Case 1: MONITORING AND EVOLUTION OF THE EFFECTS OF LASER APPLICATION ON OPEN TRAUMATIC INJURIES IN THE SKIN OF THE HORSE.

Author: Natalie Calle González
Institution: Center for Equine Sports Medicine, University of Cordoba. Spain. 2024

Summary

Post-surgical wounds in horses, especially after colic surgery, present a high risk of infection and drainage due to the size of the incision and abdominal mobility. This study evaluated the application of laser therapy (K-Laser) in the healing of these wounds. Four horses were treated: three with laser (every 3-4 days, during three sessions) and one with bandage only (control group). The treated horses showed better epithelialization and shorter incision length, without complications. The control horse did present infection and drainage. It is concluded that laser is an effective tool to improve surgical healing in horses.

Introduction

Equine abdominal syndrome (colic) frequently requires surgery, but up to 26.9% of cases present post-surgical complications such as infection and drainage. Although compressive bandages help, they are not always sufficient. The use of laser is proposed as an adjuvant therapy, thanks to its anti-inflammatory, antimicrobial and regenerative effects.

Target

To evaluate the efficacy of laser to improve healing and reduce complications in surgical wounds after colic surgery.

Case Presentation

Four horses with different diagnoses of colic were included:

- **Cases 1 and 2:** right dorsal displacement of the greater colon.
- **Case 3:** ventral and transverse colon impaction.
- **Case 4:** cecum impaction.

All of them underwent exploratory laparotomy. Postoperative laser therapy was applied in 3 of them, and one was a control group.

Treatment

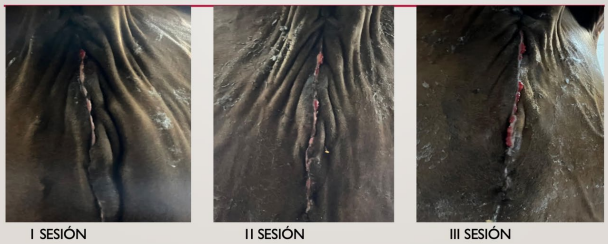
After surgery, the standard bandaging protocol was applied. In treated horses, laser was applied to the incision area in three sessions spaced 3-4 days apart. The protocol was adapted according to the type of coat and size of the incision.

Case	Incision size	Treatment applied	Fur	Applied energy
Case 1	20 cm	Laser-treated on both sides (2.5 cm each side)	Of course	4 J/cm².
Case 2	25 cm	Laser-treated on both sides (2.5 cm each side)	Dark (implicit)	5 J/cm² 5 J/cm²
Case 3	30 cm	Laser-treated on both sides (2.5 cm each side)	Dark (implicit)	4.2 J/cm².
Case 4	28 cm	Not treated with laser; only compressive bandage (control group)	Not specified	-

Results

Horses treated with laser showed a significant reduction in incision length (between 3 and 7 cm) and improved epithelialization, reaching levels 1 and 2 (75-100% coverage). They showed no drainage or signs of infection. In contrast, the horse in the control group showed only minimal improvement (1-2 cm) after three weeks, with obvious signs of complication: sero-bloody drainage, inflammation and thickening of the area.

CASO I



I SESIÓN II SESIÓN III SESIÓN

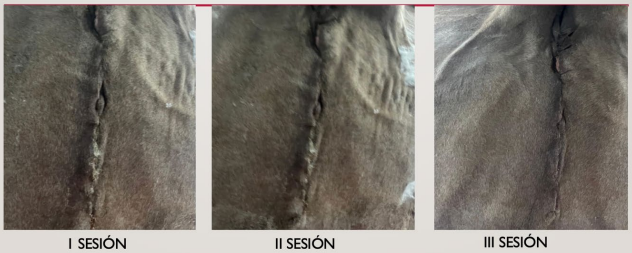
	SESIÓN I	SESIÓN II	SESIÓN III
LONGITUD DE LA LESIÓN	20 cm	18 cm	17 cm
CARACTERÍSTICAS	Inflamación en el lugar de la incisión con engrosamiento en la zona más craneal.	Reducción de inflamación y de engrosamiento de la incisión.	Cicatrización de la porción más craneal, aproximación de bordes y reducción de inflamación y engrosamiento del tejido.
EPITELIZACIÓN	3	3	2

CASO II

I SESIÓN II SESIÓN III SESIÓN

	SESIÓN I	SESIÓN II	SESIÓN III
LONGITUD DE LA LESIÓN	25 cm	22 cm	21 cm
CARACTERÍSTICAS	Inflamación en el lugar de la incisión con engrosamiento en la zona más craneal.	Reducción de inflamación y de engrosamiento de la incisión, con mayor aproximación de los bordes	Cicatrización de la porción craneal y caudal con reducción de inflamación y engrosamiento del tejido.
EPITELIZACIÓN	3	2	1

CASO III



I SESIÓN II SESIÓN III SESIÓN

	SESIÓN I	SESIÓN II	SESIÓN III
LONGITUD DE LA LESIÓN	30 cm	27cm	23 cm
CARACTERÍSTICAS	Inflamación en el lugar de la incisión con engrosamiento en la zona más craneal y caudal.	Reducción de inflamación y de engrosamiento de la incisión.	Aproximación de los bordes y cicatrización de la zona más craneal y caudal, notablemente visible con reducción de inflamación y engrosamiento del tejido.
EPITELIZACIÓN	3	2	1

CASO IV

- Control

I SEMANA II SEMANA III SEMANA

	CONTROL	CONTROL	CONTROL
LONGITUD DE LA LESIÓN	28 cm	27 cm	26 cm
CARACTERÍSTICAS	Inflamación en el lugar de la incisión con engrosamiento de la zona, y drenaje sero-sanguinolento en la porción más craneal de la incisión.	Engrosamiento de la incisión y drenaje sero-sanguinolento en la porción más craneal de la incisión.	Mayor cicatrización de la porción más craneal, y reducción de la infección y drenaje sero-sanguinolento a través de la incisión.
EPITELIZACIÓN	3	3	3

Discussion

The study demonstrated that the use of laser therapy favors the healing of surgical incisions in horses, reducing inflammation, complications and improving epithelialization. The absence of infection and drainage in the treated cases confirms the efficacy of laser as an adjuvant treatment. Although more cases are required to validate the results, this pilot study supports its clinical use. It also highlights the practicality of the laser in sterile environments and its antimicrobial action without direct contact with the skin.

Conclusion

The monitoring of surgical incisions in horses treated with laser therapy after colic surgery proved to be quite effective in reducing inflammation, thickening of the area, and reduction of the length of the area. In addition, the degree of epithelialization was improved from 3 to 2-1 in the treated horses, being more effective than in the horse that was not treated with laser. At the same time, the therapy reduced post-surgical complications since none of the treated horses presented drainage or infection in the incision, while the untreated or control horse did present sero-sanguinolent drainage, inflammation and thickening of the incision area. Therefore, the use of laser therapy after colic surgery is proposed to favor the healing of this type of wounds.

Bibliography

1. Wormstrand, B. H., Ihler, C. F., Diesen, R., & Krontveit, R. I. (2014). Surgical treatment of equine colic-a retrospective study of 297 surgeries in Norway 2005-2011. Acta Veterinaria Scandinavica, 56, 1-9.
2. Bloemen, M. C., Boekema, B. K., Vlig, M., van Zuijlen, P. P., & Middelkoop, E. (2012). Digital image analysis versus clinical assessment of wound epithelialization: a validation study. Burns, 38(4), 501-505.
3. Samaneh, R., Ali, Y., Mostafa, J., Mahmud, N. A., & Zohre, R. (2015). Laser therapy for wound healing: A review of current techniques and mechanisms of action. Biosci, Biotech Res Asia, 12, 217-23.
4. Freeman, D. E., & Perez Osorio, J. (2019). Prevention and Treatment of Postoperative Complications in Equines Postoperative Reflux, Endotoxemia, Peritonitis, Incisional Complications and Adhesions. Journal of Veterinary Medicine, (39), 109-117.
5. McDuffee, B. (2017). Laser Therapy and Multimodal Equine Rehabilitation. Laser Therapy in Veterinary Medicine: Photobiomodulation, 401-414.