

Archie's Painful Prostate

Morgan R. Myers

Mississippi State University

College of Veterinary Medicine

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Advisor: Patty Lathan, DVM, ACVIM

Introduction:

Bacterial prostatitis is a disease condition most commonly affecting mature male dogs. Typically, prostatic disease in the canine specifically affects intact individuals due to the hormonal influence on the pathophysiology. Approximately 90% of intact males will have histologic signs of BPH by 8 years of age.¹ The prostate is the only male accessory sex organ in the dog. It is a bilobed structure located in the caudal abdomen or pelvic cavity, and its function is the production of seminal fluid.^{1,2,5} The gland is closely related to the urinary tract system. Secretions from the prostate gland leave via the urethra, as the proximal portion runs through the gland. Cystitis often occurs in conjunction with prostatitis.³ There are both acute and chronic forms of prostatitis, which may present clinically different and require different treatment regimens.

History and Presentation:

Archie, a 10-year-old male intact mixed breed dog, presented to the Mississippi State University College of Veterinary Medicine Emergency Service on July 3rd, 2021 for vomiting and diarrhea for an approximately 5-day duration. He previously presented to the referring veterinarian where he received several medications including metronidazole, carprofen, Vitamin B12, and Metacam. Archie reportedly would occasionally vomit following administration of these medications and did not show any improvement in his clinical condition while receiving him. He had been noted to be consuming more water than usual and continued to have diarrhea.

On presentation, Archie was quiet, alert, and responsive. He weighed 6.6 kilograms and with a body condition score of 6 out of 9. He had an elevated temperature of 103.8 degrees Fahrenheit and a heart rate of 100 beats per minute with strong and synchronous pulses. He had a

respiratory rate of 36 breaths per minute with normal respiratory effort. His mucous membranes were pink and tacky with a capillary refill time of less than 2 seconds. His abdomen was tense on palpation, however there was no organomegaly noted or pain response elicited. Archie also had bilateral serous nasal discharge and watery eyes. Cranial to his prepuce in the region of his umbilicus, there was a soft tissue bulge that was non-reducible, which was suspected to be an umbilical hernia. There was a focal area of alopecia on Archie's tail. Cardiopulmonary auscultation revealed no murmurs or abnormalities. On rectal palpation, the right side of his prostate was enlarged and painful on palpation. No free fluid was found in his abdominal or thoracic cavities upon ultrasound scanning.

The following morning, Archie was transferred to the Internal Medicine Service for further diagnostics. On cardiopulmonary auscultation that morning, a grade IV/VI systolic murmur was noted. When walked outside, Archie walked with a stiff gait and was very hesitant to urinate.

Pathophysiology:

The function of the prostate gland is to produce seminal plasma and it is dependent on testosterone. Testosterone is produced within the testicles and is converted to the androgen dihydrotestosterone (DHT) by the enzyme 5α -reductase.¹ These androgens control the growth and secretions of the prostate gland, which is an important factor in the pathophysiology and treatment of canine prostatic diseases. In the intact male dog, the most common prostatic disease is benign prostatic hyperplasia (BPH). Under androgen-influence, the prostate continuously grows larger throughout the life span. Although this condition typically does not cause any clinical signs, it predisposes those dogs to developing prostatitis.⁵

Bacterial prostatitis occurs when the prostate is compromised due to an underlying condition, such as BPH or prostatic cysts. The routes of infection include ascending from the urethra, hematogenous spread, and extension of cystitis to the prostate.³ Because prostatic fluid can flow retrograde into the urinary bladder, prostatitis and cystitis are often found concurrently. The most commonly isolated bacteria in canine prostatitis is *Escherichia coli*; however, various other bacteria have been isolated such as *Klebsiella*, *Pseudomonas*, *Staphylococcus*, *Streptococcus*, and *Proteus*.^{1,5,6} Dogs with acute prostatitis most frequently present with signs of pain including abdominal pain, back pain, depression, or walking with a stiff gait. Often, they have signs associated with systemic disease such as fever and anorexia. Other clinical signs include gastrointestinal signs such as vomiting and diarrhea and urinary signs such as hematuria, pollakiuria, stranguria, and pyuria.^{1,5} In cases of chronic prostatitis, dogs most commonly present with recurrent urinary infections or urethral discharge; however, many do not show any clinical signs.

Diagnostic Approach:

In an intact male dog with prostatic disease, differentials should include prostatitis and benign prostatic hyperplasia. Neoplasia, including transitional cell carcinoma and prostatic carcinoma, may also be differentials. One of the most important diagnostic techniques to assess the prostate is transrectal palpation during physical exam. Transrectal palpation should be performed as a part of all routine physical exams, especially in intact male dogs presenting with urinary signs. Archie's prostate was firm, painful, and unilaterally enlarged on the right side. Prostatitis was the top differential as the prostate is normally non-painful, symmetrically enlarged, and of normal consistency in cases of benign prostatic hyperplasia.

Following Archie's physical exam, blood samples and sterile-collected urine samples were submitted for analysis. The complete blood count revealed an inflammatory leukogram consisting of a leukocytosis (31 thousand/ul) characterized by a neutrophilia (29 thousand/ul) with a regenerative left shift as well as a lymphopenia (230/ul). A chemistry panel revealed no significant findings. A SNAP C-PLI (canine pancreas-specific lipase ELISA) was performed due to Archie's gastrointestinal signs and tense abdomen; however, the results were normal. In cases of suspect prostatitis, urinalysis and urine culture with sensitivity are extremely valuable. Archie's urine was isosthenuric, with a specific gravity of 1.011, and it contained a significant amount of both white and red blood cells. Urine culture results after 48 hours revealed a growth of *Escherichia coli* with a colony count of >100,000 cfu/ml of urine and a sensitivity to amoxicillin, ampicillin, enrofloxacin, tetracycline, and trimethoprim/sulfamethoxazole. Prostatic fluid analysis via cytology, culture, and sensitivity are recommended in the diagnosis of prostatitis and selection of appropriate antimicrobial therapy; however, it was not performed in this case. Recent evidence suggests that in dogs with prostatitis with concurrent cystitis, urine bacterial culture and sensitivity results were similar to that of prostatic fluid and may be sufficient alone.³

Diagnostic imaging of Archie included thoracic and abdominal radiographs and an abdominal ultrasound. Thoracic radiographs revealed no significant findings. Abdominal radiographs revealed a distended urinary bladder, most likely due to Archie's dysuria and subsequent behavioral urine retention. On abdominal ultrasound, Archie's urinary bladder contained several hyperechoic foci of presumed cellular and/or proteinaceous debris. There were a few pinpoint, mineral opaque foci present in both renal cortices, determined to be mild bilateral renal cortical mineralization. His prostate was hyperechoic and heterogenous with numerous

ovoid hypoechoic to anechoic nodules, and his medical iliac lymph nodes were bilaterally enlarged. These findings were consistent with the presumptive diagnosis of prostatitis with subsequent reactive lymphadenopathy. An echocardiogram was also performed to further investigate Archie's heart murmur. This study revealed tricuspid regurgitation with mild pulmonary hypertension and trace mitral regurgitation. The thoracic radiographs and echocardiogram findings were submitted to IDEXX Laboratories for a cardiac consultation. The consultation reported that Archie's cardiac changes were most consistent with myxomatous mitral valve degeneration with minimal hemodynamic effects and no cardiac therapy was recommended for the time being.

Treatment/Management:

The mainstay of treatment for acute prostatitis is antimicrobial therapy based on culture and sensitivity. Another important consideration for antimicrobial choice is that the blood-prostate barrier limits the ability of certain antimicrobials to enter the prostatic tissue. Drugs that are lipid soluble, weakly alkaline, and have a high pKa are most reliably known to adequately penetrate the blood-prostate barrier.⁶ Although the inflammation involved with acute prostatitis likely decreases the effectiveness of this barrier, it is still recommended to only choose antimicrobials that will have effective penetration such as fluoroquinolones and enrofloxacin. The course of antimicrobial treatment should be at least 4-6 weeks; however, longer courses may be required in more complicated cases such as with abscessation or chronic prostatitis.^{5,6}

In addition to medical management, it is recommended that castration be performed as soon as possible due to the role of testosterone in BPH and subsequent prostatitis.⁶ In cases of a valuable breeding dog, BPH can be medically managed with the drug finasteride. Finasteride

decreases androgenic stimulation and thus the size of the prostate by reducing the conversion of testosterone to DHT.⁵

Case Outcome/Discussion:

During Archie's 3-day hospitalization, he was started on intravenous enrofloxacin to treat his acute prostatitis. He received intravenous maropitant citrate for nausea and received the appetite stimulant mirtazapine until he regained his appetite. To treat Archie's pain and dysuria due to presumptive cystitis, he received intravenous buprenorphine and oral prazosin. On the day of his discharge, Archie's clinical signs had resolved, and his temperature had normalized. He was sent home with oral enrofloxacin and prazosin. His owner was advised that he would need approximately 4 to 6 weeks of enrofloxacin, and that castration was the most important next step in the treatment and prevention of Archie's condition. It was recommended that Archie return for a follow-up in 3 to 4 weeks to monitor his response to enrofloxacin; however, a recheck examination was never scheduled.

Castration at an early age is the best strategy in the prevention of canine prostatic disease. Prostatic ultrasound can be used as a screening tool for prostatic disease. It is recommended that intact dogs receive imaging starting around 40% of the breed's life expectancy.¹ Both intact and castrated males should routinely undergo transrectal palpation to monitor prostatic changes; however, many cases of prostate disease are sub-clinical, especially in the early stages of disease. Canine prostatic-specific arginine esterase (CSPE) is a serum biomarker that has been found to be increased in dogs with BPH, bacterial prostatitis, and prostatic carcinoma.⁴ CSPE is a protein produced in the canine prostate that does not enter the bloodstream unless there is a defect in the structural integrity of the prostate.¹ Although not utilized in Archie's case, it is worth noting that CSPE shows promise as a diagnostic tool in the early detection of prostatic disease.

References:

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