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Fascia lata flap to repair perineal hernia in dogs: a preliminary study

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Abstract: Perineal hernia (PH) in dogs normally requires surgical reconstruction of the pelvic diaphragm. The use of fascia lata grafts has been reported and described in previous studies for the correction of PH after failure of the conventional herniorrhaphy. The purpose of this report is to describe a modified technique of fascia lata flap (FLP) for PH repair in dogs. Six client-owned male dogs with PH were included in the study. PH was repaired with a FLP obtained from the dog's ipsilateral thigh and sutured directly into the perineal defect. Caudal scrotal orchiectomy was performed in all dogs that were not castrated. Clinical outcome including postoperative complications and recurrence rates were evaluated. PH did not recur in any of the dogs included in this study. The mean follow-up time was 24 months (range: 18–34). Mild postoperative complications were observed. One dog presented partial skin dehiscence at the PH repair site and one had mild lameness. Complications were completely resolved within 20 postoperative days. FLP is a simple surgical technique that can be used for perineal herniorrhaphy in dogs without long-term recurrence.

Key words: Fascia lata, autologous flap, ventral perineal hernia, dog

1. Introduction

Perineal hernia (PH) occurs due to the weakness and separation of the pelvic diaphragm, resulting in the protrusion of pelvic or abdominal viscera into the perineal region. The cause of pelvis diaphragm weakening may be multifactorial, and it is believed to be associated with hormonal imbalance, prostatic enlargement, straining, and congenital or acquired muscle weakness or atrophy (1). PH is frequently observed in middle-aged male dogs that are sexually intact (2,3).

Surgical reconstruction of the pelvic diaphragm is commonly recommended for the correction of PH. Several surgeries have been suggested, including a simple appositional technique, vascularized muscle flap transposition (internal obturator muscle, superficial gluteal muscle, semitendinosus muscle), and the use of implants or graft techniques (synthetic mesh, porcine small intestinal submucosa, canine small intestinal submucosa, autologous tunica vaginalis) (4–10). A laparotomy for colopexy and/or cystopexy may be required in complicated PH, in combination with any technique of perineal herniorrhaphy (11). Orchiectomy is recommended at the time of PH repair in intact dogs (12). Complications after PH repair are common and may include recurrence of PH, surgical wound dehiscence and infection, tenesmus, fecal incontinence, and rectal prolapse (2,3).

The use of fascia lata grafts has been described to repair PH in a few dogs, with the potential to improve long-term recurrence compared with other techniques (13,14). Based on the successful use of a fascia lata graft, our study hypothesized that a fascia lata flap (FLP) can adequately be transposed to the pelvic diaphragm, achieving long-term support of the ventral and lateral aspects of the PH. The aim of this study was to describe this modified technique for PH repair in dogs.

2. Materials and methods

2.1. Inclusion criteria

A prospective cross-sectional clinical study was conducted in a veterinary teaching hospital in Brazil. Dogs with PH confirmed by physical exam and perineal ultrasonography were considered for the study. Patients with PH recurrence or with a rectum, prostate, and/or bladder identified in the perineal area were included in the present study.

Presurgical evaluation included clinical signs, previous treatment for PH, a complete physical examination, abdominal and perineal ultrasonography, blood cell count, and hepatic and renal serum chemistry profile.

2.2. Anesthesia

Anesthesia and pain management protocols were similar for all dogs. Dogs were premedicated with morphine (0.4 mg/kg, intramuscularly [IM]) or methadone (0.4 mg/

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kg, IM) and acepromazine (0.02 mg/kg, IM), and then general anesthesia was induced with propofol (4–6 mg/kg, intravenously [IV]) and maintained with isoflurane (0.5–1% IV) in 100% oxygen. Analgesia was provided by lumbosacral epidural injection (1 mL/4.5 kg) of morphine (0.1 mg/kg) and bupivacaine 0.5% (0.25 mg/kg) or target-controlled infusion of sufentanil. Preoperatively, cefalotin (30 mg/kg, IV) and carprofen (2.2 mg/kg, subcutaneously) were given to all dogs. Dogs were monitored for temperature, electrocardiogram, pulse rate, oxygen saturation, and noninvasive blood pressure.

2.3. Surgical technique

The skin of the perineum, scrotum, and ipsilateral hind limb PH (including the medial and lateral side of the thigh and the knee) was clipped and aseptically prepared; the rectum and anal sac were digitally emptied and a purse string suture was placed around the anus. Dogs were positioned in sternal recumbency, with the pelvic limbs hanging over the edge of the surgical table and the tail was fixed over the back. Scrotal caudal orchiectomy was performed in all intact dogs. Immediately after castration, a dorsoventral skin incision was made over the hernia, 1–2 cm lateral to the anus, extending from the base of the tail to the ischial tuberosity. Subcutaneous tissue was bluntly dissected until identification of the hernial sac. The hernial sac was incised and the herniated organs were identified and returned to anatomic position manually.

The ipsilateral fascia lata was surgically accessed by a craniolateral cutaneous incision over the fascia lata. Dissection of subcutaneous tissue was done to expose the entire surface of the fascia lata. The limits of the FLP were: distally, the proximal border of the patella; cranially, the sartorius muscle; and caudally, the cranial border of the biceps femoris muscle. The proximal margin was the tensor fascia lata muscle, which was maintained as the flap base. The FLP was released through two parallel incisions (proximal to distal limits) and one perpendicular incision (combining the cranial to caudal incisions at the distal limits) (Figure 1).

Following the FLP creation, a subcutaneous tunnel was opened into the site of the flap base through the perineal area (Figure 2). The distal end of the flap was then passed through the tunnel into the perineal area, with the aid of a stay suture. Starting at the distal end of the cranial border of the flap, the first 3 to 4 interrupted sutures with 2/0 nylon were placed to the ventral aspect of the hernia (ischial border, periosteum, and internal obturator muscle). Then the caudal border of the flap was sutured to the dorsal aspect of the hernia (coccygeus muscle, levator ani muscle, and sacrotuberous ligament). The distal end of the flap was sutured to the medial side of the hernia (external anal sphincter and ischiourethralis muscle). The base of the flap, where the FLP emerged (ventral and lateral aspect of the hernia), provided good tension

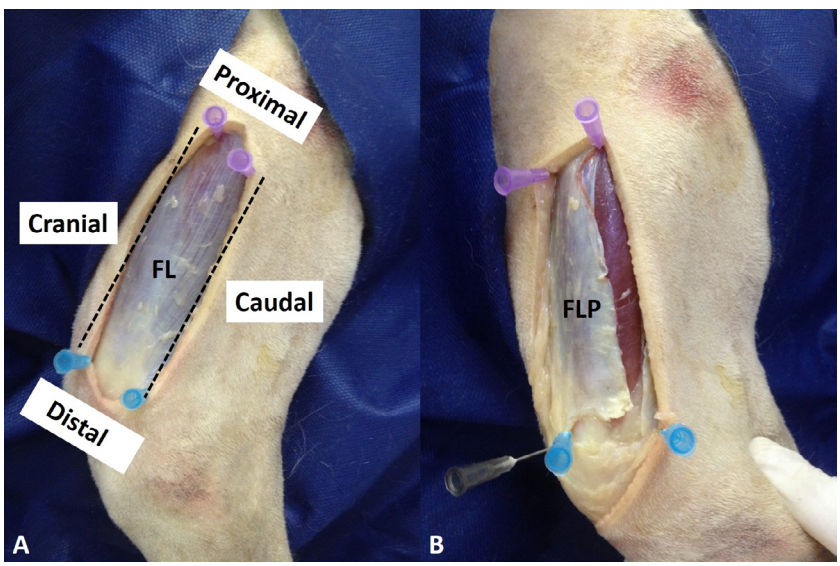

Figure 1. Anatomic landmarks for fascia lata flap (FL) creation. A) The cranial margin was the sartorius muscle; the caudal margin, the biceps femoris muscle; the distal margin, the proximal border of the patella; and the proximal margin, maintained as the flap base, was the tensor fascia lata muscle. B) Fascia lata flap (FLP) was created through two parallels incisions (cranial and caudal) and a perpendicular incision at the distal limit.

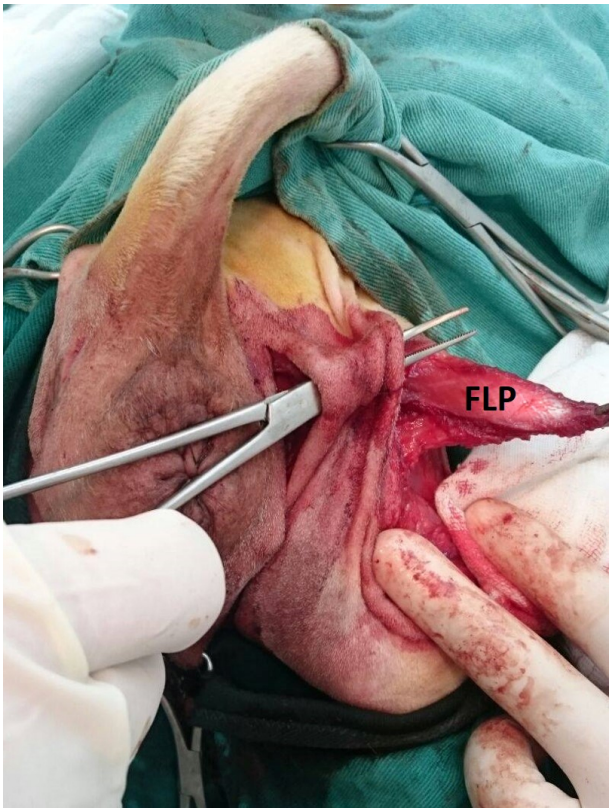

Figure 2. Intraoperative view of the fascia lata flap (FLP) and the subcutaneous tunnel (hemostatic forceps) that was opened to pass the flap up to the perineal area.

in the pelvic diaphragm without the placement of sutures (Figures 3 and 4). The subcutaneous tissue was closed over the flap using a simple continuous pattern 3/0 absorbable polyglycolic acid, and simple interrupted suture 3/0 nylon was used to close the skin. The subcutaneous tissue of the donor site was closed with a simple continuous pattern of 3/0 absorbable polyglycolic acid and the skin with interrupted sutures of 3/0 nylon.

2.4. Postoperative evaluation

All dogs received tramadol (4 mg/kg, IM or orally, every 8 h) postoperatively for 48–72 h and carprofen (4.4 mg/kg orally every 24 h for 5 days). An Elizabethan collar was placed until suture removal. The owners were advised to subjectively assess for lameness, pain, and inflammation at the surgical site, and defecation and urination behaviors. Sutures were removed 12 days after surgery.

Follow-up information was provided by monthly reexamination with digital rectal examination for a minimum of 18 months after surgery. Attention was focused on clinical signs of hernia recurrence.

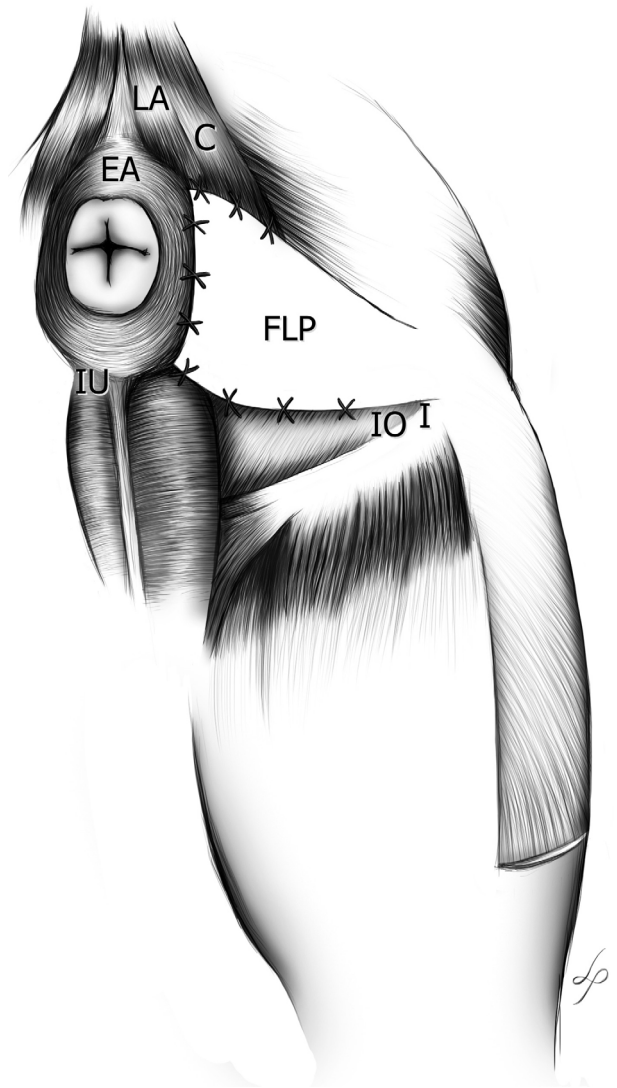

Figure 3. Illustration of the fascia lata flap (FLP) technique proposed in the paper. The FLP created was rotated cranially, passed through the subcutaneous tunnel, and placed into the perineal area. The cranial border was anchored to the ischial border (periosteum) I, and internal obturator muscle IO. The caudal border was sutured to coccygeus muscle C, levator ani muscle LA, and sacrotuberous ligament ST. The distal end was sutured to external anal sphincter EA, and ischiourethralis muscle IU.

3. Results

Two sexually intact and 4 castrated dogs were included in the study. Dogs' ages ranged from 10 to 15 years; the mean age was 12 years. The mean weight was 16 kg (range: 7–24). At presentation, all dogs had perineal swelling, 3 had dyschezia (cases 1, 3, and 5), and 4 had dysuria (cases 2, 4, 5, and 6). The differentiation between rectal deviation, sacculation, and diverticulum was not easy to make by digital rectal examination and perineal ultrasonography.

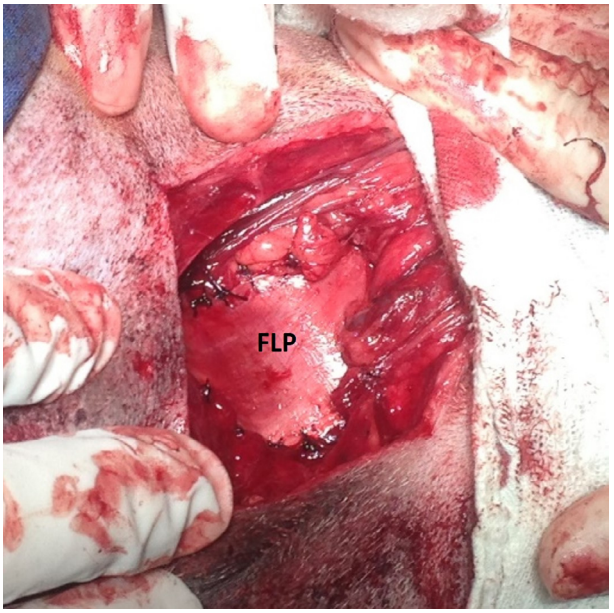

Figure 4. Intraoperative view of the fascia lata flap (FLP) sutured in place. The anus is not visible, but is on the left side of the image.

Therefore, all patients with the rectum identified by perineal ultrasonography were assumed to have mild rectal dilation.

Four dogs had previous perineal herniorrhaphy and orchiectomy simultaneously. Synthetic mesh implant had been used in 3 out of the 4 dogs that had already been treated for PH. In 1 dog, simple muscle apposition of the pelvic diaphragm had been performed during previous repair.

Unilateral perineal herniorrhaphy using FLP (n = 6) and scrotal caudal orchiectomy (n = 2) was performed without intraoperative complications. The mean follow-up time was 24 months (range: 18–34). Postoperative digital rectal examination confirmed the resolution of PH. No recurrence during follow-up was observed in any of the cases.

Resolution of preoperative clinical signs was observed in all cases. Fecal and/or urinary incontinence, tenesmus, and urine dribbling were not reported. Postoperative complications included mild lameness in the donor limb observed in 1 dog, which was resolved by the time of suture removal. Partial skin dehiscence observed 3 days after surgery, at the dorsal aspect of the PH incision, occurred in 1 dog. Complete healing was obtained within 20 days postoperatively, using sterile saline solution for wound cleaning (three times a day) and cephalexin (20 mg/kg orally every 12 h for 10 days).

Clinical data, signs at presentation, previous surgery, transoperative findings, and outcome for the 6 dogs included in the present study are summarized in the Table.

4. Discussion

The present study has shown that FLP is a suitable technique for PH repair in dogs, especially in cases with a relevant degree of atrophy of the pelvic diaphragm muscles. This new technique strengthened the pelvic diaphragm ventrolaterally and repaired PH without recurrence and major complications within 18–34 months.

Table. Clinical characteristics, previous surgery, and clinical outcome of six dogs with perineal hernia treated by fascia lata flap (FLP).

Dog	Age, breed, weight, sex	Previous surgery (herniorrhaphy)	Perineal hernia side	Clinical signs at presentation	Fascia lata flap side	Intraoperative findings (hernia contents)	Postoperative complications	Follow-up (months)**
1	13 years, Poodle, 7 kg, MI	No	Left unilateral	Perineal swelling, dyschezia	Left	Rectum	None	22
2	15 years, mixed, 20 kg, MI	No	Right unilateral	Perineal swelling, dysuria	Right	Bladder, prostate	None	24
3	11 years, Lhasa Apso, 10 kg, MC*	Yes (polypropylene mesh), recurrence 1 month after	Right unilateral	Perineal swelling, dyschezia	Right	Rectum	None	34
4	11 years, mixed, 25 kg, MC*	Yes (polypropylene mesh), recurrence 6 months after	Left unilateral	Perineal swelling, dyschezia, dysuria	Left	Bladder, prostate	Partial skin dehiscence	20
5	10 years, Poodle, 11.5 kg, MC*	Yes (polypropylene mesh), unknown time for recurrence	Right unilateral	Perineal swelling, dyschezia dysuria	Right	Bladder, rectum	Mild lameness in right pelvic limb	26
6	11 years, Rottweiler, 24 kg, MC*	Yes (primary suture of the pelvic diaphragm muscles), recurrence 1 year after	Right unilateral	Perineal swelling, dyschezia, dysuria	Right	Bladder, prostate	None	18

MI: Male intact, MC: male castrated, *castration performed at the time of previous herniorrhaphy,
**no recurrence of perineal hernia treated by fascia lata flap during follow-up.

The age, sex, and neuter status of affected dogs were consistent with previously studied populations affected by PH. Hormonal influences are involved in the pathogenesis of PH in dogs, since this condition is frequently diagnosed in intact male dogs (1,2,12). In the present study, 4 dogs were previously castrated; however, these dogs had orchiectomy simultaneously to a previous herniorrhaphy. Intact dogs included in the present study had orchiectomy performed on the same recumbence used to repair the hernia. This approach eliminated the need to aseptically prepare another surgical site, as well as the need for patient repositioning, when carrying out PH repair, thus optimizing surgical time (12).

Recurrence of PH is surely a challenge for surgeons, who should choose the most suitable technique to prevent or treat this complication. Transposition of the internal obturator muscle is one of the most commonly recommended procedures for PH repair, although a recurrence rate of 27.4% has been reported (10). The use of polypropylene mesh to strengthen the internal obturator technique has also been used; however, the recurrence rates reported reach 12.5% (8).

The use of foreign material for PH repair should be avoided, especially when it is possible to utilize the patient's own tissue. Our study showed 3 dogs (50%) with PH recurrence after polypropylene mesh treatment. Recurrence after implant techniques might reflect foreign body rejection and surgical site infection. The FLP is an autogenous material, which minimizes the risk of immunologic rejections and does not provide a site for persistent infection, compared with synthetic meshes (13,14).

It is known that fascial closures are stronger than muscular closures; therefore, FLP promotes stronger perineal repair when compared with muscular techniques (13–15), which may explain the lack of recurrence in our report. The tunica vaginalis autograft as well as the autologous fascia lata have no antigenic properties and can be used for PH repair (7). The advantages reported with the use of the tunica vaginalis autograft over the fascia lata for PH repair include that it is easier to harvest and does not require an additional surgical site, because routine castration is part of the treatment (7). Unfortunately, this technique is ineligible to repair recurrent PH, since castration is normally performed concomitantly with procedures to repair PH. Four out of 6 dogs in this study had already been castrated, since they had been previously treated for PH, making FLP a suitable option using autogenous biomaterial for recurrent PH repair.

Compared with the autologous fascia lata graft, the FLP facilitates the reestablishment of the pelvic diaphragm in PH with lateral and ventral rectal sacculation. The base of the flap, where the FLP emerges, successfully provides lateral and ventral supports without the placement of sutures. Difficulties in restoring the pelvic diaphragm have been reported because of muscle atrophy (1,2). In cases of ventral and lateral PH, the defect can be partially repaired by suturing the two internal obturator muscles at the midline, while ventral rectal support has been effectively provided by muscle transposition techniques (4). We observed the same ventral rectal support with the FLP technique.

The mean follow-up time of 24 months is adequate to demonstrate the long-term efficacy of the FLP herniorrhaphy technique. FLP was used to repair recurrent PH in 4 dogs, showing the value of this method even in cases with a relevant degree of atrophy of the pelvic diaphragm muscles, which is an important factor that contributes to the recurrence rate (2). Colopexy, cystopexy, and vas deferens pexy have been recommended prior to PH repair to reduce the risk of recurrence, to resolve rectal deviation, and to facilitate herniorrhaphy (11). In the present study, these techniques were not performed, demonstrating that dogs with complicated PH were successfully treated solely by perineal surgery and that the FLP technique can provide consistent ventrolateral support. Furthermore, anatomical positioning of hernia contents was easily obtained during surgery and recurrence was not observed.

Partial wound dehiscence was observed after PH repair in 3%–21% of the cases (4,8,11). Fecal contamination during surgical procedure, extensive surgical dissection, and previous local infection are pointed out to be the main causes of postoperative wound dehiscence (3,8). We observed partial wound dehiscence in 1 dog, previously treated with polypropylene mesh. It is possible that a previous incisional infection associated with the implant resulted in wound dehiscence (8). Unfortunately, no swab for culture was done, although a second intention was obtained with the use of antibiotics chosen empirically and would cleaning. Lameness associated with fascia lata harvest is the most frequent complication observed after fascia lata autograph for PH repair in dogs (13). Postoperative transient mild lameness in the donor limb was observed in 1 dog of this study. The rate of cases treated with FLP may increase these postoperative complications and this should be further investigated. Postoperative tenesmus and urinary incontinence have been described, normally associated with colonic and rectal disorders and bladder retroflexion (11). We were unable to identify these postoperative complications in our preliminary study; the small number of cases included in the present study may explain this finding and further investigation is needed.

Based on this initial study, we concluded that ipsilateral FLP is an effective method to treat unilateral complicated PH in dogs. The results presented in this study suggest that

the fascia lata can be safely transposed to the flap and it is sufficient to allow adequate fill of the pelvic diaphragm defect.

Despite the small number of dogs included, the transposition of the ipsilateral fascia lata for PH repair was consistent to provide a ventrolateral repair with sufficient strength to avoid recurrence. Further studies including more dogs are warranted to determine whether these results are supported.

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