

USE OF AUTOLOGOUS TUNICA VAGINALIS GRAFT FOR PERINEAL HERNIOPLASTY IN DOGS

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SUMMARY

The present study was carried out on six intact male dogs with unilateral perineal hernias to assess the efficacy of employing a tunica vaginalis autograft for perineal hernioplasty in dogs. The tunica vaginalis was harvested after a pre-scrotal open-closed orchiectomy. The prepared graft was sutured to the muscles around the hernial ring. The physiological, haematological and biochemical parameters were evaluated and ultrasonography and radiography were carried out before and after the procedure. Five out of six dogs had a successful recovery with satisfied wound healing, urination, and defecation behaviour without a reherniation. So, the tunica vaginalis autograft can be used for perineal hernioplasty in intact male dogs.

Keywords: Hernioplasty, Intact male dogs, Perineal hernia, Tunica vaginalis autograft

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A perineal hernia occurs when the contents of the abdomen or pelvis protrude through the weak or atrophied pelvic diaphragm muscles and this condition is more likely to have in older, intact male dogs (Dorn *et al.*, 1982). The weakening of the pelvic diaphragm musculature is considered as the principal cause of perineal hernia, and the chance of recurrence is higher. The treatment options reported for perineal hernia are pelvic diaphragm reconstruction with surgery, the use of implants, or graft procedures. In less severe cases, using high-fibre diets and stool softeners also helps (Guerios *et al.*, 2020). Perineal hernia is often presented with signs like perineal swelling, tenesmus, and constipation. Standard herniorrhaphy by simple apposition of the surrounding muscles may lead to recurrence of perineal hernia due to muscular atrophy and increased suture tension (Hosgood *et al.*, 1995). The hernioplasty technique with synthetic non-absorbable meshes made up of materials like polypropylene, has the merit of adequate strength and good handling properties (Bowman *et al.*, 1998). However, post-operative complications like higher infection rates and chronic pain were reported with the use of non-absorbable meshes (Szabo *et al.*, 2007). Perineal hernioplasty using an autologous tunica vaginalis graft is an effective procedure that uses autogenous tissue to repair a pelvic diaphragm defect, which helps minimize host immune reactions compared to other implants and provides strength to the pelvic diaphragm.

Six intact male dogs with unilateral perineal hernias presented to the Department of Veterinary Surgery and Radiology, Veterinary College, Hebbal, Bengaluru, were selected for the study. The diagnosis was made on the basis of clinical signs, physical examination, ultrasonography,

and radiologic examination. Two dogs among the six had perineal swelling on the left side and four dogs had it on the right side. Five out of six dogs had constipation and tenesmus. Palpation of the affected site revealed a soft, reducible perineal swelling. On rectal examination, a defect in the pelvic diaphragm musculature was discovered. Three dogs displayed stranguria, and the swelling was found to be tight with fluid within. The swelling was reduced after bladder catheterization using an appropriate-sized infant feeding tube, indicating a herniated urinary bladder.

Ultrasonography of the perineum was performed. The animals were placed in a standing position and the hernial swelling was examined using a curvilinear probe for obtaining longitudinal section with a frequency ranging from 5 to 7 MHz. Mixed hyperechoic and anechoic structures were identified on examination. In three dogs the anechoic portions seen in the perineal swelling was the urinary bladder (Fig. 1) and the prostate gland (Fig. 2) was recognized as the moderately hyperechoic structure at the neck of the urinary bladder. In all other instances, irregular hyperechoic structures were recognized as herniated retroperitoneal fat.

A radiograph of the lateral pelvic abdomen, including the perineum, was performed. Swelling on the perineum was visible with soft tissue radio-density, whereas the contents of the hernia could not be distinguished. Retrograde contrast radiography infusion of the urinary bladder was performed in suspected cases of bladder retroflexion and herniation. Diatrizote meglumine and Diatrizote sodium (Urografin) were used as the positive contrast agents for retrograde cystography. In three dogs herniated urinary bladder was identified in the perineal swelling (Fig. 3).

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Patients were given syrup Cremaffin® as a laxative three days before surgery. Food and water were withheld from the dogs 12 hours prior to surgery. After digitally evacuating the rectum, a temporary purse string suture was placed around the anus. Atropine sulphate @ 0.04 mg/kg b.wt. and xylazine hydrochloride @ 1.00 mg/kg b.wt. via intramuscular route were used for premedication. General anaesthesia was induced with intravenous administration of 2.5% thiopentone sodium @ 12.5 mg/kg b.wt. iv and maintained with the same effect until the procedure.

The dogs were placed in a dorsal recumbent position and the surgical site was aseptically prepared. A bilateral open-closed orchiectomy was performed and tunica vaginalis was harvested. The graft was prepared by stripping off the excess fat and fascia from the rectangular tunica vaginalis sheet. The graft was kept in a sterile petri dish containing a sterile isotonic solution until use (Fig. 4). Patients were positioned in ventral recumbency with slightly raised hindquarters immediately following orchiectomy and the tail was secured cranially (Fig. 5). A dorsoventral, curvilinear skin incision was made on the hernia, 1-2 cm lateral to the anus, and extending 2-3 cm ventral to the pelvic floor. After dissecting the subcutaneous tissues, the hernia sac was carefully incised. The contents of hernia were identified (Fig. 6). The contents encountered during the procedures were serous fluid, retroperitoneal fat, urinary bladder and an enlarged prostate gland and they were brought into their normal anatomical position. The graft was sutured to the external anal sphincter, the combined levator ani and coccygeus muscles, and the internal obturator muscle with a simple interrupted suture pattern using polyglactin 910, No. 1 (Fig. 7). A simple continuous suture pattern was used to secure the subcutaneous tissue above the transplant using polyglactin 910, No. 1. The skin was closed using polyamide No. 1 suture material in a horizontal mattress pattern.

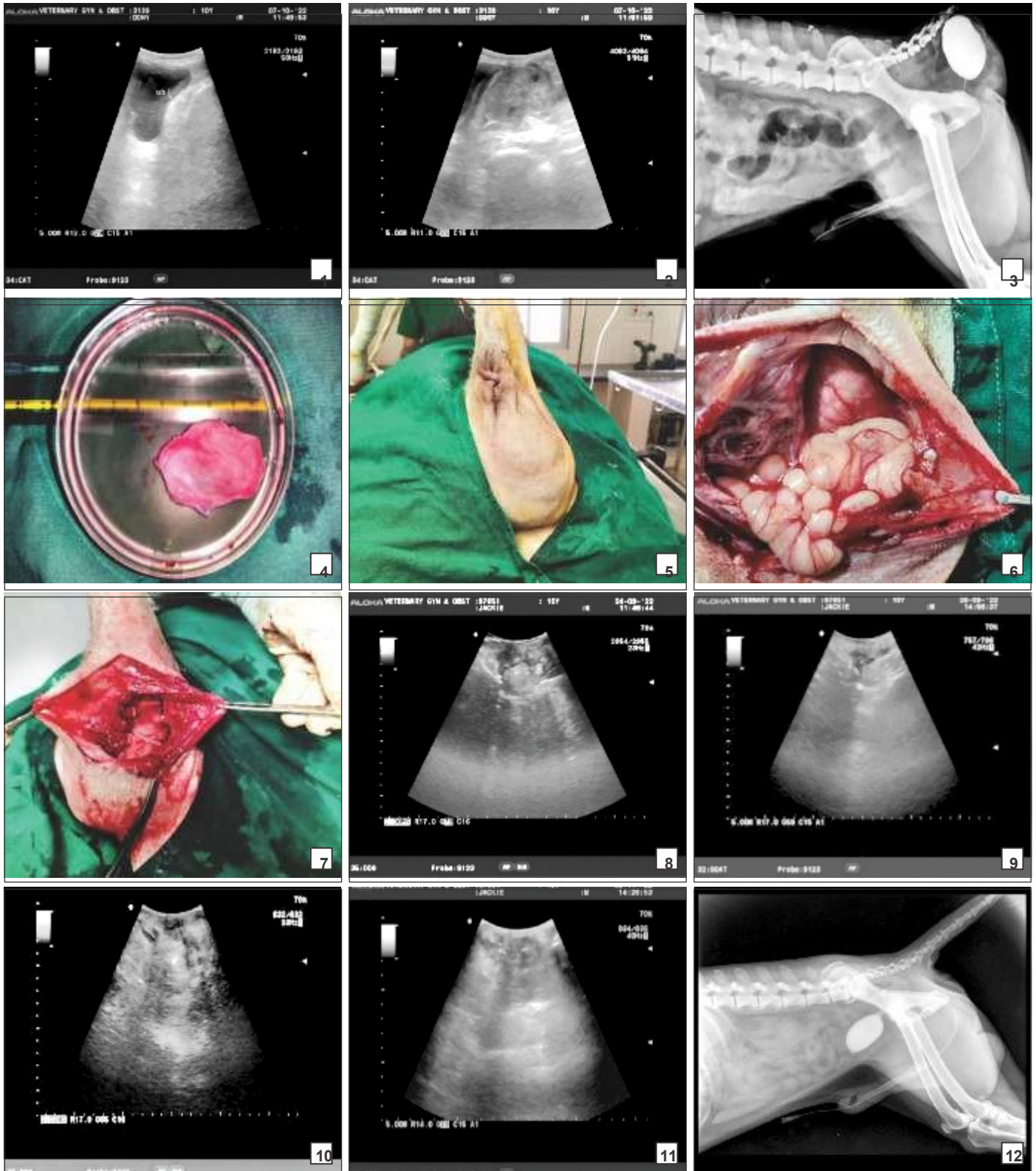
Following surgery, all animals were given the NSAID carprofen @2 mg/kg b.wt. once daily for three days and the antibiotic cephalexin @ 20 mg/kg b.wt. twice daily for seven days. The owners were instructed to offer a liquid diet for two to three days before returning to their regular high-fibre diet. For two weeks, syrup cremaffin was given orally to avoid tenesmus. On the tenth postoperative day, the sutures were removed.

The graft was prepared in a rectangular shape, and the measurement of the graft varied from a length of 4.3 cm to 6 cm and a width of 2.8 cm to 4 cm. It was found to give enough coverage to the defect. Similar findings were reported by Guerios *et al.* (2020) about the measurements

of tunica vaginalis graft and its coverage capacity in their study. Whereas Pratummintra *et al.* (2012) prepared the graft in a triangular shape. The surgical site was examined for oedema, inflammation, or reherniation on the 1st, 3rd, 5th, 7th, 10th and 30th days after the surgery. The signs of inflammation were noticed at the perineal hernioplasty site on the first postoperative day and completely disappeared by the fifth postoperative day. Similar findings were reported by Bongratz *et al.* (2005) and Abass (2008). The wound healing was satisfactory on the incision sites by the 10th postoperative day, and the sutures were removed. Seroma discharge was found at the perineal hernioplasty site in two out of six cases and was cleared completely by the fifth postoperative day. One dog had a hernia recurrence by the 30th postoperative day with a modest perineal swelling. Pratummintra *et al.* (2012) also reported recurrence in one dog whereas Guerios *et al.* (2020) reported a successful recovery without recurrence in all seven dogs operated on. Stranguria and anuria that were seen in the dogs with urinary bladder herniation were resolved by the first postoperative day. The findings of Adeyanju *et al.* (2011) on the repair of bilateral perineal hernias with bladder retroflexion were in agreement with this outcome. One out of six cases showed tenesmus on the first postoperative day and was resolved by the next day with the use of analgesics and laxatives. No other difficulties in urination or defecation were found postoperatively.

The mean $\pm$ SE values of rectal temperature (101.9 $\pm$ 0.19 to 102.4 $\pm$ 0.36!), respiratory rate (26.0 $\pm$ 0.57 to 26.5 $\pm$ 0.22 breaths per minute), heart rate (88.33 $\pm$ 4.5 to 90.33 $\pm$ 4.5 beats per minute) varied within the normal range and were statistically non-significant. Similar results were reported by Bongartz *et al.* (2005) and Bobe *et al.* (2020). The mean $\pm$ SE values of haematological parameters and biochemical parameters were within the normal range and statistically non-significant (Tables 1 and 2).

Postoperatively, an ultrasonographic examination was carried out on the 1st, 5th, 10th and 30th days after the surgery. Localized hypoechoic areas were visible on the first postoperative day, suggesting inflammation (Fig. 8). This finding was in accordance with Kramer (2011) in their report on the ultrasonographic imaging of the musculoskeletal system. In two cases, anechoic pockets suggestive of inflammatory fluid were found until the fifth postoperative day (Fig. 9), they were reduced on successive follow-up, on 10th postoperative day (Fig. 10) and disappeared. Similar observations were reported by El-Husseiny (2019) in his study. On the 30th day, five of six cases were successfully recovered without reherniation and showed normal topography of the perineum on



Figs. 1-12. (1) Preoperative ultrasonographic imaging of the perineal swelling revealing herniated urinary bladder. (2) Ultrasonographic imaging of the herniated prostate gland. (3) Positive contrast radiography showing herniated urinary bladder. (4) Prepared tunica vaginalis graft. (5) Right side unilateral perineal hernia in a 7-year-old German shepherd. (6) Urinary bladder and retroperitoneal fat encountered after incising the hernial sac. (7) Suturing the tunica vaginalis graft to the external anal sphincter medially, the combined levator ani and coccygeus muscles dorso-laterally and the internal obturator muscle ventrally. (8) 1st postoperative day, presence of inflammation at the site. (9) 5th postoperative day, accumulation of seromains spaces between the sutured muscle layers. (10) 10th post-operative day. Reduced amount of seroma compared to 5th postoperative day. (11) 30th postoperative day. Complete reduction of seroma and no signs of reherniation. Normal topography of perineum. (12) Positive contrast radiography on the 30th postoperative day.

Table 1. Mean ± SE values of haematological parameters

Days	0	1 st	3 rd	5 th	7 th	10 th	30 th
TEC (10 ⁶ Cells/mm ³)	7.330.36	7.00.37	6.300.34	6.250.48	6.390.46	6.550.44	6.920.41
TLC (10 ³ Cells/mm ³)	11.761.20	14.181.34	15.661.29	15.31.19	14.251.15	12.131.17	11.311.31
Hb (g/dL)	15.330.94	12.030.92	12.020.96	12.450.86	13.280.82	13.500.82	14.650.63
Neutrophils (%)	78.97±0.99	81.27±0.75	78.68±0.60	77.81±0.66	77.81±0.65	78.15±0.53	78.38±1.16
Lymphocyte (%)	15.68±0.96	13.78±0.74	16.16±0.61	16.79±0.34	16.84±0.25	16.58±0.70	15.76±1.06
Monocyte (%)	4.33±0.30	3.83±0.18	4.18±0.16	4.47±0.16	4.41±0.15	4.32±0.34	4.65±0.38
Eosinophils (%)	1.00±0.06	1.00±0.04	0.97±0.00	0.94±0.01	0.95±0.01	0.95±0.01	0.94±0.01

Table 2. Mean ± SE values of biochemical parameters

Days	0	1 st	3 rd	5 th	7 th	10 th	30 th
Serum creatinine (mg/dL)	1.31±0.04	1.7±0.09	1.56±0.10	1.45±0.09	1.33±0.09	1.16±0.08	1.05±0.06
BUN (mg/dL)	14.9±1.34	17.47±0.94	16.67±0.84	15.93±0.92	15.08±0.85	14.05±0.58	14.63±0.64
ALT (IU/L)	33±3.65	39.77±1.72	42.42±2.84	41.5±3.33	38.08±3.73	34.43±3.61	29.02±3.02
AST (IU/L)	40±3.15	43.45±3.31	47.22±3.55	44.47±2.79	40.28±2.28	35.75±2.56	33.33±2.60
ALP (IU/L)	107.8±2.65	112.5±2.74	115.5±2.48	115.5±2.48	113.5±1.28	108.7±0.98	107.5±2.23

ultrasonographical examination (Fig. 11). This was in accordance with the ultrasonographic finding of Bongartz *et al.* (2005) in the research on autogenous fascia lata grafts for canine perineal herniorrhaphy.

One dog with hernia recurrence showed a small, irregular hyperechoic area, suggesting herniated retroperitoneal fat. Postoperative radiographs were taken on the 1st, 5th, 10th and 30th days. In plain radiographs, no perineal swelling with soft tissue radiodensity was identified, and a retrograde cystography revealed the bladder occupying in normal anatomical position (Fig. 12).

In conclusion, the tunica vaginalis graft is a cheaper mesh that creates fewer donor site morbidities, weaker host response and provide good strength to the hernioplasty site which reduce the chance of recurrence. Therefore, in intact male dogs, the autologous tunica vaginalis graft can be used for perineal hernioplasty.

REFERENCES

- Abass, B.T. (2008). Bovine tunica vaginalis: A new material for umbilical hernioplasty in sheep. *Iraqi J. Vet. Sci.* **22**: 69-76.
- Adeyanju, J.B., Yakubu, A.S., Jibril, A., Buhari, S. and Alayande, M.O. (2011). Bilateral perineal hernia with bladder retroflexion in a 13-year-old intact Jack-Russel Dog: Case report. *Sokoto J. Vet. Sci.* **9**(1): 50-53.
- Bobé, G.M., Alexandru, D.M., Ungureanu, M.C. and Crivineanu, M. (2020). Therapeutic management in benign prostatic hypertrophy associated with perianal hernia in dogs - case study. *Rev. Rom. Med. Vet.* **30**(4): 6-10.
- Bongartz, A., Carofiglio, F. and Balligand, M. (2005). Use of autogenous fascia lata graft for perineal herniorrhaphy in dogs. *Vet. Surg.* **34**(4): 405-413.
- Bowman, K.L., Birchard, S.J. and Bright, R.M. (1998). Complications associated with the implantation of polypropylene mesh in dogs and cats: A retrospective study of 21 cases (1984-1996). *J. Am. Anim. Hosp. Assoc.* **34**(3): 225-233.
- Dorn, A.S., Cartee, R.E. and Richardson, D.C. (1982). A preliminary comparison of perineal hernias in the dog and man. *J. Am. Anim. Hosp. Assoc.* **18**: 624-632.
- El-Husseiny, M.H. (2019). Platelet rich fibrin augmented versus non-augmented glycerolized bovine pericardium and polypropylene mesh for repairing of large abdominal wall defects. *Eur. J. Med. Nat. Sci.* **3**(1): 33-48.
- Guerios, S., Orms, K. and Serrano, M.A. (2020). Autologous tunica vaginalis graft to repair perineal hernia in shelter dogs. *Vet. Anim. Sci.* **9**: 100-122.
- Hosgood, G., Hedlund, C.S. and Pechman, R.D. (1995). Perineal herniorrhaphy: perioperative data from 100 dogs. *J. Am. Anim. Hosp. Assoc.* **31**(4): 331-342.
- Kramer, M. (2011). Musculoskeletal structures. In: BSAVA Manual of Canine and Feline Ultrasonography (1st Edn.) Frances Barr and Lorrie Gaschen (Edts). British Small Animal Veterinary Association Woodrow House, 1 Telford Way, Waterwells Business Park, Quedgeley, Gloucester GL2 2AB. pp. 198-203.
- Pratummintra, K., Chuthatep, S., Banlunara, W. and Kalpravidh, M. (2012). Perineal hernia repair using an autologous tunica vaginalis communis in nine intact male dogs. *J. Vet. Med. Sci.* **75**: 337-341.
- Szabo, S., Wilkens, B. and Radasch, R.M. (2007). Use of polypropylene mesh in addition to internal obturator transposition: A review of 59 cases (2000-2004). *J. Am. Anim. Hosp. Assoc.* **43**: 136-142.