A possible association between acquired nontraumatic inguinal and perineal hernia in adult male dogs

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Inguinal hernia in dogs results from a defect in the inguinal ring through which abdominal contents protrude. Inguinal hernia in adult dogs usually occurs in middle-aged, intact bitches and is rare in male dogs (1–3,6). Perineal hernia results from failure of the pelvic diaphragm to impede the passage of abdominal organs into the pelvic cavity and perineum. The pelvic diaphragm is formed by the coccygeal and levator ani muscles, together with their external and internal fascial coverings, and supports the rectal wall. Perineal hernia is relatively common in middle-aged and older, intact male dogs. Very few cases have been reported in bitches (1,4,5). The purpose of this retrospective study was to investigate if there is an association between inguinal and perineal hernias in adult male dogs.

The literature was reviewed using *Veterinary Update*, 1986–1994, and *Focus on Veterinary Science and Medicine*, 1993–1995, to find reported cases of acquired nontraumatic inguinal hernia in male dogs older than 4 y. All references from the articles found in these publications were also reviewed. Several reports were found describing inguinal hernias in male dogs. When the criteria were restricted to only those cases of nontraumatic, acquired inguinal hernia in male dogs older than 4 y, 9 cases were found and are summarized in Table 1. Four of these 9 cases were reported to have concurrent perineal hernia.

The medical records of male dogs older then 4 y admitted to the Veterinary Teaching Hospital — Koret School of Veterinary Medicine from 1989 to 1995 were also reviewed. Five cases of nontraumatic, acquired inguinal hernia were found; they are summarized in Table 2. All 5 cases had concurrent unilateral or bilateral perineal hernia. Four of the 5 dogs had a large fluctuant mass in the inguinal region, identified during physical examination and subsequently confirmed at surgery as an inguinal hernia, and a perineal hernia, identified by rectal and perineal palpation. The 5th dog was presented for repair of a perineal hernia after an inguinal hernia had been surgically repaired 5 mo earlier. Three of the dogs had a unilateral deviation of the rectal wall, with feces accumulating in the formed pocket. Two dogs had a larger rectal sacculation, created by a 270° weakening of the rectal wall.

The data presented in Tables 1 and 2 demonstrate that a number of mature (>4 y) male dogs with a nontraumatic inguinal hernia had a concurrent perineal hernia. The percentage occurring may be even higher, since some cases of inguinal and perineal hernia are inapparent unless specifically looked for. In 4 of the 5 cases seen in this hospital, the perineal hernia was not causing marked clinical problems and was not apparent to the owners. In addition, many inguinal hernias are not causing clinical problems and are not detected unless the surgeon specifically examines the inguinal area, which is often enlarged by fat deposits.

The age of 4 y was selected as representing an arbitrary division between young adults and middle-aged dogs. By investigating only middle-aged and older dogs, it should be possible to include all cases of perineal hernia and, at the same time, eliminate cases of congenital inguinal hernia.

Hernias of the inguinal region have been divided into 2 categories, indirect and direct. In an indirect hernia, the abdominal viscera enter the cavity of the vaginal process and, in males, can proceed into the scrotum. In a direct hernia, the abdominal organs pass through the inguinal ring adjacent to the normal evagination of the vaginal process (1). In males, indirect inguinal hernias commonly become scrotal hernias and are usually designated as such (1).

Inguinal hernia in adult dogs is relatively common. Several theories have been proposed to explain the pathogenesis of inguinal hernias and their more frequent occurrence in females, but none has been confirmed. These theories have included anatomical factors; hormones, such as estrogen, related primarily to females; and metabolic factors present in both sexes.

Anatomically, the inguinal canal is both shorter and larger in diameter in females than in males (1). The distinction between direct and indirect inguinal hernias is difficult to make in bitches, since the close superimposition of the internal and external inguinal rings does not form a canal but a potential gap where hernial disruption occurs. In addition, the thickened free margin of the peritoneal fold, containing the round ligament, that reflects through the inguinal canal in bitches slightly dilates the canal, predisposing to inguinal hernia (7). Sex hormones, in particular estrogen, could also be involved in the pathogenesis of inguinal hernia, because the majority of inguinal hernias appear during estrus or pregnancy and have not been reported in neutered females (1). Estrogen could change the strength and character of the connective tissues, ligamentous structures, and muscles in the inguinal area (1).

Weakening of the structures in the abdominal wall can occur due to an altered nutritional or metabolic status in the dog (1,3). Obesity increases intra-abdominal pressure, and this could force abdominal fat through the inguinal canals. Supporting structures of the abdominal wall could become weak or stretch owing to nutritional or metabolic problems, such as hyperadrenocorticism and

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Table 1. Clinical summary of cases of nontraumatic inguinal hernia in male dogs over 4 y of age reported in the veterinary literature from 1941–1994

Age (y)	Breed	Concurrent perineal hernia	Comments	Reference
4	Welsh corgi	Yes	Bilateral IH[a] cryptorchid	2
8	English cocker spaniel	No	Unilateral scrotal hernia	2
9	Shetland sheepdog	No	Unilateral IH	2
10	Rottweiler mixed breed	No	Unilateral IH	2
6	Miniature poodle	Yes	Bilateral IH	6
11	Mixed breed	Yes		6
12	Boston terrier	Yes		6
12	Toy poodle	No		6
6	Basset hound	No	Testicular	6

[a]IH — inguinal hernia

Table 2. Clinical summary of male dogs older then 4 y of age with acquired nontraumatic inguinal hernia presented to the Veterinary Teaching Hospital — Koret School of Veterinary Medicine from 1989–1994

Dog (#)	Age (y)	Breed	Weight	Concurrent perineal hernia	Comments
1	9	Mixed breed	25 kg	Yes	Liver cirrhosis, right scrotal hernia, left direct inguinal hernia, both containing small intestine and omentum
2	8	French bulldog	20 kg	Yes	Unilateral inguinal hernia, containing omentum and paraprostatic fat
3	10	Cocker spaniel	18 kg	Yes	Unilateral inguinal hernia, containing omentum and paraprostatic fat
4	8	Mixed breed	35 kg	Yes	Bilateral inguinal hernia, containing paraprostatic fat
5	8	Dachshund	15 kg	Yes	Unilateral inguinal hernia, containing paraprostatic fat

diabetes mellitus (3). The infrequent occurrence in males is not fully explained by these metabolic and nutritional factors.

Perineal hernias develop when weakness and separation of the muscles and fascia of the pelvic diaphragm allow caudal displacement of abdominal organs and fat or the lateral deviation of the rectum into the perineum (4,5). Perineal hernia is extremely rare in female dogs, and possible causative factors may be related to male dogs. The underlying cause of perineal hernia is poorly understood. Gonadal hormone imbalance is suspected, due to the predominance of perineal hernia in older, intact male dogs and the preventive effect of castration (5). The proposed imbalances include excess estrogen secretion by the aging testis, causing relaxation of the pelvic diaphragm, and deficiency of androgenic steroids, causing weakening of the pelvic diaphragmatic musculature (5). Other proposed mechanisms have been prostatomegaly, which leads to straining to defecate and increases the pressure on the muscles of the

pelvic diaphragm (5), and various rectal diseases, such as rectal deviation, rectal sacculation, and rectal diverticulum (5).

The authors of a recent report (8) suggest a potential role for relaxin in the formation of perineal hernias, because most dogs with perineal hernia have cystic prostatic hypertrophy and that these cysts contain high levels of the hormone relaxin. They suggest that the close proximity of these cysts to the pelvic diaphragm allows leakage of the cystic fluid into the area, causing relaxation and weakening of the ligamentous structures and muscles of the pelvic diaphragm. The concurrent presence of inguinal and perineal hernias in adult male dogs raises the possibility of a common pathogenesis. Meanwhile, we suggest that every adult male dog with an inguinal hernia should be carefully examined for the presence of a coexisting perineal hernia. CVJ

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BOOK REVIEW

COMPTE RENDU DE LIVRE

Gershwin LJ, Krawkowka S, Olsen R. ***Immunology and Immunopathology of Domestic Animals, 2nd ed.*** Mosby-Year Book, St. Louis, 1995. 195 pp. ISBN 0-0816-6398-9. $99.50.

This is a concise and relatively up-to-date book that may serve as an entry level text for veterinary students or a means by which practioners can renew familiarity with the field. When one considers the magnitude and rapidity with which advances occur in immunological science, the authors have done a commendable job of condensation. In less than 200 pages, they have provided a review of the basic principles of immune response, an outline of modern techniques used to assess function and response, a summary of immune-mediated diseases, and a synopsis of immune response to infectious diseases, including vaccination and the use of immunomodulators. This is not a text designed for devotees or serious students of immunology, who would no doubt find the treatment of most subjects too superficial. Rather, it is an attempt to provide an explanation of immunological principles and technologies, as they relate to animal health, for the practioner of animal medicine who wishes to be better informed. For the reader whose last formal contact with immunology was several years ago, the book offers insights into immunological advances resulting from the application of molecular biology, particularly during the past decade. For example, the authors briefly outline the use of FACs (fluorescence activated cell scan) to analyze lymphocyte subsets (CD antigens); the production, use, and limitations of monoclonal antibodies; and the potential alternatives for future genetically engineered vaccines. The chapter on cytokines, contributed by James Cullor, is particularly informative.

In general, information is presented in simple terms, free of "immuno-jargon" (although marred unfortunately by the occasional spelling or typographical error, such as, junction for function, or rox for pox). The explanation of more complicated theory or technical procedures is aided by diagrams and figures. Nevertheless, in some places brevity has been achieved by the omission of details, which may lead to confusion, especially for the reader who is not using this text as an adjunct to a course and may lack alternative resources with which to fill in the blanks. The prospective reader should consider whether or not that potential frustration is bearable, given the opportunity for an otherwise quick and simple update in immunology.

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