

The enzootic balanoposthitis

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Abstract: In 2021, the PODPLUD bull was treated at the Pszczyna-Jankowice European Bison Breeding Center based on a study of necrotic balanoposthitis (in Polish NZN). The attempt to treat this disease resulted in a retreat of clinical symptoms. Another case of NZN was noted in 2022 in the bull PONSE, which had purulent necrotic lesions and sepsis caused by the bacterium *Trueperella pyogenes* during *post-mortem* treatment. Further observations in several bulls confirmed the suspicion of this disease. Twenty-three bulls were immobilized, a clinical examination was performed, and swabs were collected for bacteriologic examination. Based on the results of these examinations, seven animals were eliminated. *Post-mortem* examinations bring anatomical-pathological changes to the development of severity and a variable proportion of pathogenic bacteria.

Keywords: posthitis, necrotic changes, *Bison bonasus*

Introduction

Necrotic postitis (*postitis necroticans*) in wisent occurred in numerous individuals in the 1980s in the Białowieska Forest (Jakob *et al.* 2000, Kita *et al.* 2003, Krzysiak *et al.* 2014, Piusinski *et al.* 1997). The disease affected bulls and caused lesions on the foreskin and penis. The disease process, which has the character of fibrinous necrosis, usually begins at the edge of the foreskin opening and gradually covers larger and larger parts of it, penetrating into the cavity of the organ and including the glans. The advanced form resulted in autoamputation (autotomy) of the foreskin and glans and even necrosis and prolapse of the entire penis. The disease was considered a threat to the wisent population living in this ecosystem because the cause and pathogenesis of the disease were unknown. The few descriptions of the disease were

limited to transmission of morphological characteristics and attempts to identify potentially pathogenic agents isolated from diseased individuals. The disease was thought to be transmitted by a direct contact. It was assumed that diseased bulls should be eliminated from the population in hopes of reducing the incidence of the disease. Due to NZN, 1.5 to 15% of male wisent have been eliminated each year. Currently, cases of NZN occur in a small number of wisents in the Białowieska Forest. However, sporadic cases of NZN have been reported in other European bison populations.

In spring 2021, clinical signs of the disease were observed in the bull PODPLUD in the Breeding Center Pszczyna–Jankowice (Hławiczka *et al.* 2021) (swelling of the foreskin area, brush hairs clumped with brown exudate, urine excretion in an irregular intermittent stream, the first case of necrotic foreskin and penis inflammation). As a result, conservative treatment was carried out on the basis of surgery and complex antibiotic therapy. The treatment improved the health of the bull, although it is not known whether the individual retained its reproductive capacity.

Case description

In 2022, a case of NZN was detected in a bull PONSE. Due to the severe general condition (emaciation, lack of movement), it was decided to eliminate it, what took place on October 1, 2022. The anatomical-pathological autopsy revealed the presence of several fistulas on the abdominal skin, extensive necrosis of the tissues of the prepuce and penile area, forming a massive cavity filled with necrotic and purulent masses. This cavity extended from the area of the foreskin mouth to the perineal area. All lymph nodes available for examination were enlarged. *Trueperella pyogenes* (sepsis) was cultured from the lymph nodes removed for bacteriologic examination. The PONSE case prompted those responsible for the Pszczyna-Jankowice herd to conduct an examination of the males living in the herd. Twenty-three bulls were pharmacologically immobilized, visual inspection of the genitalia (prepuce and penis) was performed, and swabs were taken from the prepuce cavity for bacteriological examination. Based on the visual inspection and the results of the bacteriological examination, seven individuals were selected for elimination, which was performed on March 1, 2, and 9, 2023.

To evaluate the severity of disease symptoms, we used the scheme proposed by Malgorzata and Zbigniew Krasinski (Krasińska & Krasiński, 2017), which distinguishes five stages of NZN (*P-posthitis*):

- P + one necrotic-appearing focus at the edge of the foreskin outlet;
- P ++ several inflammatory foci at the edge of the preputial orifice;

- P + + + the disease process covers the entire periphery of the preputial orifice;
- P + + + + necrotic-purulent lesions involve the foreskin and penis, in the foreskin cavity stinking mass;
- P + + + (-) condition after overgrowth, often there is self-amputation of the penis, overgrowth of the prepuce opening and the formation of urinary fistulas, rarely to urinary retention.

Macroscopic changes in the foreskin were not noted in two bulls. In the remaining animals, the severity of lesions varied from swelling around the foreskin to advanced necrotic lesions of the foreskin and penis with autoamputation of the penile foreskin. In contrast, microscopic examination of tissue from the foreskin showed inflammatory cell infiltrates of varying severity.

Table 1. Summary of the results of *post-mortem* examinations of European bison eliminated in the herd of the breeding center Pszczyna-Jankowice

Name	Pedigree number	Age (years)	Severity of NZN	Pathogenic bacteria
PLĄDROWNIK	14116	5	+/-	<i>Trueperella pyogenes</i>
POLIS	14835	3	+ + + +	-
PLICJUSZ	14837	3	-	<i>Pseudomonas aeruginosa</i>
POBOŻNY	14065	5	+	<i>Corynebacterium pyogenes</i>
POLACJAN	14840	3	+ + +	<i>Trueperella pyogenes</i>
PLAMEK	14071	5	+ + + +	<i>Trueperella pyogenes</i>
POŚPIECH	14839	3	- (scar)	-

In Table 1 there is shown a summary of the lesions according to Krasiński's scheme. Macroscopic changes in the prepuce were not found in two bulls. In the remaining individuals, the severity of the lesions varied from swelling of the prepuce area to advanced necrotic lesions of the foreskin and penis, with autoamputation of the penile glans. In contrast, microscopic examination of tissues from the prepuce showed inflammatory cellular infiltrates of varying degrees of severity. No lesions of an acute nature were found in the bull POŚPIECH. Macroscopically, a scar-like pull from the edge of the foreskin mouth into the foreskin cavity was visible. Microscopic examination of a tissue preparation from this area, showed the presence of a band of compact fibrous connective tissue. This indicates a history of chronic repair process. This was a process that developed after the symptoms of acute inflammation had resolved. In the past, small scars at the edge of the foreskin's mouth were found at autopsy, but from self-healing prepuce inflammation. The case of the POŚPIECH bull is probably the first documented testimony of

self-healing of “non necrotic” foreskin inflammation (*posthitis non necroticans*). Although there was no complete recovery with restoration of normal structures (regeneration), there was a repair process (reparation), which, although imperfectly, allowed this individual to “mask” the dysfunction of the organ – no macroscopic features of inflammation were found. At the same time, this case is not fully satisfactory, as it is the only one of the seven. As can be seen from the summary of results, pathogenic bacteria were not isolated in two cases (POLIS, POŚPIECH). In contrast, in five cases pathogenic bacteria were found, and the most common was *T. pyogenes*

Conclusions

1. In the European Bison Breeding Center Pszczyna-Jankowice there is an outbreak of enzootic necrotic inflammation of the foreskin.
2. Under favorable conditions, spontaneous healing of foreskin inflammation may occur.

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Enzootia nekrotycznego zapalenia napletka

Streszczenie: W 2021 roku w Ośrodku Hodowli Żubrów Pszczyna – Jankowice u byka PODPLUD na podstawie objawów klinicznych zdiagnozowano nekrotyczne zapalenie napletka (NZN). Próba leczenia tej choroby spowodowała cofnięcie się objawów klinicznych. Kolejny przypadek NZN stwierdzono w 2022 roku u byka PONSE, u którego *post mortem* stwierdzono rozległe zmiany ropno-martwicowe powłok brzucha oraz sepsę związaną z bakterią *Trueperella pyogenes*. Obserwacje pozostałych byków wykazały u kilku z nich obecność objawów nasuwających podejrzenie choroby. Immobilizowano 23 byki, przeprowadzono badanie kliniczne oraz pobrano wymazy. Na podstawie wyników tych badań wytypowano siedem osobników do eliminacji. Badania pośmiertne wykazały zmiany anatomopatologiczne o różnym nasileniu oraz zmienny udział bakterii chorobotwórczych.
