

## Penile Fractures in Young Bulls Raised in Feedlots in Southern Brazil

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### ABSTRACT

**Background:** Penile fracture is a pathology of young cattle that perform precocious and disordered breeding. The incompatibility of height between males and females and sodomy between males cause a great pressure on the sigmoid flexure and retractor muscle of the penis, which are the main causes and sites of organ injury. This study aimed to describe the epidemiological and pathological aspects of penile fractures observed in young bulls raised in pre-export feedlots (PEFs) in southern Brazil.

**Cases:** In 2 PEFs located in the municipalities of Pelotas (property 1) and Capão do Leão (property 2), 3 male cattle [1 from property 1 and 2 from property 2] presented subcutaneous edema in the foreskin and perineum, associated with dysuria. The evolution of the clinical picture was approximately 20 days in all cases, with evolution to death. The bovine necropsied on property 1 had an increased volume and inguinal edema, involving the penis and scrotal sac. Necrosis of the subcutaneous tissue and local musculature was also observed. The testicles were surrounded by the necrotic tissue, and the right testis was swollen, with flaccid parenchyma adhering to the tunica albuginea. In the necropsy of 1 bull from property 2, an increase in the inguinal volume was observed, with an extensive area of necrosis and edema extending from the prepuce to the caudal musculature of the scrotal sac. There were also marked varicosis in the sigmoid flexure and necrosis of the adjacent region, without the involvement of the corpus cavernosum. During the necropsy of the 2 young bulls, fragments of organs from the abdominal, thoracic, and brain cavities were collected and fixed in 10% buffered formalin. From the bull of the property 2, an anatomical piece consisting of the penis, prepuce, and testicles was also collected and fixed in 10% buffered formalin. After 48 h, the tissue samples were cleaved, embedded in paraffin, cut into 3- $\mu$ m-thick sections, and stained using hematoxylin and eosin (HE). A histological evaluation of the penile lesions in both cattle revealed intense hemorrhage, congestion, and necrosis of the muscles and tissues adjacent to the corpus cavernosum. In addition to areas of dystrophic calcification, neutrophil and macrophage infiltration was also observed. In the bull from the property 1, an intense edema and proliferation of fibrous tissue surrounding the urethra were noted. There were also marked tubular degeneration and intense infiltration of neutrophils, lymphocytes, and macrophages in the inner portion of the tunica albuginea.

**Discussion:** In the present cases, the diagnosis was based on epidemiological data associated with clinical signs and pathology. The macroscopic lesions observed were probably due to the involvement of blood vessels adjacent to the penis, which suffered trauma during sodomy mating among cattle. These lesions have been described in other reports of this pathology and in diseases, such as acropostitis-phimosis, fibropapilloma of the glans, preputial abscess, and urolithiasis, and the differential diagnosis of these diseases must be carried out, as they have different etiologies. In the bulls of the present study, no lesions were observed in the corpus cavernosum, and this condition was attributed to the presence of varicosis and accumulation of urine in the prepuce, due to the difficulty in exposing the penis. Histologically, there were intense hemorrhage, congestion, and necrosis of the muscles and tissues adjacent to the corpus cavernosum, with the infiltration of neutrophils and macrophages, and areas of dystrophic calcification. The presence of necrotic lesions in tissues adjacent to the penis may be related to hypoxia, vascular lesions, or the action of chemical elements present in the urine. In both cases, vascular lesions were present, which were attributed to the main triggering factor for the disease.

**Keywords:** pre-export feedlots, beef cattle, sodomy, penile trauma.

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## INTRODUCTION

Penile fractures or penile hematomas occur mainly in young cattle, which perform precocious and disordered breeding [2,4]. For penetration and ejaculation into the vaginal canal, the penis becomes highly vascularized, which causes the development of a high pressure. This process favors the occurrence of injuries, such as fractures and hemorrhages in the organ [5]. The incompatibility of height between males and females and sodomy between males cause a great pressure on the sigmoid flexure and on the insertion of the penile retractor muscle, which are the main causes and sites of fracture or rupture of the organ [2].

In cases of penile trauma, damage to the distal albugineous tunic and sigmoid flexure and/or rupture of the corpus cavernosum can be observed, with or without urethral rupture. These lesions result in an increase in the organ volume due to local edema, which can progress to spontaneous recovery with sequelae or local necrosis due to vascular compromise and the accumulation of urine in the foreskin [2,4].

Penile fractures have been shown to be an important and recurrent pathology in pre-export feedlots (PEFs) of cattle in the southern region and are responsible for economic losses due to decreased weight and death of animals. PEFs are places where cattle remain confined for a period of quarantine before being exported alive [3]. This study aimed to describe the epidemiological and pathological aspects of penile fractures in young bulls confined in 2 PEFs in the south of Brazil.

## CASES

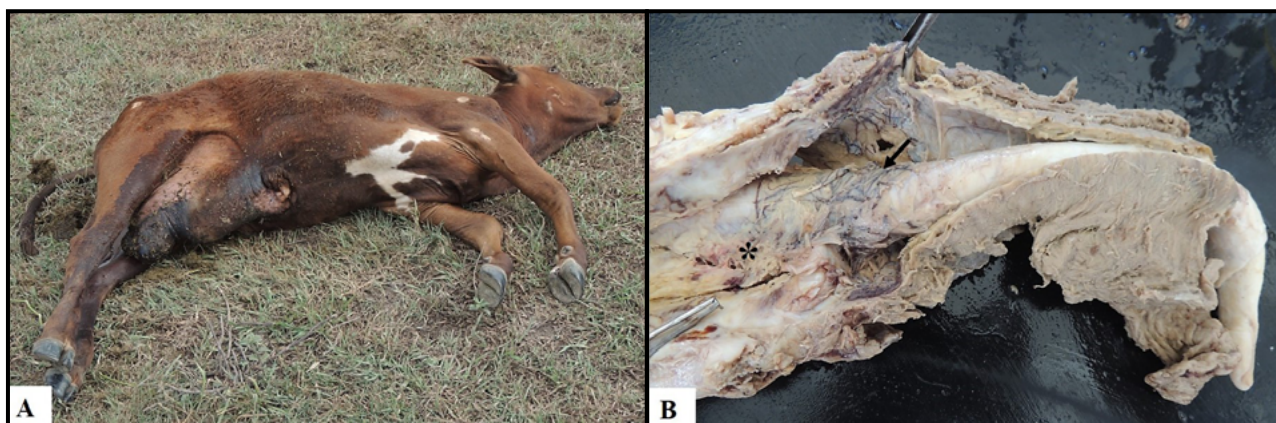
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3 male cattle [1 from property 1 and 2 from property 2] presented subcutaneous edema in the foreskin and perineum regions associated with dysuria. The evolution of the clinical picture was approximately 20 days in all cases, with evolution to death.

The bull necropsied on property 1 had an increased volume and subcutaneous edema in the inguinal region, involving the penis and scrotal sac (Figure 1A). Necrosis of the subcutaneous tissue and local musculature was also observed. The testicles were surrounded by the necrotic tissue, and the right testis was swollen, with flaccid parenchyma adhering to the tunica albuginea. In the necropsy of 1 bull from property 2, an increase in volume was observed in the inguinal region, with an extensive area of necrosis and edema extending from the prepuce to the caudal musculature of the scrotal sac. There were also marked varicosities in the sigmoid flexure of the penis and necrosis in the adjacent region, without the involvement of the corpus cavernosum (Figure 1B).

During the necropsy of the 2 bulls, fragments of organs from the abdominal, thoracic, and brain cavities were collected and fixed in 10% buffered formalin. In bulls from property 2, an anatomical piece consisting of the penis, prepuce, and testicles was collected and fixed in formalin. After 48 h, the tissue samples were cleaved, embedded in paraffin<sup>1</sup>, cut into 3 µm thick sections, and stained using hematoxylin and eosin<sup>2</sup>.

A histological evaluation of the penile lesions in both bulls revealed intense hemorrhage, congestion, and necrosis of the muscles and tissues adjacent to the corpus cavernosum. In addition to areas of dystrophic calcification, there was also inflammatory infiltration of neutrophils and rare macrophages. In the bull from



**Figure 1.** A- Bull with penile fracture showing increased volume and subcutaneous edema in the inguinal region, involving the penis and scrotal sac. B- The sigmoid flexure of the penis presents varicosities and necrosis in the adjacent region.

property 1, intense edema and proliferation of fibrous connective tissue surrounding the urethra were observed. In the testicles of this animal, there were also marked tubular degeneration and intense inflammatory infiltration of neutrophils, lymphocytes, and macrophages in the inner portion of the tunica albuginea.

## DISCUSSION

In the present report, all diagnosis of penile fractures were performed considering the epidemiological data obtained during the visit to the 2 properties associated with clinical signs and pathology. The macroscopic lesions observed were probably due to the involvement of the blood vessels adjacent to the penis, which suffered trauma during sodomy mating among cattle. These lesions have been described in other reports of this pathology and in diseases such as acropostitis-phimosis, fibropapilloma of the glans, preputial abscess, and urolithiasis, and the differential diagnosis of these diseases must be carried out, as they have different etiologies [4,7]. Vascular lesions result in local edema and ischemic necrosis. In cases of cavernous body rupture, necrosis occurs due to contamination and abscess formation in the region [5]. In the bulls of this report, no lesions in the corpus cavernosum were observed, which was attributed to the presence of varicosities and accumulation of urine in the prepuce, due to the difficulty in exposing the penis.

In cattle kept in a feedlot system, the main diseases diagnosed are associated with the respiratory and digestive systems [3]. In most cases, the confined cattle were male, young, and castrated. However, in recent years, there has been an increase in the export of uncastrated males due to the demands of new import markets for live animals [1,6]. The cattle to be exported remain quarantined in PEFs [3]. With the confinement of young bulls, the occurrence of other diseases, such as penile fractures, has increased [7].

The main predisposing factor for the occurrence of penile hematoma in bulls is related to recurrent and indiscriminate mounting, which is commonly observed in young men. Erection and frequent mounting result in a high stress in the sigmoid flexure and corpus cavernosum region, as during the erection process, there is an increase in the pressure on the penis due to local vasodilation [2]. In the present study, penile fracture was associated with sodomy, as this behavioral change was frequently observed in cattle during quarantine.

The presence of necrotic lesions in tissues adjacent to the penis may be related to hypoxia, vascular lesions, or the action of chemical elements present in the urine [4]. In both cases, vascular lesions were present, which were attributed to the main triggering factor for necrotic lesions.

The involvement of adjacent structures is related to local effects caused by circulatory disorders or the direct action of urine. In the present case report, testicular injuries were believed to be associated with testicular compression caused by injuries and edema of the tissues adjacent to the testicle.

This study concluded that in animals confined in PEFs, in addition to diseases associated with feeding and overcrowding of animals, other diseases that are not observed in bovines confined for slaughter should also be controlled, as they are uncastrated animals, due to the requirements of importing countries and, therefore, subject to different behaviors that can lead to illnesses, such as a fractured penis.

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**Declaration of interest.** The authors report no conflicts of interest. The authors alone are responsible for the content and writing of the paper.

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