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Laparoscopic Ovariectomy in Standing Donkeys by Titanium Clips and Monopolar Electrocautery

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Abstract: The purpose of this study was to develop a technique of paralumbar fossa laparoscopic ovariectomy in 6 standing female donkeys using titanium clips and monopolar electrocautery and to avoid a laparotomy incision for ovary removal. Bilateral laparoscopic ovariectomy was successfully done in the standing donkeys using monopolar electrosurgical unit. This technique was found to be minimally invasive, can be performed efficiently and provided excellent haemostasis of the mesovarium.

Key words: Laparoscopic ovariectomy, donkeys, titanium clips, haemostasis, mesovarium

INTRODUCTION

Indications for ovariectomy in mares include prevention of pregnancy and estrous behavior, treatment of ovarian pathological conditions and the provision of jump females for semen collection (Ragle and Schneider, 1995; Trotter and Embertson, 1992). Laparoscopic techniques for ovariectomy in mares has been described, with techniques adapted for both the standing (Palmer, 1993; Boure *et al*., 1997) and dorsally recumbent patient (Ragle and Schneider, 1995). Advantages of laparoscopic ovariectomy include decreased patient morbidity, smaller incisions and excellent visualization and manipulation of structures that are difficult to exteriorize from the abdominal cavity. The techniques are generally less invasive than other procedures (Ragle and Schneider, 1995; Trotter and Embertson, 1992; Palmer, 1993; Boure *et al*., 1997). Laparoscopic technique in female donkeys has not been described in the literature. The aim of this study was to describe a laparoscopic technique for ovariectomy in female donkeys in a standing position using a monopolar electrocautery.

MATERIALS AND METHODS

Laparoscopic ovariectomy was performed in six adult female donkeys of 2-6 years of age. Animals used for this study were donated to the Veterinary Teaching Hospital for euthanasia due to the existence of problems that were not related to the reproductive tract. Feed was withheld for a minimum of 12 h before surgery to reduce the volume of intestinal contents. Donkeys were sedated with xylazine hydrochloride (Pantex, Holland) at 1 mg kg^{-1} body, weight, intravenously (i.v.). Both paralumbar fossae were clipped and the abdominal wall at the sites of the portals were infiltrated with 10-20 mL of 2% lidocaine (Laborate Pharmaceutical, India). The paralumbar fossae were prepared with a povidone-iodine scrub and draped. The tail was tied away from the surgical site and the head was supported. We used laparoscopic unit (Karl-Storz, Germany) for conducting the surgical procedure as described below. Pneumoperitoneum was induced in all donkeys by introducing the verres needle into the abdomen dorsal to the crus of the internal abdominal muscle at an equal distance from tuber coxae and last rib connecting to the electronic CO_2 laparoflator unit (Karl-Storz). A pre-selected intra abdominal pressure of 16 mm Hg was maintained for better visualization and manipulation in all donkeys during the laparoscopic procedure. To achieve this pressure a CO_2 flow rate of 12 L min^{-1} was used. We took care to ensure that the needle was in the abdominal cavity to prevent extra-abdominal insufflation. Once proper intra-abdominal pressure was achieved the versse needle was removed and a 10 mm trocar-cannula unit was inserted in a caudual direction. The trocar was removed and a 10 mm, 30° angle laparoscope was inserted to locate the ovary. The second portal was placed 2 cm caudal to the last rib and 7-8 cm to the scope portal cranioventral to the primary portal. A single one cm skin incision was done and also 10 mm trocar-cannula unit was inserted. The skin incision for the third portal was made 5-6 cm caudal to the second portal and 8-10 cm ventral to the scope portal; 5- mm trocar-cannula units was inserted in this portal.

The ovary was pulled by a grasping forceps introduced through the third portal (Fig. 1). Two to three titanium endoclips were applied to the cranial portion of the mesovarium using a 10 mm clip applicator introduced

Fig. 5: The ovary exteriorized

through a 11 mm cannula (Fig. 2). After clip application was done, the site was cauterized by applying coagulation current using hooked electrocautery at 90 watt. Thereafter the mesovarium was cut at 120 watt (Fig. 3). Once this area became coagulated, it was replaced with laparoscopic scissors. The monopolar electrocautery was then positioned across the cranial portion of the mesovarium. After the area was cauterized (Fig. 4), the laparoscopic scissors transected the mesovarium below the site that was cauterized, close to the bursa and cutting through the uterine horn, mesovarium and cranial attachment, by using scissors. The skin incision of the second portal was enlarged to 6-8 cm, by a sharp dissection, followed by blunt separation of the underlying musculature, the ovary was exteriorized (Fig. 5). The mesovarium was observed for hemorrhage before the laparoscope was removed. Haemostasis, irrigation and suction were applied when needed. Ports were removed under vision to ensure no abdominal wall bleeding. Deflation of pneumoperitoneum was done to reduce postoperative pain. Skin was closed using Silk No. 2 and one stitch simple interrupted technique.

All operated donkeys received penicillin 10.0000 i.μ kg^{-1} and streptomycin 10 mg kg^{-1} (Combi-Kel 20+20, Kela Laboratoria, Belgium), intramuscularly, once daily for 3 days. The animals were observed for one month after the operation. Skin suture was removed 7 days after the surgery under xylazine (1 mg kg^{-1} i.v.)-induced sedation. Any potential complication was also recorded.

RESULTS

The mean±S.E surgical time (insertion of the laparoscope to incision closure) for bilateral ovariectomy was 40±7 min (range, 22-68 min). The standing approach during the operation eliminated the risks associated with general anesthesia and allowed excellent exposure of the mesovarium and ovaries in all donkeys. The titanium clips and monopolar electrocautery provided excellent haemostasis of the transected mesovarium. Pneumoperitoneum was successfully done in all donkeys undergoing laparoscopic ovariectomy.

None of the donkeys died during the one-month observation period after the surgery and they were apparently healthy, based on daily clinical examinations. One donkey, however, suffered from subcutaneous insufflation during the operation.

DISCUSSION

Ovariectomy in mares was first described before the twentieth century and involved the use of an écraseur (crusher) via colpotomy (vaginal approach) (Colbern

andRegan, 1987). Unfortunately, this technique is associated with a high rate of potentially fatal complications (Colbern and Regan, 1987). The standard technique at present (laparotomy) involves large abdominal wall incisions (at least 20-30 cm long). These large incisions require rest of the mares several weeks to months after the surgery in order to allow complete healing (Colbern and Regan, 1987).

Laparoscopic ovariectomy techniques have been developed in mares. Laparoscopy is a surgical technique that uses a rigid endoscope to view the organs within the abdominal cavity. Laparoscopy uses specially adapted instruments to allow surgery within the abdomen to be performed from outside the body, thus requiring very small incisions (Hand *et al*., 2002).

Laparoscopic ovariectomy in donkeys in a standing position has a number of advantages. This technique eliminates the potential risks and cost of general anesthesia. Visualization of the ovary and mesovarium during laparoscopy is better compared with the traditional celiotomy approach (Hanson and Galuppo, 1999). In contrast with humans, the large size of the donkeys abdomen provides ample surgical workspace with no interference between laparoscopic instrument manipulation. The disadvantage of this is the requirement for 3 scrubbed surgeons. Similar observations were reported in standing mares (Palmer, 2001).

A variety of methods have been reported for achieving haemostasis of the ovarian arteries during laparoscopic ovariectomy in mares (Palmer, 1993; Boure *et al*., 1997; Dusterdiech and Lanz, 2003; Rodgerson *et al*., 2000). In our study, haemostasis of the ovarian pedicle was consistently achieved by application of titanium clips and monopolar electrocautery. Application of monopolar electrocautery with titanium clips appeared to be safe for ovariectomy in donkeys in a standing position. Hemorrhage was adequately controlled by the titanium clips. We have used this technique successfully to control hemorrhage from the mesovarium. Laparoscopic ovariectomy by monopolar electrocautery appears to offer a safe and technically easy and efficient approach to ovariectomize donkeys.

Time needed to complete bilateral laparoscopic ovariectomy in donkeys ranged between 22-68 min. Operation time decreased after gaining experience with the procedure. Observation time for unilateral or bilateral standing ovariectomy in mares ranged between 45-120 min (Ragle and Schneider, 1996; Palmer, 1993; Hanson and Galuppo, 1999). Additional reduction in surgical times could be achieved by the use of alternative methods of haemostasis. It is anticipated that reduction in surgical time would reduce hand fatigue that might occur with the assistant and subsequently this may reduce the rate and severity of surgical complications.

CONCLUSION

Laparoscopic ovariectomy by titanium clips and monopolar electrocautery appears to offer a safe and technically easy and efficient approach to ovariectomy in standing donkeys.

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