

Evaluation of a Modified Surgical Technique to Correct Urine Pooling in Cows

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Introduction

Urovagina of cows and horses often results in infertility by inducing necrotizing endometritis. This condition is seen most commonly in old, pluriparous cows and mares with poor vaginal and vestibular conformation. Adverse changes result from numerous pregnancies or from dysfunction of the constrictor vestibuli muscle caused by damage to this muscle during parturition. Cranioventral tipping of the pelvis, the result of numerous pregnancies, or damage to the constrictor vestibuli muscle causes the cranial portion of the vagina to be positioned ventral to the external urethral orifice, leading to collection of urine in the vaginal fornix. Various surgical techniques have been used to create a mucosal extension from the urethral orifice to the labia to correct urovagina in cows, but a fistula often forms in the extension, causing the surgical remedy to fail. The objective of the trial reported here was to determine if the incidence of fistula formation could be decreased by covering submucosal tissue on the floor of the vestibule, exposed by transposing mucosal flaps to create the extension, with a mucosal graft.

Materials and Methods

Thirty-eight cows were used in this study including 16 Holstein cows, 2 to 6 years old and 22 cross-bred, beef cows, aged 5 to 10 years. Cows were randomly divided into control and experimental groups. The cows in both the control group (19 cows) and the experimental group (19 cows) received a modified McKinnon technique of urethral extension, performed with the cows standing. The cows in the experimental group also had a free sheet of mucosa, obtained from the dorsal aspect of the vestibule, grafted to submucosa on the ventral aspect of the vestibule exposed during creation of the urethral extension. The wound created by removing the mucosa on the dorsal aspect of the vestibule was left to heal by secondary intention. The graft was sutured, under tension, to exposed submucosa on the ventral aspect of the vestibule. No attempt was made to cover

all the exposed submucosa on the ventral aspect of the vestibule.

Results

During palpation and visual examination of the urethral extension of all cows two weeks after surgery, we found that 10 of 19 cows (53%) in the control group and six of the 19 cows (32%) in the experimental group had developed a fistula, 10 to 15 mm in diameter, in the urethral extension ($P = 0.19$). After injecting dye into the extension, under pressure, we found that four of the nine cows (44%) in the control group and four of the 13 cows (31%) in the experimental group that had no fistula detectable by palpation and visual examination had developed a minute fistula (≤ 1 mm in diameter) in the extension. Each fistula, whether palpable or not, was located at the cranial, dorsal aspect of the extension. The total number of cows that developed a fistula in the extension, whether palpable or not, was 14 of 19 (74%) in the control group and 10 of 19 (53%) in the experimental group. The total number of cows that developed a fistula in the extension did not differ significantly between groups ($P = 0.18$). The incidence of fistula formation did not differ significantly between dairy cows (12/16; 75%) and beef cows (12/22; 55%) ($P = 0.20$). During histological examination of the biopsy of the graft and its recipient site, obtained one week after surgery, neither inosculation nor revascularization of the graft was evident in any sample.

Significance

We concluded that application of a mucosal graft to the subcutaneous tissue exposed to the vestibule using the McKinnon technique of creating a urethral extension is of little or no benefit in preventing the formation of a fistula in the extension. We observed that digital palpation and visual examination alone are often insufficient in determining the presence of a fistula. The article is in press. Available online 24 April 2007. (Copyright © 2007 Elsevier B.V.)