J Anim Reprod Biotechnol 2022;37:209-212
pISSN: 2671-4639 • eISSN: 2671-4663
https://doi.org/10.12750/JARB.37.3.209

Clinical Report

JARB
Journal of Animal Reproduction and Biotechnology

Check for updates

Finasteride therapy in a dog with benign prostatic hyperplasia

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Received August 23, 2022
Revised September 15, 2022
Accepted September 20, 2022

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ABSTRACT Benign prostatic hyperplasia (BPH) is frequently observed in intact middle-aged or older male dogs with symptoms ranging from asymptomatic to various symptoms such as urination, dyschezia, dysuria, tenesmus, and intermittent serosanguinous or clear serous exudate. A 4-year-old, intact male Welsh corgi with symptoms of intermittent hematuria and serosanguinous exudate at the urethral opening was diagnosed with BPH and intraprostatic hematocyst through ultrasonographic examination and cytology test. The dog was internationally adopted for reproductive purposes and needed to undergo BPH treatment while maintaining fertility. Thus, 2.5 mg finasteride was administered orally once a day for treatment option and therapeutic effects were observed, including loss of clinical symptoms and reduced prostate and intraparenchymal cyst size.

Keywords: benign prostatic hyperplasia, dog, finasteride, treatment, 5-α reductase inhibitor

INTRODUCTION

Benign prostatic hyperplasia (BPH) is frequently observed in unneutered middle-aged or older male dogs and is characterized by an increase in the number and size of prostate epithelial cells and subsequent glandular hyperplasia. Depending on the level of hypertrophy, BPH may be asymptomatic or may present with various symptoms such as urination, dyschezia, dysuria, tenesmus, and intermittent serosanguinous or clear serous exudate from the urethral opening (Johnston et al., 2001).

Ultrasound examinations of male dogs with BPH show symmetrical enlargement of the prostate with hyperechoic findings, as well as an intraprostatic cyst. Palpation upon rectal examination mainly shows no findings of pain; however, BPH may be an underlying disease that can progress into prostate abscess, prostatitis, and prostate carcinoma. Therefore, clinical symptoms due to prostate enlargement must be treated to reduce the size of the prostate through neutering surgery or drug therapy. In addition, BPH changes the properties of the prostatic fluid and chronically lowers the quality of sperm, acting as a key cause of infertility in male dogs. Thus, dogs with potential plans to be used for breeding are recommended to undergo medical treatment (Niżański et al., 2014).

Although the etiology of BPH has not been clearly elucidated, dihydrotestosterone (DHT) is known to play an important role in the normal growth and development of the prostate. Thus, drug therapy using finasteride, a 5-α reductase inhibitor, is used in dogs to treat BPH (Angrimani et al., 2020). The mechanism of action of the drug is shown in the following Fig. 1.

Herein, we report a case of successfully treating BPH in a stud dog using finasteride which maintained the repro-

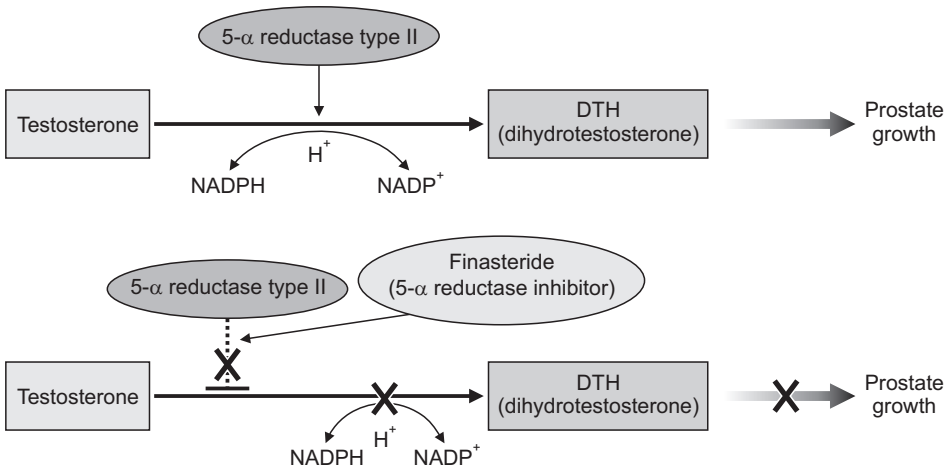

Fig. 1. A schematic diagram showing the mechanism of benign prostatic hyperplasia and the mechanism of 5α -reductase inhibitor treatment.

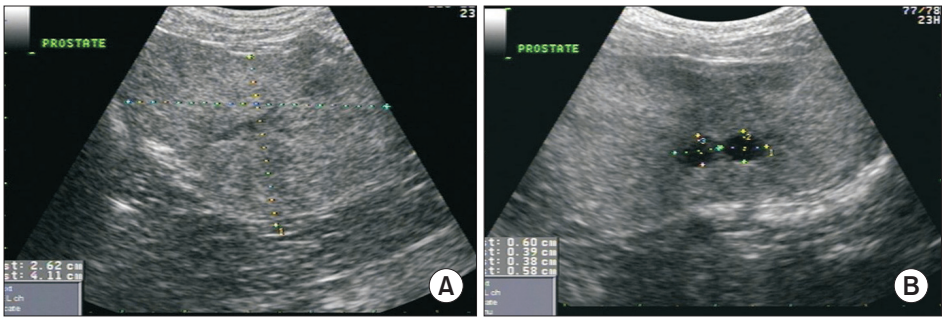

Fig. 2. Ultrasonographic images of prostate. The length and depth of prostate was measured as 2.62 × 4.12 cm (A). Two cysts in parenchyma of prostate were measured as 0.60 × 0.39 cm and 0.38 × 0.58 cm respectively (B).

ductive potential, reduced prostate size, and alleviated clinical symptoms.

CASE REPORT

A 4-year-old, intact male Welsh corgi presented to the hospital with symptoms of intermittent hematuria and serosanguinous exudate at the urethral opening. The dog was adopted internationally one month prior for breeding. After breeding one week before admission, symptoms of depression, increased frequency of hematuria, and anorexia were observed. Physical examination showed mild dehydration, and rectal palpation revealed an enlarged prostate with a relatively smooth border. No abnormal findings were observed in the blood tests. An abdominal radiograph revealed prostate enlargement and abdominal ultrasonography showed hyperechoic changes, prostate enlargement, and an intraprostatic cyst. Retrograde urography was conducted to assess the relationship between the prostatic urethra and prostate parenchyma; however, prostatic urethra damage was not observed. Fine needle aspirate examination of the prostate confirmed the diagnosis of BPH, and sanguineous cyst liquid was observed in the prostate. The size of the prostate and 2 cysts shown on abdominal ultrasonography was 2.62 × 4.12 cm, 0.60 × 0.39 cm, and 0.38 × 0.58 cm respectively (Fig. 2).

BPH and intraprostatic hematocyst due to vascular development were diagnosed through fine needle aspiration and ultrasonography of the prostate. As intermittent hematuria and serosanguineous exudate were observed, treatment for clinical symptoms was required. The patient was a breeding dog and needed to maintain its reproductive ability. Thus, medical management using finasteride (Proscar; MSD) was selected instead of neutering surgery. After two weeks of oral administration, clinical symptoms, including hematuria, were no longer observed. When finasteride 2.5 mg was administered orally once a day for five months, the size of the prostate and intraprostatic cyst was decreased to 2.34 × 3.53cm and 0.22 × 0.64cm, respectively (Fig. 3). The dog underwent two sessions of natural mating at three and four months of treatment and impregnated to female dogs, confirming that the reproductive ability was maintained during medical treatment.

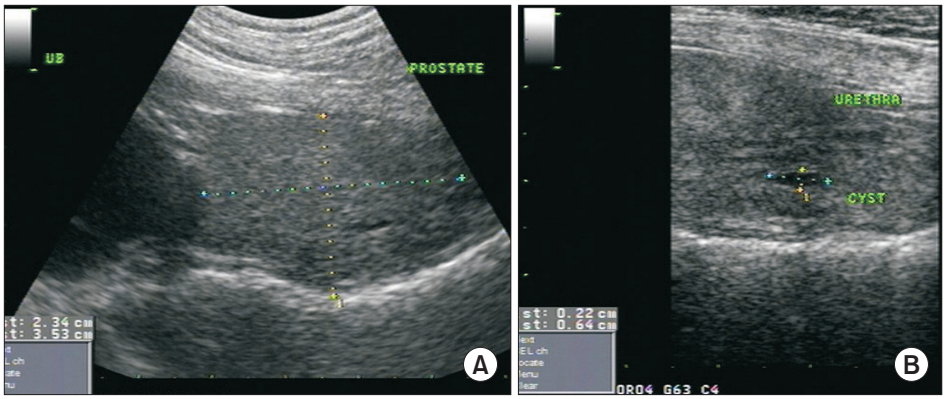

Fig. 3. Ultrasonographic images of prostate after 5 months of treatment. The length and depth of prostate was measured as 2.34 × 3.53 cm (A). The cyst in parenchyma of prostate were measured as 0.22 × 0.64 cm (B).

DISCUSSION

BPH occurs in unneutered male dogs as the number and size of prostate epithelial cells increase with age. When prostatic hypertrophy manifests, proliferation of the prostate is mainly observed in the urethra near the prostate and transition zone, and the glandular and matrix components proliferate histologically at various ratios. In humans, the leading cause of prostatic hypertrophy is an increase in the matrix (Selman, 2011). In contrast, in dogs, prostatic hypertrophy is caused as the glandular and stromal parts of the prostate increases while the epithelial tissue decreases (Lowseth et al., 1990).

BPH in dogs is commonly treated through neutering surgery to reduce hormone secretion. However, this leads to infertility. Thus, in dogs planning to undergo breeding, medical management such as drug therapy would be desirable to reduce the prostate size and maintain the reproductive ability as in the present case.

In veterinary medicine, estrogens, steroidal or non-steroidal antiandrogens, and GnRH agonists are also used to reduce the prostate size for treatment of BPH. However, estrogens can suppress bone marrow, causing aplastic anemia, and promote the growth and secretion of fibromuscular stroma and granular epithelium to form intraprostatic cysts and induce progression to abscesses and prostatitis. Thus, estrogens are not recommended for treatment of BPH in dogs. Steroidal anti-androgens competitively bind with androgen and DHT receptors to reduce the activity of DHT in the prostate; however, long-term use is known to decrease sexual desire and fertility. Common non-steroidal antiandrogens used to treat BPH include finasteride and flutamide. Finasteride inhibits 5-α-reductase which converts testosterone to dihydrotestosterone (DHT), thereby lowering the DHT concentration in the prostate and reducing its size. In addition, finasteride does not change the blood testosterone level, subsequently having no effects on sperm production. Thus, finasteride is recommended for treatment of BPH in male dogs with plans to undergo mating (Sirinarumitr et al., 2002; Angrimani et al., 2020). In previous studies on dogs, 1 mg/kg of finasteride for seven weeks reduced the prostate volume by 61% (Cohen et al., 1995), and 1 mg/kg of finasteride for 16 weeks reduced both prostate gland tissue and matrix (Laroque et al., 1995). In the present case, the dog was internationally adopted for reproductive purposes and needed to undergo BPH treatment while maintaining fertility. Therefore, finasteride (Proscar®) was used, and treatment effects were assessed through regular monitoring of the prostate size. After administration of finasteride for approximately 20 weeks, the prostate and intraprostatic cyst sizes decreased, and clinical symptoms disappeared. In addition, fertility was confirmed through natural mating.

The recommended dosage of finasteride is 1.5 mg, 2.5 mg, and 5 mg once a day for dogs weighing < 15kg, 15-30kg, and > 30kg, respectively. Upregulation due to increased blood testosterone level from finasteride use is known to have minimal physiological effects in humans, dogs, and rodents. Such lack of effects is attributed to the weak androgenic effects of testosterone, which is only 1/10 of DHT's androgen receptor affinity (Peters and Sorkin, 1993). Although there are no major side effects in relatively long-term use of finasteride, there may be changes in sperm properties due to decreased prostate fluid. Furthermore, as the prostate size increases again over several months after discontinued administration of finasteride, it would be important to regularly monitor the patient and

conduct sperm analysis to control the administration and withdrawal periods.

CONCLUSION

In this case report, a male dog with clinical symptoms was diagnosed with BPH without intention of undergoing neutering surgery. Finasteride was administered and therapeutic effects were observed, including loss of clinical symptoms and reduced prostate and intraparenchymal cyst size. During the 20-week long treatment, reproductive ability was confirmed, suggesting the clinical applicability of finasteride as a non-surgical treatment for BPH in dogs.

Author Contributions: Conceptualization, H.K.; writing-original drafting preparation, H.K.; writing-review and editing, H.K.

Funding: None.

Ethical Approval: Not applicable.

Consent to Participate: Not applicable.

Consent to Publish: Not applicable.

Availability of Data and Materials: Not applicable.

Acknowledgements: The author is grateful to Haemaru Referral Animal Hospital, where the author had been in charge of a theriogenologist.

Conflicts of Interest: No potential conflict of interest relevant to this article was reported.

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