WHAT'S YOUR SOLUTION?

Collaboration is Key- A Novel Treatment for Paraphimosis in Mice

By Samantha Setter, CVT, RLATG

Male mice may develop paraphimosis, which is commonly referred to as "penile prolapse." A non-surgical technique was developed to treat this condition. The treatment consists of pretreating the exteriorized penile tissue with a general lubricant or corticosteroid ointment and then using a probe to replace the penis into the prepuce. The results of the study were favorable, showing an overall 87% success rate. There was no significant difference between the two lubricants used for pre-treatment.

Introduction

In late 2020, at an academic research institution, the veterinary team received an animal health report about a mouse with a genital lesion. After performing a clinical assessment it was noted that 4 mm of the animal's penis was hyperemic with skin darkening and exteriorized outside the animal's prepuce, it was documented in the medical record as paraphimosis, which is commonly referred to as a "penile prolapse" in laboratory mice. Daily lubrication of the tissue or humane euthanasia of the animal was recommended to the laboratory staff member. The researcher let the veterinary technician in charge of the case that they had developed a technique to correct the prolapse non-surgically.

Since the researcher was not able to conduct a study on the labs animals' alone, the researcher and veterinary technician worked together to develop a study using the researcher's technique.

The institutional veterinarian was contacted and agreed to support a study to evaluate the treatment modality. The goals of this study were to assess the success of a novel technique of reinserting penile prolapses, and to determine the impact of a steroid containing lubricant to aid in reinsertion.

Materials and Methods

A lubricated stainless-steel 6" mall probe and seeker was used to reinsert the penis into the prepuce.

Twenty-three penile prolapse cases from January 2020 to September 2020 were identified and enrolled them in the study where a physical exam was performed to contribute to a severity-based scoring system:

1. Body condition
2. Genital health
3. Presence of comorbidities (congenital conditions)
4. Breeding status
5. Age

Score	Tissue Health
0	No inflammation or trauma; healthy tissue.
1	Mild inflammation or trauma; pink, dark pink or red tissue
2	Moderate inflammation and/or trauma; white/grey tissue

Figure 1: Tissue Health Scoring System

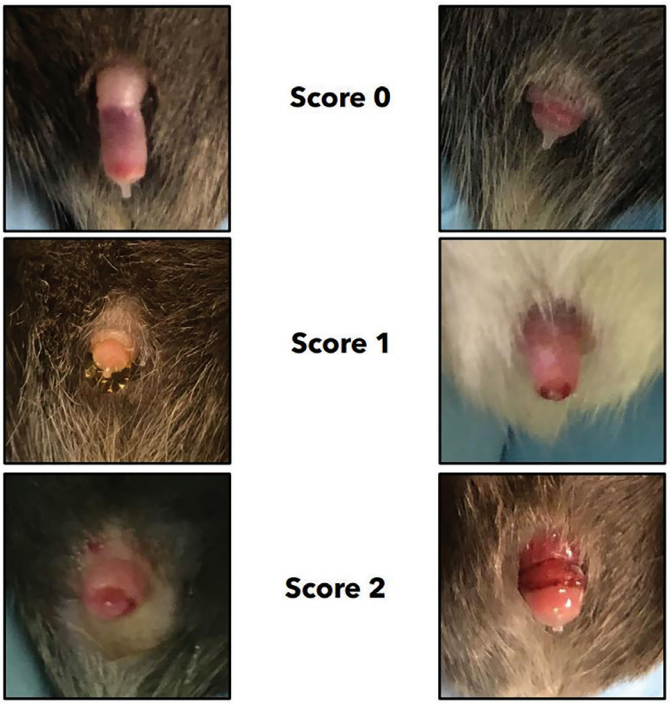

Figure 2: Visual Scoring Aid

Scoring of Penis Health

Experimental Treatment: All mice had their penises reinserted manually using a probe. To determine if the lubricant used to reinsert the penis had an effect, mice were randomly assigned into two treatment groups.

1. Sterile Lubricant (Puralube Vet Ointment used for this study)
2. Ophthalmic Triple Antibiotics Ointment + Dexamethasone

Penis Anatomy

Novel Reinsertion Technique

1. The mouse is scruffed and restrained using a one-handed technique.
2. The external prepuce is pulled back to ensure there is no foreign material present.
3. If debris or foreign material is seen, it is gently removed prior to reinsertion.

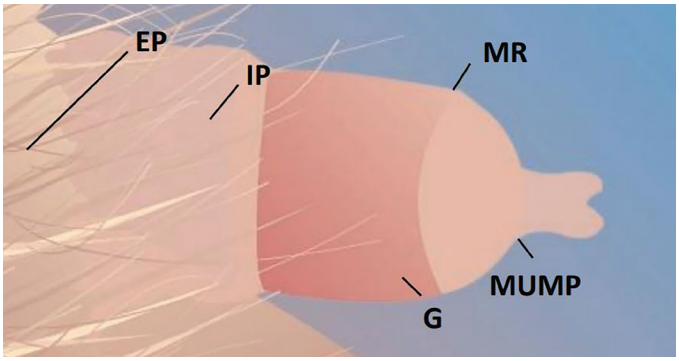

Figure 3: MUMP, male urogenital mating protuberance; MR, MUMP ridge; G, glans; IP, internal prepuce; EP, external prepuce.

Figure 4: Side view showing the structure of the penile body inside the external prepuce.

4. The lubrication is applied to the penis and prepuce and the animal is left alone in a contained area for 1-2 minutes to allow time to moisten the tissue.
5. The probe is used to tuck the penis back into the prepuce.
6. The animal tensing up can push the tissue back out of the prepuce, but once the animal has relaxed it can be gently reinserted.
7. Once the penis is fully inside the probe can be inserted into the prepuce to ensure correct position.
8. Additional lubrication is applied topically to keep the tissue moist.
9. Check the animal the following day to ensure that the reinsertion was successful

Note: If the first attempt at reinsertion was not successful, the procedure may be repeated.

Regulatory Considerations: All treatments were managed under veterinary care and reinsertion was performed as a veterinary treatment. Thus, a separate research protocol was not required for animals enrolled in the study and institutional IACUC approval was not deemed necessary. Researchers were able to use the animals as intended in their protocol throughout the treatment protocol, and animals were kept in their home cages and regular housing rooms.

Results and Discussion

There was an 87% (20/23) overall success rate for participants included in the study.

There were three key health factors I identified that decreased the probability of successful treatment:

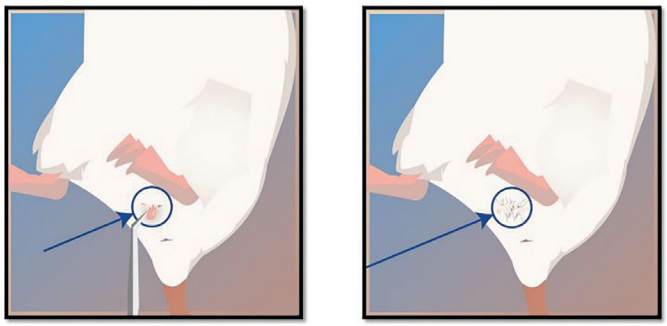

Figure 5: Before and after correction of penile prolapse.

1. Presence of internal prepuce inflammation
2. Trauma to the penis
3. Pre-existing congenital condition

In participants with healthy penile tissue and no inflammation or trauma, scored 0, 100% (10/10) of the treatments were successful.

In complicated cases where trauma or inflammation is present the success rate declined. In cases with mild to moderate inflammation or trauma, scored 1, the success rate dropped to 86% (6/7). In cases with severe inflammation or trauma, scored 2, the rate further dropped with a 67% (4/6) rate of success.

When animals have congenital conditions such as a malocclusion or hydrocephalus, they can also present with secondary paraphimosis. These animals are usually humanely euthanized due to a poor prognosis or early removal from study.

Even when inflammation was a factor, there were no substantial differences between successful treatment with general lubricant or corticosteroid ointment. Animals treated with sterile lubricant had successful resolution 92% (12/13) of the time, and animals treated with corticosteroids had successful resolution 80% (8/10) of the time.

Conclusion

Murine paraphimosis is a multifactorial condition requiring additional investigation into contributing factors and effective treatments. Additional case enrollment continues to further validate this novel technique. We are currently conducting additional studies to look at further implications and the long term outcome for these animals.

Collectively, the results of this study suggest that reinsertion of the exteriorized penis into the prepuce, via use of a probe, is an effective treatment for mice suffering from paraphimosis, otherwise known as penile prolapse. Our treatment is non-invasive and can be utilized with no active drugs for pre-treatment. This allows for more animals to benefit from this treatment without needing to be removed from study, ultimately reducing the numbers of animals used in research.

Acknolegements

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