

# A minimally invasive laparoscopic technique to surgically establish osteoporosis in sheep utilized for comparative orthopaedic research

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## Introduction

The benefits of minimally invasive laparoscopic surgery include less surgical trauma, improved cosmetic results, better intraoperative visualization and decreased surgical time, patient convalescence and pain. The use of a ventral midline celiotomy to perform ovariectomy is associated with complications including poor visualization of the reproductive tract and high incisional morbidity.

*Purpose:* To report a laparoscopic ovariectomy technique in ewes.

*Hypothesis:* The laparoscopic technique would result in improved visualization, decreased morbidity and convalescence and shorter surgical time.

## Materials & Methods

- 40 skeletally mature sheep (3.5+ yrs.)
- Minimally invasive 3-portal laparoscopic ovariectomy technique
- Surgical time, intraoperative and postoperative complications recorded for each sheep.

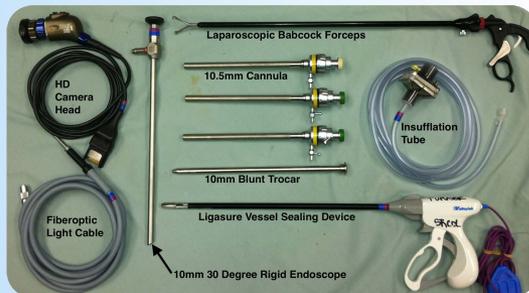


Figure 1. Laparoscopic Instrumentation

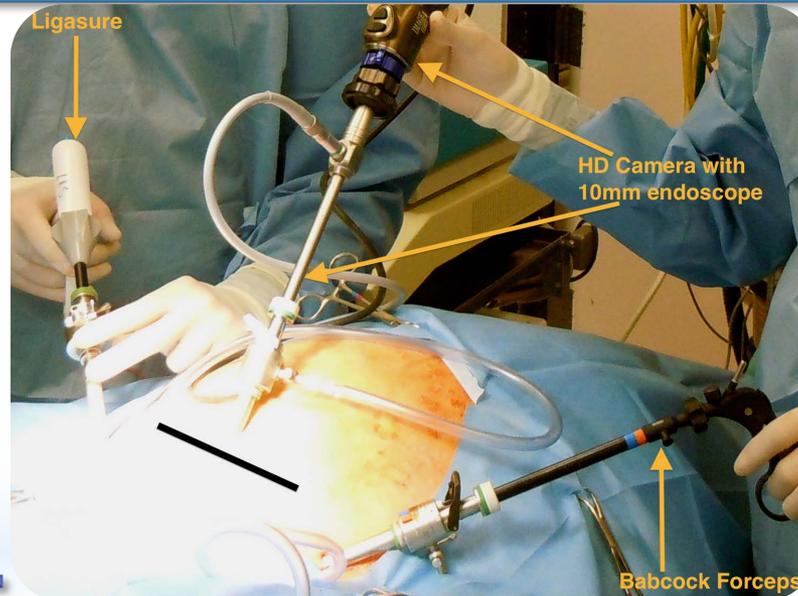


Figure 2. Portal and instrument placement. Black line represents the cranial most portion of the udder.

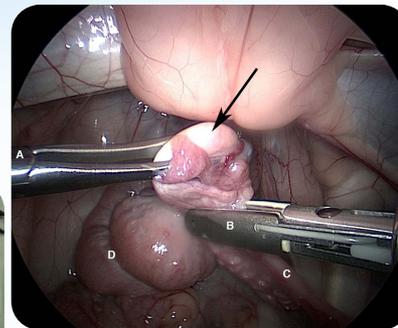


Figure 3. An HD laparoscopic image of the uterus (D) and right ovary (arrow) being grasped by Babcock forceps (A), followed by sealing and transection of the ovarian pedicle and suspensory ligament (C) and corresponding vasculature with the Ligasure™ vessel sealing device (B).

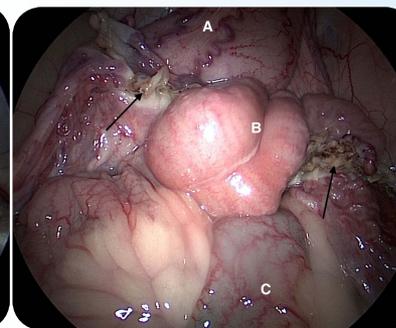


Figure 4. An HD laparoscopic image showing the urinary bladder (A), the right and left horns of the uterus (B) and the small intestine (C). Black arrows show the location where the Ligasure™ was used to excise both ovaries.

## Results

Ovaries were successfully removed in all 40 sheep. The mean time of the surgery was 19.65 (range 13-40) minutes. No intra-operative complications were reported. One minor and two major post-operative complications occurred. The laparoscopic approach allowed for improved visualization of the female reproductive organs, decreased surgical time and fewer postoperative complications than previously reported in an open approach within our laboratory.

## Conclusions

Previous ovariectomy studies in our lab using the traditional approach had a mean surgical time of 27 minutes. Decreased surgical time minimizes risk of perioperative anesthetic complications as well as decreasing anesthesia and research costs. Laparoscopic ovariectomy has also been shown to significantly decrease postoperative pain demonstrated by Teixeira et al. 2011. A minimally invasive laparoscopic ovariectomy procedure in sheep to establish estrogen deficient models of osteoporosis, osteoarthritis and oral bone loss improves surgical efficiency, minimizes patient morbidity and convalescence and decreases research expense.

## Reference

Teixeira PPM et al. (2011). Small Rumin Res. 99:199-202