https://doi.org/10.21708/avb.2025.19.1.12669

CASE REPORT

ACTA VETERINARIA BRASILICA

ISSN: 1981-5484

Use of autologous common tunica vaginalis associated with polypropylene mesh in the treatment of perineal hernia in dogs (*Canis lupus familiaris* Linnaeus, 1758)

Uso da túnica vaginal comum autóloga associada à tela de polipropileno no tratamento de hérnia perineal em cão (*Canis lupus familiaris* Linnaeus, 1758)

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ABSTRACT: The aim of this report was to describe a case of unilateral perineal hernia in a dog treated with autologous common tunica vaginalis combined with polypropylene surgical mesh. An elderly, intact male Poodle with a history of swelling in the right perineal region was presented for treatment. Clinical and ultrasound examinations revealed a muscular defect, leading to a presumptive diagnosis of perineal hernia and benign prostatic hyperplasia. The treatment involved the implantation of a polypropylene mesh covered with autologous common tunica vaginalis at the site of the muscular defect, combined with orchiectomy and ductal deferentopexy. The patient demonstrated satisfactory clinical progress, with no complications observed during the clinical or surgical follow-up. In conclusion, the use of autologous common tunica vaginalis combined with polypropylene surgical mesh proved to be an effective treatment for unilateral dorsal perineal hernia in an elderly Poodle, with an 11-month follow-up period confirming its success.

Keywords: biomembrane; canine; surgery; pelvic diaphragm; perineum.

RESUMO: Objetivou-se relatar um caso de hérnia perineal unilateral em cão submetido ao tratamento com túnica vaginal comum autóloga associada à tela cirúrgica de polipropileno. Foi atendido um cão macho idoso, da raça Poodle, não submetido à contracepção cirúrgica, com histórico de aumento da região perineal direita. No exame clínico e ultrassonográfico foi identificada a presença de defeito muscular e diagnóstico presuntivo de hérnia perineal e hiperplasia prostática benigna. O tratamento foi a implantação da tela de polipropileno coberto com a túnica vaginal comum autóloga no local do defeito muscular, orquiectomia e deferentopexia ductal. O paciente apresentou satisfatória evolução clínica, com ausência de intercorrências clínico-cirúrgicas. Concluiu-se que o uso da túnica vaginal comum autóloga associada à tela cirúrgica de polipropileno foi eficaz no tratamento de hérnia perineal dorsal unilateral em um cão idoso da raça Poodle, no acompanhamento pós-operatório de 11 meses.

Palavras-chave: biomembrana; canino; cirurgia; diafragma pélvico; períneo.

INTRODUCTION

Canine perineal hernia is a multifactorial condition resulting from the weakening and separation of the muscles and fasciae that form the pelvic diaphragm. This leads to the caudal displacement of abdominal and/or pelvic organs into the perineal region (Penaforte Junior *et al.*, 2015; Gill; Barstad, 2018).

The condition is commonly observed in elderly, intact male dogs and may present as unilateral or bilateral, with the right side more frequently affected (Reddan, 2014; Ferraz, 2017; Gill; Barstad, 2018). While the exact causes of pelvic muscle weakening remain unclear, factors such as muscular atrophy and increased pelvic pressure—often associated with prostatic or intestinal alterations—are thought to contribute to its development (Ribeiro, 2010; Gill; Barstad, 2018).

Surgical treatment involves various approaches, including herniorrhaphy, transposition of the internal obturator muscle, gluteus superficialis and semitendinosus muscles, as well as the use of biomembranes (e.g., common tunica vaginalis, bovine pericardium, intestinal serosa) and other techniques (Mortari; Rahal, 2005; D'Assis *et al.*, 2010; Gill; Barstad, 2018). Due to the high recurrence rates of perineal hernias, this report aims to describe a case of unilateral perineal hernia in an elderly dog treated with autologous common tunica vaginalis combined with polypropylene mesh.

CASE REPORT

An eight-year-old, intact male Poodle weighing 7.5 kg presented with a 30-day history of swelling in the right perineal region. During the physical evaluation, no abnormalities in physiological parameters were observed. However, clinical examination revealed a tumefaction in the right perineal area accompanied by a muscular defect, leading to a presumptive diagnosis of perineal hernia.

Ultrasonographic examination of the affected region confirmed a muscular defect measuring 29.5 mm in diameter with hypoechoic echogenicity, consistent with a perineal hernia (Figure 1). The contralateral

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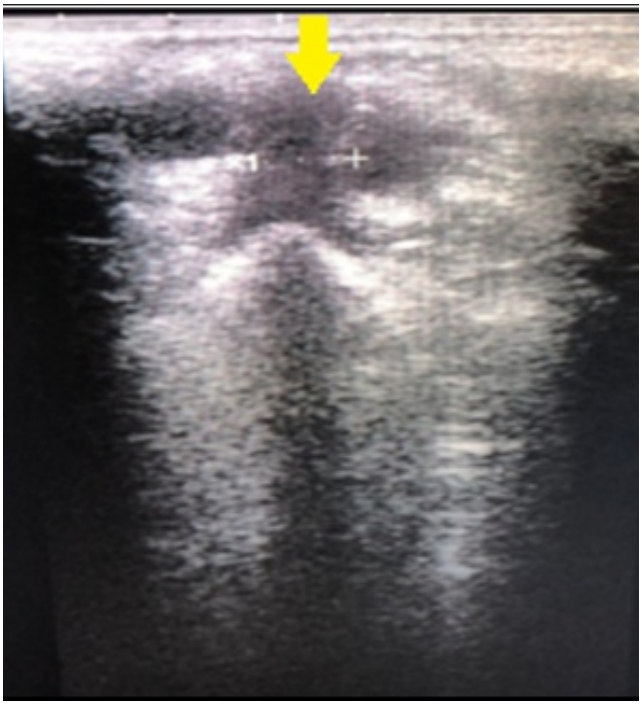
Received: 06/24/2024.
Accepted: 09/09/2024.

perineal region showed no sonographic abnormalities. Ultrasonographic evaluation of the prostate revealed an increase in size, with the right lobe measuring 19.1 mm in length and 17.3 mm in width, and the left lobe measuring 19.2 mm in length and 17.1 mm in width. Despite the enlargement, the prostate displayed no changes in echotexture, findings indicative of benign prostatic hyperplasia.

Figure 1 – Ultrasonographic image of the right perineal region showing a 29.5 mm muscular defect with hypoechoic echogenicity, indicative of a perineal hernia (yellow arrow) (Ultramedic® ultrasound device with a linear transducer - 7.0 MHz frequency).



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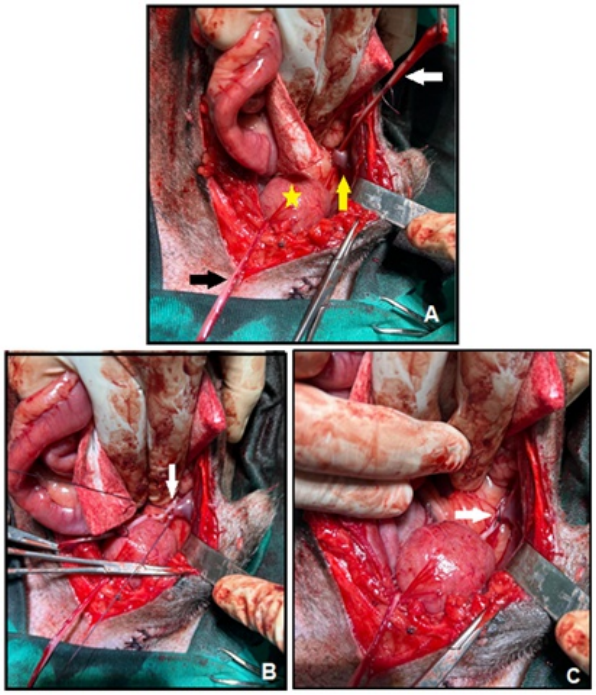
Based on the clinical and ultrasound findings, surgical treatment for the perineal hernia, bilateral orchiectomy, and ductal deferentopexy were recommended. After obtaining informed consent from the owner, preoperative exams [erythrogram, leukogram, platelet count, and serum biochemical analyses, alanine aminotransferase (ALT), creatinine, and total plasma proteins) were conducted, revealing no abnormalities.

Trichotomy was performed in the abdominal, pre-scrotal, and right perineal regions. As pre-anesthetic medication, acepromazine (0.1 mg/kg) and morphine (0.5 mg/kg) were administered intramuscularly (IM), followed by anesthetic induction with tiletamine hydrochloride and zolazepam hydrochloride (Zoletil®) (5 mg/kg), intravenously (IV). Anesthesia was maintained with isoflurane in oxygen via an open circuit, and saline solution (0.9%) was administered intravenously throughout the procedure.

The patient was positioned in dorsal recumbency to perform the bilateral orchiectomy and ductal deferentopexy by retro-umbilical abdominal approach. Preoperative and surgical antisepsis of the surgical sites was performed using a 2% chlorhexidine followed by 0.5% alcoholic chlorhexidine.

The orchiectomy was performed using a pre-scrotal approach and closed technique, preserving the common tunica vaginalis of both testicles. The spermatic cords and deferens duct were individually ligated using polyglactin 910 (2-0). Following the bilateral orchiectomy, a retro-umbilical abdominal approach was used to perform bilateral ductal deferentopexy to prevent bladder retroflexion. This procedure involved the fixation of deferens duct to a muscular loop formed between the transverse abdominal muscle and internal abdominal oblique muscle using polyglactin 910 (2-0) (Figures 2A, 2B, and 2C).

Figure 2 – Intraoperative photograph of the right side ductal deferentopexy. A- Passage of the right deferens duct (white arrow) through the muscular loop formed between the transverse abdominal and the internal abdominal oblique muscles (yellow arrow) (yellow star – bladder; black arrow – left deferens duct); B – Fixation of the ductal deferentopexy using polyglactin 910 (2-0) (white arrow); C- After the complete fixation of the deferens duct in the muscle (white arrow).



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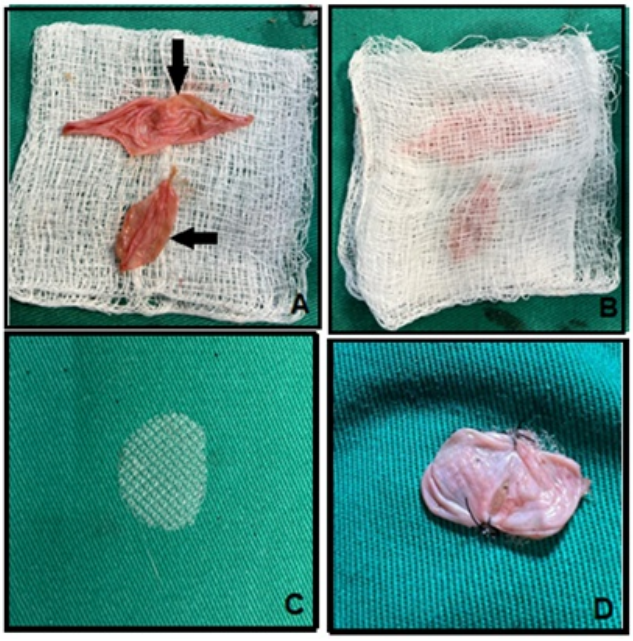
The common tunica vaginalis were removed from both testicles and placed between two sterile gauze pads and moistened with saline solution (0.9%) (Figures 3A and 3B). Based on the size of the muscular defect (diameter = 29.5 mm), the sterile polypropylene mesh was trimmed to a diameter of 35.0 mm (Figure 3C). Then the tunica vaginalis were used to covered the polypropylene mesh and sutured using simple interrupted suture using monofilament nylon (3-0) (Figure 3D), and subsequently used to cover the muscular defect.

For the surgical correction of the perineal hernia, the patient was positioned in ventral recumbency, and a suture was applied around the anus to prevent contamination. A 50 mm vertical incision was made over the site of the muscular defect (Figure 4A), followed by dissection of the subcutaneous tissue using Metzenbaum scissors. The pelvic diaphragm musculature, including the external anal sphincter, coccygeus, levator ani, and internal obturator muscles, was subsequently identified and inspected. Weakening

Figure 3 – Photograph of the common tunica vaginalis after being removed from both testicles (black arrows) (A); B – The tunica vaginalis placed between two sterile gauze pads moistened with saline solution (0.9%); C – Surgical polypropylene mesh trimmed to a 35.0 mm diameter; D - Surgical polypropylene mesh covered with the tunica vaginalis with a simple interrupted monofilament nylon suture (3-0).



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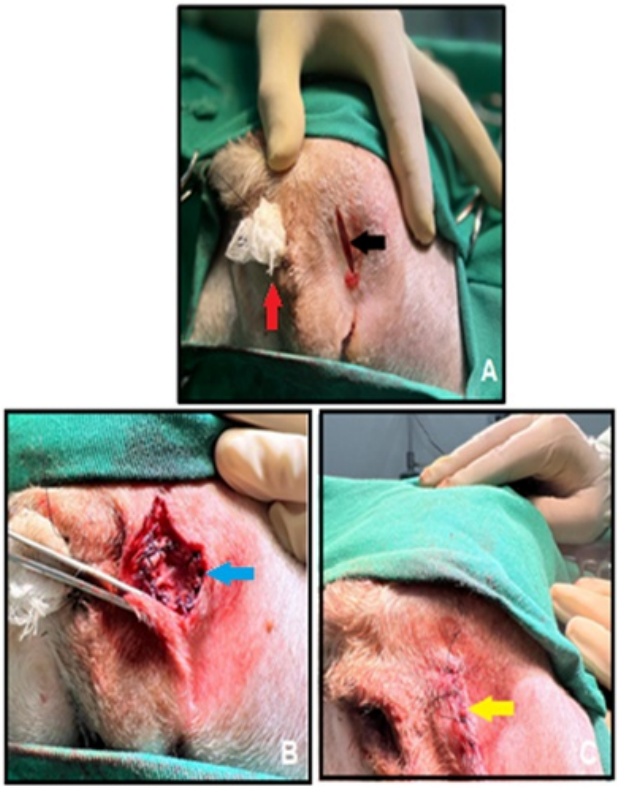
of the levator ani and coccygeus muscles, along with the associated muscular defect, was observed, leading to the diagnosis of a dorsal perineal hernia. To repair the defect, a polypropylene surgical mesh coated with the common tunica vaginalis was sutured to the non-weakened portions of the levator ani and coccygeus muscles, the external anal sphincter, and the internal obturator muscles using simple interrupted suture with polyglactin 910 (2-0) (Figure 4B).

Closure of the subcutaneous tissue was performed with simple continuous suture pattern with polyglactin 910 (3-0), and dermorrhaphy was performed using simple interrupted suture with nylon monofilamentar (2-0) (Figure 4C). Finally, the suture around the anus was removed.

After the anesthetic recovery, was prescribed orally cefalexin (25 mg/kg) every 12 hours for 15 days; meloxicam (0.2 mg/kg) every 24 hours for four days; sodium dipyrone (15 mg/kg) every eight hours for five days; and cleaning the surgical wounds with saline solution (0.9%), and a chlorhexidine digluconate-based ointment was applied every 24 hours, as well as the use of Elizabethan collar and post-surgical clothes until the skin sutures removal.

Ten days after the surgical procedure, the patient returned for a follow-up. During the clinical examination, no abnormalities in the surgical site were identified, therefore the skin sutures were removed. Another follow-up appointment was recommended seven days after removing the skin sutures. During the palpation of the region, a structure with fibrotic consistency was identified, suggesting an inflammatory reaction. No treatment was prescribed, and after 15 days the patient returned for an ultrasonographic examination of the perineal region subjected to surgery. The exam revealed an integration of the graft and the absence of a muscular defect (Figure 5). Thus, the patient received medical discharge. Eleven months after the surgical procedure, the patient was clinically evaluated and no signs of recurrence of the perineal hernia.

Figure 4 – A – Photograph of the longitudinal surgical incision site (black arrow) and purse-string suture (red arrow); B – Polypropylene surgical mesh covered with the common tunica vaginalis sutured to the defect with simple interrupted suture using polyglactin 910 (2-0) (blue arrow); C – Dermorrhaphy (yellow arrow).



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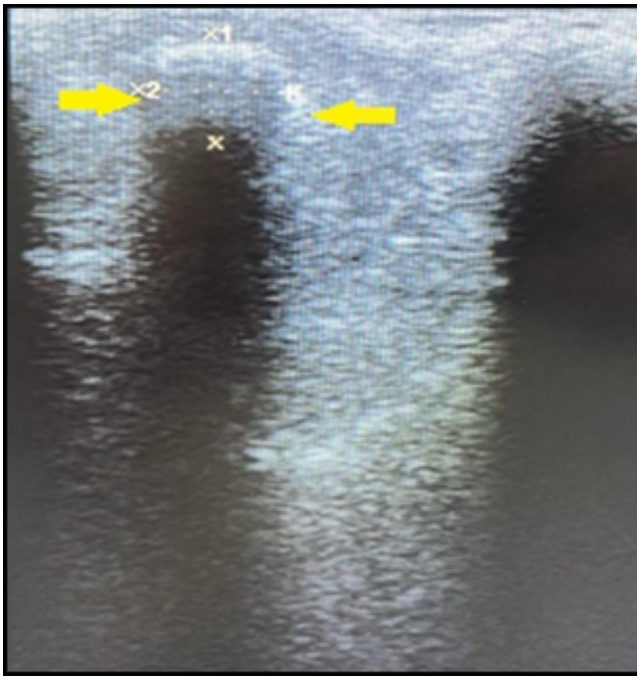
DISCUSSION

This study aimed to evaluate the use of autologous common tunica vaginalis in combination with polypropylene surgical mesh for the treatment of unilateral perineal hernia in an elderly dog. This approach addresses the challenges posed by weakened pelvic diaphragm muscles and high recurrence rates, which necessitate the use of biologically inert synthetic or biological implants to minimize recurrence and post-surgical complications (Ribeiro, 2010; Zerwes *et al.*, 2011).

The clinical and surgical relevance of this technique lies in the prevention of omental adhesion to the mesh, achieved by covering it with the common tunica vaginalis. According to Gómez, Morales and Sañudo (2005), polypropylene surgical meshes are prone to omental adhesions due to their porous structure and rough surface. However, integrating the tunica vaginalis with the surgical mesh eliminates the need to reinforce the area with muscle tissue, which is often required when the tunica is used without any reinforcement. Studies by Tanaka *et al.* (2004) and Faria *et al.* (2016) identified low tensile strength in the common tunica vaginalis when treating muscular

defects, necessitating reinforcement with adjacent musculature. Conversely, study by Faria *et al.* (2020) demonstrated that the incorporation of the common tunica vaginalis in a double-layer configuration enhances its structural resistance, making it a viable alternative for repairing the pelvic diaphragm in dogs. This technique also offers potential when combined with other approaches, such as the use of polypropylene mesh, for the effective treatment of perineal hernias.

Figure 5 – Ultrasonographic image of the right perineal region, 32 days after the surgical procedure, showing the absence of the muscular defect (yellow arrows) (Ultramedic® ultrasound device, linear transducer – Frequency 7.0).



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In the current case, the condition was associated with the weakening of the levator ani and coccygeal muscles, as well as prostatic hyperplasia. According to Ramírez *et al.* (2015) and Gill and Bastard (2018), hormonal changes are present in unneutered elderly dogs, which may induce a dysfunction in the prostatic hormonal receptors, leading to hyperplasia and increased pelvic pressure. The perineal hernia of the present case report was classified as a dorsal perineal hernia since it was possible to identify the muscular defect due to the partial weakening of the levator ani and the coccygeal muscles, during the intraoperative period. Dorsal perineal hernia is considered less common when compared to the caudal hernia, which occurs due to the weakening of the levator ani, external anal sphincter and internal obturator muscles (Gómez; Morales; Sañudo, 2005).

The patient exhibited unilateral swelling in the affected region, which contrasts with the findings reported in the literature (Ribeiro, 2010; Gill; Bastard, 2018), where other clinical signs, such as dysuria, stranguria, tenesmus, and dyschezia, are more commonly described. On the other hand, Ferreira and Delgado (2003) reported that the clinical signs can vary, and the severity is associated with the herniation stage. The absence of these clinical signs was related to the initial stage of perineal hernia; however, the treatment is required to be performed as soon as possible to prevent a more severe weakening of the pelvic diaphragm muscles and the development of more severe clinical signs (Gill; Bastard, 2018).

The purpose of the performance of the ductal deferentopexy in the present case report was to prevent a future retroflexion of the bladder, since it is present in most cases of perineal hernia (Assumpção; Matera; Stopiglia, 2016; Calva *et al.*, 2022). During the postoperative period, the patient demonstrated satisfactory clinical progress, with no systemic or local complications indicative of failure in the implantation of the surgical mesh covered with the common tunica vaginalis. The fibrotic structure identified 17 days post-implantation was attributed to connective tissue formation, a process typically occurring between four and six weeks after the application of surgical meshes and often resolving by 10 weeks (Ribeiro, 2010), consistent with the findings of the present case.

CONCLUSION

Based on the findings of the present case, the use of autologous common tunica vaginalis combined with polypropylene surgical mesh is effective in treatment a unilateral dorsal perineal hernia in an elderly Poodle, with an 11-month postoperative follow-up.

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