SURGERY ALONE OR SURGERY AND POST OPERATIVE RADIATION FOR THE TREATMENT OF FISS

Sarah Boston, DVM, DVSc, Dipl ACVS, ACVS Founding Fellow of Surgical Oncology
VCA Canada, 404 Veterinary Emergency and Referral, Newmarket, ON, Canada

Feline Injection Site Sarcoma (FISS) is a highly aggressive variant of sarcoma that arises at sites of chronic inflammation. Commonly this is secondary to vaccines with adjuvant, but not always. The incidence of the development of FISS after vaccination is 1 in 1000 to 1 in 10,000. There is some evidence that there may a genetic predisposition to developing these tumours. It involves the transformation of cells involved with the inflammatory process into malignant fibrosarcoma. The veterinary literature on the treatment of FISS indicates that this tumour has a high recurrence rate with marginal excision or even with standard wide excision with 3cm margins and a fascial plane deep.

This tumour type should be diagnosed via incisional biopsy. Cytology can be deceptive and be more indicative of inflammation than of neoplasia. Excision biopsy may result in the disruption of fascial planes and a more difficult and less successful excision and should be avoided. Once a diagnosis of FISS has been made, staging should be performed. Local staging with MRI or CT should be performed. MRI will give a more accurate reflection of the tumour. However, practically, CT is more often used because it allows for thoracic staging and radiation planning, if indicated.

Current recommendations for are 5cm margins with 2 fascial planes deep. This is more aggressive than the strategy for sarcoma resection in dogs and humans. This technique has resulted in tumour control in 86% of the cases in one study in the absence of radiation, which is much higher than previously reported. Unfortunately, the location and size of the tumour will limit this technique to relatively small tumours at sites that are amenable to 5cm margins. The common sites of FISS have shifted over the years from the intrascapular region to the hip area. This is because of recommendations for vaccine sites in cats. Unfortunately, the recommendations and feline vaccinations practices have not gone far enough to help make this disease more amenable to surgery. If a vaccine is administered above the stifle, it is often near the hip and flank area and resection will result in remove of the hemipelvis, limb and lateral abdominal wall if 5cm margins are taken. If vaccination is performed below the stifle or elbow and the mass is worked up by incisional biopsy expediently, it is feasible that a limb amputation would provide adequate margins and local control. Educating veterinary students and general practitioners on appropriate vaccination protocols and sites and work up of these cases is likely to have much more impact on the disease than any advances in surgical or radiation techniques. I would elated if I never treated another case of FISS again because it could be managed with limb amputation alone. #LifeGoals #NoCatLeftBehind

For cases where 5cm radial margins and 2 fascial planes deep is no feasible, surgery and radiation can be used in combination to achieve local control of tumor. Radiation alone is unlikely to obtain complete tumor control in most cases. This is because tumor control by radiation is proportional to the volume of the tumor. Cytoreductive surgery prior to radiation is the most classical application of these treatment modalities together. In general this still will involve 2-3cm margins and one fascial plane. The limb should be salvaged if possible as this is a

major advantage of combining modalities. The anticipation is that microscopic disease will be left behind and that the tumour will recur without post operative radiation. The surgeon should attempt to create simple incisions with straight or curved lines. Multiple angles and flaps should be avoided.

When approaching these cases, it is important that the surgeon and radiation oncologist have made a comprehensive plan for the patient prior to the initiation of surgery, radiation or chemotherapy. If the plan is a marginal excision followed by radiation therapy, the goal should not be to take as much as possible or to see if margins could be achieved, as this will inevitably result in a larger incision, more potential for wound healing complications and a larger radiation field, which will increase the morbidity to the patient. The goal of this excision should be to remove all macroscopic disease and to close the wound in a tension-free, compact, flat scar with a simple linear closure. Tissues lateral and deep to the mass should be disrupted as little as possible. In general, drains are avoided with type of surgery. However, a drain is preferable to seroma formation, as this can cause the complications of delaying the onset of radiation and the radiation field necessary is larger and hard to define because of the high potential for tumor cells to move to the periphery of a seroma after marginal excision. If a drain is used, a closed suction drain is ideal. The drain should exit adjacent to the incision so that it is included in the radiation field. Penrose drains should be avoided because in order to function, they must exit ventrally and this can lead to the driving viable tumor cells along the drain tract and it may be difficult to locate this drain tract and include it into the radiation field. It is also useful to mark the surgical site with metal hemostatic clips to assist the radiation oncologist in planning. From the exterior, the scar appears to be the central part of the affected wound bed. However, it may be that the deep surgical site is not located directly central to the scar once the wound has been closed and has healed. Failure to mark the tumour bed may result in a geographic miss with radiation.

The advantages of post operative irradiation are:

1. There is no delay in surgery. This will be appreciated by many owners who will feel that they are making more progress if the mass is no longer present.
2. Wound healing is not impaired
3. Decrease in tumor burden for radiation therapy

The disadvantages of postoperative irradiation:

1. All tissues handled at the time of surgery must be irradiated
2. At least a theoretical risk that handling tumor cells at the time of surgery could increase the risk of metastatic disease. This has not been proven either way in veterinary studies
3. Damage to vasculature at the time of surgery may result in increased radioresistance of residual tumor
4. If there are complications with wound healing, this may result in treatment delay

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