Equine Sarcoidosis:
Review of Current Knowledge and Treatment Options

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Overview

- Introduction
- Types of sarcoid
- Cause of sarcoid
- Treatment options

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The Basics

- Most common skin tumor
- Multiple lesions
- Often persistent and resistant to therapy
- Commonly recur
- Not fatal
- Lead to loss of use

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Signalment

- Occurs world-wide
- Reported in horses, donkeys, mules, and zebras
- All ages, breeds and colors

TREATMENT OF EQUINE SARCOID IN SEVEN CAPE MOUNTAIN ZEBRA (*EQUUS ZEBRA ZEBRA*)

Hendrik J. Marais[1,2] and Patrick C. Page[1]
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[2] Corresponding author (email: johan.marais@up.ac.za)

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Types of Sarcoid

- Occult
- Verrucous
- Nodular
- Fibroblastic
- Malevolent
- Mixed

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Occult Sarcoid

- Mild superficial form
- Mostly around the mouth and eyes, the neck, and other relatively hairless regions
- Generally slow growing
- Can turn into verrucous or fibroblastic-type sarcoid

https://equinesarcoid.co.uk/types

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Verrucous Sarcoid

- Rough hyperkeratotic appearance
- Flaking and scaling
- Often on face, trunk, and groin/sheath areas
- Generally slow growing until injured
- Can turn into fibroblastic-type sarcoid

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Nodular Sarcoid

- Well-defined subcutaneous spherical nodules
- Two types
  - Type A – entirely subcutaneous
  - Type B – involvement of overlying skin
- Often on groin, sheath, and eyelid
- Generally moderate growth
- Injury can lead to rapid growth and transformation to fibroblastic-type sarcoid

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Fibroblastic Sarcoid

- Fleshy, ulcerated, aggressive appearance
- Two types
  - Type 1 – pediculated with limited base palpable
  - Type 2 – broader-based (sessile) without recognizable pedicle
- Often on groin, eyelid, lower limb, and coronary band
- Do no metastasize but locally invasive

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Malevolent Sarcoid

- Most severe form
- Infiltration of lymphatic vessels
- Cords of tumor
- Highly invasive and destructive
- Often on jaw, face, elbow, and medial thighs

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Mixed Sarcoid

- Mixture of any or all types
- Likely represents progressive or transient state between types

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Sarcoid Histology

TABLE 1: Epidermal and dermal changes in 10 sarcoids from each clinical type. The epidermis was absent in one fibroblastic and one nodular sarcoid

Epidermis (48)	Occult	Verrucous	Fibroblastic	Nodular	Mixed	Total (per cent)
Hyperkeratosis – mild	5	–	7	3	3	
– moderate/pronounced	–	10	1	2	7	38 (79)
Epidermal thinning	1	4	–	5	3	13 (27)
Hyperplasia – mild	2	5	3	2	5	
– moderate/pronounced	–	1	6	–	2	26 (54)
Rete pegs	–	9	2	2	9	22 (46)
'Picket fence' at junction (ep)dermis	–	8	4	3	8	23 (48)
Partial surface ulceration	–	2	10	–	4	16 (33)
Dermis (50)						
Increased density of dermal fibroblasts	10	10	10	10	10	50 (100)
Typical whorling fibroblast pattern	–	8	8	9	9	34 (68)
Cystic hair follicles	–	8	1	3	7	19 (38)

n, number of sarcoids where the respective changes were detected; –, no changes detected.

Martens et al. Histopathological characteristics of five clinical types of equine sarcoid(2000) *Res in Vet Sci*

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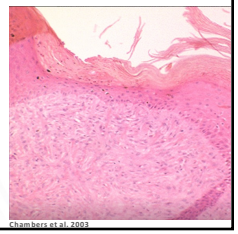
Verrucous Sarcoid

- Hyperkeratosis
- Rete pegging
- Fibroblastic whorls
- Ancanthosis
- Difficult to distinguish from dermal fibroma



Chambers et al. 2003

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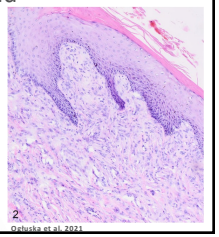
Fibroblastic Sarcoid

- Spindle-shaped neoplastic cells
- "Picket fence"
- Hyperplastic epidermis
- Rete peg-like structures
- Compact hyperkeratosis



Ogłuska et al. 2021

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Cause – Bovine papillomavirus?

Association of bovine papillomavirus with the equine sarcoid

G. Chambers,[1] V. A. Ellsmore,[2] P. M. O'Brien,[1] S. W. J. Reid,[2] S. Love,[2] M. S. Campo[1] and L. Nasir[2]

- Sarcoid associated with bovine papillomavirus types 1 and 2
- Most contain detectable viral DNA and RNA
- Express E5
- Do not produce infectious virions

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Treatment Options

So many options!!!
But which one works?

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Treatment - Benign neglect

Pro	Con
▪ Cheap ▪ Not generally fatal ▪ Do not usually metastasize	▪ Can be unsightly ▪ Limit use ▪ Secondary bacterial infections

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Treatment – Topical therapies

Topical treatment of equine sarcoids with imiquimod 5% cream or *Sanguinaria canadensis* and zinc chloride – an open prospective study

Carina M. Pettersson*, Hans Broström†, Patrice Humblot‡ and Kerstin E. Bergvall‡

- Immune-modifying/anti-viral
  - Imiquimod
- Chemotherapeutics
  - AW5, 5-Fluorouracil
- Bloodroot
  - Xxterra

Owner Compliance!!!

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Treatment – Intralesional chemotherapeutics

- Injectable chemotherapeutics
- Intralesional slow releasing chemotherapeutic beads.

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Treatment - Cryotherapy

- Aim to freeze tissue to -20C
- Use freeze cycles
- Can use spray canister or metal probe

The Treatment of Equine Sarcoids by Cryosurgery

J. G. LANE
Department of Veterinary Surgery, University of Bristol, Langford House, Langford, Bristol BS18 7DU

https://www.ironsgateequine.com/equine-cryosurgery

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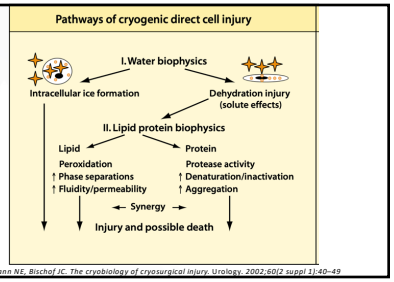

Hofmann NE, Bischof JC. The cryobiology of cryosurgical injury. Urology. 2002;60(2 suppl 1):40–49

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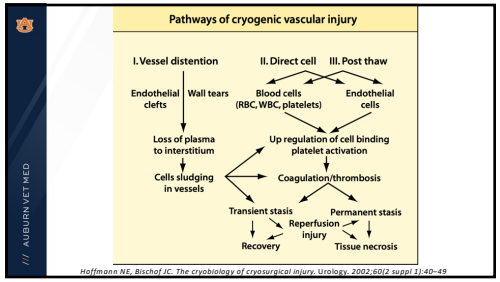
Pathways of cryogenic vascular injury
I. Vessel distention
II. Direct cell
III. Post thaw
Endothelial clefts
Wall tears
Blood cells (RBC, WBC, platelets)
Endothelial cells
Loss of plasma to interstitium
Up regulation of cell binding platelet activation
Cells sludging in vessels
Coagulation/thrombosis
Transient stasis
Reperfusion injury
Permanent stasis
Recovery
Tissue necrosis
Hoffmann NE, Bischof JC. The cryobiology of cryosurgical injury. Urology. 2002;60(2 suppl 1):40–49
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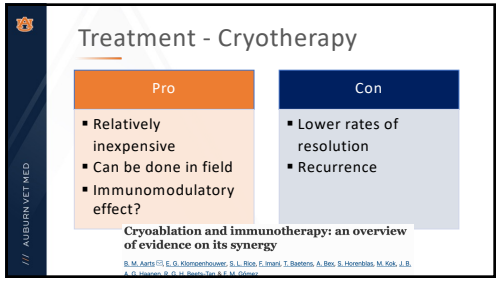
Treatment - Cryotherapy
Pro
Relatively inexpensive
Can be done in field
Immunomodulatory effect?
Con
Lower rates of resolution
Recurrence
Cryoablation and immunotherapy: an overview of evidence on its synergy
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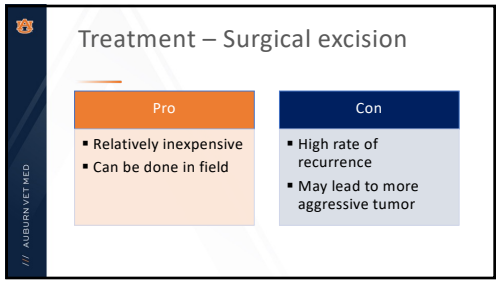
Treatment – Surgical excision
Pro
Relatively inexpensive
Can be done in field
Con
High rate of recurrence
May lead to more aggressive tumor
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Treatment – CO2 laser

Use of a carbon dioxide laser for surgical management of cutaneous masses in horses: 32 cases (1993–2000)

Charles T McCauley [1], Jan F Hawkins, Stephen B Adams, John F Fessler

- Local tissue ablation
- Minimize seeding possibilities
- Up to 80% resolution reported

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Treatment – CO2 laser

Pro	Con
▪ Standing sedation ▪ Improved margins to excision alone	▪ Less accessible ▪ Recurrence ▪ Cost

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Treatment – Photodynamic therapy

***In Vitro* and *In Vivo* Evaluation of Hypericin for Photodynamic Therapy of Equine Sarcoids**

A. MARTENS*, A. DE MOOR*, E. WAELKENS†, W. MERLEVEDE† and P. DE WITTE‡

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Treatment – Photodynamic therapy

Pro	Con
▪ Standing sedation ▪ Improved margins to excision alone	▪ Less accessible ▪ Repeated treatments ▪ Cost ▪ Recurrence unknown

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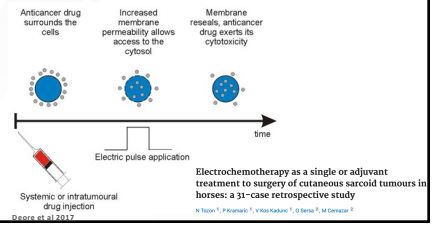
Treatment - Electrochemotherapy



Electrochemotherapy as a single or adjuvant treatment to surgery of cutaneous sarcoid tumours in horses: a 31-case retrospective study

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Treatment - Electrochemotherapy

Pro	Con
▪ Improved margins to excision alone ▪ Complete response in 92% of cases	▪ Less accessible ▪ General anesthesia ▪ Repeated treatments ▪ Cost

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Autologous/Autogenous vaccine

Autologous vaccination for the treatment of equine sarcoids: 18 cases (2009–2014)

Caitlin C. Rothacker, Ashley G. Boyle, David G. Levine

Remove a sarcoid and section → Freeze in liquid nitrogen → Re-implant frozen sections in neck

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Autologous/Autogenous vaccine

Pro	Con
▪ Standing sedation ▪ May prevent future sarcoids	▪ Rates of complete resolution not reported ▪ Surgical site complications

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Treatment - Radiation

- Noted particularly equine head and nasal tumors
- No data for rate of success
- Reported success of refractory cases
- Con – up to 10 sessions of general anesthesia, cost

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