How to Treat Equine Sarcoids by Autologous Implantation

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1. Introduction

Sarcoid skin tumors are the most common nodular skin tumors in the horse. They are typically non-metastatic but can be locally aggressive and ulcerated. They may account for up to 90% of equine dermatological neoplasms.1–3 Approximately 40% of affected horses have more than one lesion and up to 50% of horses may have recurring lesions after surgical excision.1–3

Two of six subtypes of bovine papillomavirus (BPV) have been associated with the advent of sarcoid disease in the equine species. PCR techniques have found BPV genetic sequencing from both DNA and RNA in equine sarcoid tumors.1 Because of this bovine viral etiology, it is of no surprise to find that sarcoid syndrome is more prevalent in horses that work with or around the bovine species.

Because of the wide prevalence of sarcoid disease (especially in working cow horses), the viral etiology, the subsequent possibility of insect vector enhancement, the difficulty in surgical excision, the inconvenient location of many of the lesions (underneath areas of tack application that may impede surgical healing), and the unsatisfactory response to medical treatment, the administration of an autologous implantation technique is advocated in this paper.

2. Materials and Methods

It is always recommended to obtain a representative sample for histopathological submission before making any treatment decisions. Squamous cell carcinoma (SCC) may mimic sarcoid development, especially around the genitalia of the male and the face of a light-skinned horse. A hypothesis for this sarcoid development is the theory of the insect vector in the distribution of BPV.

It is recommended that large and deep (6–8 mm) biopsies be obtained, because the surface of an ulcerated sarcoid may be read as granulation tissue by the pathologist.1

Equine sarcoids rarely regress spontaneously, and numerous therapies have been described. Surgical excision, cryosurgery, CO2 LASER, hyperthermia, radiotherapy, chemotherapy, and immunotherapy have all been attempted with varying degrees of success.

Although complete surgical excision may be curative, this paper describes a unique therapy applicable to sarcoids that are not amenable to surgical excision because of size, inconvenient location for practitioner to access safely without using general anesthesia on the horse, or application of tack such as bridles, saddles, or cinch straps that may influence surgical healing time.
After a sarcoid has been identified and the pathologist has determined that the lesion is indeed a sarcoid, the therapy described in this paper may be attempted.

The horse is sedated with commonly used IV medications such as xylazine, detomidine, butorphanol, or any combination of the three (Fig. 1). If the horse is fractious or unamenable to sample manipulation, local anesthesia (lidocaine or mepivacaine) can be infiltrated at the base of the sarcoid lesion.

Without surgical preparation, the sarcoid can be manually debulked or a large section can be cut from the sarcoid tumor (Fig. 2). This may vary from 1 to 2 cm in width and depth.

After debulking or surgical excision of a sample of the large sarcoid, the sample is cut into sections that closely resemble cubes of tissue measuring 0.5 × 0.5 cm (Fig. 3). The author prefers to obtain at least 12–16 cubes of sarcoid tissue for the ensuing surgical procedure.

An available liquid nitrogen tank for semen storage and the canisters for semen-straw plunging may be used, or alternatively, a Styrofoam beverage cooler with a small amount of liquid nitrogen may be used. If the second method is used, the practitioner needs to have enough liquid nitrogen lining the bot-
tom of the container to completely submerge the sarcoid cubes wrapped in gauze (Fig. 4).

The sarcoid cubes are cut on a clean but not necessarily sterile drape. They are wrapped in a 4 × 4 cm cotton gauze and submerged in liquid nitrogen while the patient is surgically prepared.

Under the mane and just ventral to the nuchal ligament, four squares, equidistant along the length of the neck, are shaved in a 4 × 4-cm fashion with a No. 40 clipper blade (Fig. 5). It is advisable to braid the hair and tape the mane out of the way with white bandage tape to make the surgical site more easily accessible. These squares are surgically prepared with chlorhexadine or povidone-iodine surgical scrub. After surgical prep, a bleb of mepivacaine or lidocaine is infiltrated subcutaneously in the center of each of the four squares.

A surgical pack is opened, and a No. 10 surgical blade should be available as well as suture of choice, usually 2–0 Caprolactam, Polyglycolic acid, Polyglactin 910, or Polydioxane. The surgeon dons surgical gloves and proceeds to cut, using the surgical blade, a stab incision in each of the four squares over the blebs of local anesthesia. The stab incisions should be deep enough to penetrate the dermis; a small hemostat is inserted closed and then opened after insertion (Fig. 6). The subcutaneous space should be enlarged to make a space large enough to place 3–4 cubes of the frozen sarcoid waiting in the liquid nitrogen.

An assistant should retrieve the gauze-wrapped sarcoid cubes from the liquid nitrogen (Fig. 7). The surgeon can then handle the frozen gauze over the surgical pack. After 3–5 min, the gauze will have thawed enough to unwrap the 12–16 frozen sarcoid cubes (Fig. 8). Three to four sarcoid cubes are inserted into the subcutaneous space in each of the four squares that have been prepped, blocked, and opened with stab incisions (Fig. 9). After insertion of the multiple cubes has been completed, one cruciate suture is placed in the stab incision (Fig. 10). This should be repeated until all four surgical sites have been implanted with the frozen sarcoid cubes (Fig. 11).

The mane is untaped, and the horse should be verified to be current on tetanus toxoid immunization. No prophylactic antibiotic, anti-inflammatory, or pain-control medication is necessary (Figs. 12–13).

3. Results
In this author’s experience, regression of the sarcoid tumor is occasionally seen in 90–120 days but may take as long as 180 days. The number of horses treated in this manner has been a relatively small sample size (15), but except for a small proportion (3), all have responded with complete tumor regression.

The horse that has been followed the longest in follow-up care has been sarcoid-free for 5 yr.

Perhaps on exposure to a new subtype of BPV, sarcoid tumor growth would again occur, but because of the low cost associated with this procedure,
a follow-up surgery would be indicated. There is no contraindication known to reimmunizing the patient with the frozen sarcoid implants.

4. Discussion
In the past, surgical excision has been used with mixed results. Up to 64% of sarcoid tumors recur within 6 mo. Typical safe margins to adhere to using the surgical technique are 0.5–1 cm. The current belief among veterinary dermatologists is that margins from 3 to 10 cm may be necessary to prevent recurrence.4 Given the location of many sarcoids, having enough excess skin to close a surgical defect of this size is unlikely at best. Depending on location, excessive granulation tissue can become a problem, and lost training time may also influence treatment decision, because many sarcoids appear underneath areas where tack may be worn by a horse.

Cryotherapy is used with varying results. It requires multiple freeze-thaw cycles and almost always results in edema and hyperemia of underlying tissue. Unsightly white hair growth is undesirable sequela to cryotherapy surgical techniques.

CO₂ LASER is effective and has thermal effects that may be beneficial by extending surgical margins; however, it has an economic drawback, because few equine medical centers possess a LASER device.

Intralesional chemotherapeutic agents have the recognized drawback of safety precautions for the practitioner, staff, and owner and the potential for
carcinogenicity and teratogenicity when handling these agents. There has been success identified with injecting sarcoid lesions with cisplatin followed by electropulsation to improve diffusion of the chemotherapeutic agent throughout the tumor.\(^1\) In a study by Yu,\(^1\) tumor regression occurred after 2–3 electrochemotherapy regimens in 100% of patients, and no regrowth was observed in an 18-mo follow-up period.

Topical cytotoxic approaches have been described and seem to be safe on normal skin. The affected area can be bandaged if the region of the body allows, or cytotoxic can be topically applied as per labeled directions without a bandage. The theory on this ointment is that it stimulates an immune response and allows the immune system to recognize the tumor as foreign.

Immunomodulatory treatments have received some popular support and may include BCG, \(\text{Propionibacterium acnes}\) injected IV or intralesionally, or Imiquimod.\(^4\) Autogenous vaccine has been described and used,\(^5\) but it has the side effect of exposing the patient to a variety of blood-borne diseases including equine infectious anemia (EIA). This is reported to have caused complete tumor regression in 9 horses, but it should only be attempted in the most refractory of cases and from known EIA-negative sources.\(^1\)

This paper describes a technique that uses many known etiologies and therapies to the practitioner’s advantage. The author accepts the demonstrated BPV etiology using the basic surgical premise of the inability to excise a lesion without adequate redundant skin to close the surgical defect as well as the applicability of hypersensitizing the individual’s immune system to recognize a lesion as foreign. The technique described in this paper has no known side effects other than those associated with minor surgery performed on an equine patient in any capacity, and it has the advantages of being able to be performed using common supplies available in most equine practices.

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References and Footnotes


References:

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