Testicular Torsion with Ureteral Entrapment in a Dog

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Abstract:

A 7-year-old male Shih Tzu was presented for an acute abdomen and history of intermittent hematuria. An abdominal ultrasound revealed bilateral intra abdominal cryptorchidism. An exploratory laparotomy revealed a right testicular tumor with torsion and entrapment of the right ureter. The right ureter was salvaged and the dog was clinically normal 10 months after surgery.

1. Introduction

Canine cryptorchidism occurs 1.2-10% of the time in dogs **[1]**. The most common site of a retained testicle is a right-sided inguinal cryptorchidism, followed by right-sided abdominal cryptorchidism **[1-4]**. The retention can occur anywhere between the caudal pole of the kidneys to the inguinal area. Canine cryptorchidism is a congenital defect and is heritable, occurring more in purebreds, especially some small breeds **[2-4]**. Cryptorchidism is diagnosed after 6 months of age in a dog once closure of the inguinal rings occurs **[3, 5]**. Bilateral orchidectomy is the treatment of choice, as testicular neoplasia and torsion are more likely to occur in retained testes **[3-7]**.

The risk and incidence of neoplasia in retained testis has been reported to be 9 to 14 times higher than in scrotal testis **[3, 5, 6, 8-14]**. Additionally, retained testes that go through neoplastic transformation tend to exhibit more aggressive behavior than those in scrotal testes **[11]**.The three most common testicular tumors are Sertoli cell tumors, Seminomas, and Interstitial cell tumors with similar frequencies of occurrence in any location **[7, 9, 13, 14]**. Cryptorchidism is a factor that influences the development of testicular tumors in the dog, specifically Sertoli cell tumors and Seminomas, with one study reporting a 54% incidence of neoplasia in retained testicles **[1, 7, 13, 14]**. Approximately 70% of all abdominal testicular tumors, and 25-50% of dogs with Sertoli cell tumors present with signs relating to increased estrogen production (male feminization and bone marrow suppression) due to the testicles being abnormal since they are retained, and cryptorchidism predisposing the testicle to becoming neoplastic **[1, 6, 7, 14]**. Sertoli cell tumors in retained testicles that cause signs of feminization are, on average, two to three times bigger than tumors that do not cause hyperestrogenism, suggesting that the testicle being in an environment to grow so large allows more cells which produce estrogen **[1]**. Additionally, dogs with Sertoli cell tumors compared to normal tend to have significantly higher levels of Estradiol-17Beta **[7]**. To the authors' knowledge, the frequency of occurrence of testicular torsion in dogs has not been reported in the literature. There are only 18 case reports of

testicular torsion occurring in dogs and none with urinary signs from ureteral entrapment. However, the current case report describes an unusual presentation of a dog with a Sertoli cell tumor, testicular torsion, and intermittent severe abdominal pain and gross hematuria due to ureteral entrapment within the testicular torsion.

2. Case Description

A 7-year-old male Shih Tzu, thought to be neutered, was presented to the primary care veterinarian for routine annual examination. An abdominal mass was incidentally palpated on examination. Examination was otherwise unremarkable. Radiographs confirmed a mass in the mid ventral abdomen. A 2.8 x 5.0cm mass in the left side of mid abdomen of mixed echogenicity with a small 1cm fluid filled area and moderate prostatomegaly was noted on abdominal sonography. A fine needle aspirate of the mass submitted for cytopathology was consistent with testicular tissue. Retention of at least one testicle was suspected but the owner elected not to pursue removal as the dog was asymptomatic. Ten months after being diagnosed with a retained testicular mass, the dog was presented for acute abdominal pain. Prior to presentation, the dog had a two-to-three month history of intermittent episodes of lethargy and pain with pacing, restlessness, not wanting to lay down, and reluctance to jump. Gross hematuria and stranguria was also noted during these episodes. Empirical treatment with oral antibiotics for presumptive urinary tract infections failed to alleviate the symptoms. Four days prior to the current presentation, the dog was administered 60mg/kg of aspirin by the owner for unrelenting abdominal pain.

On physical examination, severe abdominal pain associated with a palpable abdominal mass was noted. Although a thinner hair coat was found on exam, alopecia was not noted. Gross hematuria or stranguria was not noted in a hospital setting. Bloodwork, urinalysis, thoracic and abdominal radiographs, and an abdominal ultrasound were performed. Complete blood (cell) count (CBC) showed a mild leukocytosis [22.27 x 10^9/l; reference interval (RI): 6.00-17.00] with neutrophilia [17.85 x 10^9/l;RI 3.00-12.00], serum biochemistry and urinalysis were unremarkable. The thoracic radiographs showed no evidence of metastatic disease or lymph node enlargement. A mid-abdominal soft tissue opaque mass was noted on the abdominal radiographs, displacing the GI tract. The mass was approximately 6.6cm x 4.9cm (**Figure 1**).
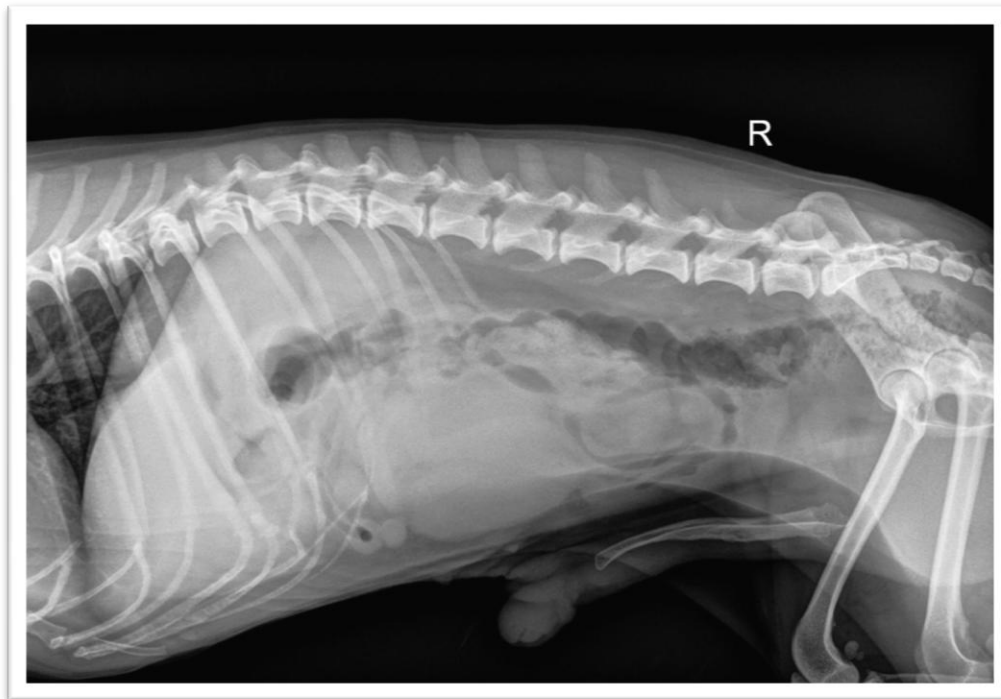

Figure 1: Right lateral abdominal radiograph-Mid-abdominal soft tissue opaque mass of unknown origin (6.6cm x 4.9cm) displacing the GI tract.

A large complex mid-abdominal mass, measuring approximately 10cm x 3cm, with multiple tortuous tubular structures in the parenchyma and one tubular structure originating from the caudal aspect of the mass and entering the prostate was noted on abdominal ultrasonography. The patient was hospitalized for supportive care and treatment of aspirin toxicity (patient received 103mg/lb, reported mild aspirin toxicity is <100mg/lb) **[15]**.Improvement was noted on treatment with Hydrocodone, Gabapentin, Omeprazole, and Sucralfate, and was discharged and scheduled for surgery the following week. Due to the concern for decreased platelet function from the aspirin toxicity, time was allotted to allow near complete turnover of affected platelets (lifespan of platelets is 5-7days) **[16, 17]**. Surgery was performed 5 days later. A ventral midline laparotomy was performed. Both testicles were retained. The left testicle was atrophied in appearance. The right testicle was markedly large and necrotic. The associated spermatic cord was torsed many times around its pedicle (**Figure 2a**).
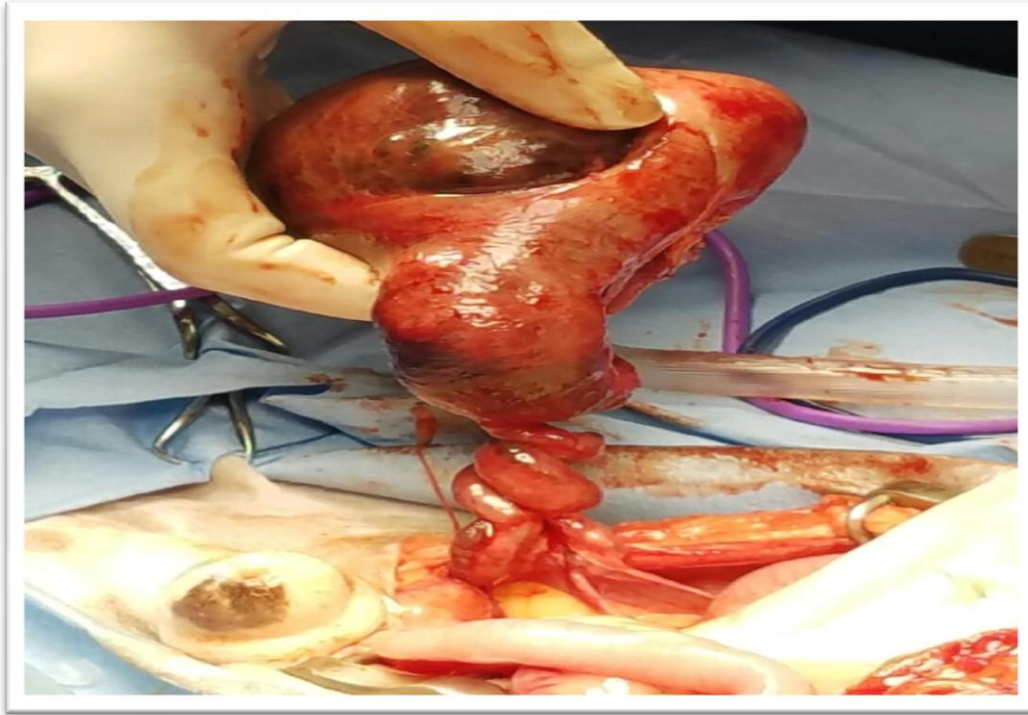

Figure 2a: External visualization of enlarged and engorged retained testicular tumor with severe spermatic cord torsion.

The right ureter was entrapped by the testicular torsion (**Figure 2b**). Care was taken to preserve the right ureter and dissect it free prior to orchiectomy. The testicles were submitted for histopathology (**Figure 2c**).

Figure 2b: Retained testicle being lifted out of the abdomen to visualize the torsion of deferential duct and right ureteral entrapment (instrument pointing to right ureter).

Figure 2c: Visualization of testicles after orchiectomy. Marked atrophy of the left retained testicle is noted.

The patient recovered uneventfully from surgery. Histopathology of the right testicle revealed a nodular mass composed of cords of epithelioid cells, presumed to be a Sertoli Cell tumor, but marked necrosis limited further cellular detail and interpretation. Evaluation of the left testicle was consistent with marked testicular atrophy. The

dog was doing well at the time of suture removal 2 weeks after surgery. The dog was doing well based on phone follow-up (10 months after surgery) with a thick fur coat and resolution of abdominal pain.

3. Discussion

Testicular torsion in dogs is rare. It occurs more commonly with retained intra abdominal testes and more often when they are neoplastic (36% occurrence of torsion is in neoplastic testes) [14, 18]. It is suspected that the presence of neoplasia is responsible for increased testicular weight in a pendulous, abdominal testis, predisposing it to rotation [14]. To the authors' knowledge, none of the case reports in the veterinary literature report ureteral entrapment and episodic abdominal pain with concurrent stranguria/hematuria [17-20]. Torsion of the spermatic cord is usually an acute presentation associated with signs of discomfort including abdominal pain, anorexia, lethargy, vomiting, and difficulty ambulating [14, 19]. Additional signs include abdominal distension, ascites, and shock [14]. Abdominal pain is the most consistent finding on physical examination [14]. The intermittent worsening episodes of restlessness, abdominal pain and stranguria over a few months in this case are likely related to multiple torsions of the spermatic cord and further incorporation of the right ureter into the pedicle. Testes have a distinct appearance on ultrasound, thus it can be a valuable tool in determining if a testicle is retained and its location within the abdomen or inguinal canal. As demonstrated in this case, ultrasound helped identify the retained testicle when the patient's alteration status was unknown. In one study, ultrasound was 96.6% sensitive and 100% specific for determining location of undescended testes [5]. Normally descended canine testes have a coarse, homogenous sonographic texture with a centrally located hyperechoic mediastinum testis [5]. When retained, they are small, oval or globoid, echo-poor structures that are architecturally normal, and a hyperechoic mediastinum testis can usually still be identified [5]. When they are torsed, the changes are even more distinct. Generally, testes are oval to globoid in shape and have a uniform echogenicity, and the mediastinum testis is more indistinct [20, 21]. Color flow doppler can be of use, and may show decreased to no flow signal in the epididymis [21]. In one study, color flow doppler ultrasound was without error in correctly detecting a relative decrease in perfusion [21]. In this case, color flow doppler confirmed the absence of perfusion to the testicular tumor (**Figure 3**).
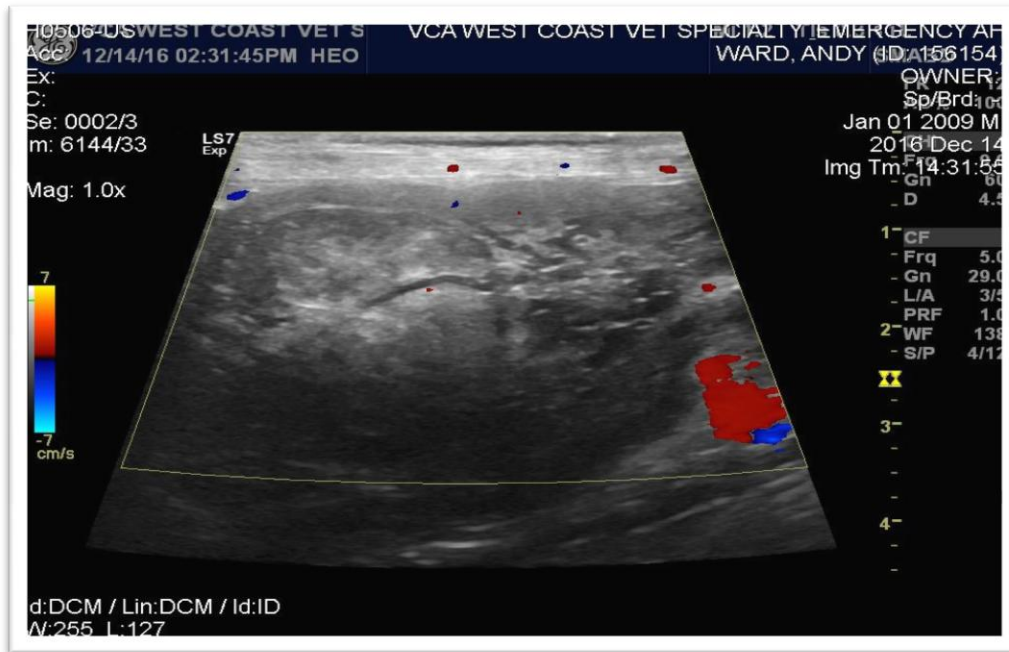

Figure 3: Color Flow Doppler image of large complex mass in mid-abdomen with absent color flow within it.

When testicles become neoplastic, with ultrasound it can be observed that the size increases relative to its counterpart, and they appear as masses of mixed or complex echotexture, as was reported in this case. In this case, on ultrasound, the right kidney showed no signs of obstruction. However, there were multiple tubular structures reported running to and from the mass. The use of color flow doppler on ultrasound could have helped distinguish the ureter from the epididymis, but the fact that it was torsed may have clouded this determination since blood flow

was diminished to absent in this case [21]. Over 50% ofdogs with Sertoli cell tumors present with clinical signs of feminization syndrome, especially if they are large tumors [7, 22]. Sertoli cell tumors that develop in retained testicles are more likely to produce signs of hyperestrogenism [7]. Common manifestations of increased estrogen production include bilateral flank alopecia that is non-pruritic, cutaneous hyperpigmentation, epidermal thinning, squamous metaplasia of the prostatic epithelium, gynecomastia, galactorrhea, a pendulous preputial sheath, attraction of other males, standing in a female posture to urinate, atrophy of the non-neoplastic testicle, and bone marrow suppression [1, 6, 7]. Whether the owner takes notice or not, the first manifestation of disease is often flank alopecia [22,23]. If clinical signs associated with hyperestrogenism are not noted, the other clinical signs that are noted tend to be caused by the space-occupying effect of the tumor itself [14]. It is thought that testicular tumors are slow to grow and become neoplastic [7]. Generally, dogs with retained testes that become neoplastic are on average between 6-10 years of age when the diagnosis is made [7]. The patient in this case fits within the age range of when retained testes tend to become neoplastic. This case report is interesting because the patient had no signs of feminization syndrome other than mild generalized thinning of the fur coat and did not present due to clinical signs associated with the space-occupying aspect of the tumor. With bilateral orchiectomy and no evidence of bone marrow suppression, the cure rate for retained testicular tumors is very high [7]. Signs of hyperestrogenism generally resolve within one to three months of surgery, unless metastasis is present [7]. Sertoli cell tumors metastasize less than 15% of the time [23]. Once myelotoxicity develops, the prognosis becomes guarded [6]. If it does not resolve within two weeks post-operatively, it likely will not resolve and prognosis becomes grave [6]. Most dogs with testicular tumors are asymptomatic [7]. This is the first case report of a dog with a retained testicular tumor with torsion and entrapment of the right ureter. He did not become symptomatic until the torsion and entrapment occurred. Testicular torsion with ureteral entrapment should be a differential for acute abdominal pain and hematuria in dogs with retained testicles.

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