

**CANINE SOFT TISSUE SARCOMAS (STSS): MULTIMODAL IMAGING APPROACH**

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Soft tissue sarcomas (STSS) are common in dogs accounting for up to 15% of all cutaneous/subcutaneous tumours. They represent a true diagnostic challenge for both clinicians and pathologists and a multidisciplinary approach is needed for successful management[1,2]. Radiographs represent the first step: they could reveal soft tissue mineralization, bone erosion, cortical destruction or periosteal reaction. Ultrasonography (US) can be used in the early evaluation of soft tissue lesions, providing information about size, location and consistency (cystic vs solid lesion). B-mode ultrasound has been rarely reported in literature in the study of cutaneous/subcutaneous tumours, due to its low soft tissue detail and margins identification. However, the integrative analysis of these tumours with contrast enhanced ultrasound (CEUS) was recently reported to complete clinical examinations in humans [3]. No specific literature is available about subcutaneous sarcomas, but CEUS and US could be considered as early staging steps to detect neoplastic recurrence or early tumour infiltration. Computed Tomography better assesses skeletal involvement than MRI, showing subtle periosteal reaction, osseous remodelling or cortical destruction. Administration of contrast media allows to evaluate different enhancement patterns, according to tumour perfusion and permeability. CT is also preferred to identify small pulmonary metastases, since non-gated MRI is subjective to cardiac and respiratory motion. US and CT are also important interventional techniques for biopsy procedures. MRI could provide better information in the evaluation of STSS. High field MRI, although more subjective to artefacts, can provide high quality images, allowing accurate evaluation of tumour location and relationship with surrounding tissues. This technique is in fact reported to be excellent in diagnosis and pre-surgical staging of human STSS. STSS usually appear moderately heterogeneous with variable T1 and T2 signal intensities. As for CT, STSS signal intensity features are not specific and grading is only possible through histopathology. Contrast media administration increases MRI potential, providing information about capillary permeability and composition of the interstitial space. MRI spectroscopy could also give information about cellular chemistry, but it's not routinely employed in Veterinary Medicine[4]. Nuclear Medicine can be employed to detect distant metastases and sentinel lymph node involvement, depending on the type of tumour. The use of SPECT or PET techniques with CT fusion can also enhance the anatomic detail. In humans, metabolic imaging with Nuclear Medicine is very helpful in the evaluation of STSS [5]. Unfortunately, such equipment is not routinely available for veterinary patients.

[1] Dennis MM et al. Prognostic factors for cutaneous and subcutaneous soft tissue sarcomas in dogs. *Vet Pathol* 48(1):73-84, 2011. [2] Hohenhaus et al. Canine cutaneous and subcutaneous soft tissue sarcoma: an evidence-based review of case management. *JAAHA*, 52(2):77-89, 2016. [3] Crisan D et al. Integrative analysis of cutaneous skin tumours using ultrasonographic criteria. Preliminary results. *Med Ultrason*. 16(4): 285-90, 2014. [4] Aga P et al. Imaging spectrum in soft tissue sarcoma. *Indian J Surg Oncol*. 2(4):271-279, 2011. [5] Rodney JH. Functional imaging techniques for evaluation of sarcomas. *Cancer Imaging* 5(1):58-65, 2005