

TRANSVAGINAL HYBRID ENDOSCOPIC OVARIECTOMY IN DOG: A PRELIMINARY CLINICAL STUDY

KOMAL GAIKWAD, S.B. AKHARE*, S.V. UPADHYE, M.V. KAMBLE, V.M. DHOOT¹,
GAURI FISKE and B.K. BHADANE

Department of Surgery & Radiology, ¹Department of Clinical Medicine,
Nagpur Veterinary College, Nagpur

Maharashtra Animal and Fishery Sciences University, Nagpur-440001, Maharashtra

Received: 09.07.2025; Accepted: 27.09.2025

SUMMARY

The transvaginal hybrid endoscopic ovariectomy in dog is a new approach for ovariectomy. In the present study, the surgeries were performed on clinically healthy female dogs using rigid endoscope (Laparoscope). Ultrasonography was done to rule out the pregnancy, if any. The female dogs were positioned in a Trendelenburg position. Sedation was achieved using xylazine, followed by induction with diazepam and ketamine, while anaesthesia was maintained with Isoflurane. Laparoscopic procedure was performed using transvaginal access through the fornix and one hybrid port was used at umbilicus. Both the ovaries were removed from the either ports. The haemato-biochemical parameters were recorded on day 0 and 7th in all the female dogs and the changes were found statistically non-significant. It indicates that the surgical procedure does not affect haemato-biochemical parameters. Surgical time was noted intraoperatively and the mean surgical duration during the study was 133.67±6.55 minutes. Pain score was calculated up to four days postoperatively using Glasgow pain scale. The mean pain score of the bitches showed a declining trend from 24 to 96 hours, indicating a reduction in pain. Transvaginal Hybrid Endoscopic Ovariectomy is a type of NOTES (Natural Orifices Transluminal Endoscopic Surgery) technique in which the vaginal access is used as a surgical approach along with one hybrid port at the umbilicus. This is minimal invasive surgery with fewer scars as comparative to conventional open and laparoscopic surgeries. This surgery involves less surgical trauma, lesser complications and early recovery.

Keyword: Dog, Flexible endoscope, Minimally Invasive Surgery, Ovariectomy, Transvaginal

How to cite: Gaikwad, K., Akhare, S.B., Upadhye, S.V., Kamble, M.V., Dhoot, V.M., Fiske, G. and Bhadane, B.K. (2026). Transvaginal hybrid endoscopic ovariectomy in dog: A preliminary clinical study. *Haryana Veterinarian*. 65(1): 117-120.

Natural Orifices Transluminal Endoscopic surgery (NOTES) is minimally invasive surgical procedure that uses natural orifices as a route to enter the peritoneal cavity. NOTES is a recent advancement in minimally invasive surgery that shows encouraging outcomes compared to traditional and other endo-surgical techniques (Freeman *et al.*, 2009; Brun *et al.*, 2011). NOTES technique utilizes natural body openings such as the mouth, anus, nostrils, vagina, and urethra to reach luminal organs, where their walls are then punctured to enter the peritoneal cavity. One of the main natural orifice used in NOTES includes the vagina (Arntz, 2019).

Notes can be done using the hybrid technique, which combines laparoscopic access with natural orifices. The benefit of the hybrid technique is that it allows the transvaginal port to be positioned with direct visualization, which significantly reduces the risk of accidental injury to abdominal and pelvic organs during the procedure (Linhares *et al.*, 2019). The three primary rationales for NOTES are enhanced cosmetic outcomes, reduced post-operative discomfort and pain (Swain, 2008). The transvaginal approach for laparoscopic ovariectomy (OVH) is a viable method that offers the benefit of reducing the need for an additional abdominal port (Bakhtiari *et al.*,

2012). The present study was conducted on eight healthy female dogs over two years of age presented at the Department of Veterinary Clinical Complex, Nagpur Veterinary College, during 2024-2025. The primary objective of the present study was to assess the clinical applicability of laparoscopic transvaginal ovariectomy in female dogs. Comprehensive signalment and detailed anamnesis were recorded for each subject, including breed, age, body weight, coat colour and identifying markings. A complete clinical history was obtained, covering previous illnesses, vaccination and deworming status, prior surgical interventions, dietary patterns, exercise regimen, and any observed behavioral or physiological abnormalities. All animals underwent a thorough physical examination, which included the evaluation of rectal temperature, heart rate, respiratory rate, mucous membrane colour, and general demeanor. Abdominal palpation and ultrasonographic assessment were conducted to rule out pregnancy and detect any underlying abdominal abnormalities. Preoperative haematological and biochemical analyses were performed to evaluate systemic health status and determine suitability for anaesthesia and surgical intervention.

Blood samples of about 5-7ml were collected for haemato-biochemical testings. All parameters were

*Corresponding author: sandeepakhare@yahoo.co.in

measured on the day of surgery (0 day) and again on the 7th post operative day. Haematological studies include haemoglobin, total leukocyte count, packed cell volume, total erythrocyte count, differential leukocyte count, and platelet count, using an automated haematology analyzer (Vetscan 5 Hm, Abaxis Company). Biochemical evaluation involved assessment of blood urea nitrogen, serum creatinine, AST, and ALT using a semi-automatic biochemistry analyzer (Vetscan 2, Abaxis Company). The anaesthetic protocol includes premedication using Atropine Sulphate (0.04 mg/kg body weight), Ranitidine (0.2 mg/kg body weight), amoxicillin and cloxacillin (20 mg/kg body weight) and meloxicam (0.2 mg/kg body weight). Sedation was achieved using Xylazine HCl at a dose of 1.1 mg/kg body weight. Anaesthesia was induced with an intravenous combination of Diazepam (0.5 mg/kg body weight) and Ketamine (5 mg/kg body weight), administered intravenously. After successful induction, the dogs were intubated and anaesthesia was maintained using 1.5-3% Isoflurane delivered through an anaesthesia machine equipped with a vaporizer. A multiparameter monitor was used throughout the procedure to monitor heart rate, respiratory rate, temperature, oxygen saturation and ECG activity.

In all dogs, food was withheld for 10 hours and water was withdrawn for 6 hours prior to the surgery. The soap water enema was given 2 hours prior to surgery. The ventral abdomen was shaved, scrubbed with iodopovidone (povidone iodine 10%) and prepared aseptically. A urinary catheter was placed and intravenous access was secured. Laparoscopic instruments were sterilized in 2% glutaraldehyde for 30 minutes and rinsed with sterile water before use. The animals were positioned in dorsal recumbency with the pelvic limbs extended and secured caudally (Fig. 1). A Veress needle was inserted in the midline between the umbilicus and xiphoid process and proper positioning was confirmed using the Hanging Drop Test (Fig. 2). Carbon dioxide was insufflated to create pneumoperitoneum, maintaining intra-abdominal pressure between 7 and 13 mmHg at a flow rate of 1.5 to 6.6 L/min. A 30° laparoscope was inserted through the first port. The vaginal canal was accessed using a speculum, and a 5 mm cannula (Fig. 3) was introduced and guided against the abdominal wall. Under telescopic visualization, a blunt trocar was inserted through the cannula into the peritoneal cavity (Fig. 4).

Using grasping forceps, the ovaries were identified, manipulated, cauterized using unipolar cautery. The cauterised ovary was held against lateral abdominal wall of respective ovarian side (Fig. 5). Ovaries were removed either through the vaginal or laparoscopic port, depending

on their size. The surgical site was inspected for haemorrhage, and once haemostasis was confirmed, the pneumoperitoneum was released. The muscular layer was sutured with Vicryl (No. 1 or 0) and the skin was closed with polypropylene (No. 0). The vaginal incision was left unsutured as suggested by (Arntz, 2019).

Postoperative care included oral administration of Ranitidine (2 mg/kg body weight) and amoxicillin and cloxacillin (22 mg/kg body weight) for five days. Pain was assessed using the Glasgow Pain Scale, and analgesics were administered accordingly. Topical Pendistrin ointment was applied to the vaginal site for five days. Dogs showing anorexia were given supportive fluid therapy. Owners were instructed to ensure the use of an Elizabethan collar for at least five days to prevent self-trauma. Haematological parameters remained within normal physiological range and the changes were statistically non-significant (using student t-test). Similar results were reported by Fernandez-Martin *et al.* (2022). During the study, haemoglobin levels increased slightly from 14.35/ g/dL to 15.02/ g/dL and platelet counts rose from 350 to 396 lakh/cumm, reflecting stable systemic responses. Similarly, the differential leukocyte counts, including neutrophils, lymphocytes, monocytes and eosinophils, showed no clinically meaningful changes. These findings indicated that the surgical procedure did not induce haematological stress or inflammatory responses. Biochemical parameters such as serum AST, ALT, creatinine, and BUN were also assessed on days 0 and 7. AST remained nearly constant (25.92 to 25.33/ IU/L) and similar results were noted by Kumari *et al.* (2018) where AST values remain same throughout observation period. The ALT showed a mild, non-significant rise from 26.42 to 29.46/ IU/L. Serum creatinine levels increased slightly from 0.61 to 0.81/mg/dL and BUN remained unchanged. These results confirmed the absence of hepatic or renal compromise following surgery. Collectively, the haematological and biochemical stability supports the safety of the transvaginal hybrid endoscopic ovariectomy in terms of physiological impact.

The mean surgical time required in the study was 133.67 ± 6.55 min. The time required for the first and second surgery was nearly same. Third surgery took more time than first and second operation. Subsequently, the surgical time in remaining five surgeries were in descending order indicating the more feasibility of technique than before stated by Yang *et al.* (2019). Pain scores assessed via the Glasgow Composite Pain Scale showed a declining trend from 6.17 at 24 hours to 0.67 at 96 hours postoperatively, with only three dogs requiring analgesia. Similar observations were recorded by Freeman



Fig. 1. Trendelenburg positioning and aseptic preparation of the dog



Fig. 2. Veress needle insertion for pneumoperitoneum at umbilicus.



Fig. 3. Introduction of transvaginal port using vaginal speculum

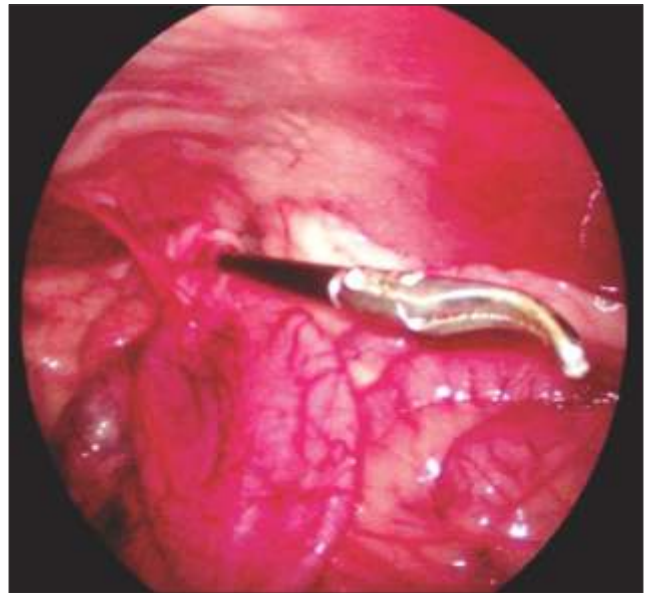


Fig. 4. Entry of grasping forceps through transvaginal port

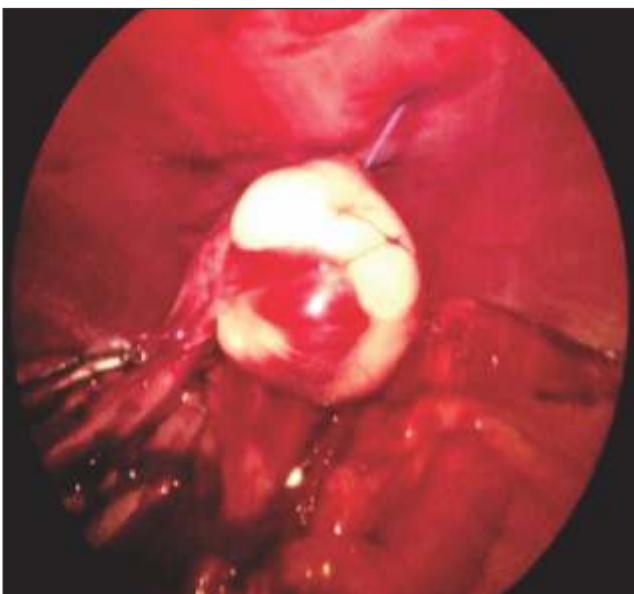


Fig. 5. Ovary tied to lateral abdominal wall of the respective side

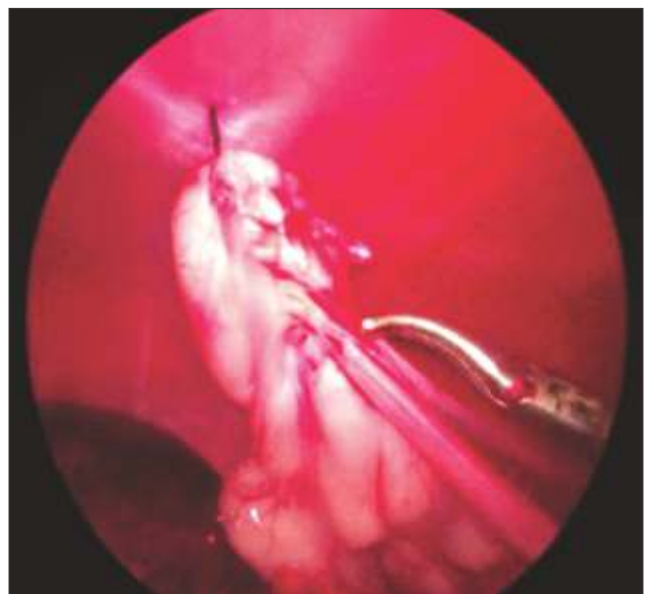


Fig. 6. Ovarian cauterisation using unipolar cautery

et al. (2010) as they compared postoperative pain in oophorectomy procedures performed via NOTES, laparoscopy and open surgery. They further opined that the NOTES group consistently experienced the lowest pain scores across all postoperative intervals.

Minor complications were noted which include difficulty in inserting the transvaginal port in obese dogs and ovary retrieval which was managed by increasing the incision. Overall, the procedure proved to be a safe, minimally invasive, and effective neutering option with excellent cosmetic and clinical outcomes.

REFERENCES

- Arntz, G.J.H. (2019). Transvaginal laparoscopic ovariectomy in 60 dogs: Description of the technique and comparison with 2 portal access laparoscopic ovariectomy. *Vet. Surg.* **48**(5): 726-734.
- Bakhtiari, J., Khalaj, A.R., Aminlou, E. and Niasari Naslaji, A. (2012). Comparative evaluation of conventional and transvaginal laparoscopic ovariohysterectomy in dogs. *Vet. Surg.* **41**(6): 755-758.
- Brun, M.V., Silva, M.A.M. and Mariano, M.B. (2011) Ovariohysterectomy in a dog by hybrid NOTES technique-a case report. *Canadian Vet. J.* **52**: 637-640.
- Fernandez-Martin, S., Valiño-Cultelli, V. and Gonzalez-Cantalapiedra, A. (2022). Laparoscopic versus open ovariectomy in bitches: Changes in cardiorespiratory values, blood parameters and sevoflurane requirements associated with the surgical technique. *Animals.* **12**(11): 1438.
- Freeman, L.J., Rahmani, E.Y., Sherman, S., Chiorean, M.V., Selzer, D.J., Constable, P.D. and Snyder, P.W. (2009). Oophorectomy by natural orifice transluminal endoscopic surgery: Feasibility study in dogs. *Gastrointest. Endoscop.* **69**(7): 1321-1332.
- Freeman, L.J., Rahmani, E.Y., Al-Haddad, M., Sherman, S., Chiorean, M. V., Selzer, D.J. and Constable, P.D. (2010). Comparison of pain and postoperative stress in dogs undergoing natural orifice transluminal endoscopic surgery, laparoscopic and open oophorectomy. *Gastrointest. Endosc.* **72**(2): 373-380.
- Kumari, A., Guha, S.K., Tiwary, R. and Ansari, M. (2018). Haemato-biochemical indices in female dogs undergoing laparoscopic and open elective ovariectomy. *J. Pharm. Innov.* **7**(8): 168-176.
- Linhares, M.T., Feranti, J.P.S., Coradini, G.P., Martins, L.R. Martins, A.R. Sarturi, V.Z. and Brun, M.V. (2019). Canine ovariectomy by hybrid or total natural orifice transluminal endoscopic surgery: technical feasibility study and pain assessment. *Vet. Surg.* **48**(S1): O74-O82.
- Swain, P. (2008). Nephrectomy and natural orifice transluminal endoscopy (NOTES): transvaginal, transgastric, transrectal, and transvesical approaches. *J. Endourol.* **22**(4): 811-818.
- Yang, E., Nie, D. and Li, Z. (2019). Comparison of major clinical outcomes between transvaginal notes and traditional laparoscopic surgery: a systematic review and meta-analysis. *J. Surgic. Res.* **244**: 278-290.

THE HARYANA VETERINARIAN

Editors/Editorial Board Members are highly thankful to all the distinguished referees who helped us in the evaluation of articles. We request them to continue to extend their co-operation and be prompt in future to give their valuable comments on the articles for timely publication of the journal.