Evaluation of a Vessel Sealing Device for Use in Performing Standing Bilateral Laparoscopic Ovariectomy in Mares

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Use of the LigaSure™ provides a new, safe, and alternative method of accomplishing hemostasis while performing laparoscopic ovariectomy. Authors’ Address: Texas Veterinary Medical Center, Department of Large Animal Medicine and Surgery, College of Veterinary Medicine, Texas A&M University, College Station, TX 77843-4475. © 2001 AAEP.

1. Introduction
Ovariectomy is becoming a more common surgical procedure in horses. Standing laparoscopic ovariectomy has been described as the preferred method for elective ovariectomy.1–3 Several disadvantages cited in the literature are difficulty in proper knot tying, cost of preformed ligatures, ligature slippage, and inadvertent damage to associated structures.1–3 Recently, a vessel sealing instrument (LigaSure™) has been described in the human literature.3,4 The LigaSure™ is a feedback controlled bipolar vessel sealing device that uses high current (4 amps) and low voltage (< 200 V) to perform hemostasis. The feedback controlled electrothermal sealer applies a precise amount of energy to vessel walls based on the setting and the amount of tissue in the jaws of the instrument to produce a seal of partially denatured protein. The integrity of the seal in 3–7 mm vessels approximates the burst strength of ligature and clips, is independent of a proximal thrombus, and resists dislodgement because they are intrinsic to the wall structure.4

2. Materials and Methods
Thirteen mares (8 experimental, 5 patients) with normal reproductive tracts had bilateral standing laparoscopic ovariectomy. Experimental mares were re-examined laparoscopically to assess if any signs of inflammation or adhesions were present at the surgical site. The mares were divided into 2 groups; 4 mares were re-examined laparoscopically at 72 h and 4 mares were re-examined laparoscopically at 10 d. The clinical patients were 5 mares admitted for behavioral problems associated with hormonal abnormalities. Patients were not re-evaluated laparoscopically, however, follow-up was obtained by telephone interview of owners. Approach through paralumbar fossa was performed as previously described.1 The ovary was removed using the LigaSure™ and laparoscopic scissors. The LigaSure™ was applied across a portion of the ovarian pedicle and discharged. This produced a translucent seal that was then transected with laparoscopic scissors. The contralateral ovariectomy was performed from its corresponding flank using...
the same procedure. Each ovary was removed from the ipsilateral flank by enlarging one of the portals to 6 cm.

3. Results

Complete hemostasis of the ovarian pedicle was obtained for all 26 ovaries. Postoperatively, all mares were bright and alert with minimal signs of pain or discomfort when moving in the stall. No major incisional complications occurred although all portal sites had mild edema and subcutaneous emphysema that resolved over several days without treatment. On repeat laparoscopic examination (72 h or 10 d), no complications were observed at the surgical site. At 72 h, there was mild edema and hyperemia limited to tissue immediately adjacent to the surgical site. At 10 d, granular-like tissue was seen covering the surgical site and little, if any, inflammation was observed.

Telephone conversations with owners of the patients conducted 2 months after surgery revealed no complications, satisfaction with procedure, and normal behavior.

4. Discussion

Our interest in a vessel sealing device related to several potential advantages the method seemed to offer including the possibility of not requiring dissection of the mesovarium, no likelihood of ligature slippage, no foreign body reaction to suture material, and minimal chance for inadvertent damage to surrounding structures. This technology has been reported to be as effective as clips and ligatures when measurement of vessel burst strength was performed on 3–7 mm vessels in canine splenectomy and bowel resection, and in human hysterectomy and bowel resection. Each application results in a seal approximately $2 \times 0.5$ cm that is readily visible when the LigaSure™ is removed. It took approximately 5–7 applications to seal the ovarian pedicle. On visual inspection, translucence of the seal indicates there is no blood flow and the seal is complete. Thermal changes associated with the procedure are essentially confined to within-the-jaw tissue. The entire process takes 2–5 sec, depending on vessel size and amount of tissue included within the jaws of the device. Total time for the surgical procedure was comparable to previously described methods. Minimal dissection was needed before application of the LigaSure™. In the first 4 mares, we dissected the mesovarium at the cranial and caudal poles of the ovarian pedicle using laparoscopic scissors to expose the ovarian vasculature. This dissection resulted in blood seepage from smaller vessels. To prevent this bleeding and to eliminate the tedious dissection, the mesovarium was sealed without dissection in the other 9. Benefits of vessel sealing with the LigaSure™ include no remaining foreign material, minimal thermal damage (confined to the target tissue), and minimal to no need for surgical dissection before application. The LigaSure™ provided a quick and secure method of vessel hemostasis, thereby eliminating potential complications with ligature slippage and bleeding during dissection. In our experience, laparoscopic ovariectomy in the mare using the LigaSure™ is a safe technique to achieve hemostasis.

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References and Footnotes


$^a$Valleylab, Boulder, CO 80301-3299.

$^b$Laparoscopic scissors, Millennium Surgical Corp., Bryn Mawr, PA 19010.