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CASE REPORT

Arthroscopy-Assisted Minimally Invasive Harvest of Fascia Lata for Revision Repair of Perineal Hernia in a Dog

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ABSTRACT

Perineal hernia is a common surgical problem in old male dogs and usually presents a high risk of recurrence, particularly after a failed repair. This article describes the use of arthroscopy-assisted fascia lata (FL) for repair of perineal hernia after tunica vaginalis graft failure in a dog. A 10-year-old intact male Pomeranian was examined with left perineal swelling and dyschezia. Imaging suggested a left perineal hernia accompanied by prostatic enlargement. Herniorrhaphy using a tunica vaginalis graft was initially performed, and the postoperative infection resulted in graft dehiscence. Revision surgery involved anal sacculectomy, debridement, and repair, using a FL graft harvested using an arthroscopy-assisted technique. The dog recovered uneventfully, with physiological hematological parameters and no recurrence, infection, or donor-site morbidity were recorded at the 2-month follow-up. This case highlights the feasibility and clinical application of minimally invasive FL harvesting in dogs, which can be a useful alternative for conventional open technique of graft harvest with low donor-site complications.

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INTRODUCTION

Perineal hernia (PH) is most commonly encountered in older, intact male dogs and remains a frequent indication for surgery in small animal practice. Despite the availability of several established techniques, including simple herniorrhaphy and different muscle transposition procedures, recurrence rates of approximately 20–46% are still reported and long-term outcomes are often disappointing (Bongartz *et al.*, 2005; Grand *et al.*, 2013). This has encouraged surgeons to seek more reliable methods of reinforcing the pelvic diaphragm.

Fascia lata is a dense deep fascia of the thigh, located along the lateral aspect of the limb and provides structural support to the thigh musculature. It has attracted attention as an autologous graft material because of its tensile strength and durability. When FL is incorporated into the repair, recurrence rates as low as 10–12% have been documented, suggesting that it can provide more robust long-term support than conventional soft-tissue techniques alone (Bongartz *et al.*, 2005). However, harvesting FL in the traditional manner requires a relatively long skin incision over the lateral thigh, which may result in postoperative pain, delayed healing, and temporary gait disturbance at the donor site (Slatter, 2003; Bongartz *et al.*, 2005). These drawbacks can limit the broader clinical adoption of the technique, particularly in patients that already have orthopedic disease. In human medicine, a minimally invasive, arthroscopy-assisted FL harvesting method has been introduced to reduce donor-site morbidity and to shorten recovery time (Ângelo and de Campos Azevedo, 2019).

To the authors' knowledge, the application of this technique has not previously been described in veterinary patients. The present report describes a dog with recurrent PH in which a tunica vaginalis graft failed because of infection secondary to anal sac rupture and in which revision herniorrhaphy was successfully performed using an arthroscopy-assisted, minimally invasive FL graft.

Case history: A 10-year-old intact male Pomeranian weighing 5.1kg was referred to the Veterinary Medical Teaching Hospital of Gyeongsang National University Jinju, Republic of Korea on July 09, 2025 for evaluation of progressive swelling on the left side of the perineum. According to the owner, the dog showed discomfort during defecation, hematochezia, softer stools, increased frequency

of defecation, and persistent licking of the perineal region. No history of trauma or systemic illness was noted.

Clinical examination: On presentation, the dog was bright and alert, with normal vital parameters. Palpation identified a soft, non-painful swelling in the left perineal area measuring approximately 42×42mm (Fig. 1A). Rectal examination using digits indicated presence of an opening in the left pelvic diaphragm, suggestive of PH. Orthopedic examination demonstrated positive bilateral Ortolani signs, suggestive of coxo-femoral joint laxity, and bilateral grade 3 medial patellar luxation. During gait assessment, the dog showed a mild but consistent lameness, which was scored as 2 using a previously described grading system (Duerr, 2020). No additional clinically relevant abnormalities were detected.

Pelvic radiograph (Ventro-dorsal view) showed rounded soft-tissue and gas opacities in the left perineal region (Fig. 1B). The lateral view further demonstrated herniation of rectal tissue and intra-abdominal fat into the perineal region (Fig. 1C). The patellae were displaced medially in both stifle joints, and radiographic changes consistent with bilateral degenerative coxo-femoral joint disease were present (Fig. 1B).

Transabdominal ultrasonography was performed using an ultrasound system (ARIETTA 70, Hitachi-Aloka, Tokyo, Japan), fitted with a high-frequency linear transducer (2–12 MHz), which identified a segment of the rectum and adjacent fat herniating through an opening (12mm in diameter) in the left perineal region (Fig. 1D). Prostatic enlargement consistent with benign prostatic hyperplasia was identified (Fig. 1E).

Diagnosis and treatment plan: On the basis of the physical examination and imaging, a left-sided PH was diagnosed and benign prostatic hyperplasia was suspected based on the signalment of the dog and ultrasonographic features. Surgical repair of the hernia and castration were planned. If the opening in the pelvic diaphragm could not be closed primarily because of muscle atrophy or tension, reinforcement with a tunica vaginalis graft obtained at the time of castration was planned.

Initial surgery: The dog was pre-oxygenated with 100% oxygen from premedication to endotracheal intubation. Cefazolin (25mg/kg IV) was given as prophylactic antibiotic therapy. Premedication consisted of midazolam (0.2mg/kg IV) and butorphanol (0.2mg/kg IV). Anesthesia was induced with alfaxalone (2mg/kg IV) and maintained with isoflurane in oxygen. Intraoperative analgesia was provided using a continuous rate infusion of tramadol (1mg/kg/h), lidocaine (2mg/kg/h), and ketamine (0.6mg/kg/h) (TLK infusion). A purse-string suture was placed around the anus to limit fecal contamination.

The dog was positioned in ventral recumbency, and the surgical field for castration was prepared with 2% chlorhexidine gluconate in 70% isopropyl alcohol. An intratesticular lidocaine block was administered before a pre-scrotal incision was made for closed orchiectomy. Routine layered closure was performed. The tunica vaginalis was dissected from the excised testicle (Fig. 2A), spread on a sterile pad, and kept moist with saline (Fig. 2B).

For PH repair, the dog was repositioned in dorsal recumbency with the hind limbs extended caudally beyond the table edge and the tail suspended vertically (hanging-tail position). A curvilinear incision was made over the hernia. A hernial sac was found between the levator ani and coccygeal muscles, and an additional opening was identified between the ischiourethralis and bulbocavernosus muscles. Marked muscular atrophy prevented tension-free primary closure, so the tunica vaginalis graft was used as an onlay to reinforce both ventral and dorsal aspects of the opening (Fig. 2C) while preserving the obturator nerve, as described earlier (See *et al.*, 2020). The field was lavaged with warm sterile saline, a Jackson–Pratt drain was placed, and closure was completed using 4-0 PDS for the subcutaneous layer and 4-0 Monocryl in an intradermal pattern for the skin.

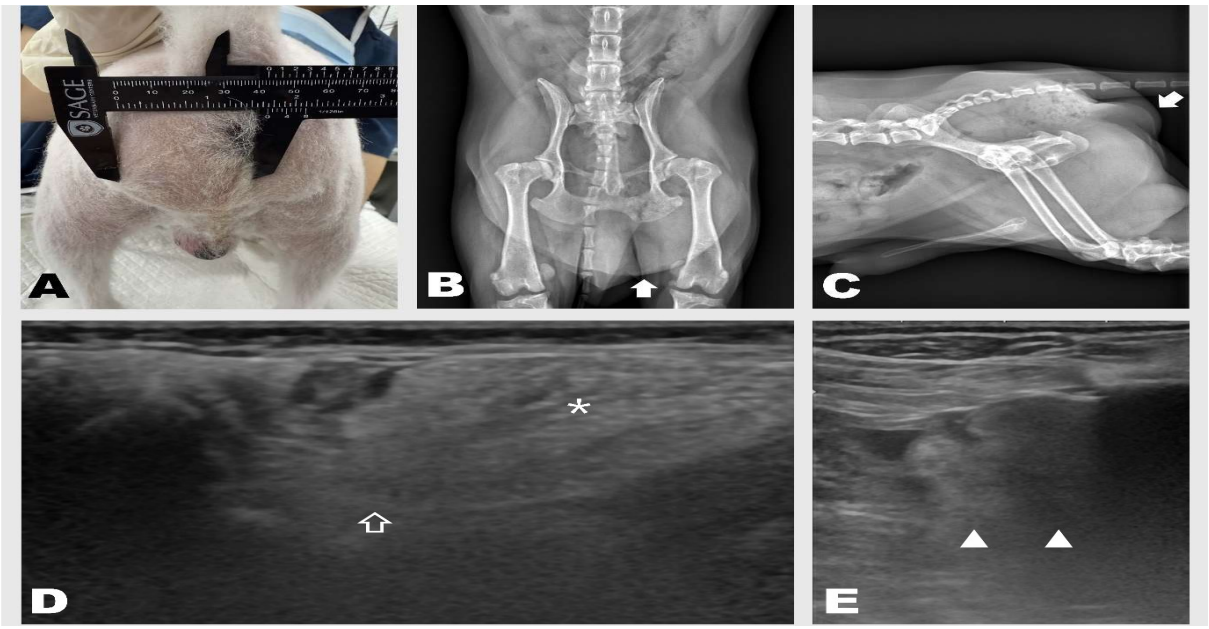

Fig. 1: Physical and imaging examination of the dog. (A): Gross appearance of left-sided perineal swelling measuring 42×42mm. (B): Ventro-dorsal, and (C): Lateral radiographs showing soft tissue swelling in the left perineal region (arrow) and degenerative changes in the coxo-femoral joint with bilateral patellar luxation. (D): Ultrasonograph showing pelvic diaphragmatic opening (Blanked arrow, 12mm) with herniated pelvic fat (Asterisk). (E): Ultrasonograph showing prostatic enlargement (Arrowhead).

Postoperatively, the dog received amoxicillin–clavulanate (20 mg/kg IV q12h), enrofloxacin (5mg/kg IV q12h), carprofen (2.2mg/kg SC q12h), and famotidine (0.5mg/kg IV q12h). Dressing changes and local cryotherapy were performed twice daily for three days. No discharge was initially observed, and drain output remained below 0.02mL/kg/h, allowing drain removal on day 3.

On postoperative day 4, however, a large volume of purulent discharge with a typical anal sac odor was noted at the surgical site (Fig. 3A). Ultrasonography showed diffuse swelling at the repair site with intact right anal sac (Fig. 3B) and rupture of the left anal sac with direct communication between the sac and the hernia area (Fig. 3C). This indicated infection of the surgical site resulting from rupture of the anal sac.

Revision surgery and arthroscopy-assisted FL harvest: Following induction of anesthesia, the dog was placed in right lateral recumbency with the left hind limb suspended in a hanging-leg position, and the perineal field was prepared aseptically. The previous skin sutures were removed, and the incision was reopened. Exploration revealed severe inflammation and dehiscence of the tunica vaginalis graft, marked swelling, and fibrous adhesions of surrounding tissues (Fig. 4A), prompting removal of the failed graft and aggressive debridement.

The ruptured left anal sac was excised through the same incision using a closed technique, and contaminated tissues were thoroughly debrided (Lee *et al.,* 2023). The hernia site was flushed with sterile saline and packed temporarily with moistened gauze. A simple continuous 3-0 PDS pattern was used for temporary skin closure.

For FL harvest, the intended donor site on the left lateral thigh was marked, and a 1-cm skin incision was made over the distal lateral thigh. A handmade K-wire retractor, approximately 50mm in depth (Fig. 4B1) and 7mm in width (Fig. 4B2), was inserted through the incision (Fig. 4C). The FL was identified and dissected using arthroscopic visualization (Fig. 4D). After removing through the incision, the graft was prepared for implantation (Fig. 4E). Then the graft was placed through the perineal incision (Fig. 4F), and the incision was closed. After lavaging surgical area with warm sterile saline, samples were sent for culture and bacterial susceptibility examination. The subcutaneous tissues were closed with 4-0 PDS in a simple continuous pattern, and the skin was closed intradermally with 4-0 Monocryl.

Postoperatively, the dog received amoxicillin–clavulanate (20mg/kg IV q12h), enrofloxacin (5mg/kg SC q24h), and famotidine (0.5mg/kg IV q12h). Bacterial culture and susceptibility testing of the intraoperative samples were performed to guide postoperative antimicrobial management, but the results yielded no bacterial growth. Analgesia was maintained using the same TLK infusion protocol as in the first surgery. Recovery was uneventful, and the dog was discharged on postoperative day 5 after the revision procedure, following stabilization of hematologic parameters, vital signs, and local wound appearance. At four-month follow-up, the lameness score remained 2 without deterioration, there was no evidence of donor-site discomfort, and the PH repair remained stable without recurrence.

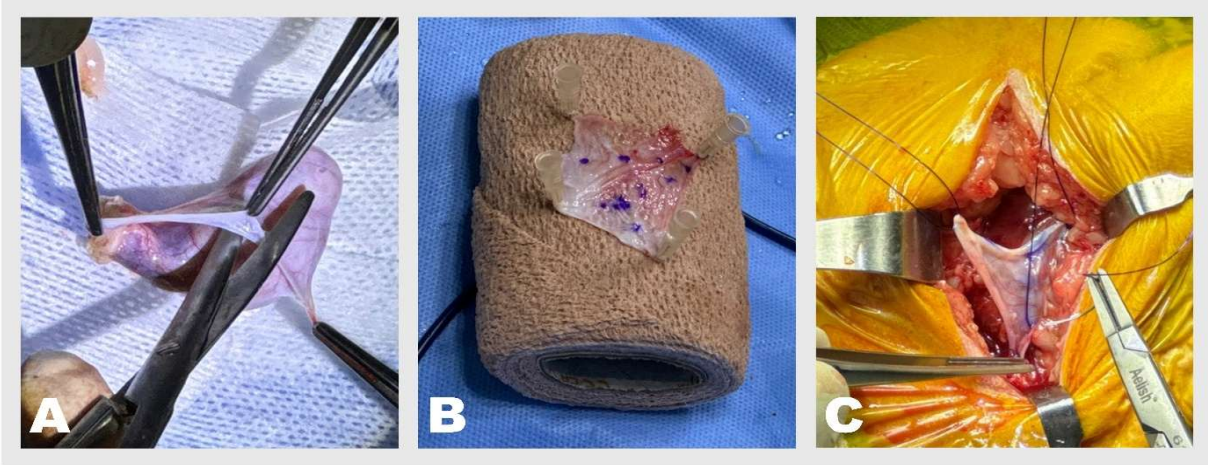

Fig. 2: Application of the tunica vaginalis graft to the hernia site. (A): Harvest of tunica vaginalis from resected testicle. (B): Tailored graft of tunica vaginalis for perineal herniorrhaphy. (C): Perineal herniorraphy using autologous tunica vaginalis.

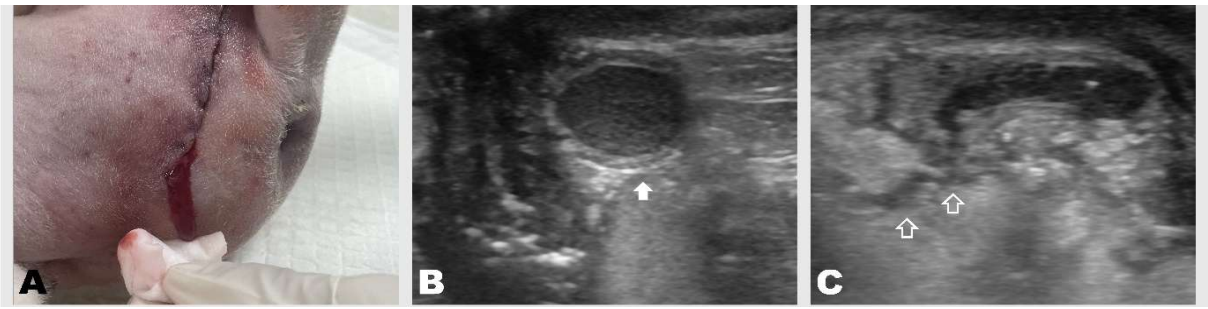

Fig. 3: Postoperative findings after herniorrhapy using autologous tunica vaginalis. (A): Surgical site discharge with odor at postoperative day 4. (B): Intact right anal sac (Arrow). (C): Ruptured left anal sac communicating with previous herniorrhapy site (Blanked arrow).

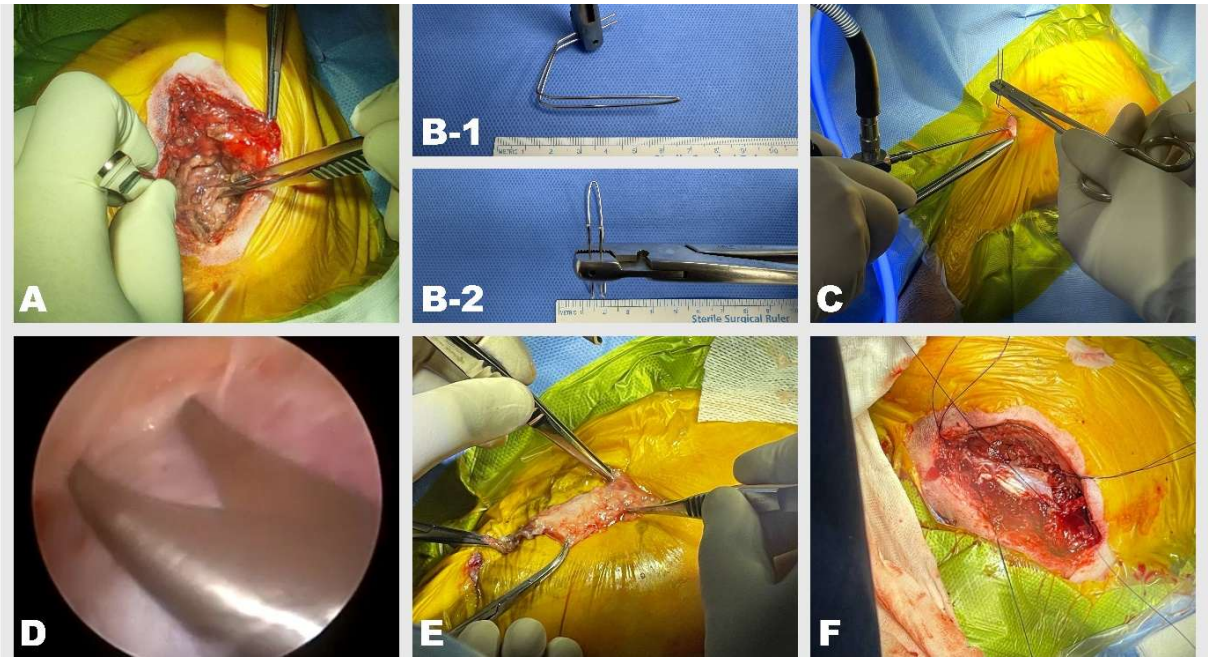

Fig. 4: Postoperative finding after herniorrhapy using autologous tunica vaginalis. (A): Severe inflammation and dehiscence of tunica vaginalis graft. (B): Customized handmade retractor fabricated from a 1-mm K-wire; the retractor measured 50mm in depth (B-1) and 7mm in width (B-2). (C): Insertion of the arthroscope and Metzenbaum scissor after securing the surgical field. (D): Harvesting of fascia lata using Metzenbaum scissors. (E): Removal of adipose tissue from the surface of the fascia lata. (F): Herniorrhapy using autologous fascia lata graft.

DISCUSSION

This report describes, to the authors' knowledge, the first successful clinical use of arthroscopy-assisted, minimally invasive FL harvesting for revision of PH in a dog. The technique provided an adequate graft for reinforcement of the pelvic diaphragm while avoiding the need for a long lateral thigh incision. Importantly, no donor-site morbidity or worsening of pre-existing orthopedic disease was recorded.

Fascia lata has been reported to be a dependable autologous graft material for PH repair (Bongartz *et al.*, 2005; Åhlberg *et al.*, 2024). However, conventional harvesting requires a wide skin incision and partial removal of fascia, which can lead to postoperative pain, delayed wound healing, and transient gait alterations (Slatter, 2003; Bongartz *et al.*, 2005). In the present case, an autologous graft was preferred, while a synthetic mesh was considered inappropriate, due to contamination of the surgical site. Due to the degenerative coxo-femoral joint disease and bilateral medial patellar luxation, any additional limb manipulation was assumed to aggravate lameness. Therefore, the arthroscopy-assisted approach (Ângelo and de Campos Azevedo, 2019) was selected to limit donor-site trauma. Resultantly, there was no deterioration in gait or change in medial patellar luxation grade of the dog.

According to Bongartz *et al.* (2005) and Grand *et al.* (2013), the perineal region is inherently at risk for postoperative infection due to its proximity to the anus and rectum. After placing a graft, infection can cause graft necrosis or failure of suture line and may also compromise the repair (Bongartz *et al.*, 2005). In this case, the left sac ruptured after surgery and it could not be determined whether this rupture was related to intraoperative manipulation or to postoperative inflammatory changes. This case suggests that prophylactic anal sacculectomy may be worth considering, even in the absence of clinical signs of anal sac disease, particularly when the opening cannot be closed directly and reinforcement with an autologous or synthetic graft is required.

Overall, the present case indicates that arthroscopy-assisted FL harvesting can be integrated into PH revision surgery in dogs and may offer a less invasive alternative to the traditional open harvest technique. Additional clinical cases and long-term follow-up are needed to better define complication rates, donor-site outcomes, and recurrence rates associated with this minimally invasive method.

Authors contribution: TS Noh and CH Moon conceived and designed the study. TS Noh and WJ Lee executed the experiment and collected the samples/data. TS Noh and WJ Lee analyzed the data. All authors interpreted the results, critically revised the manuscript for important intellectual contents, and approved the final version.

Ethical approval: Ethical approval was not required for this study because it describes a single clinical case managed as part of routine veterinary care and does not involve experimental procedures. Written informed consent was obtained from the owner for all diagnostic and surgical procedures and for publication of the case details and accompanying images.

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