

Histologic comparison of inflammatory cells in the penile and preputial epithelium of young vs mature beef bulls

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Introduction

There is evidence supporting clearance of the *Tritrichomonas foetus* in young bulls. The reasons for mature bulls becoming chronic carriers and resolution of venereal infections in young bulls have not been illuminated. It has been hypothesized that there is variation in the inflammatory response in the reproductive tract as the bull ages. Hence, the objectives of this study were to evaluate the immune cell population in the normal bovine penile and preputial epithelium and to examine any differences in cell populations between young and mature age groups. Our hypothesis was that there are significant differences in immune cell types within the penile and preputial epithelium and dermis of young versus mature bulls.

Materials and Methods

Twelve *Bos taurus* bulls were divided into two age groups; Group A (n=6) young bulls 14-24 months of age and Group B (n=6) mature bulls five years and older. All bulls were determined to be PCR-negative for *Tritrichomonas foetus*. A 1 cm (height) x 1 cm (width) x 0.5 cm (depth) biopsy was taken from three locations: 2 cm proximal to the glans penis, 2 cm distal to the penile preputial attachment, and 6 cm proximal to the penile preputial attachment. Slides were prepared for hematoxylin and eosin staining and immunohistochemistry using markers IBA1+, CD79a + and CD3+ for identification of macrophages, T-lymphocytes, and B-lymphocytes, respectively. The slides were graded by a boarded pathologist. The data were recorded and analyzed using a mixed linear model.

Results

Inflammation scores, marginated neutrophil infiltration scores, CD3+ T cell numbers, CD3+ T cells numbers around vessels, CD79a+ B cell infiltration scores within lymphoid nodules, IBA1+ cell numbers in the epidermis, IBA1+ cells numbers in the superficial dermis, epidermal dermal junction basement membrane disruption scores, and epidermal junction cellular hyperplasia scores were all found to be statistically different ($p < 0.05$) when comparing Group A versus Group B bulls. Bulls in Group A had an increased presence of inflammatory cell infiltrate when compared to Group B ($p < 0.05$). The bulls in Group B had greater presence of B-lymphocytes (CD79a+) and macrophages (IBA1+) than (what was seen in) Group A bulls ($p < 0.05$).

Significance

Hence, the null hypothesis was rejected and the alternative hypothesis accepted. These results suggest an age-associated change in the number and type of inflammatory cells within the penile and preputial epithelium in bulls. These cellular differences may be key in clearance of *T. foetus* from the penis and prepuce in bulls.