



## Case Report

## Laparoscopic Uteropexy (Mesometrium Imbrication) in Three Mares Using a Barbed Suture



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## ABSTRACT

The aim of this study is to describe the surgical technique, complications and outcome of laparoscopic uteropexy in three mares using an absorbable barbed suture. Three old multiparous mares were referred for laparoscopic uteropexy. History information included abnormal uterine position, regular ovarian activity and recurrent uterine fluid accumulation during estrus or post-breeding. The mares had been unsuccessfully bred for years. Physical examination of each mare revealed an abnormal perineal conformation and a large pendulous uterus. *Per rectum* ultrasound examination failed to reveal any abnormalities. Laparoscopic uteropexy was performed using an absorbable suture with unidirectional shallow barbs. There were no complications neither intraoperative nor postoperative. Follow-up examination confirmed that uterine position was more dorsally in the abdomen. Two mares became pregnant without other treatments the following breeding season and delivered two live foals. This is the first report on the use of a barbed suture in laparoscopic uteropexy. With Barbed suture is a new surgical suture that gives surgeons the possibility to perform suture without making knots. Barbed suture could be useful during laparoscopic surgery when performing knots represents a difficult and time consuming procedure. Despite barbed suture is becoming popular in human laparoscopic surgery, there are very few reports on its use in horses.

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## 1. Introduction

Old multiparous mares often have a large ventrally positioned uterus. The aging process, along with repetitive stretching of the uterine wall and ligaments that is associated with pregnancy, can result in elongation of the mesometrium that is no longer able to suspend the uterus in a horizontal position [1].

The anatomical condition is associated with reduced uterine clearance and chronic endometritis [1]. In some cases, common treatments used to improve uterine contractile function and clearance of fluid and bacteria (i.e., oxytocin, prostaglandins) are ineffective [2]. Pendulous

uterus is definitely an important cause of infertility in older mares [3].

Laparoscopic uteropexy is a minimally invasive surgical technique that consists in the imbrication of the uterine body and horns to the mesometrium in a more dorsal position. The aim of the procedure is to shorten the distance between the uterine wall and the mesometrium, effectively suspending the uterus in a more horizontal position and thus improving uterine drainage. Moreover, pendulous uterus is often associated with poor perineal conformation [1]. Because enlarged and pendulous uterine horns drag the rectum and vagina cranially, affected mares have a sunken anus and a horizontal tilt to the vulva [4]. Elevation of the uterine horns after uteropexy is performed, usually brings about immediate improvement in vulvar conformation [4].

A benefit of barbed sutures is that knots are not required, which reduces the length of suture material used.

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Furthermore, the barbs circumferentially orientated on the suture strand provide for consistent tissue holding capability across the length of the suture line. In human, medicine barbed sutures are now used more frequently than before. Numerous reports exist in plastic surgery [5], orthopedic surgery [6], and laparoscopic surgery [7]. Use of barbed suture is advantageous because knot tying is avoided thus reducing operative time and risks of infection associated with knots [8]. In equine veterinary medicine, there are only few reports on the use of barbed sutures [9,10] despite they can be potentially used in several surgical procedures.

The aim of this study was to report the surgical procedure and the reproductive outcome of laparoscopic uteropy using barbed suture in three mares.

## 2. Case Report

### 2.1. Case Histories and Clinical Findings

Three Warmblood mares were referred to the Veterinary Teaching Hospital for laparoscopic uteropy in standing position. They were old multiparous mares unsuccessfully bred during the previous breeding seasons (Table 1) despite regular follicular activity. Referring veterinarians reported recurrent uterine fluid accumulation during estrus, persistent postbreeding endometritis, and repeated bacterial isolation. Despite repetitive treatments (Table 1), including uterine lavages, ecobolic agents, intra-uterine antibiotics, and surgical correction of poor perineal conformation (Caslick's procedure), mares were still barren.

During physical examination of each mare, no gross abnormality was detected except for poor perineal conformation. Vulvar plane was abnormally angled toward the rectum. During palpation of the abdomen per rectum, the uterus was large, heavy, and ventrally positioned, and the ovaries were firm and small. Per rectum ultrasound examination confirmed the presence of inactive ovaries typical of anestrus. Results of a complete blood count and serum biochemical analysis were within reference limits.

### 2.2. Materials and Methods

#### 2.2.1. Laparoscopy

On the basis of the history and clinical findings, laparoscopy in standing position was scheduled.

In preparation for laparoscopy, the horses had free access to water, but food was restricted to one cup of soaked complete feed twice a day for 36 to 48 hours.

Uteropy has been already described [11] although a brief summary of the adopted technique and a detailed description of the use of barbed suture is included in this report. During the preoperative preparation, hair was clipped in the flanks, feces were removed from the rectum, and urethral catheterization was performed. Horses were administered procaine penicillin (Depomicina; MSD Animal Health S.r.l., Segrate Milano, Italy) (22,000 UI/kg bodyweight [bwt], intramuscular [IM]), streptomycin (Depomicina; MSD Animal Health S.r.l.) (11 mg/kg bwt, IM), and flunixin meglumine (Flunifen; Ceva Salute Animale SpA, Agrate Brianza, Monza, Italy) (1.1 mg/kg bwt, intravenously [IV]) within 30 minutes before surgery. Mares were sedated with romifidine (Sedivet; Boehringer Ingelheim Italia spa) (30 µg/kg bwt, IV) or detomidine (Domidine; FATRO spa, Italy) (10 µg/kg bwt, IV) and butorphanol (Dolorex; MSD Animal Health S.r.l.) (20 µg/kg bwt, IV). Sedation was maintained via constant rate infusion of the same alpha-2 agonist. Morphine (Morfina Idroclorato; Molteni S.p.a.L. Molteni & C. dei F.lli Alitti Societa' di Esercizio S.P.A., Scandicci (FI), Italy) (50 mg in 20-mL sterile saline solution) or methadone (Eptadone; L. Molteni & C. dei F.lli Alitti Societa' di Esercizio S.P.A.) (50 mg in 20-mL sterile saline solution) was injected in the epidural space at the first intercocygeal space to provide long-lasting analgesia, as reported in literature [12].

Instrumentation consisted in a 5- to 11-mm fixation cannula and 11-mm gun-like optical obturator (Visiport Plus RPF 5–11 mm Optical Trocar with Versaport Plus RPF Single Use Radiolucent Converterless Trocar Sleeve; Covidien, Italia spa), two 5 to 12-mm fixation cannulae and 12-mm shielded bladed obturators (Versaport Plus V2 5–12 mm; Covidien), a 10-mm 0° 3D laparoscope (Viking Systems 0 Laparoscope; Viking Systems Inc, Westborough, MA), two Babcock forceps (Babcock, Storz Medical Italia srl, Roma, Italy), a gun-type needle holder (Needle-holder, Storz Medical Italia srl), a 3D HD image acquisition system (Viking 3DHD image acquisition system; Viking Systems Inc), and one (per side) barbed suture.

V-Loc 180 (V-Loc™ 180; Covidien) is a surgical suture made of copolymer of glycolic acid and trimethylene carbonate. It is absorbed in 180 days and at 21 days maintains 65% of the original tensile strength. The 2-0 USP used in the mares presents an end-looped extremity and is swaged to a 26-mm, round-bodied, taper point, half-circle needle (Fig. 1). Monodirectional shallow barbs project from the body of the suture strand (Fig. 2).

After draping the surgical area, local infiltration of 2% mepivacaine (Carbosen 20 mg/ml, Industria Farmaceutica, Galenica Senese srl) throughout the full-thickness body

**Table 1**  
History and clinical features of the three mares referred for laparoscopic uteropy.

Horse	Age	Breed	Weight	Main Complaint	Duration of Infertility	Previous Treatments
Mare 1	15 years	Warmblood	550 kg	Infertility, recurrent uterine fluid	2 years	Intrauterine antibiotics, ecobolics, uterine lavage
Mare 2	23 years	Warmblood	600 kg	Infertility, recurrent uterine fluid, postbreeding endometritis	3 years	Intrauterine antibiotics, ecobolics, uterine lavage, caslick
Mare 3	25 years	Warmblood	620 kg	Infertility, recurrent uterine fluid, postbreeding endometritis	3 years	Intrauterine antibiotics, ecobolics, uterine lavage, caslick

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