

## The lameness in a cryptorchid dog with intra-abdominal torsion of one of the two neoplastic testicles: a case report

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**ABSTRACT:** This report describes a case of hind limb lameness associated with intra-abdominal torsion of a neoplastic testicle in a dog. An 11-year-old, male, bilaterally cryptorchid dog was referred for third degree lameness in the left hind limb. An orthopaedic and radiographic examination did not reveal any alteration in the limb, whereas transabdominal palpation and ultrasonography showed the presence of retained gonads. The surgical procedure revealed a left testicular torsion adherent to the viscera and peritoneum in the ventral-caudal part of the abdomen. A few days after a bilateral orchiectomy, the lameness was completely resolved. Histopathological investigations allowed diagnosis of interstitial (Sertoli) cell tumours in both testicles. One of the two testes was twisted. Sertolioma often affects undescended testicles and causes additional clinical changes, due to estrogenic steroidogenesis. The hyper-oestrogenism is characterised by alopecia, feminisation, prostatic alteration and haematological disorders. However, in this case these clinical signs were not present. The aim of this case report is to highlight the correlation of the disease and the onset of limp, which is similar to what has been reported in human medicine in patients affected by meralgia paresthetica.

**Keywords:** cryptorchidism; canine; limp; interstitial cell tumour; testicular torsion; meralgia paresthetica

Testicles in dogs are in the abdominal cavity at birth, and reach their physiological site at approximately 10–14 days of age. Cryptorchidism is the failure of one or both testicles to descend into the scrotum within the first eight weeks of life (Ettinger and Feldman 2005).

The causes of this condition are topographic position abnormalities, a short gubernaculum testis or its failure to regress correctly. Undescended testicles can remain in the abdominal cavity, in the inguinal canal, or they can shift to an ectopic paraneuronic position. These testicles are predisposed to develop neoplasia. It has been hypothesised that the negative effect of a higher temperature on the various cell types of the testicle or an inherent defect in the non-descending testicles promotes neoplastic development (Laing et al. 1983).

Testicular torsions are rare, but they are more frequent in neoplastic, undescended testicles, due to their size and greater mobility inside the abdomen (Romagnoli 1991; Mostachio et al. 2007). In

the literature, this disease is often associated with a feminisation syndrome (Quartuccio et al. 2012) and prostatic diseases (Spackman and Roth 1988, Mostachio et al. 2007), but no reports have described any kind of lameness.

The aim of this report is to describe a case of lameness in the left leg in a bilateral cryptorchid dog with intra-abdominal torsion of one (left) of the two neoplastic testicles and to show how the absence of classical symptoms may sometimes complicate the final diagnosis.

### Case description

**Case history.** An 11-year-old male poodle weighing 6 kg was referred for left hind limb lameness. At the age of five months, a physical examination suggested the development of bilateral abdominal cryptorchidism, but the owner declined the recommendation of submitting the dog to surgery.

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**Clinical findings.** The dog was referred to the Veterinary Teaching Hospital of Perugia for a limp in the left hind limb. The owner reported that the lameness had been evident for about a couple of weeks without mentioning any traumatic event. The practitioner administered NSAID for ten days without success. During the general physical examination, the animal was nervous, unwilling to move and exhibited a contracted abdomen. A subsequent palpation of the abdomen was difficult because of muscle contraction and pain. There was, however, a moderate distension in the hypogastric region. Body temperature was within the norm.

The diagnostic work-up of the left hind limb lameness began with the clinical examination of gait. The dog showed third-degree lameness (zero to four degrees) (Quinn et al. 2007), and was unwilling to run or climb stairs. Manipulations of the stifle joint, flexion and extension, did not induce pain. To exclude ligamentous involvement, the anterior drawer test, tibial trust test and sit test were carried out with negative outcomes. A neurological examination failed to demonstrate any significant signs. Manipulation of the lower back revealed no reaction, whereas flexion and extension of the hip provoked a severe painful reaction. For this reason, a survey radiograph of the pelvis and left hind limb was carried out. However, this did not reveal any skeletal abnormalities; instead the radiographic exam of the abdomen showed a fuzzy and shadowy soft tissue area 8–10 cm in diameter in the caudal-ventral portion of the abdomen. The differential diagnoses for acute abdominal pain and lameness, based on the clinical symptoms, led to speculation regarding the following pathologies: traumatic limb injury, torsion of the spleen, splenic mass, discal pathologies or testicle torsion.

To better differentiate the diagnosis, an ultrasonographic examination of the caudal abdomen was performed, which revealed two “complex mass” structures enclosed by a hyperechoic capsule characterised by a heterogeneous pattern, less hypoechoic than the surrounding peritoneum (Boza et al. 2011).

Based on anamnesis, blood tests and clinical findings, an exploratory laparotomy was advocated in order to confirm the diagnosis.

The dog was premedicated with 3 µg/kg of medetomidine (Domitor®, Zoetis) and 1 mg/kg of ketamine (Ketavet® 100; Intervet) by intramuscular injection. When an adequate level of sedation

was achieved, general anaesthesia was induced with 3 mg/kg of propofol (Rapinovet®; Intervet), and maintained, after endotracheal intubation, with a mixture of isoflurane (Isoflo®; Esteve spA) and oxygen (50–100 ml/kg/min) via a circle breathing circuit in spontaneous ventilation. Thirty minutes before surgery, a prophylactic dose of 20 mg/kg intravenous injection of cefazoline (Cefazolina Dorom®; Dorom srl) was administered. Surgery consisted of a caudal midline incision from the umbilicus to the cranial margin of the pubis. The major caudal viscera were examined and found to be normal. The left undescended testicles presented spermatic cord torsion adherent to the viscera and caudal peritoneum. There was a serious vascular deterioration which prevented the normal, vascular inflow/outflow of blood to the organ. The testicle appeared enlarged, firm, swollen and haemorrhagic, and probably undergoing neoplastic degeneration. Its size was 4.6 cm × 6.2 cm × 3.5 cm. The right testis also appeared neoplastic and was firm, irregular, globoid, hyperaemic, swollen and haemorrhagic (4 cm × 6 cm × 2.9 cm) (Figure 1). The sublumbar lymph nodes were removed, even though macroscopic alterations were not observable. A synthetic, absorbable, braided 2/0 suture material (Vicryl®; Johnson & Johnson International) was used to ligate the spermatic cord and remove both gonads. The abdomen was closed in three layers according to standard procedure.

Histopathological examination of the two masses revealed irregularly multilobulated clusters, with abundant connective stroma with tumour cells of-

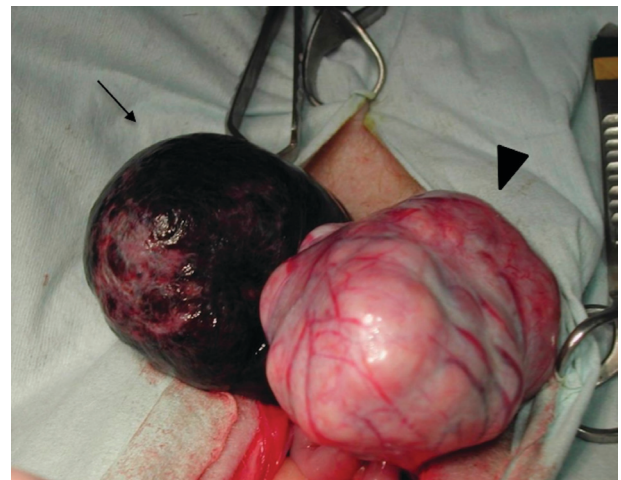


Figure 1. The right testis (arrowhead) appears to be globoid and swollen. The left testicle (arrow) is enlarged, firm, swollen and haemorrhagic

ten arranged in tubular structures. The neoplastic cells resembled normal sustentacular-like cells with indistinct borders with large oval- or spindle-shaped nuclei and rare mitotic figures. Tissues in the left testicle had undergone acute necrosis due to the torsion and rare areas of inflammation characterised mostly by diffuse, mild lymphomonocytic infiltration. Histopathological examination of the sublumbar lymph nodes did not reveal any abnormality.

After two days of hospitalisation, the dog was discharged with a complete resolution of the hind limb lameness. Ten days after treatment, when cutaneous sutures were removed at the clinical examination, the lameness was absent and the abdomen was not painful on palpation. An ultrasonographic exam of the abdomen was carried out and showed mild hyperechogenicity of the peritoneum. The scheduled postoperative follow-ups at 1–6–12 months after surgery were not performed due to the owner's lack of compliance.

## DISCUSSION AND CONCLUSIONS

This case summarises the inherent problem of cryptorchidism in dogs. To the authors' knowledge, there are no reports of lameness in a cryptorchid dog with intra-abdominal torsion of one of the two neoplastic testicles. In this case, the testicular torsion caused left hind limb lameness and acute abdominal pain, which led to the discovery of the nature of the gonadal tumour (Pearson and Kelly 1975; Romagnoli 1991).

Genetic aspects play a primary role in the transmission of cryptorchidism and the disease is most probably linked to an autosomal recessive sex-linked trait. The cryptorchid dog should not be bred as there is the risk of it transmitting the defect to its progeny. Other pathogenic hypotheses imply the involvement of the descending testicular mechanism with multiple genes involved.

Testicular torsion is very rare in dogs. It occurs more frequently in undescended testes with neoplastic phenomena. Reports have described that 36% of torsions occurred in animals with testicular neoplasia and commonly in cryptorchids (Laing et al. 1983). Despite the fact that the aetiology of intra-abdominal testicular torsion is not well defined, it has been hypothesised that the neoplastic testicle is more exposed to rotational stresses caused by

trauma or physical strains due to increased weight and size (Laing et al. 1983). Tumours of the testis represent 5–15% of tumours in dogs. Sertolioma often affects undescended testes and in 10% of cases is bilateral. Its growth is usually slow and only 10% metastasise, usually via the sublumbar lymph node, liver, kidney, spleen, pancreas, lung and heart (Laing et al. 1983). Sertolioma may often cause additional clinical changes, due to oestrogenic steroidogenesis. This syndrome is characterised by alopecia, feminisation, prostatic alterations and haematological disorders, such as non-regenerative anaemia, thrombocytopenia, fever and secondary infections. Signs of hyper-oestrogenism develop in 70% of intra-abdominal sustentacular cell tumours (Laing et al. 1983). The absence of these classic symptoms in this case may have been due to rapid tumour differentiation.

As there were no obvious clinical signs, we did not initially expect to find a testicular tumour. Thus, the attention was focused first on the lameness, and then on all the differential diagnoses that could cause lameness and acute abdominal pain. Acute abdominal pain includes disorders of the gastrointestinal, genital and urinary tract, peritoneum or spleen (Hecht et al. 2004). Nevertheless, torsion of the retained testicle must be considered as one of the differential diagnoses. A tentative diagnosis depends on the features presented by the cryptorchidism, but it requires an ultrasonography to confirm the diagnosis of testicular torsion in order to differentiate it from other pathologies which may present similar signs (Miyabayashi et al. 1990). Although not used in this particular case, a colour Doppler is also a helpful tool to show the absence of blood flow within the twisted testicle (Mostachio et al. 2007; Boza et al. 2011). It is also important to intraoperatively perform a biopsy of regional lymph nodes, to discover whether there are any early signs of metastasis.

Undescended testes are extremely likely to develop into a neoplastic degeneration that is sometimes invisible. These observations reinforce the importance of bilateral orchiectomy as treatment for this disorder (Post and Kilborn 1987).

As reported in the literature (Ein 1987), the presence of a neoplastic intra-abdominal mass in a human male would rarely cause an ipsilateral lower leg limp. In human medicine, meralgia paresthetica (MP) is a mononeuropathy of the femoral cutaneous nerve with characteristic symptoms usually

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secondary to injury or compression, being most common in the inguinal area (Cheatham et al. 2013). The symptoms most frequently associated with this condition in humans are pain, lameness and difficulty in climbing stairs: these are strictly correlated with the symptoms of the patient described in our case. In consideration of what is reported in the human literature, it was proposed that the presence of this large intra-abdominal mass, located in the left caudal abdominal area, can compress and/or cause inflammation of the homolateral femoral cutaneous nerve or femoral nerve (Anderson and Anderson 1994), which may lead to pain and limping. Exceptional cases have been published of MP in humans, associated with compressions caused by abdominal or pelvic tumours (Suber and Massey 1979). If the equipment is available, electromyography is the specific test that allows diagnosis of MP. Ein (1987) did not use electromyographic tests for identifying MP in humans.

To the authors' knowledge, there are no reports of hind limb lameness in a cryptorchid dog with ipsilateral, intra-abdominal torsion of one of the two neoplastic testicles.

In the evaluation of hind limb lameness in a cryptorchid dog, it would be advisable to consider torsion of the neoplastic testicle as a differential diagnosis.

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