Fibropapilloma of the Bovine Penis

Lionel Dawson, *B.V.Sc., M.S.*
Department of Veterinary Medicine and Surgery
College of Veterinary Medicine
Oklahoma State University
Stillwater, Oklahoma 74078
C. J. Bierchwal, *D.V.M., M.S.*
Department of Veterinary Medicine and Surgery
College of Veterinary Medicine
University of Missouri
Columbia, Missouri, 65201

Introduction

Fibropapilloma of the penis is seen commonly in young bulls. The vast majority are found surrounding the tip of the glans penis *(Fig. 1).* Basal attachment is quite narrow but on initial examination will not give this picture due to the growth of the tumor and the tight containment of the proliferating mass which causes it to surround the penis, giving an illusion of extensive attachment.

Case Report

A 2-year-old horned Hereford steer was referred to the University of Missouri Large Animal Clinic with an unusually large mass on the tip of its penis.

Three months earlier, the owner noticed a small growth on the penis. Apparently, since the growth was small and the penis enclosed in the preputial cavity, there was no external sign for a short period. Two months later, the owner noticed the mass was much larger, with the steer unable to retract the penis into the preputial cavity.

A physical examination revealed a mass 13 x 10 x 8 cm in size attached to the glans penis and hemorrhaging due to constant trauma *(Fig. 2).* The owner wanted us to do whatever we could so that he could salvage the steer.

Materials and Methods

The area around the tail fold was clipped and scrubbed, and a pudendal nerve block was done to anesthetize the penis and prepuce. The steer was placed on the surgery table, and the operative site was surgically prepared. A tourniquet was applied to the base of the penis, and a polypropylene 10 French urinary catheter was introduced into the urethra to avoid incising the urethra and to prevent a urethral fistula when removing the mass *(Fig. 3).*

A part of the mass was removed to reveal the extent of attachment *(Fig. 4).* Since the basal attachment covered a wide area, it was decided to amputate the tip of the penis immediately caudal to the attachment. A 'V'-shaped incision was made dorsally and ventrally on the penis to make a flap and to close the corpus cavernosum after amputation *(Fig. 5).* Later, the tip of the penis was amputated, including the attached margin of the mass *(Fig. 6).* A ligature was then placed above the flaps by taking a bite ventrally beside the urethra, through the integument and the corpus cavernosum, coming out on the other side of the urethra, and tied dorsally over the penis *(Fig. 7).*

The ligature was placed to prevent profuse bleeding when the tip of the penis was amputated. Dorsal and ventral flap were sutured back together enclosing the opened part of the corpus cavernosum.

To avoid stricture of the urethra after amputation, a 2-inch longitudinal incision was made over the urethra *(Fig. 8).* The urethral mucous membrane was then sutured to the integument of the penis on both sides with a simple interrupted suture pattern using 00 Dexon *(Fig. 9).*

The ligature placed above the flaps was removed and the penis replaced into the preputial cavity. Later, a purse-string suture was placed on the preputial opening.

Postoperative Care

The purse-string suture was removed the next day, and daily infusion of an oil-based antibiotic into the preputial cavity such as mastitis ointment was begun. Parenteral antibiotics were given 4 to 5 days.

The steer recovered very well after the surgery and was sent home a week later.

Pathologic Findings

Samples were taken from the mass *(Fig. 10)* and sent to the diagnostic laboratory for microscopic examination. The tumorous growth was nearly round and firm or rubbery in consistency. Cut surface was homogenous grayish-white.

Histopathologic findings confirmed our diagnosis with the characteristic whorles and interlacing bundles of fibroblasts and collagen fibres.

Figure 1.

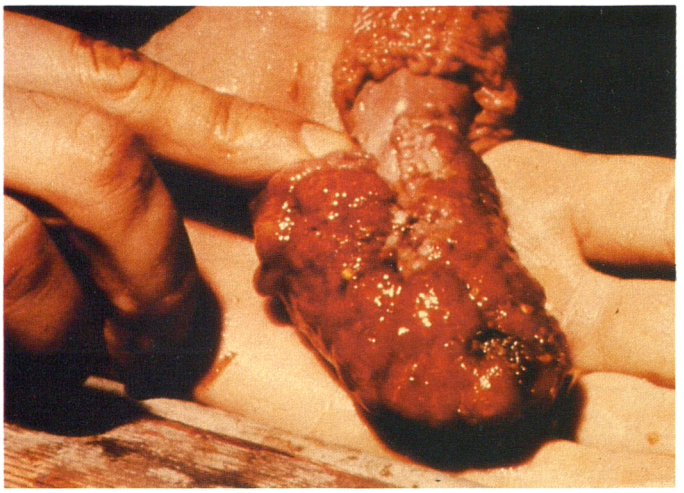


Figure 2.

Figure 3.

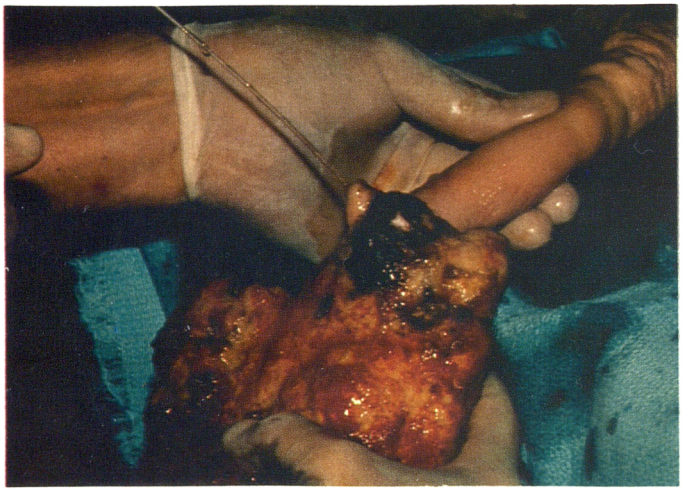


Figure 4.

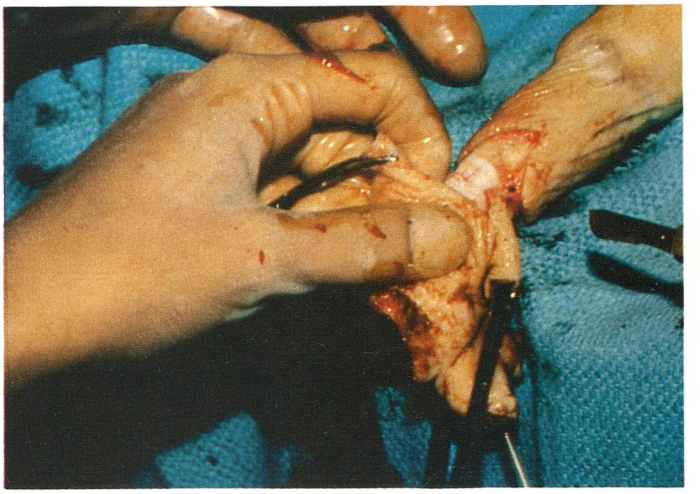


Figure 5.

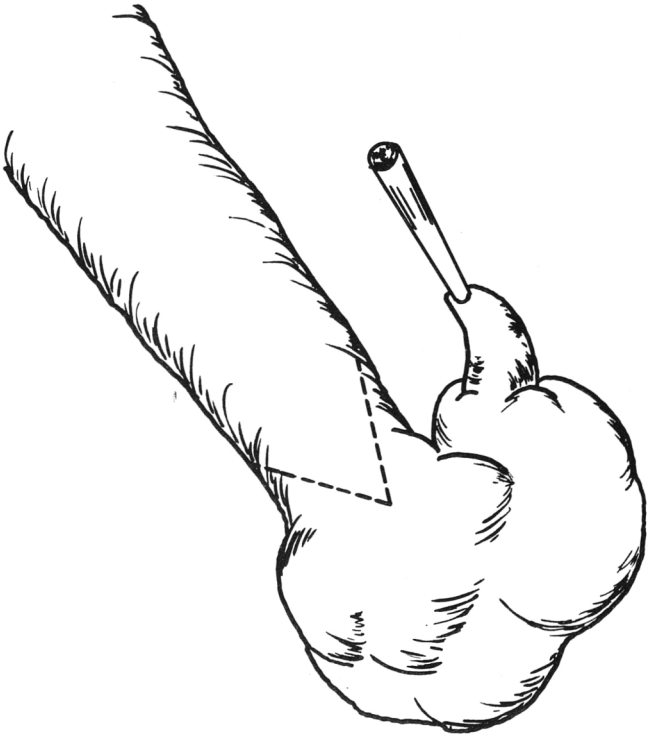
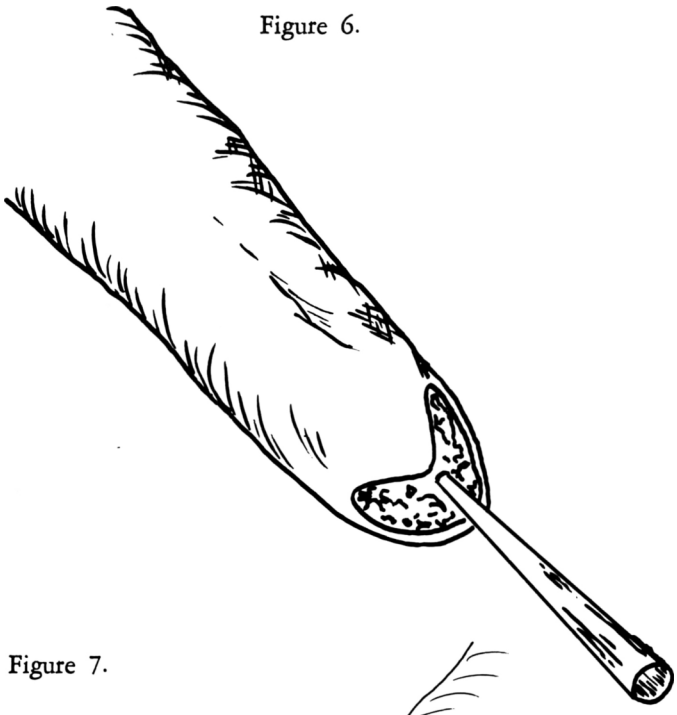


Figure 6.



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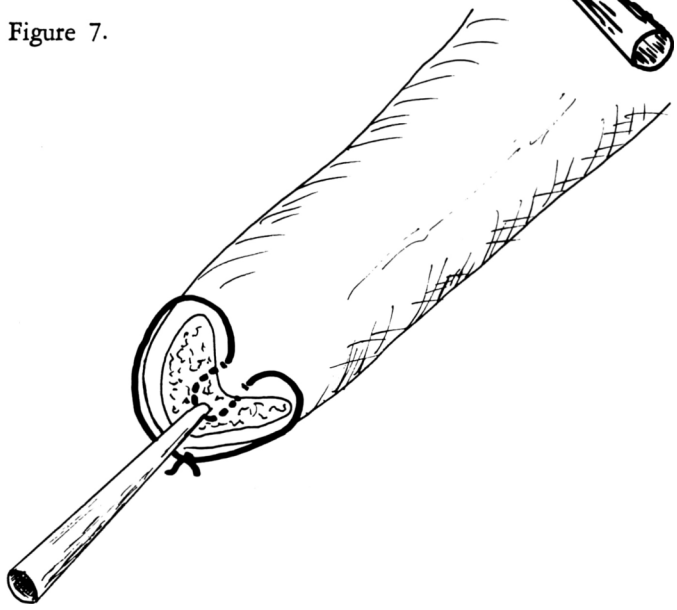

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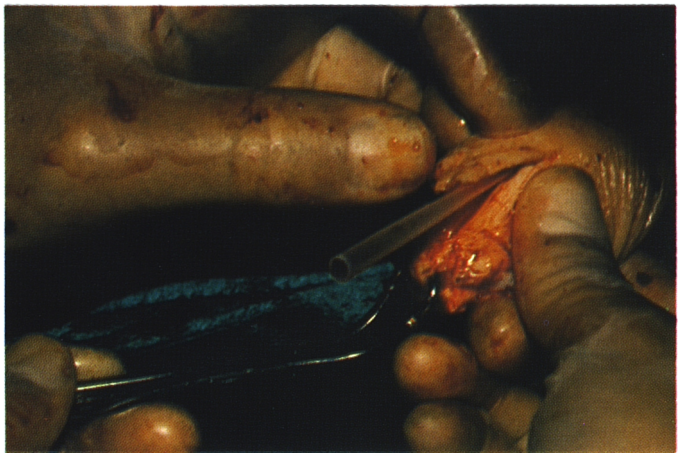
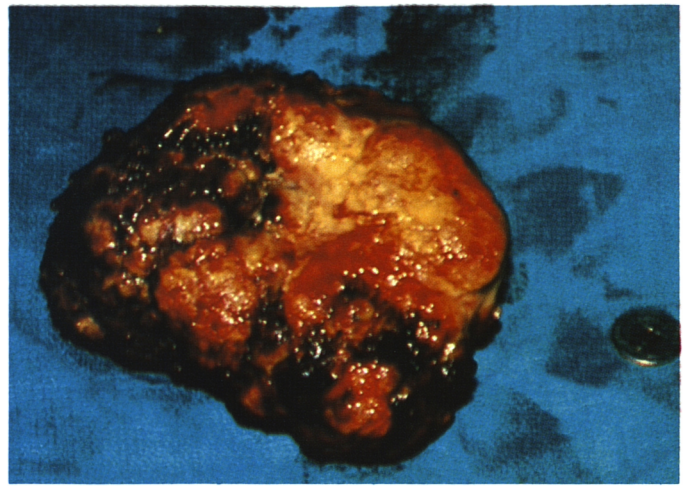


Figure 9.

Figure 10.



Discussion

Bovine papillomatosis is worldwide in distribution. It is more common in cattle less than 2 years of age that are housed in close contact with each other.

The neck, legs, back, and abdomen are more usual sites of infection since these locations are probably more subject to abrasions and wounds of the skin through which the virus may infect the tissues. Cutaneous papillomas in cattle can be of various sizes, depending on the areas infected. They usually have a cauliflower-like appearance with a fibromatous base in the dermis.

Papilloma viruses are host specific under natural conditions. The virus appears to stimulate the basal cells of the epithelium, causing some cells to degenerate while others are stimulated to excessive growth and wart formation as follows:

Virus → Basal Cells
↓ ↓
Degenerate Excessive growth
↓
Replace the nuclear material
↓
Reach the surface

Fibropapillomas of the penis and vulvovaginal mucosa have a smooth surface with less epithelial proliferation. The infective virus is concentrated in the outer keratinized epithelium of the papilloma and, when shed, can readily contaminate fomites such as fences, stanchions, and woodwork in stables. These fomites containing the virus readily transmit the disease to susceptible cattle by causing wounds on the skin.

Fibropapillomas occurring on the penis are shaped due to the retention and confinement inside the preputial cavity, and the growth within the sheath causes it to surround the penis. Most of them will have a narrow basal attachment. In this case, the attachment was diffuse and the shape nearly round since the mass was no longer inside the preputial cavity.

Immunity develops in a few weeks after exposure to the virus, and older animals are more resistant than the very young probably because of prior inapparent infection.

Fibropapilloma is self limiting. Results from either administration of vaccine or excision of some warts indicate that neither method is particularly effective in the treatment of the disease. Earlier reports have indicated the excision during the early stages as well as vaccine therapy may eventually prolong the diseases (Blood and Henderson, 4th Edition).

Vaccination has been claimed as a "cure" for warts but, actually, it does not provide benefit in the treatment of existing warts.

Barthold and Olson have shown that the wart vaccine elicits a preciptin response similar to that of live Bovine Papilloma Virus. The magnitude of the response in terms of antibody titer seems to be directly related to repeated exposures to the antigen.

It has been shown that precipitin antibody to Bovine Papilloma Virus (BPV) develops in cattle, and the levels correlate with immunity to the virus on challenge exposure but not with growth or regression of already-existing warts.

Immunity to the tumor, as evidenced by wart regression, seems to be mediated by a host immune response to tumor antigens unrelated to the viral antigen. This explains the failure of Bovine Papilloma Virus vaccine in the treatment of existing warts.

Surgery was indicated in this case due to paraphimosis caused by the tumor, and partial amputation of the penis was done because of its diffuse attachment involving deeply into the corpus cavernosum penis.

References

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