**Injection Site Sarcoma**  
*Extended version*

**Classic case:** 8 year old **adult cat** with a growing **skin mass between the shoulder blades**

**Presentation:**
Adult cat (7-9 yrs) with a growing skin mass, very rare in dogs
- Firm nodular
- Non-painful
- May be hairless or ulcerated
- Located at a previous vaccination site
  - Interscapular
  - Lateral thorax
  - Dorsal lumbar
  - Flank
  - Limb
- Usually due to **INACTIVATED (killed) VACCINE adjuvant**
  - Aluminum hydroxide implicated, but not proven
  - Rabies, FeLV
- Other injections
  - Antibiotics, lufenuron, FVRCP, SQ fluids, etc
  - **Multiple injections** in one site= **risk factor**

**DDX:**
- Inflammatory vaccine reaction, granuloma, other neoplasia, abscess

**Test of choice:**
- **Incisional biopsy** (not excisional) in area to be excised with tumor
  - 1-2-3 rule to biopsy
    - Increase in lump size over 1 month
    - $\geq$ 2 cm diameter
    - Persists $> 3$ months

Thoracic radiographs – check for metastases

**CT or MRI** – determine extent of tumor to help with complete excision

**Rx of choice:**
- **Consultation** with **board-certified** veterinary oncologist and surgeon **highly recommended**

**First treatment has greatest chance of successful outcome** with aggressive surgery and complete margins
Rx of choice: (continued)

Aggressive surgical excision

- Distal limb or tail tumors
  - High success rate w/ amputation alone
- Other locations
  - Deep wide margins into normal tissue
  - Orient and ID tissue margins to evaluate complete removal in all planes

1. Radiation Rx:

- Treats microscopic tumor extensions (*fingers*) in normal tissues
- Decreases chance of recurrence
- Increases survival time

Complications:

- **Minimal side effects**, Signs depend on location (critical structures: spinal cord, kidneys, lungs) and radiation dose
- May confound histopath evaluation of tumor margins
- Increased post-op healing time

-AND-

2. Aggressive surgical excision with deep, wide margins into normal tissue

- Submit tumor for histopath:
- Orient & ID tissue margins to evaluate complete removal in all tissue planes

3. +/- Chemotherapy: (*Studies have NOT shown conclusive benefit if surgery + radiation are adequate, but many specialists recommend chemotherapy*)

Long term Monitoring

- Routine checkups / thoracic radiographs
- Monitor for recurrence / metastasis
- Treat side effects

Prognosis:

**Better long term prognosis if 1st surgical excision of tumor is done by a specialist** than if 1st surgical removal done by a general practice vet.

- Probably because more aggressive surgery can be done at a referral institution
- **AVOID multiple surgeries**
  - Recurrence in ½ time (sooner) after each Sx
  - Requires wider area excision; Becomes more difficult to Rx
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**Prognosis: (continued)**

Prognosis depends on stage and tumor location

- **Excellent prognosis if**
  - Tumor excised with wide margin of normal tissue
  - Big, but resectable tumor with aggressive surgery and radiation

- **Poor prognosis regardless of treatment if**
  - Large non-resectable tumor
  - Metastases

**Prevention:**

- Vaccinate at locations that allow aggressive surgical removal *(distal limbs)*
- Don’t over-vaccinate
- **Use non-adjuvanted** products
- **Avoid multidose vials** and polyvalent vaccines
- Always **record injection sites** on medical record
- **Monitor** injection sites
- Discuss risks of vaccination with owner

**Pearls:**

- Occurrence: **1 to 10 cases per 10,000 cats**
  - Fibrosarcoma most common type diagnosed
  - Locally aggressive, invasive, high recurrence
  - Low metastasis (10-25% lungs, liver, mediastinum, abdominal organs)

- Treat tumors aggressively when small
- **Report** injection site sarcomas

**Refs:** Cote, Clin Vet Advisor, Dog and Cat. 2nd ed. pp 610-12, Merck Manual, 10th ed (online): Soft tissue sarcomas, Vaccine-associated feline sarcomas, Morrison, Starr and the Vaccine-Associated Feline Sarcoma Task Force, JAVMA, Vol 218, No. 5, March 1, 2001, Cat photos courtesy, Wikimedia Commons