

# Feline Injection Site Sarcomas

*A PowerPage Presented By*



Injection site sarcomas (ISS, often referred to as vaccine-associated sarcomas) are **locally aggressive** tumors induced by injections. They occur in approximately **1 out of 10,000 vaccine** injections. Although they do not occur with high frequency, it will be important for all practitioners who administer injections to cats to know how to prevent and manage this iatrogenic disease.

## Key Points

- Biologic behavior
  - Extremely **locally invasive** with tendrils or “fingerlike projections”
  - Metastatic rate of 20-25%
- Occurs in **1 out of 10,000 vaccine** injections
- Refer to a board certified surgeon for longer disease free intervals prior to recurrence
- Vaccinate as distally as possible on a limb to facilitate local treatment by amputation if ISS develops

## Etiology

- Believed to be caused by inflammation associated with injections, particularly with the **adjuvant** in vaccines
  - **Rabies and FeLV vaccines** historically have been most commonly implicated
  - Other injections such as the upper respiratory and panleukopenia vaccine (FVRCP+/-C), lufenuron, penicillin, microchips, etc have also been implicated

## Diagnostics

### Fine needle aspirate cytology

- Often not definitive

### Biopsy

- More accurate than FNA
- Compared to naturally occurring sarcomas, ISS histology has more **necrosis, inflammation** with lymphocytes and macrophages, and more **mitotic figures**
- Occasionally may see macrophages containing vaccine adjuvant
- **1, 2, 3 rule:** biopsy is indicated if a vaccination site lump fits any of these criteria:
  - Continues to grow after **1 month** post vaccination
  - Larger than **2 cm**
  - Still present after **3 months**

### Thoracic radiographs

- To assess for pulmonary metastasis

### CT or MRI

- To assess invasiveness for surgical planning
- External tumor is considered “tip of the iceberg” and is often several times larger than what is visible externally

## Treatment and Prognosis

### Surgery

- Radical excision with 3-5 cm lateral margins and 2 fascial planes deep is recommended
- Amputation if on a limb
- Often requires body wall resection with reconstruction or hemipelvectomy for proximal pelvic limb tumors
- Dorsal spinous process removal and partial scapulectomies often required for interscapular tumors
- Time to tumor recurrence
  - About 2 months with conservative surgeries
  - About 9 months with radical surgeries performed by referral surgeons
  - About 16 months if surgical margins are “clean” or complete on histopathology

### Radiation therapy

- Adjuvant treatment to surgery to prolong recurrence if margins are narrow or incomplete on histopathology
- Can be performed before or after surgery

### Chemotherapy

- Adriamycin (doxorubicin) chemotherapy has up to a 50% response rate in cats with macroscopic ISS in small studies
  - Response is usually not durable so it is unclear if it prolongs survival times in cats with gross disease
  - May be more helpful in treating cats believed to have microscopic metastatic disease or cats with incomplete surgical excision when radiation therapy is not an option

## Prevention

- Only vaccinate for diseases that the cat may be exposed to, or if required by law
- Vaccinate as distally as possible on limbs so they can potentially be cured of their local disease with amputation alone if ISS develops
- Standardize and record sites of injections
  - Any vaccine containing rabies antigen in the right pelvic limb
  - Any vaccine containing FeLV antigen in the left pelvic limb
  - Feline rhinotracheitis and panleukopenia vaccines (FVRCP) in the right shoulder
  - Give all vaccines as distally in the limb as possible

## References and links

<http://www.avma.org/vafstf/vafstf01.asp>

Withrow, S., *Withrow & MacEwen's Small Animal Clinical Oncology* 4th ed. 2007, pp 442-449.

