

USING CONTRAST COMPUTED TOMOGRAPHY (CT) IN THE DIAGNOSIS OF SOME CANINE MALE GENITALIA DISORDERS

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Abstract

The ultrasound examination is a powerful tool in diagnosing canine male genital disorders, but presents some shortcomings in the exact localization of some intraabdominal masses and their vascularization. Some disorders, such as abdominal sertolinomas, atrophic testicle, persistent Müllerian ducts (PMDS) or testicle cord torsions, can be difficult to diagnose and pinpoint if the obvious symptoms (for example feminization, alopecia and skin hyperpigmentation) are not present. The purpose of this study was to test the accuracy of contrast computed tomography (CT) techniques compared to the ultrasound exam (US), in diagnosing some male reproductive disorders. The study was conducted on 7 male canine patients, pure breed, with the age between 3 months and 7 years old. After the patients were presented at the clinic an ultrasound in B-Mode and Doppler was performed using a Mindray DC3 Vet equipment. The CT contrast agent was Visipaque (iodixanol, 320 mgI/mL, producer Nycomed Amersham) using automated injection after the patient was general anesthetized, the dose being automated adjusted by the device. The results are inconclusive; the retained testicle can be easily observed but the uterine artery as well as the reminiscent uterine horns are too small to visualize. The disadvantage of the CT is besides the radiation; the patient needs to be under general anesthesia. In conclusion, in some cases, such as cryptorchidism, sertolinomas, lymphnode metastasis or intraabdominal masses, the CT is very efficient in pinpointing the exact location, but in other cases such as PMDS the contrast CT is not recommended, but the US is.

Keywords: contrast CT, PMDS, cryptorchidism, sertolinomas

Introduction

Cryptorchidism is defined by the retention of one or both testis and can be a presumptive diagnosis, in dogs, if the testis cannot be palpable within the scrotum starting with the age of 8-10 weeks of age (Simpson G., 1998).

The connection between this disorder and testicular tumors has been studied and very early results have been discovered. For example, an early study, on 410 cases stated that cryptorchid dogs had a 13.6 times higher risk of testicular neoplasia than non-affected dogs (Hayes H. M. Jr., 1976). The retained testis has higher risk of developing sertolinomas or seminomas (Hayes H. M. Jr., 1985). Due to this fact, this congenital disorder represents a very serious problem for the dogs and their owners, but at the same time an equally serious issue within the breeder's community.

Given this high risk, an ultrasound examination (US) is performed, not only to confirm the diagnosis but to localize the retained testicle as well. In cases where the testicle is in the abdomen, these are usually very small hypotrophic structures, which makes their identification and localization by this method difficult (Mannion P., 2006). This difficulty can be seen in puppies, but also in older dogs with an early stage of neoplasia.

The ultrasound examination (US) is an important clinical method to diagnose various male genitalia disorders, but in cases such as persistent Müllerian ducts syndrome (PMDS) this proves to be more difficult. In about 50% of cases, males diagnosed with PMDS suffer from cryptorchidism, unilateral or bilateral and furthermore with testicle tumours (Brown T. T., 1976, Matsuu, A., 2009 and Vegter A. R., 2010). The persistent uterine horns in males are not only small but can be easily confused with the deferent vas and difficult to locate. Other disorders such as testicle cord torsions and some cases of sertolinomas where the obvious symptoms (feminization of the male, alopecia or skin hyperpigmentation, etc.) are not present, are also difficult not only to diagnose but to pinpoint their localization as well.

The purpose of this study was to test the accuracy of the contrast computed tomography (CT) techniques compared to the ultrasound exam (US), in diagnosing some male reproductive disorders.

Materials and methods

The study was conducted on 7 canine male patients, different pure breeds with the the age between 3 months and 7 years.

The patient's history and the first clinical examination was performed in the Clinical Reproduction Department of the Faculty of Veterinary Medicine, UASVM Cluj Napoca. One case was a healthy male dog, Basset Hound breed considered as a control model (case 1). The remaining 6 males were diagnosed with unilateral or bilateral cryptorchidism. Two (cases 2 and 3) were young puppies with the age of 3 and 6 months, a Deutscher Drachthaar and a Dachshund. Three were adult with the ages 1, 1 ½ and 2 years old (cases 4, 5 and 6), an Akita Inu breed, a Labrador Retriever and a Siberian Husky. The remaining case was a 7-year-old Bichon Frise.

The US examination was performed using a Mindray DC3 Vet equipment with an 8 and 6.5 MHz transducer. Each patient was examined in B-Mode and Doppler US to evaluate the morphology of the testicles and visualize the vascularization.

The computed tomography (CT) examination was performed Radiology and Imagistic Laboratory, within the same institution. The CT contrast agent was Visipaque (iodixanol, 320 mgI/mL, producer Nycomed Amersham) using automated injection after the patient was general anesthetized, the dose being automated adjusted by the device.

Results and discussion

The first case was observed in order to study in detail the anatomical structures of the male genitalia. The CT scan showed a good picture of the testicle morphology and vascularization (*figure 3*).

The cases 2 and 3 were young puppies. At the clinical examination trough palpation, we observed that both had one testicle retained. The US examination was performed afterwards to locate and evaluate the testicle. In case 2 was retained subcutaneous in the inguinal region and in case 3 the testicle was in the inguinal canal. The CT scan was performed to evaluate the exact location and the length of the testicle cord and it confirmed the results of the US. Both owners wanted to help de descent of the testicles through drug treatment.

After US exam, case 4 and 5 were diagnosed with unilateral cryptorchidism, the retained testicle located subcutaneously in the inguinal region. The CT scan showed an exact location and a perfect view of the size and shape of the testicle (*figure 4*). We evaluated the vascularization and the state of the testicle (*figure 5*). It showed as well a considerable length of the testicular cord so the owners decided to opt for the orchiopexy.

Case 6, after US, was diagnosed with unilateral cryptorchidism with the retained testicle in the abdominal cavity (*figure 1*). The CT showed no tumoral abnormalities and because is a working dog, the owner decided to postpone the orchidectomy surgery and continue to do periodical check-ups.

In the last case, the US examination showed both testicles in the abdominal cavity, small, with an hypoeogenic heterogeneous aspect and the rete testis was not observed (*figure 2*). This aspect led to a possible testicle tumor. The CT scan showed no metastasis in the lymph nodes or in the other organs. The surgery was not performed yet for a definitive diagnosis.

In all cases, we tried to observe a possible PMDS, given the fact that 50% of this affected dogs are cryptorchids. The CT method showed a lack in data in this aspect. The median uterine artery that is located between the vas deferent and the reminiscent uterine horn could not be observed. The size of this vessel is too small to visualize.

Beside this shortcoming, the disadvantage of this method, besides the radiation, compared to US, the patient needs to be under general anesthesia, which represents a risk to the older dogs.

In a case report it describes the “whirl sign” on CT, which is defined by the rotation of a tissue and its associated vascular supply. This report also describes retained testes with tumoral transformation and suspected partially torsion. The report states that the CT provides an alternative

organ for “whirl sign”. The ultrasonography was unable to determine, in that case, the origin of an abdominal mass (Stokowski S, 2016).

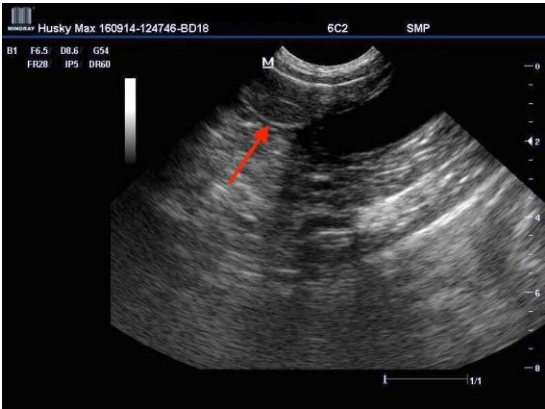


Figure 1 US examination of a retained testicle (red arrow)

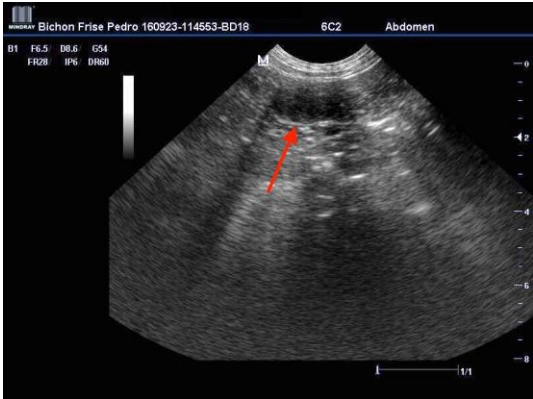


Figure 2 US examination on a retained testicle suspected of a neoplastic transformation (red arrow)

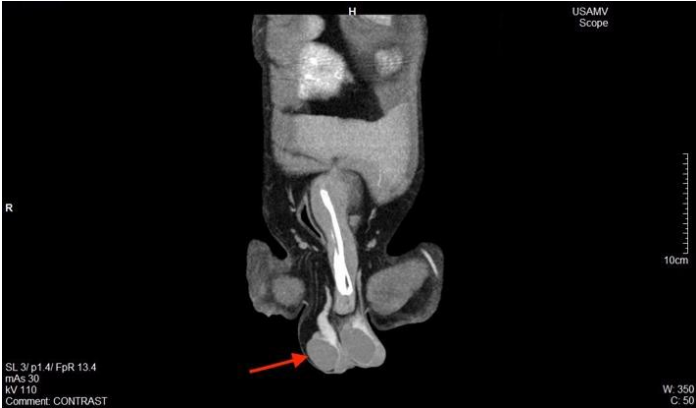


Figure 3 CT scan of a healthy male dog, with the testicles indicated by a red arrow



Figure 4 CT scan in a case with cryptorchidism with the subcutaneous retained testicle (red arrow)

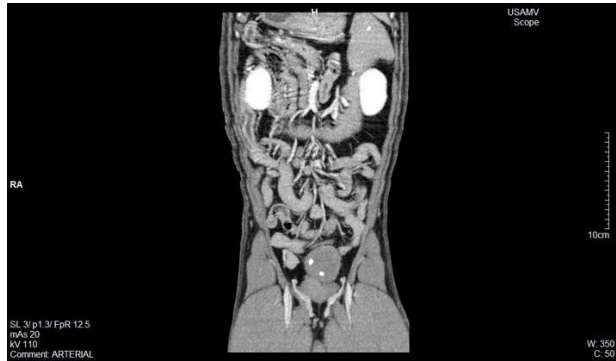


Figure 5 CT scan

Conclusions

Contrast CT is an important method, but insufficient in diagnosing PMDS.

In some cases, such as cryptorchidism, sertolinomas, lymph-node metastasis or intra-abdominal masses, the CT is very efficient in pinpointing the exact location, but in other cases such as PMDS the contrast CT is not recommended, but the US is.

The CT remains an invasive procedure and it is recommended when radiography and ultrasonography are not enough to provide a diagnosis.

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