Short Communication

Unilateral Seminoma in a Dromedary Camel

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Contents

A 10-year-old, clinically healthy, male dromedary camel had presented a history of progressive unilateral testicular enlargement over the past 5 years. The animal had mated with 32 females during that period; all had conceived. The sex ratio of his offspring was one male to 31 females. Ultrasound examination of the right testicle revealed a diffusely heterogeneous parenchyma with no identifiable normal testicular tissue. The enlarged testicle was surgically removed. Macroscopically, the testicle had a glistening pink surface and contained multiple soft, bulging nodules. Histopathologically, a well-differentiated, diffuse seminoma was diagnosed. In conclusion, this study describes the fertility, sex ratio, clinical findings and ultrasonographic imaging in a male dromedary camel affected with unilateral testicular seminoma.

Introduction

Seminoma, also known as germinal cell tumour, is a primary testicular tumour arising from the germinal epithelium of the seminiferous tubules. The aetiology is not well understood, but cryptorchidism and advancement of age are well-known risk factors. Other risks include trauma, mumps and exposure to maternal oestrogens during foetal life (Meuten 2002).

Seminoma is one of the most common testicular tumours reported in domestic species (Kennedy et al. 1998). Metastatic seminoma has been reported in horses (Trigo et al. 1984). Reports of testicular tumours in Camelidae are rare (Tibary and Anouassi 2000). Together with an intrahepatic cholangiocarcinoma, a diffuse-type seminoma was an incidental finding in an 18-year-old male camel (Serap et al. 2008). The effect of testicular seminoma on reproductive efficiency and sex ratio has not been investigated in domestic animals.

The aim of this report was to describe the fertility, sex ratio, clinical findings and ultrasonographic imaging of a male dromedary camel affected with unilateral testicular seminoma.

Materials and Methods

The animal and case history

A 10-year-old male dromedary camel (Camelus dromedarius) was presented to the Veterinary Teaching Hospital of Qassim University (VTHQU) in November 2011 because of progressive right testicular enlargement over the past 5 years. The animal was used for natural mating during the last five rutting seasons.

Clinical examination

On admission, the animal was evaluated for body condition scoring (BCS) (Sghiri and Driancourt 1999) and clinical parameters, which included rectal temperature, heart and respiratory rates, rumen contraction, mucous membrane evaluation and palpation of the scrotal lymph nodes. The external genitalia were evaluated via inspection, palpation, measurement and ultrasonography (Aloka SSD-500, equipped with 5 linear-array transducer; Aloka Co., Ltd., Tokyo, Japan). The examination was performed while the animal was in a sternal recumbent position on a transporting truck.

Hemicastration

With the owner’s consent, the affected testicle was surgically removed. The procedure was performed with the camel in sternal recumbency. The camel was restrained with ropes and deeply sedated using xylazine HCl (0.3 mg/kg, IV, Bomazine 10%; BOMAC Laboratories Ltd, Manukau City, Auckland). The perineal region was prepared for aseptic surgery. Local infiltration analgesia using Lidocaine HCl 2% (Norbrook Laboratories, Northamptomshire, UK) was applied at the intended line of the scrotal incision. A linear scrotal incision was made at the lower part. The enlarged testicle along with the visceral part of the vaginal tunic was freed and exteriorized. The spermatogenic cord was crushed using a sand crusher (Emasculator Sand Single Crush, Aesculap, Germany) and then ligated at the site of crushing with a transfixation ligature, using polydioxanone size 2 (PDS; ETHICON; Johnson & Johnson Medical Limited, Livingston, UK). The spermatic cord was then severed below the ligation site. The uppermost part of the scrotal incision was partly sutured with a simple interrupted suture pattern, using polypropylene size 2 (Ethicon). The camel was given postoperative therapy consisting of antibiotics (penicillin-streptomycin, at a dose of 30,000 IU/kg penicillin and 10 mg/kg streptomycin, IM, Penstrep; Norbrook Laboratories) for 5 days, and a non-steroidal anti-inflammatory (phenylbutazone, at a dose of 4.4 mg/kg, IV, Phenylarthritis, Vetoquinol; Lure cedex, France) for

The work was performed at the Veterinary Teaching Hospital, College of Agriculture and Veterinary Medicine, and Pathology lab, College of Medicine, Qassim University.
3 days. The excised testicle was then examined macroscopically.

**Histopathology**

Testicular specimens were taken and immediately fixed in 10% neutral buffered formalin, dehydrated in ascending grades of ethanol, cleared in xylol, cast and blocked in paraffin, sectioned at 2–5 μm, de-waxed and stained with hematoxiline and cosin for microscopic examination (Bancroft and Stevens 2006).

**Results**

**General health condition**

The BCS of the male was 3.5 upon presentation, and all clinical parameters were within normal limits (temperature = 36°C; heart rate = 45 beats/min; respiratory rate = 8 breaths/min; rumen contractions = 3 every 2 min). There was no enlargement in the scrotal lymph nodes.

**Pre-operative fertility**

Breeding history data was obtained on the 32 females mated during the last five seasons (five in 2006, 7 in 2007, 7 in 2008, 4 in 2009 and 9 in 2010). All females conceived. All offspring were females except one that was born in the last breeding season.

**Clinical findings**

The enlarged right testicle measured 30.6 cm in length, 14.7 cm in breadth and 12.4 cm in thickness. On palpation, the testicle was firm but not painful. Comparatively, the left testicle measured 7.8 cm in length, 4.1 cm in breadth and 4.4 cm in thickness, had an elastic texture and was freely movable. The body of the prostate was measured 4.3 cm in length and 2.2 cm in breadth. The bulbourethral gland was 1.9 cm in length and 1.1 cm in breadth. Inspection and palpation of the penis and prepuce did not reveal any abnormalities.

**Ultrasonographic imaging**

Ultrasound examination of the enlarged testicle revealed a heterogeneous parenchyma. The testicle was generally echogenic, with less-defined areas of hypoechogenicity, giving the appearance of echogenic lobules all through the testicular parenchyma. No normal testicular tissue was identifiable (Fig. 1a). The mediastinum could not be seen. On the other hand, the left testicle showed a homogeneous echogenic texture without lobulation or masses. The mediastinum was seen as an echogenic linear band with longitudinal imaging of the testicle (Fig. 1b). The prostate and bulbourethral glands were homogeneously echogenic without any lesions or masses.

**Macroscopic appearance**

The right testicle appeared diffusely enlarged and had lost its morphological architecture. The different parts of the epididymis were not palpable. Scattered, irregular black spots were observed on the vaginal tunics of the affected testicle (Fig 1c). The cut surface of the excised testis was fresh, with a glistening pink surface, and contained multiple soft, bulging nodules (Fig. 1d).
Histopathology
Microscopic examination revealed diffuse aggregates of closely packed polyhedral cells with sharp borders and faint eosinophilic cytoplasm, apparently resembling germinal epithelium. The neoplastic cells were slightly variable in size, with round or oval nuclei and prominent nucleoli. In some areas, fibrous trabeculae were occasionally seen. Mitotic figures were clearly observed, and there was an absence of scanty lymphocytic infiltration (Fig. 1e).

Discussion
In the present case, testicular seminoma was diagnosed based on the gross appearance and histopathological findings. Seminoma of the testicle develops from the germ cells before somatic differentiation. It arises from cells of the spermatogenic series, presumably from basal spermatogonia (Meuten 2002).

From the general health condition, palpation of the scrotal lymph nodes, and from the breeding history, it seemed that this case of testicular tumour did not metastasize. This is comparable with the same condition in men; however, metastasis has been reported in horses (Trigo et al. 1984; Enewold et al. 2011). It has been suggested that cryptorchidism plays a role in the development of equine testicular tumours (Brinsko 1998). Smith et al. (1989) has reported a horse with colic that had a large, lobulated soft-tissue mass to the left of the pelvic inlet. During surgery, two large, multilobulated pedunculated masses were removed. Post-mortem examination revealed the masses to be malignant seminoma, with multiple sites of metastasis.

Knowing the echo texture of the normal and diseased testes is important in detecting and diagnosing scrotal and testicular abnormalities. Ultrasonic imaging of testicular seminoma may be diagnostic, as it exactly represents the cut surface of the lobulated testicle. Moreover, this imaging differs greatly from the echo texture of testicular abscesses, hydrocele and haematocele, which commonly cause scrotal/testicular enlargement in camels (Tibary and Anouassi 2000).

Unilateral testicular seminoma did not affect the fertility of the presented male; however, it lowered the offspring sex ratio. Analysis of associations between testicular tumour, subfertility and offspring sex ratio has been carried out in men. A reduced fertility and a lower proportion of boys, as compared to the general population, have been observed (Jacobsen et al. 2000). A very likely explanation for the low offspring sex ratio could be a hormonal imbalance of men with carcinoma in situ (Petersen et al. 1999). Low testosterone levels are a consequence of the tumour itself and represent a more permanent condition related to bilateral carcinoma in situ (James 1996). Although the sex ratio is an interesting aspect of this case, it is important to point out that the number of observations was limited.

In summary, the current study describes the fertility, sex ratio, clinical findings and ultrasonographic imaging in one male dromedary camel affected with unilateral testicular seminoma.

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Conflict of interest
None of the authors have any conflict of interest to declare.

Author contributions
Ali A has carried out sonar and clinic examination. A.F. Ahmeda and O. El-Tookhy have carried out surgery and revision. E.E. Mehanab has performed Histopathology. A. Al-Hawasa has carried out clinic examination and surgery.

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