

## The Use of Polypropylene Mesh for Perineal Herniorrhaphy in the Dog

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(Accepted: November 14, 2006)

**Abstract :** Perineal hernia occurs spontaneously in older male dogs after idiopathic weakening of the pelvic diaphragm. A 14-year-old uncastrated male shih tzu dog with right-sided perineal swelling was referred to the Veterinary Medical Teaching Hospital of Konkuk University. He had sign of perineal swelling for three years. Plain radiography documented the extent of rectal and colonic dilation in the herinal sac. During surgery, external anal sphincter muscle, coccygeus muscle and levator ani muscle were weakened due to the three years of herniation. Internal obturator muscle transposition method was not enough for large defect, so mesh was applied to reduce the hernial sac. Internal obturator muscle transposition combined with using of polypropylene mesh was successfully performed in this dog.

**Key words :** Perineal hernia, pelvic diaphragm, internal obturator muscle transposition, polypropylene mesh.

### Introduction

Peritoneum is denoted as the entire cutaneous muscular closure of the pelvic outlet in the environments of the anal and urogenital canals (1). The pelvic diaphragm is the musculo-fascial closure of the pelvic outlet that is found internally and caudally at the pelvis. It is formed by the levator ani muscle of the sides with bilaterally adjacent coccygeus muscle and both lamellae of the diaphragmatic fascia of the pelvis (1,6).

An atrophy of the pelvic diaphragm, especially between external anal sphincter and levator ani muscle, between levator ani muscle and coccygeus muscle, often leads to perineal hernia present in older intact male dogs (1,6). Perineal hernia is a failure of the supporting structures of the pelvic outlet that results in an inability of the pelvic diaphragm to contain the pelvic organ (4). Sometimes fecal material can be pushed into the stretched section of the rectum instead of through the anal sphincter.

The underlying cause for weakening or failure of the pelvic diaphragm is unclear. However many factors have been incriminated in its etiopathogenesis including; hormonal imbalance, congenital predisposition, structural weakness of the pelvic diaphragm, prostatic disease, and chronic constipation (1,4,6).

Most common in the middle-old aged (7-9 years), intact (95%) male dogs (97%) were affected (1). Two thirds are unilateral and the right side is the most commonly affected. Among the breeds frequently affected in German shepherd, Boxer, Doberman, Pekingese, Dachshund and Mongrel dogs (1).

Perineal hernia repair is a surgical procedure involving the replacement of displaced or protruding organs to their normal location and closure of the opening in the tissue wall. Several techniques for the surgical treatment of perineal hernia are direct apposition of surrounding tissue with nonabsorbable suture, internal obturator transposition, superficial gluteal muscle transposition, semitendinosus muscle flap and synthetic mesh implants (1,3,4,6).

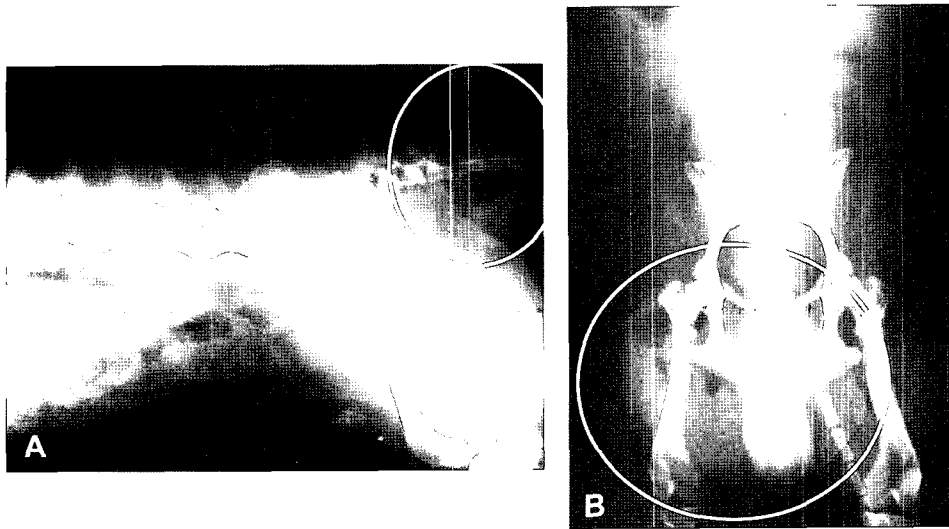
The purpose of the case report was to use a new alternative technique of perineal herinorrhaphy and to reduce complications.

### Case Report

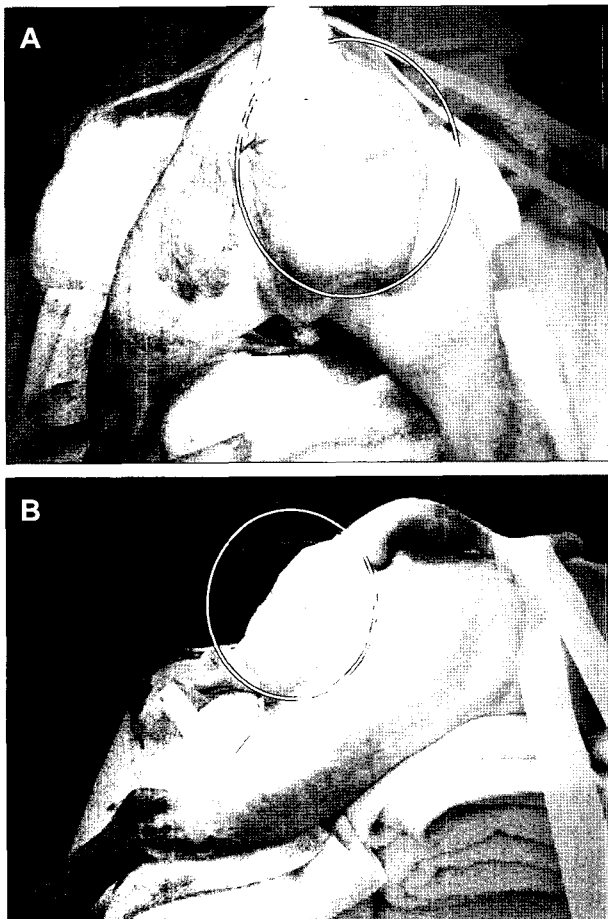
A 14-year-old uncastrated male shihtzu dog (5.3 kg) with right-sided perineal swelling was referred to the Veterinary Medical Teaching Hospital of Konkuk University. He had signs of perineal swelling, constipation and dyschezia for three years. The swelling was ventrolateral to the anus on the right.

Plain radiography documented the extent of rectal and colonic dilation in the herinal sac (Fig 1). Hematology and serum biochemistry were with normal laboratory reference ranges. The patient was anesthetized by premedication with medetomidine (Domitor<sup>®</sup>, Pharmos, 20 µg/kg) and acepromazine (Sedaject<sup>®</sup>, Samwoo, 0.1 mg/kg) intramuscularly and then induced with 6 mg/kg of intravenous propofol (Anepol<sup>®</sup>, Hana pharm). And then the patient was intubated, and anesthesia was maintained with isoflurane in oxygen. The lactated Ringer's solution was administered at the rate 10 ml/kg/hr. The patient was positioned in sternal recumbency. The cranial thigh region was cushioned against the table (Fig 2A), and a rectal examination was performed to assess the rectal wall support and to

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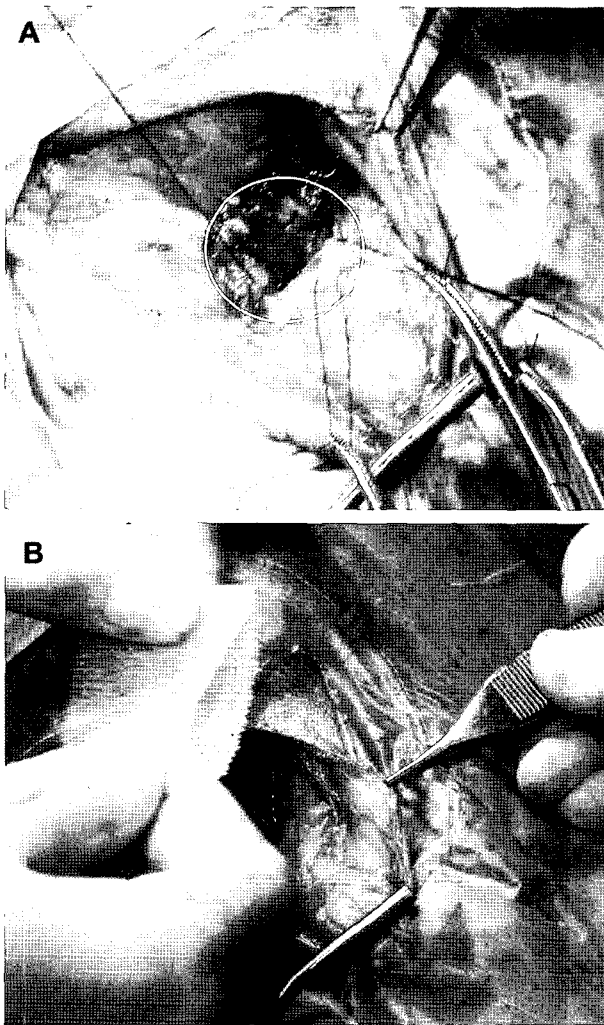
**Fig 1.** Plain radiography A. extent of rectal and colonic dilation in the right-sided perineal hernial sac at the lateral view and B. ventrodorsal view.



**Fig 2.** Positioning for perineal herniorrhaphy. A. Right-sided perineal hernia, positioned on the operating table. The anus and perineum are swollen. A purse-string suture has been placed in the anus. B. The towels provide padding. Tape secures the tail in a midline position over the back.

empty the caudal rectum and a povidone iodine gauze tampon was inserted into the anus; then, a purse-string suture was placed around the anus. The pelvic limbs were placed off the end of the table. The perineum was clipped and the tail was fixed cranially with several pieces of adhesive tape. The cranial thigh region is cushioned against the table to avoid placing unnecessary pressure on the femoral region. The surgical site was prepared for aseptic surgery (Fig 2B). A curvilinear skin incision was made 1 to 2 cm lateral to the anus. Hemorrhage was controlled by electrocautery (UM880AI, UMECO). The hernial sac was opened with blunt dissection, avoiding damage to any other organ. Hernial contents were returned to their original location. During surgery, external anal sphincter muscle, coccygeus muscle and levator ani muscle were weakened due to the three years of herniation. Internal obturator muscle transposition method was not enough for large defect (Fig 3), so mesh was applied to reduce the hernial sac. A polypropylene mesh was trimmed to dimensions slightly larger than the pelvic diaphragm. Sutures were horizontal mattress pattern using 3-0 polyglyconate (Maxon®, tyco/healthcare) through the polypropylene mesh and into the pelvic diaphragm muscle and sacrotuberous ligament. The mesh (Bard® Mesh, Monofilament knitted polypropylene, USA) was sutured first at ventral, then lateral and finally at medial position. The mesh was covered by subcutaneous tissue using 3-0 polyglyconate. The skin was sutured by skin stapler. The purse-string suture was removed. The patient was castrated after perineal herniorrhaphy.

Buprenorphine (Renolphan®, Hanlim pharm) at the dose of 10 µg/kg was given by an intramuscular route after the operation. Afterwards, carprofen (Rymadil®, Pfizer) tablets at a dose of 2.2 mg/kg were administered at 12 hour intervals during the next three days. Cephalexin (Cefulen®, Newzenpharm) at a dose of 30 mg/kg was administered orally for 7 days. The surgical site was cleaned with dry sterile gauze sponges. Elizabethan collar had been applied for 10 days postoperatively. The



**Fig 3.** A. External anal sphincter muscle, coccygeus muscle and levator ani muscle were weakened due to the three years of herniation. Internal obturator muscle transposition method was not enough for large defect. B. Polypropylene mesh was used to close a defect in the pelvic diaphragm.

skin staplers were removed at the 10<sup>th</sup> day after the operation.

After 10 months, there were no other complication.

### Discussion

Perineal hernia develops almost exclusively in older intact male dogs. Progressive weakening of the muscular pelvic diaphragm and supporting intrapelvic connective tissue structures eventually leads to herniation of pelvic organs and to deviation and sacculation of the rectum. The cause of perineal hernia has yet to be defined. However several theories have been proposed including tenesmus secondary to prostatomegaly or chronic constipation, imbalances of gonadal hormone concentrations, and neurologic atrophy of the levator ani muscle (1). In this case, the patient was 14-year-old uncastrated that had clinical signs for 3 years.

Surgical closure of the hernia can be affected after detachment of the tendon of internal obturator muscle and its transposition and union with the external sphincter muscle and coccygeus muscle which are sutured to each other. And castration counteracts the tendency the incidence and recurrence rates of perineal hernia (4).

Reported complications for perineal hernia repair techniques are tenesmus (10% to 25%), sciatic nerve injury (<5%), rectal prolapse (2% to 13%), fecal incontinence (<10%), wound infection abscess formation (6.4% to 26%), urinary incontinence, positional neuropraxia, recurrence rates (5% to 46%)<sup>2</sup>. For decreasing these postoperative complications, several methods of perineal hernia repair have been reported, including muscle appositional techniques, superficial gluteal muscle transposition and internal obturator muscle transposition. But these methods also have reported postoperative complication for perineal hernia repair. Muscle appositional techniques result in excessive tension on the external anal sphincter and are not recommended if there is muscle atrophy; complication rates range from 28.6% to 61% and recurrence from 10% to 45%. Surgical gluteal muscle transposition involves a wide approach and filling of the ventral part of the defect is not easy; complication rates range from 15% to 58% with recurrence at 31%. The internal obturator muscle transposition has complication rates range from 12% to 45% and recurrence from 2.38% to 36% (4,6). Depending on defect, polypropylene mesh or porcine intestinal submucosa is also used.

The range of surgical techniques and complications reported that there is no ideal repair method because of the complex nature of perineal hernia and various clinical signs. The ideal perineal hernia repair technique should be easy to perform, provide a repair with sufficient strength to avoid recurrence, and minimize complications (2,3,5). In this case, during the internal obturator muscle transposition, we observed that the muscle flap was too weak and did not hold a suture after pulling of hernial contents. Therefore, non-absorbable mesh could be used for augmentation when the internal obturator muscle is thin, friable, or reduced in size, or as a salvage procedure when recurrence occurs after muscle flap transposition. This situation was resolved by this modified technique of perineal hernia repair. This modified technique can be used as like as the operation of the first choice, if the internal obturator muscle flap is weak. Repair of hernia by implantation of non-absorbable meshes has resulted in low recurrence rates and good postoperative patient comfort. The most commonly used material is polypropylene mesh, because it is strong, inert and well incorporated into the surrounding tissue (4). It is also technically easy to handle and implant. Previous reports have evaluated implantation of polypropylene mesh in the closure of thoracic wall, abdominal wall, skull, and tracheal defects in dogs (5). However, the disadvantage of this technique is high cost of polypropylene mesh.

Polypropylene mesh easily secured the perineal hernia site, and provided a strong repair without recurrence of perineal hernia for 10 months or development of common complica-

tions such as fecal incontinence, wound infection, tenesmus, and sciatic nerve injury. Although major effort has been made to optimize mesh implantation and operation techniques, the influence of mesh material and properties on clinical outcome have not been thoroughly studied.

This suggests that polypropylene mesh could be used with internal obturator muscle transposition for perineal hernia repair, as an augmentation in case where the internal obturator muscle is thin and friable in the dog. This perineal hernia repair provided evidence that polypropylene mesh can serve as a satisfactory substrate for perineal herniorrhaphy in dogs without causing a significant inflammatory reaction. This technique can be used in case of weakness of internal obturator muscle flap like the operation of the first the choice.

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## 개에서 polypropylene mesh를 이용한 회음부 탈장 교정술 증례

강은희 · 장화석 · 양희택 · 정다정 · 이재훈 · 양우종 · 김태훈 · 이영수 · 최치봉 · 김휘율

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**요 약** : 회음부 탈장은 나이든 수컷에서 골반강의 특별한 약화로 일어난다. 14년령의 중성화되지 않은 수컷 시츄견이 우측 회음부 종창으로 건국대학교 부속 동물병원에 내원하였다. 3년간의 회음부 종창의 소견을 나타내는 병력을 가지고 있었으며, 방사선 검사에서 헤르니아 낭내의 직장과 결장의 확장이 관찰되었다. 회음부 탈장 교정술 중 바깥 항문조임근, 미골근, 그리고 항문 올림근이 약 3년간의 탈장으로 약화되어 있었고, 속폐쇄근의 변위만으로는 큰 결손부를 막기 어려워 polypropylene mesh를 이용하여 성공적인 수복이 이루어졌다.

**주요어**: 회음부 탈장, 골반강, 속폐쇄근 변위법, polypropylene mesh, 개