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Overview of perineal hernia in dogs

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Abstract
A perineal hernia is a condition where abdominal contents are herniated through the pelvic diaphragm, causing swelling, constipation, lethargy, and difficulty urinating in dogs. The cause is unclear, but theories suggest neurogenic or senile atrophy, degeneration changes, high testosterone levels, and prostatic hypertrophy. It is most common in uncastrated male dogs aged 7-9 and rare in females. Treatment includes medication, dietary management, herniorrhaphy, and castration. Postoperative complications include wound infection, fecal incontinence, urinary tract malfunction, and sciatic nerve paralysis. Recurrence risk is higher in non-castrated dogs. Prevention of overactivity, self-trauma, and castration during hernia repair may reduce recurrence.

Keywords: Perineal hernia, pathogenesis, dog

Introduction
Hernia is described as an organ or portion of an organ that protrudes through a hole in the wall of the abdominal cavity, where it should be located. Defects in the perineum, diaphragm, or abdominal wall account for the majority of hernias in small animals [1]. These can be acquired or congenital, and they have the potential to cause significant morbidity and even death. Herineal defects can be abnormal, like those that result from trauma, or they can occur at a normal opening, like the inguinal ring or the diaphragm's esophageal hiatus [2].
A perineal hernia occurs when part of the abdominal contents pass through the pelvic diaphragm, a group of muscles that surrounds the end of the rectum and runs from the sacrum and tail vertebrae to the pelvis. Animals suffering from a perineal hernia will exhibit either bilateral or unilateral swelling next to the anus, along with symptoms such as difficulties urinating, lethargy, and constipation [3].
The rectum, the bladder, any portion of the intestine, or fat may be present in the hernia. It is known to affect dogs and other animals, and it frequently manifests as an abrupt enlargement of one or both sides of the anus. Perineal hernias in dogs typically occur on the right side [4]. Breeds such as Boston terriers, Boxers, Corgis, Pekingese, Welsh Corgis, Dachshunds, Australian kelpies, Collies, old English sheepdogs, and kelpies are more susceptible, particularly if they are unneutered males [5]. The Clinical manifestations are dyschezia, raised perineal volume, redness, hyperthermia, and pain in the perineal region [6]. We can diagnose PH by physical examination, radiography, and ultrasound, and the best treatment method is Herniorrhaphy [7]. PH challenges the dog's life so prevention is mandatory. Therefore the purpose of this review is to provide an overview of perineal hernia etiology, pathogenesis, symptoms, diagnosis, therapy, and prevention.

Overview of perineal hernia
The perineal hernia (PH) of a dog is a protrusion in the anal region that may develop over time. Its presence may weaken the sensitive area's muscle, making it more difficult to pass waste. Furthermore, the effort required to defecate may cause these dog hernias to enlarge. PH is more prevalent in older non-neutered male canines (7–10 years). Female dogs are more resilient to these kinds of hernias since, by nature, their anal musculature is stronger due to giving birth [2]. A PH in dogs is mostly found on the right side [8], which is 2.8 times more common than left-sided [9]. Perineal hernias are more common in dog breeds including boxers, border collies, and Pekingese [10]. Individuals suffering from a perineal hernia may exhibit either bilateral or unilateral swelling next to the rectum, along with symptoms such as altered tail carriage, constipation, lethargy, and difficulty urinating [11].

This type of hernia is different from other types that the contents of the hernia don't cover by peritoneum, and partly due to the weakness of muscle of perineum making it easier to droop some viscera of the abdominal and pelvic cavity. Usually in perineal hernia animal has abdominal swelling and brutal space director and in some cases bilateral in the perineal area is swollen [12].

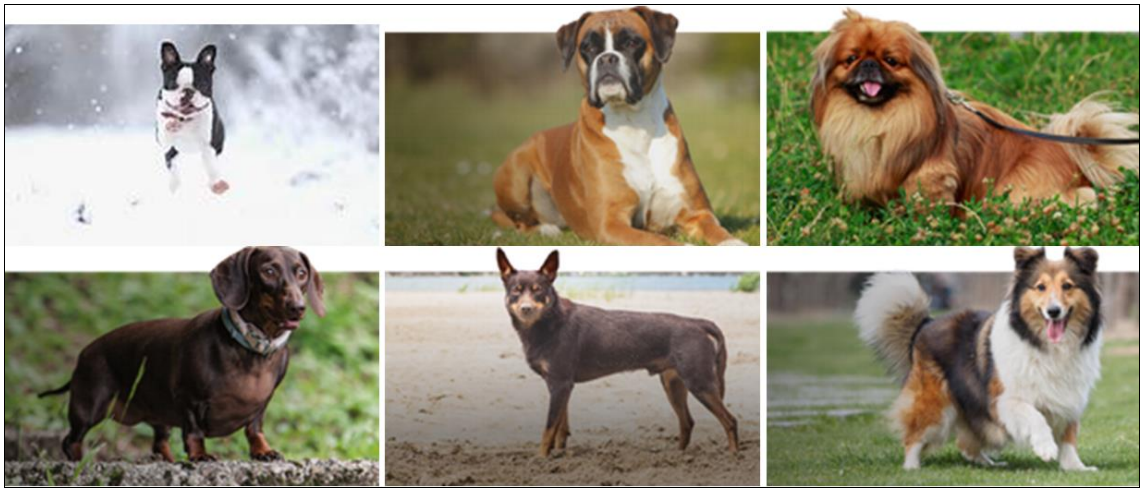

Fig 1: Perineal hernia susceptible breed of dog

Causes

It is yet unknown what is causing the pelvic diaphragm to deteriorate or fail. Nonetheless, a variety of ideas have been put out, all of which may operate independently or in concert to permit pelvic diaphragm weakness or failure. When the pelvic diaphragm weakens in male dogs, a perineal hernia develops on its own. Cystic para-prostatic tissues are occasionally seen in hernias. Castration lowers the frequency of post-surgical recurrence and incidence. While cystic prostatic hypertrophy is a regular finding in perineal hernia patients, there is little evidence to support an endocrine connection between the condition and steroid sex hormones. In dogs with perineal hernia, we observed strong immunoreactivity to relaxin in the periprostatic tissues and the epithelia of hypertrophic prostates. Normal dog prostates are stained with relaxin similarly, though less intensely. Therefore, relaxin of prostatic origin may play a local role in the weakening of connective tissue and the consequent creation of perineal hernias [13]. Such abnormalities can be caused by a variety of predisposing conditions, including age, breed, hormone imbalance, prostate disease, chronic constipation, and pelvic diaphragm weakening from prolonged straining.

Age

Few PH occurrences occur in dogs younger than five years old, with the majority occurring in those aged seven to nine. In Boston terriers, boxers, and Pekingese, the increased relative risk age of herniation is greatest between 7 and 9 years old; in collies and mongrels, it is between 10 and 14 years of age [14, 15].

Sex

Perineal hernia most commonly occurs in males and rarely in females [16]. The larger strength, size, and area of the levator ani muscle's rectal connection in females has been linked to this variation in incidence [17]. The weight of the levator ani muscle about body weight and the length of the muscle concerning the length of the pelvis and vertebral columns were found to be considerably higher in females than in males in a study involving 39 mixed-breed dogs. It has been suggested that these variations are related to the strain that parturition places on the pelvic diaphragm muscles [18].

Breed

Mixed-breed dogs, Boston terriers, miniature poodles, Bouviers des Flandres, boxers, Old English sheepdogs, and Pekingese are among the breeds of dogs where perineal hernias are frequently documented. Numerous research on perineal hernias has shown an overrepresentation of short-tailed and long-tailed dog breeds. It is unknown if short-tailed breeds have a structural weakness of the pelvic diaphragm, yet a study revealed that long-tailed corgis have larger perineal muscles than short-tailed corgis [2]. The weights of the muscles (as a percentage of the total thigh and perineal muscle weight) tended to be higher in long-tailed corgis, according to a study that evaluated the pelvic diaphragm muscles dissected from male short-tailed and long-tailed corgis [19]. Nonetheless, studies on perineal hernias also show an overrepresentation of long-tailed breed dogs [14].

Side of the body

321 (59%) and 232 (41%) of the 553 cases that 11 researchers documented were unilateral and bilateral, respectively. Among the unilateral cases, 108 (3%) and 213 (66%) were on the left. Although the weight of particular muscles varies, sometimes dramatically, between the right and left sides of the body, the evidence does not point to an innate weakness on the right side of the perineum [20]. Rather than being caused by factors that impact one side more than the other, the side on which herniation occurs may be connected to the rate and extent of tissue degradation on the pelvic diaphragm's side.

Pathogenesis

Usually, perineal herniation happens between the levator ani muscle and the external anal sphincter; on rare occasions, it happens between the levator ani and the coccygeal muscles. Herniation occurs when the pelvic diaphragm's supportive role deteriorates [21]. While some researchers reported a

facial weakening that was followed by the external anal sphincter's detachment from the pelvic diaphragm muscles, others reported a partial or complete rupture of the ani muscles. The rectal wall is less supported when the levator ani muscle deteriorates. Any one of the following degenerative conditions, alone or in combination, could be the source of this muscle degeneration.

Atrophy: Muscle fibers gradually diminish in size. A muscle whose nerve supply is cut off completely or partially will experience neurogenic atrophy. Atrophy of muscle fiber clusters indicative of neurogenic atrophy was seen in levator ani muscle biopsy specimens obtained after herniorrhaphy [9]. It's possible that straining during defecation caused the motor neurons to stretch, which is why the contradictory changes were discovered. Tenesmus may not play a major role in the clinical picture, occur before or after perineal edema, or persist for a considerable time without herniation [22]. One physical sign of aging is senile atrophy. Reduced tone in the levator ani muscle can be a factor in herniation. Short-tailed dogs may have underdeveloped levator ani and coccygeal muscles because they are involved in tail movement. This may be one of the risk factors for perineal hernia in the boxer, corgi, Old English sheepdog, and Boston terrier breeds [23].

Myopathies: Polymyositis, dermatomyositis, and muscular dystrophy are examples of these primary degenerative disorders. They can be linked to abnormalities, like neoplastic and endocrine conditions. Most have sporadic degenerative alterations to their muscle fibers [24].

Hormonal imbalance: The tendency of male dogs to develop this illness implies that hormones may play a role in the pathogenesis. This notion is supported by the observation that females have larger and stronger pelvic diaphragm muscles and a larger sacrotuberous ligament, as well as data that combining surgical repair with castration considerably lowers recurrence rates. Despite this, it has not been possible to show any appreciable variations in serum concentrations of either estrogen/ testosterone between dogs with and without perineal hernias [5].

Prostatic disease: Tenesmus can be brought on by prostatic enlargement and prolonged constipation, and this condition has historically been linked to the development of perineal hernias. Since the prostate gland is the principal location of relaxin synthesis in males, it plays a significant role in the pathophysiology of the condition, even if tesmus is currently thought to be simply a contributing factor [2].

Clinical signs

Dogs that have perineal hernias usually show one or both sides of a bulge next to the anus. Herniated abdominal and pelvic canal contents, including retroperitoneal fat, omentum, dilated rectum, prostate, urinary bladder, and small intestine, may be present in the edema. The organs trapped in the hernia are responsible for the clinical symptoms observed in pets suffering from perineal hernias. Constipation, straining to urinate or defecate, difficulty urinating, urine incontinence, abdominal pain, fatigue, depression, anorexia, and altered tail carriage are typical symptoms of these conditions [25].

Diagnosis

Perineal hernias are diagnosed based on medical history, physical examination, and rectal palpation. However, a rectal examination is necessary to identify unilateral vs bilateral disease, prostatic disease, the contents of the hernia, and the presence or absence of a mass-like lesion. A rectal examination or the prescription of sedatives or analgesics may be necessary for certain patients. The hernia typically contains fatty tissue. A lump in the hernia that is non-reducible and filled with fluid indicates that the bladder has been displaced. The pelvic diaphragm should always be palpated on both sides. Even though the patient may seem to be impaired only on one side, both sides are frequently discovered to be weaker [26].

Rectal palpation can be used to make the final diagnosis. Other diagnostic tests including abdominal radiography and ultrasonography tests can be done to confirm the organs involved. The use of radiography in evaluation has mostly been replaced by ultrasound, which is useful for examining the herineal contents, particularly the prostate, and bladder [27]. There have been reports of both retroflexion of the bladder with the neck positioned cranially to the body and caudal displacement of the bladder with the neck laying caudal to the body Positive or negative contrast cystography can show where the bladder is located. Using a barium meal rather than a barium enema to demonstrate any deviation in the rectum's transit is better. Within three to five hours, the large intestine contains the contrast medium. Dorsoventral projections are the finest for observing rectal deviation and dilatation, while lateral predictions are the best for observing displacement resulting from an enlarged prostate gland [9].

It's important to distinguish a hernia from an abscess, tumor, hematoma, and cyst. Tumors, cysts, and abscesses grow gradually, whereas hernias appear suddenly [28]. Perineal swelling, rectal neoplasia, rectal prolapse, anal sac neoplasia, prostatitis, prostatic abscess, pelvic trauma/fractures, anal sac abscess, and medial iliac lymph node enlargement must all be considered in the differential diagnosis of a perineal hernia [29]. Hernia can be confirmed by the presence of the hernial ring. Exploratory puncture or radiography and Ultrasound also be done for conformation [30].

Treatment

Most cases of perineal hernias with effective surgical intervention have very good prognoses; however, 10 to 15 percent of them recur within a year. Recurrence rates can be decreased by preventing overactivity and self-trauma [31]. Medical therapy or elective surgery may be used to treat non-emergency perineal hernias. While medical treatment is recommended to get a patient ready for surgery, it usually doesn't work to permanently control the disease process’s clinical indications. A combination of enemas, stool softeners, IV fluid therapy, nutritional control, and analgesics will be used in medical management [32].

Medical Treatment

The majority of medical professionals think that the best way to treat perineal hernias is through surgical surgery. Without surgical intervention, medical and dietary therapies are only adjuncts to surgical procedures and cannot permanently regulate the clinical indications associated with herniation [33]. The use of diets with high fiber content, stool softeners and/or laxatives (Methylcellulose and psyllium mucilloid powder) assists in preventing Constipation enemas, or manual evacuation may sometimes be necessary. Docusate raises mucosal permeability, decreases the net

absorption of electrolytes, and maintains soft stools [34].
Repeated catheterization or centesis is frequently necessary to decompress the bladder in cases of bladder retroflection. The bladder can then be manually decreased by applying light pressure to the perineal area. Prostatic hypertrophy is treated with medical hormonal therapy (castration) to reduce tenesmus. Prostatic hyperplasia may be suppressed using chlormadinone acetate and cyproterone acetate, a well-tolerated progestin with anti-androgenic action [5].

Surgical Treatment

Surgery is the usual course of treatment for perineal hernias. Emergency surgery is necessary for visceral entrapment and urinary bladder retroflection. To lessen the likelihood that perineal hernias may reoccur, castration is advised during herniorrhaphy. Internal obturator muscle transposition is the most commonly utilized surgical procedure for correction of a perineal hernia. Several additional methods are created, includes tunica vaginalis communis, using canine small intestinal submucosa, placing a synthetic mesh, transposition of the superficial gluteal and semitendinosus muscles, and placing fascia lata grafts [35].
Fasting the day before surgery, preoperative antibiotics, patient sedation, and appropriate laboratory assessment are all part of the patient's preoperative preparation. The day before surgery, enemas may be administered. After the patient has been given anesthesia, it is advised to do a digital evacuation of the rectum on the day of surgery. The patient is castrated and placed in dorsal recumbency following a total rectal evacuation. After that, the patient is put in the perineal position, a purse-string suture is applied in the anal orifice, and a tampon is placed in the rectum. From the tail base to a point halfway between the pubis and ischial tuberosity, a curving incision is created over the perineal mass, and then the incision is closed back to the midline near the scrotum. After entering the hernial sac, the bladder, small intestine, prostate, and/or paraprostatic fat or prostatic cysts are removed [36].

Post Operative Care (POC): In this often contaminated site, it is advised to administer broad-spectrum antibiotic prophylaxis during the immediate postoperative period. Opioids can be injected intravenously, however epidural administration of post-operative analgesics such as bupivacaine and morphine is advantageous. A clean surgical site is required. A controlled diet reduces the need for undue straining and promotes regular defecation. After surgery, animals with bladder retroflection need to balance their fluid, electrolyte levels, renal function, and bladder function carefully monitored [14].

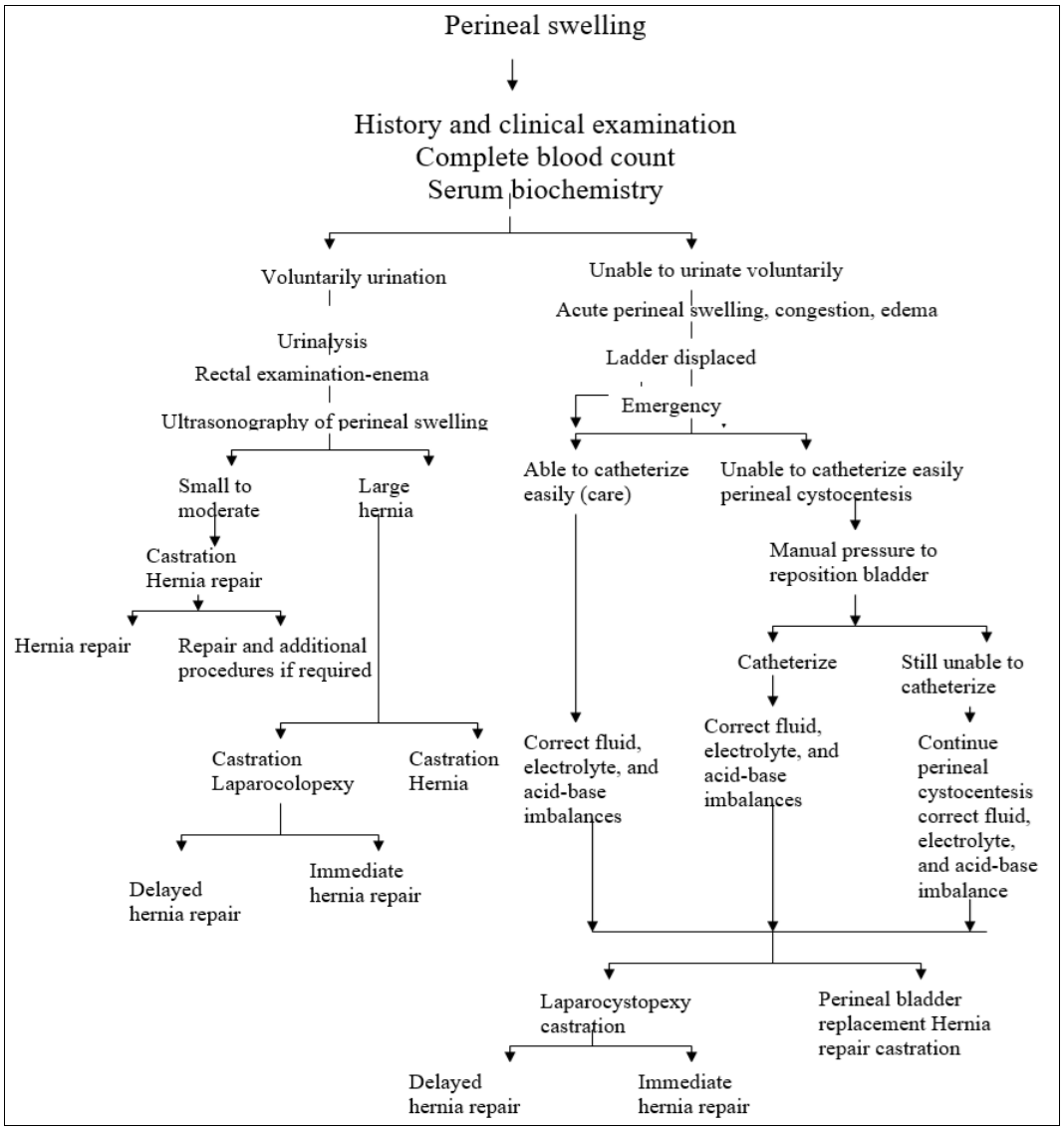

Fig 2: Algorithm for surgical treatment of perineal herniation

Complication of PH: Recurrence of PH, unilateral PH with significant rectal dilatation, PH with concomitant surgical prostatic illness, and PH with retroflexed bladder are the criteria that classify PH as complex. Urinary and fecal incontinence can result from injury to the pelvic and pudendal nerves. After bilateral repair, strain or local inflammation may cause anal sphincter incompetence, which should resolve a few days after surgery. Hernia repairs may increase the risk of rectal prolapse in dogs with large rectal sacculations until the dilated rectum retracts to its usual diameter. Dogs with rectal edema might also exhibit rectal prolapse. Purse-string sutures may need to be used temporarily. If a colopexy is performed, the likelihood of rectal prolapse appears to be reduced. Hernia recurrence following surgical repair failure could be brought on by inadequate healing, weak local tissue, or other risk factors. The hernia in certain animals is located relatively dorsally, meaning that sutures may need to pass between the recto-coccygeus muscle and the dorsolateral anal sphincter. While it is a known consequence, infections are uncommon [29]. Methods to reduce the risk of fecal contamination and the use of atraumatic surgical techniques are beneficial in minimizing the infection rate. Should wound infections occur, removal of some ventrally placed sutures to allow irrigation and bacterial culture is generally curative.

Prevention

Prevention methods for perineal hernia for dog include: (i) medical management using enemas, stool softeners, IV fluid therapy, nutritional control, and analgesics; and (ii) surgery to restore the pelvic diaphragm and avoid recurrence. Sutures are usually placed during a perineal herniorrhaphy to repair the pelvic diaphragm, (iii) Mild cases may initially respond favorably to medical therapy. It is possible to offer the animal stool softeners and oral laxatives to keep it from getting constipated. Adding extra fiber to the animal's diet could also assist in maintaining the softer stool, (iv) Hard stool elimination by hand and enemas may be required [37], (v) neutering of male dogs early in life may decrease their chance of having perineal hernias in the future [38].

Conclusion and Recommendation

A perineal hernia is characterized by unilateral or bilateral reducible swelling next to the anus is the result of part of the abdominal contents protruding through a weak or damaged pelvic diaphragm. In older male dogs who are not castrated, it is more prevalent; in female dogs, it is rare. It is predisposed to a certain breed. Hormonal involvement and senile or neurogenic muscle atrophy are linked to the weakening of the pelvic diaphragm. Ultrasonography and radiography can be performed to help determine perineal contents, bladder and rectal position, prostate disease, or the existence of a tumor. The diagnosis can also be made based on the patient's history and rectal examination. Castration and the avoidance of overactivity and self-trauma may reduce the need for treatment.

Based on the above conclusion the following recommendations are forwarded;

- Castrate the dog during or before herniorrhaphy.
- A comprehensive rectal examination is required to make a diagnosis, as well as to ascertain the contents of the hernia and if the prostate is developing or not.
- Prescribe a diet rich in dietary fiber and hydration. Use bulk-forming laxatives to prevent straining and constipation

List of Abbreviations

PH**:** Perineal Hernia
IV: Intravenous
POC: Post-Operative Care

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