

Fibrolipoma of a Cryptorchid Testis in a Young Bull

Takeshi OSAWA^{1,2)*}, Moe MIURA¹⁾, Norio YAMAGISHI^{1,2)}, Danil KIM^{1,2)}, Naruhiko FUKUDA³⁾, Hiroyuki FUKUOKA¹⁾, Jun SASAKI¹⁾ and Masanobu GORYO^{1,2)}

¹⁾Department of Veterinary Medicine, Faculty of Agriculture, Iwate University, 3-18-8 Ueda, Morioka 020-8550, ²⁾United Graduate School of Veterinary Sciences, Gifu University, Gifu 501-1193 and ³⁾Livestock Dairy Department, Livestock Market Section, Iwate Prefectural Headquarters, Zen-Noh, Nanatsumori, Shizukuishi 020-0503, Japan

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ABSTRACT. A six-month-old Japanese Black bull was found to have no left testis in the scrotum. A fist-sized mass was palpated per rectum. Two months later, hCG was injected and blood samples were collected before and after injection. No testosterone response to hCG was observed. On the cut surface of the excised mass, most of the mass was composed of homogeneous adipose-like tissue. The rest of the surface was composed of a well-circumscribed testicular parenchyma-like tissue (18 × 16 × 15 mm). Histology revealed diffusely distributed mature adipocytes and septa of fibrous connective tissue. Neither germ cells nor spermatozoa were observed in the seminiferous tubules. A diagnosis was made of fibrolipoma and aspermatogenesis of the left cryptorchid testis.

KEY WORDS: cattle, cryptorchidism, fibrolipoma, testosterone concentrations.

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Cryptorchidism is rare in cattle in comparison with other domestic animal species such as horses, dogs and pigs [1, 20], and testicular neoplasia in cattle has been seldom described [6]. This short communication describes a case of bovine testicular fibrolipoma in a young bull with unilateral cryptorchidism.

A six-month-old Japanese Black bull, from which a normal right testis had been removed, was found to have no left testis in the scrotum. On rectal examination, a mass of approximately 10 × 10 × 8 cm was palpated to the left of the bladder. No other clinical signs were observed and the animal had a normal appetite.

When the bull was eight months old, plasma testosterone concentrations were measured. Human chorionic gonadotrophin (hCG; 3000 IU) was injected intramuscularly. Peripheral blood samples were collected five minutes before (D0), three days after (D3) and five days after (D5) injection. Plasma testosterone concentrations, determined by chemiluminescence immunoassay (Architect analyser i2000, Abbott Japan Co., Ltd., Tokyo, Japan), were 422, 468 and 363 pg/ml on D0, D3 and D5, respectively.

At nine months old, the bull was hospitalised. Transrectal ultrasonography of the mass was performed using B-mode equipment (LogiqBook XP, General Electric Company, Fairfield, CT, U.S.A.) and a linear 8.0 MHz transducer (T739-RS, General Electric Company). Ultrasonography depicted a structure with a loss of homogeneous echogenicity consistent with testicular parenchyma, and loss of the hyperechoic line of the mediastinum testis and with multiple hyperechoic areas. On rectal palpation, no abnormalities were detected in the internal accessory sex

glands and other organs in the abdominal cavities.

Laparotomy was performed through a left paramedian incision to excise the mass. The mass (10.5 × 9.5 × 7.0 cm, 415 g) had an elastic texture and was enclosed by a smooth, glistening, vascular capsule (Fig 1a). On the cut surface, most of the interior of the mass was milky-white and composed of homogeneous adipose-like tissue. The rest of the surface was composed of a well-circumscribed testicular parenchyma-like tissue, measuring 18 × 16 × 15 mm (Fig 1b). Normal testicular architecture, such as the mediastinum testis, was not present.

Tissue samples of the mass were fixed in 10% buffered formalin and routinely processed for paraffin embedding. Four µm-thick sections were deparaffinised, dehydrated and stained with Haematoxylin and Eosin. Histologic examination of the mass revealed diffusely distributed mature adipocytes, septa of fibrous connective tissue and occasional cystic structures in the adipose-like tissue (Fig 2a). Mitotic figures were rare. Neither germ cells nor spermatozoa were observed in the seminiferous tubules in the testicular parenchyma-like tissue (Fig 2b). Group of interstitial cells lies in scarcely between the seminiferous tubule, but not in mature adipose and fibrous tissue. On the basis of these gross and histologic findings, a diagnosis was made of fibrolipoma and aspermatogenesis of the left cryptorchid testis.

In this bull, the basal testosterone level was comparable to those observed in normal eight-month-old bull calves [10]. However, no testosterone response was observed in this case after hCG injection, as opposed to the response seen in mature bulls after hCG or gonadotrophin-releasing hormone (GnRH) analogue injection [5, 18]. In our previous study using 2 normal seven to eight-month-old bull calves, the average plasma testosterone concentrations, determined by the same immunoassay as used for the present case, were 580, 7175 and 9060 pg/ml on D0 (=injection of hCG; 3,000 IU), D3 and D5, respectively (unpub-

* CORRESPONDENCE TO: OSAWA, T., Laboratory of Theriogenology, Department of Veterinary Medicine, Faculty of Agriculture, Iwate University, 3-18-8 Ueda, Morioka, Iwate 020-8550, Japan.
e-mail: osawa@iwate-u.ac.jp

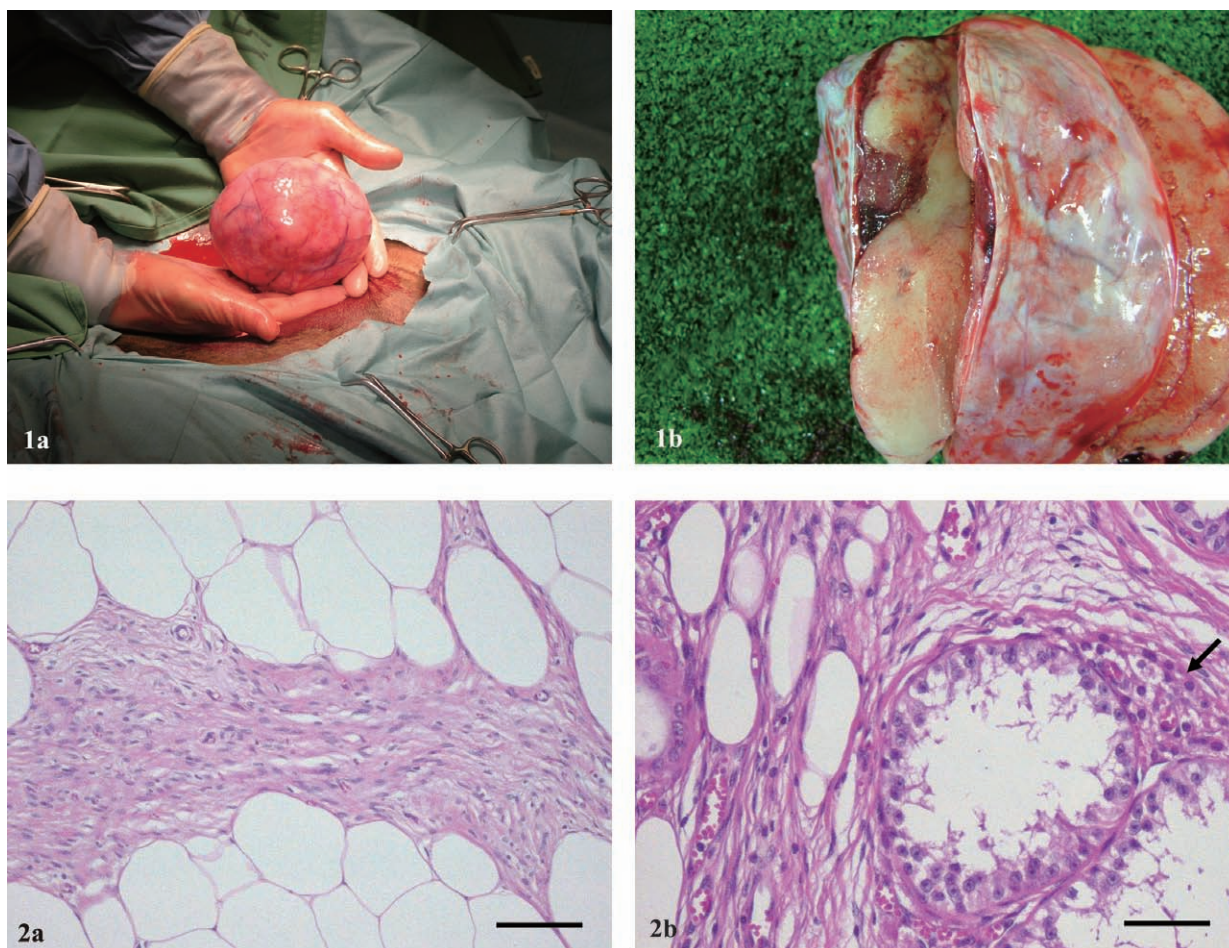


Fig. 1a. Surgically-resected mass (10.5 × 9.5 × 7.0 cm, weight: 415 g) of a young bull showing unilateral (left side) cryptorchidism.

Fig. 1b. A well-circumscribed testicular parenchyma-like tissue (18 × 16 × 15 mm), surrounded by milky-white adipose-like tissue, is observed in the cut surface of the mass.

Fig. 2a. Proliferation of mature adipocytes and septa of fibrous connective tissue in the mass. Bar=100 μ m.

Fig. 2b. Seminiferous tubules surrounded by mature adipose and fibrous tissue. Neither germ cells nor spermatozoa are present. Group of interstitial cells lies in scarcely between the seminiferous tubule (arrow), but not in mature adipose and fibrous tissue. Bar=100 μ m.

lished data). Testosterone response profiles, which were similar to the present case, have been reported in unilaterally cryptorchid calves [8]. Post-hCG plasma testosterone concentrations have been reported to be positively correlated with testis weight in horses with unilateral inguinal cryptorchidism [3]. Lack of testosterone response to hCG in the present case may have been associated with the small volume of normal testicular tissue.

Incidence of testicular tumours is low in bulls and reports include interstitial cell tumours, Sertoli cell tumours and seminomas [4, 6, 14]. Fibrolipomas have rarely been reported in cattle [13] and to the best of the authors' knowledge, this is the first report of testicular fibrolipoma in a bull. The aetiology of this condition is not well understood, even in human medicine, where testicular fibrolipoma is an uncommon benign tumour [9, 15]. In contrast, fibrolipoma of the spermatic cord is the most common non-testicular

tumour [11].

Aspermatogenesis in the present case is likely secondary to cryptorchidism. Incidence of cryptorchidism is relatively high in dogs and it is well documented that cryptorchidism and advanced age are major risk factors associated with testicular tumours in dogs [12, 16, 19]. In addition to the present case, where the tumour was diagnosed at nine months of age (the mass was initially palpated per rectum at six months of age), tumours in other newborn and young cattle have been reported [2, 6, 17]. Testicular tumours in bulls may not be as age-dependent as in other species.

Although surgical removal of cryptorchid testes is a common veterinary practice in the beef industry, it is not always successful. The cryptorchid testes can be located as far into the abdominal cavity as the kidney, making them too deep to remove. Even cryptorchid testes that are physically accessible are sometimes left in place while the animal proceeds to

fattening. Because of this, testicular tumours in young bulls may be more common in the field than the scarce literature represents. In human medicine, measurement of serum α -fetoprotein provides a significant tool for the diagnosis of testicular tumour [7]. Such a tumour marker may be useful for a specific diagnostic application for bovine testicular tumour. Further investigation is warranted to clarify the aetiology of cryptorchidism and testicular tumours in bulls.

REFERENCES

1. Amann, R. P. and Veeramachaneni, D. N. R. 2007. Cryptorchidism in common eutherian mammals. *Reproduction* **133**: 541–561.
2. Cotchin, E. 1960. Tumours of farm animals: a survey of tumours examined at the Royal Veterinary College, London, during 1950–1960. *Vet. Rec.* **72**: 816–823.
3. Cox, J. E. 1989. Testosterone concentrations in normal and cryptorchid horses. Response to human chorionic gonadotrophin. *Anim. Reprod. Sci.* **18**: 43–50.
4. Foster, R. A. and Ladds, P. W. 2007. Male genital system. pp. 565–621. In: *Pathology of Domestic Animals*, vol. 3 (Maxie, M. G. ed.), Elsevier Saunders, Edinburgh.
5. Gábor, G., Mézes, M., Tözsér, J., Bozó, S., Szűcs, E. and Bárány, I. 1995. Relationship among testosterone response to GnRH administration, testes size and sperm parameters in Holstein-Friesian bulls. *Theriogenology* **43**: 1317–1324.
6. Jensen, K. L., Krag, L., Boe-Hansen, G. B., Jensen, H. E. and Lehn-Jensen, H. 2008. Malignant Sertoli cell tumour in a young Simmenthal bull—Clinical and pathological observations. *Reprod. Dom. Anim.* **43**: 760–763.
7. Kawai, K., Kojima, T., Miyanaga, N., Hattori, K., Hinotsu, S., Shimazui, T. and Akaza, H. 2005. Lectin-reactive alpha-fetoprotein as a marker for testicular tumor activity. *Int. J. Urol.* **12**: 284–289.
8. Kitahara, G., Shirao, Y., Hayashi, J., Uematsu, D., Nakanishi, I., Ono, Y., Sato, T., Henmi, K., Kobayashi, I. and Kamimura, S. 2010. [Endocrinological and ultrasonographic evaluation of cryptorchid/ectopic testicles in Japanese black cattle]. *Jpn. J. Ultrasonic Technol. Anim. Sci.* **2**: 24–30 (in Japanese).
9. Kuzaka, B. and Pykalo, R. [Fibrolipoma of the testis]. *Patologia Polska* **40**: 243–245 (in Polish).
10. Lacroix, A. and Pelletier, J. 1979. Short-term variations in plasma LH and testosterone in bull calves from birth to 1 year of age. *J. Reprod. Fertil.* **55**: 81–85.
11. Lerais, J. M., Baudrillard, J. C., Bouchie, J. M. and Devillebichot, C. 1988. [Lipoma of the spermatic cord. Description of a case and review of the literature]. *J. Radiol.* **69**: 607–609 (in French).
12. Liao, A. T., Chu, P.-Y., Yeh, L.-S., Lin, C.-T. and Liu, C.-H. 2009. A 12-year retrospective study of canine testicular tumours. *J. Vet. Med. Sci.* **71**: 919–923.
13. Marino, F., Salvaggio, A. and Macri, D. 2006. Congenital retroperitoneal fibrolipoma and osteochondroma in a calf. *Vet. Rec.* **158**: 772.
14. McEntee, K. (ed.) 1990. *Reproductive Pathology of Domestic Mammals*, 1st ed. Academic Press, Inc., San Diego, CA.
15. Mitchiner, P. H. 1948. Enlargements of the testis and epididymis. *Ann. Roy. Coll. Surg. Engl.* **3**: 176–180.
16. Ortega-Pacheco, A., Rodríguez-Buenfil, J. C., Segura-Correa, J. C., Bolio-Gonzalez, M. E., Jiménez-Coello, M. and Linde Forsberg, C. 2006. Pathological conditions of the reproductive organs of male stray dogs in the tropics: prevalence, risk factors, morphological findings and testosterone concentrations. *Reprod. Dom. Anim.* **41**: 429–437.
17. Palmer, N. C., King, A. B. and Basrur, P. K. 1980. Sertoli cell tumour in two related newborn shorthorn calves. *Can. Vet. J.* **21**: 317–319.
18. Post, T. B. 1978. Similarity between episodic testosterone peaks and those induced by GnRH or HCG in bulls. Australian Society for Reproductive Biology. 10th Annual Conference, University of Sydney, Sydney, August 30–31. Programme and abstracts of papers. 66.
19. Reif, J. S. and Brodey, R. S. 1969. The relationship between cryptorchidism and canine testicular neoplasia. *J. Am. Vet. Med. Assoc.* **155**: 2005–2010.
20. St. Jean, G., Gaughan, E. M. and Constable, P. D. 1992. Cryptorchidism in north American cattle: Breed predisposition and clinical findings. *Theriogenology* **38**: 951–958.