Clinical Technique

Equine Perineal and Vulvar Conformation Correction Using a Modification of Pouret’s Technique

Frederico O. Papa PhD⁵, Cely M. Melo PhD⁵, Gabriel A. Monteiro MSc⁵, Patricia M. Papa DVM⁵, Priscilla N. Guasti MSc⁵, Rosiara Rosária D. Maziero MSc⁵, Ana Augusta P. Derussi PhD⁵, Luis Carlos O. Magalhães MSc⁵, José Carlos Martin PhD⁶, Ian Martin PhD⁵

⁵Department of Animal Reproduction and Veterinary Radiology, College of Veterinary Medicine and Animal Science, São Paulo State University, Botucatu, São Paulo, Brazil
⁶College of Veterinary Medicine and Animal Science, Federal University of Goias, Goiânia, Goiás, Brazil

ABSTRACT

An incompetent vulvar seal leads to reproductive failure, and a surgical intervention might be required. The present paper describes modifications to Pouret’s surgery. We suggest the use of a simple interrupted vertical mattress suture, which avoids seroma. Eighteen Brazilian Jumping Horse mares, older than 20 years and barren for 3-5 consecutive years, underwent modified Pouret’s surgery. A horizontal skin incision of 3-4 cm was made half way between the anus and upper commissure of the vulva. The submucosal and connective tissue were dissected, and the rectovaginal shelf was split horizontally by sectioning the muscular and ligamentous connections between the anus, vulva, caudal portion of the rectum, and vagina until the vulva was oriented vertically. The wound was changed from a horizontal plane to a vertical plane by placing the suture vertically using approximately eight interrupted U sutures distributed in two layers with polyamide thread. The modified Pouret’s surgical technique provided a perfect coaptation of the vulvar lips and a correct perineal position. Those mares that presented with horizontally tipped vulvar lips due to advanced age and stretching of the pelvic tissues by multiple foaling had their vulvas replaced. Also, the surgical procedure was easy to perform. As to fertility, of the 18 initial mares, 14 were inseminated, and all became pregnant. Thus, it was possible to conclude that the anatomical changes performed throughout the surgical procedure predisposed to a better vulvar coaptation, correcting the pneumovagina.

© 2014 Elsevier Inc. All rights reserved.

1. Introduction

Reproductive failure in mares may represent a challenge to the attending veterinarian. Many causes of conception failure or difficulty to carry pregnancy to term may be easy to diagnose and treat. In some cases, more than one problem will be present, and both medical therapy and surgical intervention might be required to achieve a successful outcome [1]. Perineal surgery in mares is usually performed to correct acquired perineal conformation abnormalities from breeding or foaling trauma. A common consequence of perineal trauma is the disruption of protective barriers that prevent contamination of the cranial reproductive tract [2]. The vulva provides the first effective barrier that protects the uterus from ascending infections. Normal labia are full and firm and meet evenly in the midline, and 80% or more of the vulvar opening is below the brim of the pelvis.
If the vulvar seal is incompetent, aspiration of air and, thus, contamination of the vagina can occur. The initial vaginitis may lead to cervicitis and acute endometritis, which will consequently result in subfertility [3]. Therefore, the external genitalia (vulva) must be evaluated for conformation and muscular tone [4].

The trauma to the vulva and decrease in muscular tone that comes with age may lead to a compromise of the vulvar seal and may predispose to pneumovagina or "wind sucking." Inclination of the vulva secondary to a recession of the anus or poor muscular tone of the labia of the vulva may predispose the mare to an ascending infection of the reproductive tract [4].

Defective vulvar conformation can be congenital, which is very rare, or acquired, which is caused by vulvar stretching following repeated foaling, injury to perineal tissue by foaling or breeding injuries, or poor body condition (old, thin mares) [3]. Poor body condition caused by loss of perineal fat can also result in pneumovagina or even exacerbate the problem [1]. Alterations of vulvar angle and length have been used to determine a Caslick index, which is used to provide an index of need to perform vulvoplasty. An index lower than 150 represent a normal anatomical arrangement. However, fertility rates are better in mares with a Caslick index of 100 or less. The Caslick index naturally increases with age, and a continuous evaluation is essential, especially if loss of body condition occurs [5].

In some cases, pneumovagina occurs only in estrus, because the perineum is more relaxed. The inrush of air may occur when the vulvar labia are partially opened, which occurs because of the incompetence of the vestibular seal [1]. Failure to correct predisposing conditions such as pneumovagina may be one reason for unsuccessful treatment of endometritis [6].

The aim of the present study was to describe some modifications of Pouret’s surgery [7]. Conventional surgery does not make any attempt to close the perineal dead space, and the final result allows the upper commissure of the vulva to return to its normal vertical orientation. We suggest the use of a simple interrupted vertical U suture, which correlates with avoidance of seroma.

2. Materials and Methods

Eighteen Jumping Horse mares older than 20 years old were used. All mares did not become pregnant for 3-5 consecutive years, even though they were regularly inseminated. Two of the mares had presented with pyometra prior to the experiment.

The mares were sedated and restrained in the stock before receiving epidural anesthesia. Sedation was performed using acepromazine, 0.03 mg/kg (Apromazin 1%; Syntec do Brasil Ltda, Cotia, SP, Brazil), in association with xylazine, 0.3mg/kg (Sedomin; Laboratórios König S.A., Avellaneda, Argentina). The tail was bandaged, the rectum evacuated, and the perineum was cleaned and sanitized. Epidural anesthesia was administered using 6 mL of lidocaine 2% (Xylestesin 2%; Cristália Produtos Químicos Farmacêuticos Ltda, Itapira, SP, Brazil). Local anesthetic was infiltrated in the rectovaginal shelf, and the Pouret surgery was performed.

Pouret’s surgery was performed conventionally; however, some changes concerning the suture of Pouret’s surgery were made. Sutures were not placed in a horizontal plane but rather in a vertical plane. A horizontal skin incision of 3-4 cm was made half way between the anus and the upper commissure of the vulva (Fig. 1). The submucosal and connective tissues were dissected, and the rectovaginal...
The shelf was split horizontally by sectioning the muscular and ligamentous connections for 10 to 13 cm between the anus, vulva, caudal portion of the rectum, and vagina (Fig. 2). The suture was performed vertically using eight interrupted U sutures distributed in two layers and using a polyamide thread (pseudo-monofilament, nonabsorbable, USP 3, metric 6; BBraun Aesculap; Tuttlingen, Germany) as shown in Figs. 3-6. The suture was removed after 12 days.

2.1. Pre- and Postoperative Treatment

At the moment prior to surgery, mares received 1.1 mg/kg flunixin meglumine (Mogipen, Bimeda Mogivet Farmacêutica S.A., Monte Mor, SP, Brazil) intravenously (IV), 20,000 UI/kg benzathine penicillin (Vencosat, Laboratórios Vencofarma do Brasil Ltda, Londrina, PR, Brazil) intramuscularly, and tetanus prophylaxis. Following surgery, they received a two more treatments consisting of 20000 UI/kg benzathine penicillin intramuscularly every 2 days and 1.1 mg/kg of flunixin meglumine intravenously daily for 3 days. The wound was cleaned once a day with povidone-iodine solution.

3. Results

The modified Pouret’s surgery technique provided a perfect coaptation of the vulvar lips (vulvar seal), as well as a correct perineal position avoiding the entrance of foreign material into the tubular tract. Thus, those mares that presented with horizontally tipped vulvar lips because of advanced age no longer had vertical vulvas. The surgical procedures themselves were easy to perform.

In relation to fertility, 14 mares were inseminated and became pregnant. Those who had pyometra were treated and will be subsequently inseminated this season.

4. Discussion

It is well known that pneumovagina is one cause of infertility, once it leads to genital infections. Although there are few studies related to the vulvar and vestibule alteration, it is hard to assume that treatments with antibiotics and chemotherapeutic medications are enough to solve the infertility problem.

In normal mares, the vulva provides the first effective barrier to protect the uterus from ascending infection. If the vulvar seal is incompetent, aspiration of air and contamination of the vagina might occur. The initial vaginitis may lead to cervicitis and acute endometritis, resulting in sub-fertility. Treatment should aim to correct the cause of pneumovagina and concurrently treat the resulting acute endometritis [8].

There are currently three surgical options for correction of pneumovagina: Caslick’s operation, the Gadd procedure, and transection of the perineal body. If the vulva is markedly horizontally positioned and the anus quite sunken, it

---

Fig. 3. Front view of the 2-cm skin incision between the anus and upper commissure of the vulva and (horizontally) the fixation of the incision into a vertical position.

Fig. 4. Lateral view shows fixation of the incision into the vertical position and how to perform the vertical suture of the incision with horizontal interrupted U stitches.
Fig. 5. Lateral view shows the second sequence of stitches on the borders and the final result with stitches. The vulva is repositioned in its normal anatomical position after the application of the suture.

Fig. 6. (A) Abnormal vulvar conformation before surgery. (B) Horizontal incision between the anus and the dorsal commissure of the vulva. (C) A 10-cm-deep internal perineum divulsion. (D) Vertical suture with horizontal interrupted U suture. (E) Vulvar horizontal incision fixation into the vertical position. (F) Horizontal U suture. (G) First U stitch. (H) Three U stitches. (I) Final result with a sequence of greater distance (2 cm) and stitches on the borders. (J) Vulva repositioned in the correct anatomical position.
Fig. 6. Continued
may be impossible to suture the vulvar lips to the recommended level below the ischiatic arch. Transection of the perineal body may be necessary to regain more vertical vulvar alignment [1].

Advantages of such modifications of Pouret’s surgery are the vertical positioning of the vulva, reducing the contamination with feces, as in those cases of pneumovagina. The use of a vertical suture instead of one horizontal provides a better perineal location and creates an internal wall that overlaps the pelvic floor, re-establishing the pubic region pressure.

Another important factor is the increase in fertility rates after surgery. All the mares had not become pregnant for 3-5 years, which brings up the importance of a healthy uterine environment to maintain the pregnancy. In two more severe cases, the uterine alterations developed pyometra, which could occasionally result in endometrial atrophy and fibrosis of endometrial stroma [9].

In the present study, the use of the U suture allowed an adequate orientation of the vulva and cicatrization of the wound in just 12 days for all the animals, showing that the use of a suture does not lead to enough wound contracture to impair the corrective surgery. In contrast, Trotter and McKinnon [1] allowed the wound to heal by second intention and observed less return of the vulva to its pre-surgical position.

After the surgery, re-creation of a vertical orientation of the vulva decreases fecal contamination of the vulvar lips and aspiration of feces and air into the vestibule. It prevents vaginal and uterine contamination, and consequentially, we have a vaginal and healthier uterine environment.

5. Conclusions

In conclusion, all the mares presented with an abnormal perineal and vulvar conformation prior to surgery, and the anatomical changes performed throughout the surgical procedure (repositioning of the perineum, anus and vulva; formation of a new internal wall in the perineal site) predisposed to a better vulvar coaptation, correcting the pneumovagina, even in the old mares. Most of the mares (14 of 18) inseminated with fresh semen became pregnant.

Acknowledgments

Funds were provided by FAPESP (Sao Paulo Research Foundation). The authors declare no conflict of interest. This work was approved by the Ethics and Animal Experimentation Committee at the College of Veterinary Medicine and Animal Science, UNESP, Botucatu. All authors contributed to, read, and approved the manuscript and consented to its submission for publication in Journal of Equine Veterinary Science. All authors contributed to the study design, data collection, study execution, interpretation, and preparation of the manuscript. The authors are grateful to the owner of the mares for cooperation in facilitating numerous surgeries. The figures were drawn by A. A. P. Derussi.

References