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OVINE MODEL OF OBSTETRIC FISTULA

Hypothesis / aims of study:
Obstetric Fistula is a devastating problem affecting millions of women in the developing world.(1) Indigenous social, economic, and political factors make it very difficult to study obstetric fistula repair techniques, methods of prevention, and methods of treating post-repair stress urinary incontinence. A large animal model of obstetric fistula is sought to meet these needs and provide a means of training surgeons in fistula repair techniques.

Study design, materials and methods:
Five adult female Rambouillet Merino sheep underwent surgical creation of an experimental bladder neck, circumferential, vesico-vaginal fistula. Fistulae were created using monopolar cautery to open the bladder neck and proximal urethra into the vagina and to separate the bladder neck from the proximal urethra circumferentially. Post operatively, a 24 Fr 30cc Foley catheter was left within the fistula for 1 – 2 weeks. Six weeks after creation of the fistula an exam under anaesthesia was performed followed immediately by repair of the fistula using standard surgical techniques.(2) Six weeks after fistula repair an exam under anaesthesia was performed. Urethral pressure profilemetry was performed prior to creation of the fistula, prior to repair of the fistula, and six weeks after repair. Urethral length measurements were performed using a transurethral 14 Fr 5cc foley catheter by inflating the balloon within the bladder neck, marking the catheter at the external urethral meatus, deflating the balloon, removing the catheter, and re-inflating the balloon so as to note the distance from the external urethral meatus to the lower edge of the balloon. Statistical analysis was done using a paired T test.

Results

Table 1. Urethral Length Measurements (cm)

Urethral Length (cm)	**Animal 1**	**Animal 2**	**Animal 3**	**Animal 4**	**Animal 5**	**Mean**
Baseline Urethra Length	4.5	3.7	4.2	3.2	3.1	3.7
Before Closure of Fistula	2.7	4.0	4.0	3.0	4.2	3.6
After Closure of Fistula	2.7	4.0	3.5	2.5	3.0	3.1

Table 2: Urethral Length Change (cm)

	Animal 1	**Animal 2**	**Animal 3**	**Animal 4**	**Animal 5**	**Mean**	**SEM**
Delta Length 1	-1.8	0.3	-0.2	-0.2	1.1	-0.2	0.8
Delta Length 2	0	0	-0.5	-0.5	-1.2	-0.4	0.2
Delta Length 3	-1.8	0.3	-0.7	-0.7	-0.1	-0.6	0.4

Delta Length 1 = Change in urethra length from baseline to after creation but before repair
Delta Length 2 = Change in urethra length from after fistula creation to after repair
Delta Length 3 = Change in urethra length from baseline to after fistula repair

Table 3: Maximum Urethral Closure Pressure (cm H2O)

MUCP (cm H2O)	**Animal 1**	**Animal 2**	**Animal 3**	**Animal 4**	**Animal 5**	**Mean**
Baseline MUCP	81.5	97.3	93.3	81.0	92.0	89.0
Before Closure of Fistula	64.0	82.2	77.5	41.0	46.5	62.2
After Closure of Fistula	89.5	79.3	54.0	70.6	85.0	75.7

Six weeks after fistula creation animals were observed to have a 1.5 – 2.5 cm vaginal epithelial defect (figure 1). After opening the vaginal epithelium a circumferential bladder neck lesion was discovered in all animals. The investigators experience of repairing this experimental fistula was very similar to operations in adult female obstetric fistula patients.
All animals demonstrated a decline in MUCP after creation of the experimental fistula with a mean decrease of 26.9 cm H2O prior to fistula repair ($p = 0.015$). Four out of five animals were found to have lower MUCP after closure of the fistula compared to MUCP prior to creation of the fistula ($p = 0.16$). Although highly variable, anatomic urethral length measurements trended lower after fistula creation and after fistula repair ($p = 0.11$).

Interpretation of results
Creation of this experimental bladder-neck vesico-vaginal fistula was associated with a lower maximal urethral closure pressure and a trend toward shorter anatomic urethral length. Fistula repair was not consistently associated with further decrease in MUCP but was associated with a trend toward shortening. This model is a realistic representation of obstetric fistula commonly seen in the developing world and the first large animal model of obstetric vesico-vaginal fistula to date.

Concluding message
The Ovine model of obstetric fistula may be useful in surgical training and investigating methods of preventing and treating post fistula repair residual stress urinary incontinence.

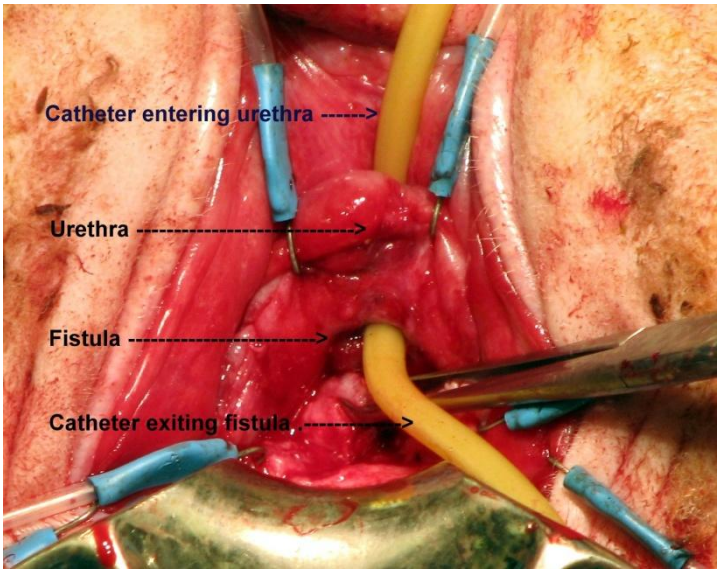

Figure 1: Experimental Ovine Bladder Neck Vesico-Vaginal

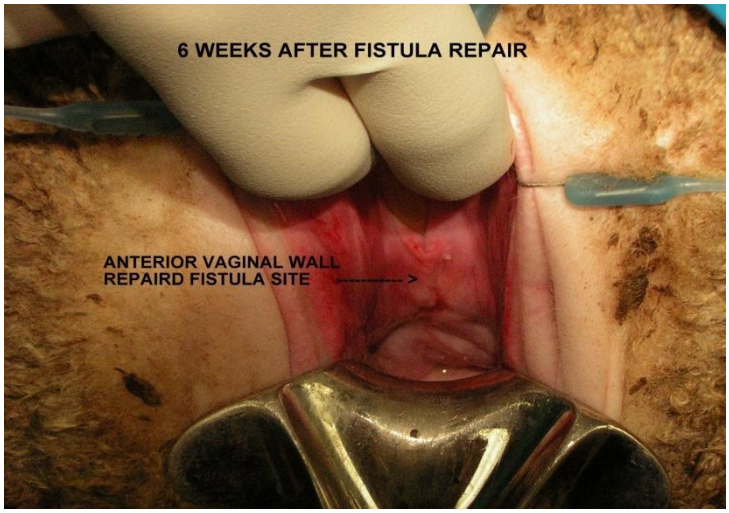

Figure 2: Anterior Vaginal Wall 6 Weeks after Repair of Experimental Fistula

References

1. Wall kk et al.,The Obstetric Vesico-Vaginal Fistula in the Developing World,Obstet Gynecol surv, 2005 Jul:60(7 suppl 1):S3-S51
2. Waaldijk K., Step-by-step surgery of vasicovaginal fistulas, Edinburgh: Campion Press Limited, 1994

Specify source of funding or grant	**None**
Is this a clinical trial?	**No**
What were the subjects in the study?	**ANIMAL**
Were guidelines for care and use of laboratory animals followed or ethical committee approval obtained?	**Yes**
Name of ethics committee	**Instutitional Animal Care and Use Committee**