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Urine Pooling in the Mare

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Summary

Pooling of urine in the anterior vagina is a fairly common cause of infertility in the mare. It is a problem of either poor conformation or poor muscle tone and incomplete involution of the tubular genital tract. A simple method of surgical correction consists of retracting the transverse fold, a mucosal fold overlying the external urethral orifice, caudally approximately 5 cm. (two inches) and suturing it to the vestibular floor. This in effect extends the urethra caudally 5 cm. (two inches) and enhances complete evacuation of urine. This procedure has been shown to be effective in the elimination of urine-pooling.

Introduction

In older pluriparous mares, urine-pooling is attributed to a condition known as "sinking vagina" or splanchoptosis of the genital tract. Other causes include poor muscle tone, stretched ligaments, and incomplete involution of the tubular genital tract in the undernourished mare or the mare that has experienced a difficult foaling.[2,10] With proper feeding and sexual rest the latter group will regain good uterine and vaginal tone and make a spontaneous recovery.[5] The preceeding group, however, may require surgical revision of the urethra for satisfactory results. A small vulvar orifice resulting from a Caslick's operation may contribute to urine-pooling as urine splashes off the vulvar orifice and down into the anterior vaginal vault. Clark feels some mares may pool urine only during estrus due to the hormonal relaxation of the vaginal and uterine tissues. For this reason reproductive examinations should be performed at estrus when the genitalia is in its most relaxed state.[2]

Splanchoptosis occurs when elongated ovarian ligaments allow the genital tract, lacking normal tone, to be pulled cranioventrad so the vagina falls below the level of the pubis.[5,9] The external urethral orifice is then directed more dorsally causing urine to splash off the roof of the vaginal vestibule during micturition and reflux into the anterior vagina.[6,8] (Fig. 1) Urine and vaginal secretions accumulate around the external cervical os predisposing to inflammation and infection of the vagina, cervix, and/or uterus.[9] The urine "pool" can also serve as a lethal mechanical barrier to spermatozoa.[6] Chemical irritation, inflammation, and infection all contribute to the resulting infertility.

Case Record

A six year old Thoroughbred mare was presented to the Animal Clinic in Pocatello, Idaho for a fertility examination on June 25, 1979. The mare had foaled on May 5, 1979 and was bred twice, May 12 and May 14, during her foal heat. Nineteen days later, the mare was showing signs of estrus and was bred every other day until out of heat on June 2, 1979 (three services). She began to show signs of estrus again on the evening of June 24, 1979.

Upon presentation to the clinic the mare was nursing a foal and both appeared to be in good health. Upon external examination it was noted that the mare had a badly recessed anus and a tipped vulva. Rectal papation revealed a 50mm follicle on the posterior pole of the left ovary; no significant structures were noted on the right ovary. The uterus was approximately 65mm in diameter and "doughy". The cervix was relaxed. Vaginal

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exam revealed a mildly inflamed vaginal mucous membrane, a relaxed open cervix, and approximately 250 cc of cloudy yellow fluid in the anterior vaginal vault.

The fluid was withdrawn with a syringe fitted with an insemination pipette. The uterus was cultured with a Tiegland uterine swab. The uterus was then infused with 500 cc of a 10% Betadine[a]-in-saline solution.

Fluid analysis revealed:

Gross appearance: turbid, pale yellow color with the odor of urine
Specific gravitry: 1.018
pH: 9
Labstik[b]: protein, glucose, ketones, occult blood, urine bilirubin, urobilinogen—all negative
Sediment: moderate number of epithelial cells

The urea nitrogen content of the fluid was determined using the Biodynamics Digitek[c] system and the Bunograph.[d] The results were "off of the scale" with both methods. The fluid was considered to be urine.

A mixed culture was obtained from the uterine swab. Some colonies were hemolytic *Streptococcus sp.*; the others were unidentified. All were quite susceptible to most commonly used antibiotics.

The owner was contacted and informed of the findings. The fact that the mare was a "urine-pooler" was discussed.

On June 28, another vaginal exam was performed and again approximatley 150 cc of fluid was obtained from the anterior vaginal vault. The characteristics were much the same as the previous fluid. A similar uterine mixed culture was also obtained.

The owner was contacted again and it was decided to perform surgery on July 5.

Procedure

The surgery is an attempt to lengthen the urethral tunnel by extending the transverse mucosal fold posteriorly and suturing it to the ventral-lateral floor of the vulvar vestibule.

The surgery was performed with the mare in the standing position sedated wth 40mg acepromazine maleate intravenously. Anesthesia was achieved with a caudal epidural using 8 cc of 2% lidocaine hydrochloride. The tail was wrapped and tied cranially. The rectum was cleared of feces to prevent defecation into the surgical field during the procedure. The perineal region was scrubbed thoroughly by alternating pHisoHex[e] soap and a Betadine solution rinse.

Ribbon retractors held by an assistant were used to pull the lips of the vulva laterally allowing maximum visualization of the vagina. The transverse fold (Fig. 2), a wrinkled mucosal fold overlying the external urethral orifice, was identified and grasped with a thumb forceps approximately 2.5 cm. (one inch) lateral to the midline. The fold was then retracted caudally 5 cm. (two inches) into the desired position. The left lateral edge of the transverse fold was "freshened" by trimming off 1/8 inch of the mucosa with a Mayo scissors. A corresponding 1/8 inch strip of mucosa was also removed from the vestibular floor. The "freshened" mucosal edges were then sutured together using 2-0 VICRYL[f] in a simple continuous pattern. The procedure was repeated with the right lateral edge of the transverse fold. (Fig. 3)

Following surgery, the mare was given 1 cc tetanus toxoid IM, 25 cc procaine penicillin IM, and the uterus was infused with 500 cc of a 10% nitrofurazone-in-saline solution.

The mare was rechecked on July 16, 1979. The sutures were still in place and the mare was not pooling urine at that time. A uterine culture taken during the exam was negative. Since the mare was in heat and appeared to be reproductively normal she was taken to the stallion for mating.

Discussion

Before any type of surgery is performed to correct urine-pooing, the mare's reproductive capability should be evaluated. The size, shape and consistancy of the uterus can be evaluated by rectal palpation. Endometrial secretions can be examined for micro-organisms by swabbing the endometrium and subsequent culturing. Direct visualization of the endometrium with a fiber optic system may also aid in detecting detrimental changes.[8] Although all of these methods are

[a]Betadine, Purdue-Fredrick, Norwalk, Conn. 06856
[b]Labstik, Ames Division, Elkhart, Indiana 46515
[c]Digitek, Biodynamics/BMC, Indianapolis, Ind. 46250
[d]Bunograph, General Diagnostics, Kansas City, Mo.
[e]pHisoHex, Winthrop, New York, New York 10016
[f]VICRYL (polyglactin 910), Pitman-Moore Inc., Washington Crossing, New Jersey 08560

Fig. 1

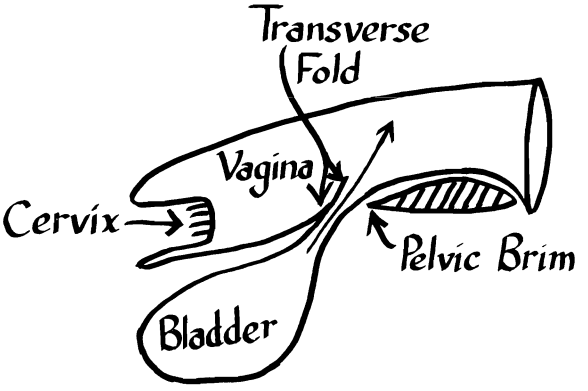


Fig. 2

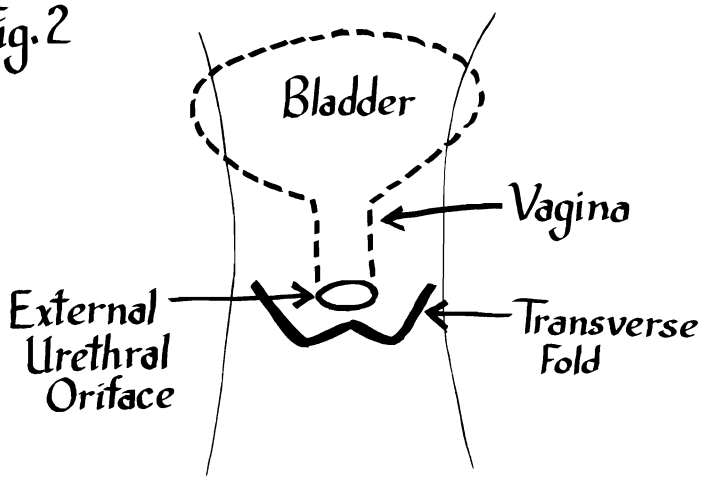
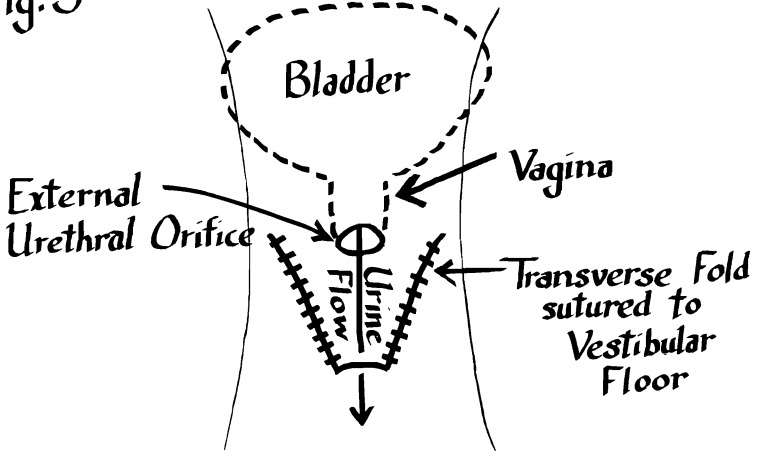


Fig. 3



valuable in evaluating reproductive capability, many factors that affect fertility can go undetected. Chronic uterine in flammation created by aspirated urine may result in considerable scarring.[8] A uterine biopsy can allow for a more accurate prognosis of the future breeding soundness by revealing these degenerative changes.[1,4,8] A uterine biopsy was considered in this mare but Dr. Noone felt that since the mare had a foal by her side the condition was not of long duration and the scarring was probably not significant. It should be emphasized, however, that surgical repair would be a wasted effort in mares with an endometrium not capable of supporting a pregnancy to term.[4]

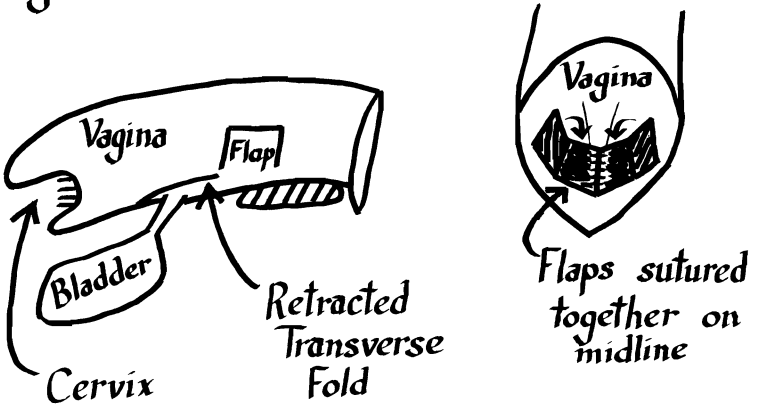
Caudal epidural anesthesia is usually quite adequate although local administration of lidocaine hydrochloride may be used if necessary. However, the use of lidocaine locally should be kept to a minimum since local infiltration of anesthetic into the vaginal wall may cause delayed healing.[7]

This urethroplasty technique was originally described by Monin using a nonabsorbable suture material.[6] Noone prefers VICRYL (polyglactin) because it is quite nonreactive and the sutures do not have to be removed.

Postoperatively, Monin suggests 30-60 days of sexual rest. During this time the uterine inflammation and infection can be treated. Artificial insemination is recommended for those mares repaired during the breeding season.[6] The mare in this case was not artificially inseminated because AI is prohibited by the Thoroughbred Association. There are no reported problems regarding natural service tearing the transverse fold loose, but it is recommended to wait until the second post-op heat period if possible.[8] In some mares the fold will fistulate or tear away from the vestibular floor. Generally these unsuccessful attempts are associated with 1) friable tissues resulting from a severe vaginitis and 2) excessive caudal retraction of the transverse fold causing too much tension on the suture line.[2,6] Excessive tension on the fold may also prevent the "urethral tunnel" from lying flat on the vaginal vestibular floor and may be damaged during breeding.[6]

Another method of urethral extension has been described by Brown, Colahan, and Hawkins utilizing a three-layer suture technique to pull the wall of the vaginal vestibule over the external urethral orifice to create a "urethral tunnel".[1] Although the procedure proved effective in 16 of 18 mares, it has three main disadvantages; 1) excessive bleeding due to tissue dissection decreases visualization of the surgical field[2] 2) increased tension on the suture line form the pull of the vestibular walls predisposes to fistulas and dehiscence[8] 3) the increased complexity of the procedure greatly increases the length of surgery time.[8] The single-layer suture, transverse fold urethroplasty has been shown to be just as effective as Brown's technique without the above disadvantages. Dr. Noone

Fig. 4



has been associated with transverse fold urethroplasty in 15 mares. The procedure was effective in 14 of the 15 mares. The one mare in which the fold tore loose was subsequently resutured with no further complications. In addition, Noone averages only twenty minutes of surgery time after anesthesia has been achieved. In two instances, Noonė has had mares continue to "pool" urine after this procedure has been performed. In these cases a mucosal flap was dissected from each side of the vaginal vestibule and sutured together along the midline to extend the "urethral tunnel" even further caudally. (Fig. 4) This eliminated the pooling of urine in these mares.

Urine-pooling is a common cause of infertility in the mare and Monin's technique is considered a very practical procedure for surgical correction of this problem. The procedure is relatively bloodless, simple, and quick.

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Changes in National Boards to Affect Iowa Students

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Students who take the National Board examination in Iowa will find some important differences from the exam given in past years. A major part of this change will be the inclusion of a Clinical Competency Test (CCT) in the examination.

First offered in Colorado and other states last spring, the CCT is designed to simulate, as closely as possible, an actual clinical problem. Examinees are given a case history and provided with a number of options in the use of diagnostic procedures and expanded case history. Many of the options available are "dead ends" that are of no assistance in leading to a diagnosis. Other options may require prolonged effort and/or multiple diagnostic tests before the correct diagnosis is made. Examinees are graded by a formula that uses two criteria for evaluating: 1, their ability to arrive at the correct diagnosis and, 2, their ability to arrive at that diagnosis in the simplest possible manner.

Reaction to the Clinical Competency Test given in other states last year was enthusiastic, both from those who took the test and those who administered it. According to Dr. Wertmann, a member of the National Board Examination Committee, examinees generally preferred the CCT to other portions of the exam.

Those who administer the National Boards see the CCT as part of a larger plan to restructure the entire examination. According to the October 15, 1979 AVMA Journal, the following changes in the National Board Examinations are also being made: 1. Test materials will be revised to place greater emphasis on clinical subjects (e.g. medicine, surgery, and jurisprudence). 2. The number of test questions will be reduced from 435 to 360 questions. 3. The examination will be given on only one date (June 2) rather than the two dates previously scheduled.

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