

IMAGING OPTIONS FOR FELINE INJECTION-SITE SARCOMA (ISS)

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Diagnostic imaging techniques are commonly applied for staging and surgical planning of injection-site sarcoma (ISS) in cats. Radiology has low sensitivity in assessing tumour margins and its relationship with the surrounding tissues. Soft tissues mineralization can be occasionally detected on radiographs, while skeletal involvement is rarely observed. Ultrasound (US) is employed for determination of tumour components (solid vs liquid) and margins, for biopsy guidance and assessment of local lymph nodes. Computed Tomography (CT) and Magnetic Resonance Imaging (MRI) are gold standard modalities, allowing accurate assessment of tumour extension, musculoskeletal infiltration and metastatic spread. Feline ISS distant metastatic rate is about 10-25%, with thorax, subcutaneous tissues, regional lymph nodes and liver being most frequently involved; local metastatic rate ranges between 14-50% of cases [1]. Pre- and post-contrastographic whole body CT examination is recommended. The patient is positioned in sternal recumbence, with fore limbs extended cranially and the hind limb extended caudally. If the tumour is interscapular, a further post-contrast examination with the fore limbs flexed caudally along the thorax is recommended (“double positioning”). This approach can enhance the relationship between the mass and the surrounding tissues, potentially improving the pre-surgical evaluation of the tumour [2,3]. When CT or MRI exams cannot be performed, staging consists of 3 radiographic projections of the thorax and a full abdominal US. CT, MRI and US features overlap: neoplasms are usually round to irregular in shape, with ill-defined margins, cavitory components and large necrotic centres. Long and thin digitations with associated angiogenesis may be detected and they represent potential soft tissues infiltration. Contrast enhancement is moderate to strong, mostly late and peripheral (ring effect) [2,4,5]. CT and MRI also allow to easily measure tumour volume, usually mildly overestimating it [1]. They should therefore be preferred to detect visceral spread and superficial “skip” metastases, which are subcutaneous nodules not detectable through palpation. Nuclear Medicine techniques complete tumour staging. A nanocolloid-coupled radiopharmaceutical is injected in the subcutaneous tissues around the tumour and absorbed by the lymphatic vessels, accumulating in the sentinel lymph node. Radiopharmaceutical distribution is initially traced by a gamma camera; a specific probe is then employed to exactly identify the sentinel lymph node, which will be excised together with the tumour [6].

[1] Ladlow J. Injection site-associated sarcoma in the cat. Treatment recommendations and results to date. *J Feline Med Surg.* 15(5):409-18, 2013. [2] Travetti et al. Computed tomography characteristics of fibrosarcoma – a histological subtype of feline injection site sarcoma. *J Feline Med Surg.* 15(6):488-93, 2013. [3] Longo et al. Advances in the anatomic study of the interscapular region of the cat. *BMC Vet Res.* 5(11): 249, 2015. [4] Rousset N et al. Clinical and low-field MRI characteristics of injection site sarcoma in 19 cats. *Vet Radiol Ultrasound.* 54(6):623-29, 2013. [5] Zardo KM et al. Recurrent and non-recurrent feline injection-site sarcoma: computed tomographic and ultrasonographic findings. *J Feline Med Surg.* 18(10):773-82, 2016. [6] Tsugawa K et al. Dye- and gamma probe-guided sentinel lymph node biopsy in breast cancer patients: using patent blue dye and technetium-99m labeled human serum albumin. *Breast Cancer,* 7(1):87-94, 2000.