

Spindle cell neoplasms of the head and neck

Tim Helliwell

University of Liverpool and the Royal Liverpool University Hospital

Spindle cell morphology is typical of mesenchymal cells but is also seen in epithelial neoplasms as a consequence of epithelial mesenchymal transition (EMT). EMT is a key mechanism in embryogenesis and is important in the development of an invasive, metastatic phenotype in epithelial malignancies, with the converse mesenchymal-epithelial transition (MET) allowing the formation of metastases (Baum 2008). This talk will review spindle cell malignancies of mucosal origin, particularly spindle cell carcinoma, in which EMT is implicated, as well as selected soft tissue neoplasms (not arising in skin) that have a predilection for the head and neck region, particularly those in which 'epithelial' markers may be expressed.

Spindle cell carcinoma is a biphasic tumour composed of in situ and/or invasive squamous cell carcinoma and a malignant spindle cell component that is thought to be of epithelial origin. The oral cavity and larynx are the main mucosal sites of origin in the upper aerodigestive tract, where the tumour usually presents as an ulcerated polypoid mass. Microscopically the spindle cell component usually predominates and resembles undifferentiated pleomorphic sarcoma, although heterologous elements may be present. The carcinomatous element may be difficult to identify morphologically, particularly if there is extensive ulceration. Immunocytochemistry may reveal cytokeratin expression but, if EMT is complete, the spindle cells lose expression of cytokeratins and E-cadherin and express vimentin and smooth muscle actin. Primary spindle cell sarcomas of mucosal origin are extremely rare and most spindle cell mucosal malignancies behave as spindle cell carcinoma (Stelow 2005), with a tendency for nodal metastasis similar to that of conventional squamous cell carcinomas. The differential diagnosis includes mucosal melanoma, sarcomas and reactive spindle cell proliferations such as intubation granulomas and nodular fasciitis. Mucosal melanomas occur in the oral and nasal cavities and often have epithelial and spindle cell morphology and lack pigmentation. The presence of an in situ component and/or appropriate immunocytochemistry facilitates diagnosis. Mucosal melanomas have a poor prognosis with local recurrence and distant metastasis. Sarcomas, particularly those occurring in the context of previous radiotherapy, can be difficult to distinguish from spindle cell carcinoma microscopically.

A wide range of soft tissue neoplasms may arise in the head and neck region (Fletcher 2002) and many have a characteristic morphology so that diagnosis is not usually a problem. Nodular fasciitis is relatively common in the head and neck area and characterised by a mitotically active fibroblastic proliferation with oedematous stroma. Myofibroma and myofibromatosis are generally non-aggressive lesions of adults and children but can occasionally cause problems through involvement of important structures in the head and neck. The immunocytochemical expression of epithelial markers including cytokeratins and epithelial membrane antigen in soft tissue neoplasms may occur predictably, for example, in synovial sarcoma, myoepithelial neoplasms and ectopic thymoma. Aberrant expression is well recognised in smooth and skeletal muscle neoplasms and in angiosarcomas and should not detract from the appropriate morphological diagnosis.

References

Baum B, Settleman J, Qunilan MP. Transitions between epithelial and mesenchymal states in development and disease. *Semin Cell Dev Biol* 2008, 19, 294-308.

Fletcher CDM. Distinctive soft tissue neoplasms of the head and neck. *Modern Pathology* 2002, 15, 324-330.

Prasad KRS, Jones, AS, Birchall M, Krajacevic J, Helliwell TR. Immunocytochemical analysis of malignant melanoma of the nasal cavity and sinuses using tissue microarray. *Histopathology* 2007; 50, 516-519.

Stelow EB, Mills SE. Squamous cell carcinoma variants of the upper aero-digestive tract. *Am J Clin Pathol* 2005, 124 (suppl. 1), S96-109.