, the intraoperative diagnosis was confirmed: both histology and immunohistochemistry (cytokeratins AE1/AE3+; EMA+; S100+; Brachyury+; CK7-; CK20-) were consistent with a chordoma (fig. 1D–1F), making it possible to exclude the main differential diagnoses (chondrosarcoma, metastatic carcinoma, myoepithelial tumours, myxopapillary ependymoma, ecchordosis physaliphora) [2]. Finally, it is noteworthy that also the neoplastic cells from the touch imprint were also Brachyury-positive, demonstrating its applicability on cytological samples.

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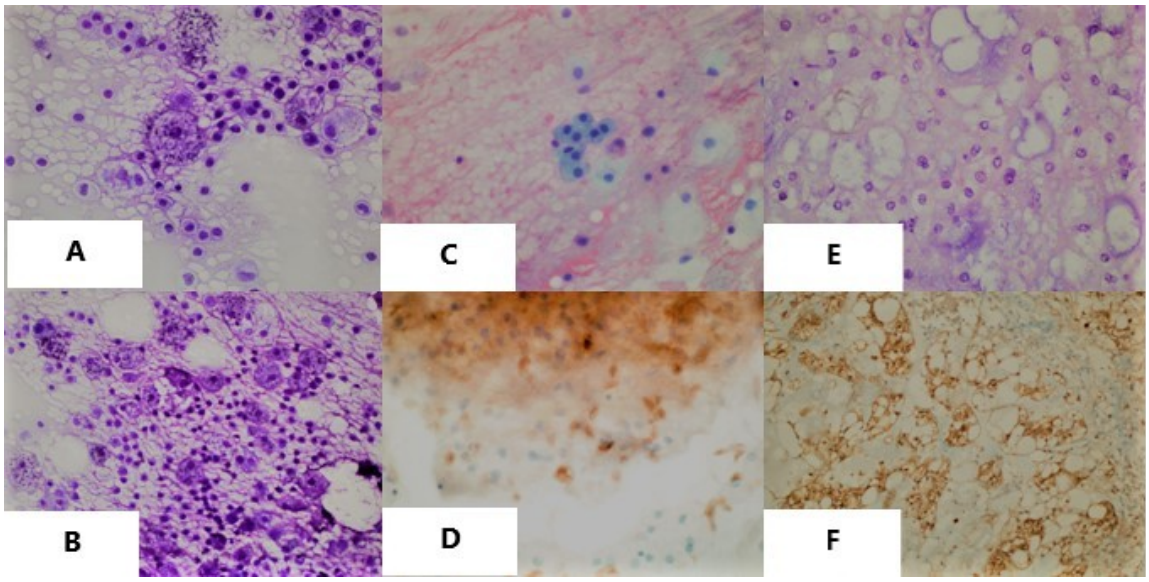

Figure 1. Main microscopic features of chordom

A, B – intraoperative touch-imprint shows large cells with central nuclei, high nuclear/cytoplasmic ratio and a myxoid matrix (toluidine blue staining, 40x and 20x); C – intraoperative touch-imprint shows epithelial-like cell types arranged in cords and clusters (PAP staining, 20x); D – Brachyury immunohistochemical positive staining on cytology (20x); E – histology confimed epithelioid cells with central nucleus, granular cytoplasm, physalliferous cells and myxoid matrix (H&E, 40 x); F - Brachyury immunohistochemical staining on histology (10x)