

# Hand-assisted laparoscopic partial ovariectomy in a standing mare suffering from a bleeding uterine leiomyoma

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**Summary:** A 22-year-old, non-pregnant, retired pasture pony was presented with severe and sudden-onset haemorrhage from the vulva. Transrectal palpation revealed a mass in the right uterine horn. Laparoscopic partial ovariectomy was performed and a histopathologic examination of the tumour revealed a uterine leiomyoma. The mare recovered without complications and was discharged nine days later. Both four and eighteen months after discharge, the mare was found to be in a good general condition, enjoying her retirement without any clinical complaints.

**Keywords:** horse, uterine leiomyoma, haemorrhage, laparoscopy, ovariectomy

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## Introduction

Aside from pregnancy disorders, bleeding from the vulva must be differentiated from hematuria and can be caused by a variety of disorders of the urogenital tract including diseases of the kidney, ureter, bladder, uterus, cervix, and vagina (White et al. 1984, Frazer 2005, Zantingh et al. 2012, Vienenkötter et al. 2017, Smith et al. 2018) or by trauma (Prell et al. 2016). Leiomyomas are very common uterine neoplasms, which occur in women during their reproductive age at a prevalence of more than 70% (Yang et al. 2016, Lewis et al. 2018). They are known to cause uterine bleeding, impaired fertility, anemia, lower abdominal pain, pain during intercourse, pressure symptoms, and urinary incontinence (Islam et al. 2018, Lewis et al. 2018). However, compared to other domestic animals and humans, in horses, uterine neoplasms are rare gynaecological disorders. When uterine neoplasm do occur in horses, then leiomyomas are the most frequently detected tumours (Hoffsis et al. 1986, Romagnoli et al. 1987, Santschi and Slone 1994, Berezowski 2002, Bartmann et al. 2003, Rötting et al. 2004, Janicek et al. 2004, Brandstetter et al. 2005).

Indistinct infertility, secondary metritis, persistent vaginal haemorrhage and fetal death in a pregnant mare have all been ascribed to uterine leiomyoma (Hoffsis et al. 1986, Bracher et al. 1992, Broome et al. 1992, Santschi and Slone 1994, Brandstetter et al. 2005, Heijltjes et al. 2009, Schneeweiss et al. 2015). Leiomyoma indeed is the most common uterine tumour in the mare but it is uncommon in association with hemorrhage.

## Case history

A 22-year-old pony – gravida 0, approximately 400 kg, body condition score (BCS) 7/9 – presented with a one-day history of acute, severe bleeding from the vulva. One day prior to presentation, the pony was clinically unremarkable. The mare has been in owners' possession for nearly twenty years and has never shown any signs of disorders of the urogenital tract. Oestrus had been normal and pregnancy could be ruled out. The pretreating veterinarian administered detomidine hydrochloride (Detogesic<sup>®</sup>, 0.012 mg/kg intravenously [IV])<sup>a</sup> to facilitate transportation and referred the mare for further evaluation.

## Clinical findings

On presentation the mare was bright, alert and responsive. The hind limbs, tail and vulva were soaked in blood clots, and blood was dripping from the vulva indicating severe bleeding from the urogenital tract.

Mild tachycardia (48 beats per minute) and tachypnea (20 breaths per minute) were present. Rectal temperature was 37.1 °C, oral mucous membranes were pink, capillary refill time was 2 seconds, lung auscultation was unremarkable and heart auscultation revealed no arrhythmias or murmurs. Vaginal examination per speculum showed vaginal bleeding originating from the cervix, which was relaxed and passable for the examiners' hand. In the uterus lumen a large mass of clotted blood was detected. Palpation per rectum revealed an oval, solid mass in the middle of the right uterine horn, which could be clearly distin-

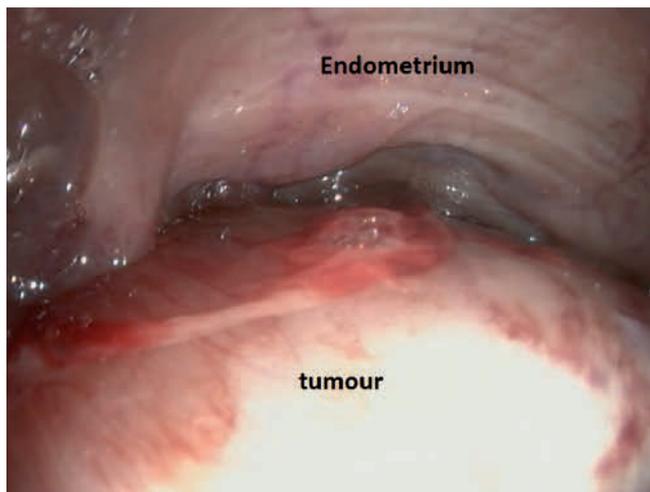
guished from the ovary. Transrectal ultrasonography (10–5 mHz-probe, Sonosite®<sup>d</sup>) confirmed a normal-sized uterus with a solid, homogeneous mass in the uterine wall measuring approximately 10 cm in diameter. Both ovaries were without cyclic activity and the remainder of the uterus was unremarkable.

Transabdominal ultrasound examination (5–2 mHz-probe, Sonosite®<sup>d</sup>) showed no free fluid or other abnormalities. Complete blood count (CBC) revealed a moderate hypochromic, normocytic anemia with a packed cell volume (PCV) of 24.8% (reference range [rr] 30–47%), a decreased red blood cell count of 5.6 T/L (rr 6.4–10.4 T/L), and decreased hemoglobin of 9.7 mmol/L (rr 10.7–16.5 mmol/L), most likely indicating blood loss anemia. Serum biochemistry showed mild hypocalcemia (9.7 mg/dL, rr 10.4–12.9 mg/dL), hypoproteinemia (5.0 g/dL, rr 5.6–7.9 g/dL), and hyperglycemia (160 mg/dL, rr 60.0–150 mg/dL). Common causes of panhypoproteinemia are excessive fluid therapy or water intake, acute blood loss, gastrointestinal ulceration, a strangulating gastrointestinal obstruction or infarction, protein-losing enteropathy, acute severe peritonitis, nonsteroidal anti-inflammatory drug toxicity, and glomerulonephritis (Smith 2015). In this particular case, hypoproteinemia with concurrent anemia was most likely attributable to the haemorrhage, while hypocalcemia was attributed to the hypoalbuminemia. Hyperglycemia presumably reflected stress and excitement due to transportation and clinical examination.

A coagulation panel revealed a mild prolonged thrombin time (30.6 seconds, rr 18–25 seconds) and thromboplastin time (14.5 seconds, rr 8–14 seconds), likely representing increased consumption as a result of ongoing bleeding.

Peritoneal fluid, obtained by abdominocentesis, was clear and of pale-yellow color. Fluid analysis yielded a total nuclear cell count of 1750 cells/ $\mu$ L (rr < 5000 cells/ $\mu$ L), a total protein amount of 18 g/L (rr < 25 g/L), and lactate within normal ranges (rr < 1.78 mmol/L). Cytopathologic examination of the peritoneal fluid was unremarkable.

Hysteroscopy (flexible endoscope, 180 cm, STORZ®<sup>e</sup>) was performed the next day and revealed blood clots as well as a smooth protruding mass intramurally in the right horn. The mass could be identified as the source of bleeding, as a diffuse



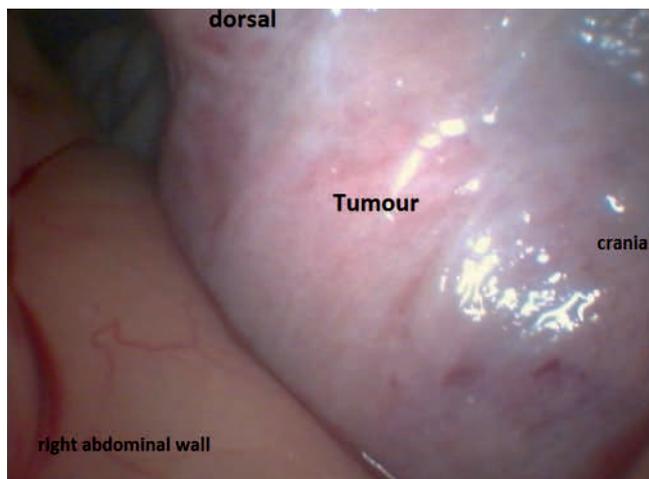
**Fig. 1** Hysteroscopic view of the tumour with diffuse haemorrhage on the surface | *Hysteroskopische Ansicht des Tumors mit diffuser Blutung auf der Oberfläche*

haemorrhage was visible on the surface (figure 1). Transendoscopic biopsy was performed and histopathology results revealed necrosis of the endometrium, but were unfortunately inconclusive due to the superficial tissue sampling. A presumptive diagnosis of a bleeding uterine tumour was made, and partial ovariectomy was recommended. Thoracic radiographs of four overlapping lateral projections on both sides were performed and did not suggest a metastasizing neoplasm. Surgery was performed two days later as an elective procedure.

## Surgery

Prior to surgery, the right uterus horn was lavaged with 10 L of sterile sodium chloride (B. Braun NaCl 0.9%®)<sup>c</sup>. Feed was withheld for 12 hours with free access to water. The horse was sedated with detomidine hydrochloride (Detogesic® 0.012 mg/kg IV)<sup>a</sup> and butorphanol tartrate (Torbugesic® 0.025 mg/kg IV)<sup>b</sup> through a jugular vein catheter. Phenylbutazone (Phenylbutazon® 200 mg/ml 4.4 mg/kg IV)<sup>f</sup> and procaine penicillin G (Procaïn Penicillin G® 22.000 IU/kg intramuscularly [IM])<sup>g</sup> were administered prior to surgery. The mare was restrained in stocks with the tail tied up and the right flank was clipped. After routine preparation for surgery with chlorhexidine and alcohol, the skin and underlying structures were infiltrated with 40 ml mepivacainhydrochlorid (Meaverin® 20 mg/ml)<sup>h</sup>. The portal and entrance into the abdomen were made as described by Rijkenhuizen and Grinwis (1999). Two additional portals were created for instruments, one about 10 cm distal, the other one about 15 cm distal to the scope portal. Laparoscopy was performed using a rigid laparoscope with a 30° viewing angle (diameter 10 mm, length 57 cm). The abdomen was distended with carbon dioxide, introduced through an insufflator with a flow rate of 7–8 l/min and a pressure cutoff of 6 mmHg (Heijltjes et al. 2009).

Inspection of the right abdominal cavity revealed a normal ovary and a uterine horn, located quite ventrally because of the increased weight, with a firm 10–12 cm swelling in the middle (figure 2). The cranial part of the right uterus horn was increased in size and was again located more ventrally. The mesovar and the cranial mesometrium were anaesthetized by infiltration with 15 ml of 2% lidocaine hydrochloride (Lidocainhydrochlorid 2%®)<sup>i</sup> via a laparoscopic needle. Using



**Fig. 2** Laparoscopic view of the uterine tumour | *Laparoskopische Sicht auf den Uterustumor*

a sealing device (Ligasure®)<sup>n</sup>, the mesovar and mesometrium were transected from cranial to right caudal of the uterus mass, holding the ovary and uterus under slight tension with small grasping forceps (5 mm). The uterine horn was then circumferentially ligated twice with a 2 USP suture (braided absorbable Polysorb®)<sup>o</sup>, approximately 4 cm caudal to the mass using extracorporeal modified Roeder's knots (Rijkenhuizen and Grinwis 1999). The cranial part of the uterine horn, including the mass, was resected between the 2 ligatures with laparoscopic scissors. The mucosa of the remaining uterus horn was sealed (Ligasure®)<sup>n</sup> and no leakage of fluid out of the uterus stump occurred (figure 3).

The resected ovary and the cranial part of the uterine horn were positioned in the right caudoventral part of the abdominal cavity with grasping forceps. The abdominal incision was enlarged by connecting the two instrumental portals, using a modified grid technique. Extraction of the excised ovary and portion of uterus was facilitated by introducing a part of a disposable surgical drape (Raucodrape® 120 × 120 cm)<sup>m</sup> through the enlarged laparotomy wound and passing it around the excised tissue, starting ventrally, under laparoscopic vision and with the help of a laparoscopic Babcock (10 mm), as described by Rambags et al. 2003. The drape was put under and around the ovary and cranial uterus horn and then drawn back out of the wound, enclosing the ovary and resected uterus horn with the mass. The drape was outspread outside of the wound with the ovary and resected uterus still being inside the abdominal cavity, which made it possible to reduce the size of the mass by cutting it with a scalpel blade (21) into smaller parts. The small pieces were removed.

Once the remains of the uterus and the mass were small enough, they were extracted via the relatively small surgical wound (about 8 cm) by simply pulling on the drape. The caudal part of the uterus horn could be extracted extraabdominally and was, for safety purposes, sutured extra-abdominally using a continuous Lembert pattern (0 USP braided absorbable suture Polysorb®)<sup>o</sup> and re-inserted into the abdomen. Prior to suturing, a swab was taken for microbial culture. No other abnormalities could be found on the right abdominal side. The laparoscope was removed, and the abdomen was desufflated. The skin incision of the laparoscopic portal was closed using 2

simple interrupted sutures (0 USP poliglecaprone Monocryl®)<sup>p</sup>, the incision was closed distally in a 4 layer pattern, closing first the peritoneum and transverse muscle in a simple interrupted pattern (2–0 USP poliglecaprone Monocryl®)<sup>p</sup>, then the internal abdominal oblique muscle in a simple interrupted pattern second (2–0 USP poliglecaprone Monocryl®)<sup>p</sup>, the external abdominal oblique muscle in a continuous pattern third (2–0 USP poliglecaprone Monocryl®)<sup>p</sup>, and finally the subcutaneous tissue and the skin in a simple interrupted pattern (0 USP poliglecaprone Monocryl®)<sup>p</sup>. Parts of the uterine tissue, including the mass, were sent to histopathologic examination as well as a uterine swab for microbial culture.

### Postoperative care

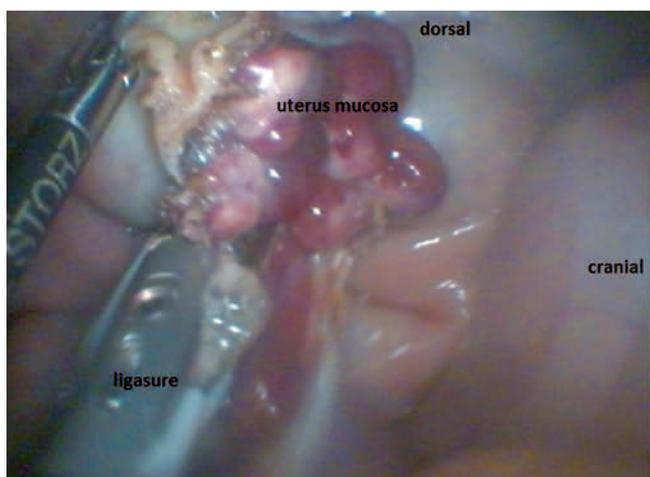
Medical management was initiated with procain penicillin G (Procain Penicillin G®<sup>q</sup>, 22.000 IU/kg IM once daily)<sup>q</sup>, gentamicin (Gentacin®<sup>i</sup>, 6.6 mg/kg IV once daily)<sup>i</sup>, flunixin-meglumine (Finadyne®<sup>k</sup>, 1.1 mg/kg orally twice daily)<sup>k</sup> and omeprazole (Gastrogard®<sup>l</sup>, 4 mg/kg orally, once daily)<sup>l</sup> for five days postoperatively. Feeding was started six hours after surgery. The postoperative clinical course remained uneventful and no bleeding per vaginum occurred. PCV and TP were monitored twice daily postoperatively, anemia improved gradually over the first week. CBC and SBC were unremarkable except for a mildly increased creatine kinase (CK) of 533 U/L (rr 10–350 U/L) four days post operationem. The mare was discharged 9 days after surgery and the wound had healed per primam. Bacterial culture of the uterine lumen, taken during surgery, showed no growth. The recommended exercise was stall rest for a further two weeks, followed by pasture exercise.

### Pathology

Macroscopic examination of the uterus yielded a firm 12 cm mass within the myometrium. Histopathologic diagnosis was a benign uterine leiomyoma without indication of malignancy.

### Discussion

The here presented case describes the rare occurrence of a severe haemorrhage from the vulva as the predominant complaint, caused by a benign uterine neoplasia in a horse. In the case history, no signs of previous gynaecologic disease were reported. Vaginal discharge (Broome et al. 1992, Santschi and Slone 1994, Brandstetter et al. 2005, Heijltjes et al. 2009), abdominal discomfort (Bonfig and Ingenhorst 1992), infertility and uterine bleeding are the most common symptoms of uterine leiomyoma (Hoffsis et al. 1986, Broome et al. 1992, Brandstetter et al. 2005, Heijltjes et al. 2009). One mare with a concurrent mummified foetus, caused by the mass, has also been reported (Heijltjes et al. 2009). In Rötting et al. 2004 and Bartmann et al. 2003 Leiomyoma was not found to be a tumour with hemorrhage but malign leiomyosarcoma. In the present case, previous symptoms may have been missed, as the pony mare was living on pasture without being used for breeding or riding. Admission occurred during winter, and the mare showed signs of pronounced hormonal imbalances, as the cervix was opened widely and allowed for passage of the examiners' hand. In the transrectal ultrasonography, neither of the ovaries



**Fig. 3** Sealing of the uterus mucosa with the Ligasure® | Verschluss der Uterismucosa mittels Ligasure®

revealed any hormonal activities, represented either by follicles or a corpus luteum. Haemorrhage was severe and onset of bleeding acute, but previous low-grade uterine bleeding could not be ruled out. Sexual hormones were not determined preoperatively, which might have been helpful for evaluating the cyclic activity, but results would not have influenced the decision for the required surgical procedure. Degenerative alterations and fibrosis of the endometrium are known to cause an increased susceptibility to uterine infections and hormonal disturbances (Troedsson et al. 1993). In the current case, endometrial culture was without microbial growth. However, clinical symptoms suggest endometrial dysfunction and hormonal imbalances despite the absence of bacteria. The dilated cervix likely enabled the blood clots in the uterus lumen to drop out at night, and during the hysteroscopy the next day a clear view was obtained without uterus lavage. Haemorrhage was visible on the endometrial surface, but the source of bleeding was obscured by the large mass, which made haemostasis with, for instance, the use of laser technique, an infeasible option (Campos et al. 2018).

Leiomyomas are not necessarily visible intraluminally, as they originate in the uterine wall, are located intramurally, and arise from the smooth muscle layer of the uterus (Protic et al. 2016). Histopathology of a biopsy is required for definitive diagnosis, but full-thickness tissue sampling via endoscopy can be difficult, as exemplified by the present case, which revealed merely endometrial necrosis. The size of the instrument channel (2.8 mm diameter) was the limiting factor and it proved impossible to obtain a deeper biopsy. Due to the appearance of the mass and its bleeding behaviour, a tumour was suspected and partial ovariectomy was performed. While surgical removal of the right uterine horn in conjunction with the ovary was facilitated, it was not deemed necessary to perform a unilateral ovariectomy, as the ovary was not suspected to be affected, in this case. A histopathologic examination of removed tissue confirmed the uterine mass to be a leiomyoma.

In humans, uterine leiomyomas are thought to develop due to an inappropriate inflammatory response to physiological injuries of the uterus during menstruation, ovulation, and implantation or harmful stimuli, mechanical forces, hypoxia or oxidative stress (Islam et al. 2018). As a consequence of injury, myofibroblasts produce extracellular matrix (ECM) in order to repair the defect. If concurrent chronic inflammation in the uterus occurs, excessive production of ECM may occur, resulting in pathologic fibrosis, which may then lead to the development of leiomyomas (Wegienka 2012). Progesterone and estrogen are known to be important stimulating regulators of uterine leiomyoma growth (Islam et al. 2013). Also involved in the development of uterine leiomyomas are, assumedly, genetic and epigenetic factors, risk factors as heredity, and nulliparity. Primary diseases, such as obesity, polycystic ovary syndrome, diabetes, and hypertension, are associated with increased risk of this tumour (Okolo 2008). Considering the existence of these risk factors in humans, they could also have contributed to the leiomyoma in the pony, as the mare was nullipara, retired, and overweight. An underlying equine metabolic syndrome (EMS) could not be ruled out, but further diagnostics have not been performed.

Increased uterine bleeding as the predominant symptom of leiomyoma is considered very common in women but not horses, which may be due to the physiologic menorrhagia in women, which is absent in mares (Hughes et al. 1975).

In mares presenting with haemorrhage from the urogenital tract, a uterine neoplasia should be considered as a differential diagnosis. Patients should first be examined thoroughly by transrectal palpation of the urogenital tract and transrectal ultrasonographic examination, followed by hysteroscopy and biopsies for histopathology. When a leiomyoma is diagnosed, prompt treatment should be initiated.

Currently, in humans, the most common applied technique is an organ-preserving surgery for women who wish to maintain their fertility. Myomectomy can be performed via hysteroscopy or via abdominal, laparoscopic myomectomy (Closon and Tulandi 2016). Fertility sparing approaches may have a tremendous impact on the quality of life in humans, and alternative treatments to surgical intervention have recently been developed (Lewis et al. 2018, Kröncke and David 2019).

In horses, the most practicable treatment is partial ovariectomy, which does not prevent further breeding because, in contrast to humans, horses have a uterus bicornis. Successful pregnancy in two mares after partial hysterectomy has been reported (Santschi and Slone 1994, Bartmann et al. 2003). Hence, in our case, fertility sparing was not an issue for the described patient. In younger horses, removal of the ipsilateral ovary might be chosen to prevent the horse from ovulating on a side with no uterus, and so to eliminate the possibility of nonfertile oestrus. Nevertheless, it should be noted that fertility in mares does decrease after a partial hysterectomy, proportionate to the amount of horn removed (McDowell et al. 1988). Standing laparoscopy procedure was performed, thus avoiding general anesthesia, and allowing for minimal invasive approaches and an improved overview of the abdominal cavity during surgery, compared to laparotomy. After morcellation of the uterus horn and mass within the plastic drape, thus reducing the risk of the tumour spreading, the tissue was removed through an enlarged incision. Laparotomy alone is an excellent option especially in large tumours located in one uterine horn (Rötting et al. 2003, Bartmann et al. 2003). In cases with large tumour sizes, also a midline laparotomy can be considered, following the laparoscopy. Morcellation is a common surgical procedure to reduce the uterus size and to remove smaller parts of tissue via minimally invasive approaches or through the vagina, but uncontained morcellation has been scrutinized, due to the risk of the tumour spreading in malignant neoplasms. In women, preoperative evaluation includes imaging, cervical cancer screening, and endometrial tissue sampling to assess the risk of malignancy (ACOG Committee Opinion No. 770 Summary: Uterine Morcellation for Presumed Leiomyomas 2019).

Theoretically, it would have been possible to exteriorize the ovary and uterus horn through an enlarged incision after partial resection of the mesovarium and mesometrium, and to perform a partial hysterectomy extra-abdominally, instead of intra-abdominally (Janicek et al. 1991, Marchionatti et al. 2016). However, the size of the mass required a much larger incision than necessary in the described technique.

Bacterial culture prior to surgery was unfortunately not performed, as bacterial infection seemed not to be a clinical problem. Since b-haemolytic streptococci, *E. coli*, *Pseudomonas aeruginosa* and *Klebsiella pneumoniae* are common

bacteria isolated from the uterus (Albihn et al. 2003, Skive et al. 2017) treatment with a broad-spectrum antibiotic with penicillin and gentamicin was initiated. The uterine swab taken during surgery for microbial culture did not reveal bacterial growth. To prevent retrograde infection, the mucosa was sealed using the ligasure, while the uterus was oversewed.

Severe vaginal bleeding caused by a uterine leiomyoma is a rare complaint in mares. Uterine neoplasms can be diagnosed based on a thorough clinical examination, in combination with transrectal ultrasonography and hysteroscopy. Leiomyomas have a favourable prognosis after successful surgery, due to their benign character and low potential for recrudescence.

In conclusion, hand-assisted laparoscopy in the standing horse offers an excellent way of performing a unilateral ovariectomy combined with a partial hysterectomy.

### Acknowledgements

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### Manufacturers' addresses

- <sup>a</sup> Detogesic® 10 mg/ml: Zoetis, Schellingstraße 1, 10785 Berlin, Germany
- <sup>b</sup> Torbugesic® Vet: Zoetis, Schellingstraße 1, 10785 Berlin, Germany
- <sup>c</sup> NaCl 0,9% B. Braun®: B. Braun Melsungen AG, Carl-Braun-Straße 1, 34212 Melsungen, Germany
- <sup>d</sup> Sonosite®: FUJIFILM Sonosite GmbH, Amelia-Mary-Earhart-Strasse 8, 60549 Frankfurt, Germany
- <sup>e</sup> KARL STORZ SE & Co. KG, Dr.-Karl-Storz-Straße 34, 78532 Tuttlingen, Germany
- <sup>f</sup> Phenylbutazon® 200 mg/ml: medistar, Lüdinghauser Straße 23, 59387 Ascheberg, Germany
- <sup>g</sup> Procain-Penicillin-G® 300,0 mg/ml: bela-pharm GmbH & Co. KG, Lohner Straße 19, 49377 Vechta, Germany
- <sup>h</sup> Meaverin® 20 mg/ml, PUREN Pharma GmbH & Co. KG, Willy-Brandt-Allee 2, 81829 München
- <sup>i</sup> Lidocainhydrochlorid 2%®: bela-pharm GmbH & Co. KG, Lohner Straße 19, 49377 Vechta, Germany
- <sup>j</sup> Gentacin® 85 mg/ml: bela-pharm GmbH & Co. KG, Lohner Straße 19, 49377 Vechta, Germany
- <sup>k</sup> Finadyne® Paste 50 mg/g: Intervet Deutschland GmbH, Feldstraße 1, 85716 Unterschleißheim, Germany
- <sup>l</sup> Gastrogard® 37%: Merial GmbH Am Söldnermoos 6, 85399 Hallbergmoos, Germany
- <sup>m</sup> Raucodrape® 120 × 120 cm: Wirtschaftsgenossenschaft deutscher Tierärzte eG, Siemensstraße 14, 30827 Garbsen, Germany
- <sup>n</sup> Ligasure®: Covidien Deutschland GmbH, Werk Neustadt, A Medtronic Company, Gewerbepark 1 93333 Neustadt an der Donau, Germany
- <sup>o</sup> Polysorb®: Covidien Deutschland GmbH, Werk Neustadt, A Medtronic Company, Gewerbepark 1 93333 Neustadt an der Donau, Germany
- <sup>p</sup> Monocryl®: Johnson & Johnson Medical GmbH ETHICON Hummelbütteler Steindamm 71, 22851 Norderstedt, Germany

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Erweiterte Zusammenfassung

### Hand-assistierte laparoskopische partielle Ovariectomie bei einer stehenden Stute mit Blutungen durch ein uterines Leiomyom

Bei der Abklärung von Hämorrhagien aus der Vulva kommen differentialdiagnostisch verschiedene Ursachen in Betracht. Abgesehen von Störungen der Trächtigkeit muss eine Blutung aus der Vulva zunächst von einer Hämaturie differenziert werden; eine Blutung kann ihren Ursprung in Nieren, Ureteren, Blase, Uterus, Cervix und Vagina haben. Im Vergleich zum Menschen und anderen Haussäugetieren sind uterine Neoplasien selten bei Equiden; wenn sie jedoch auftreten, sind bei Pferden Leiomyome am häufigsten beschrieben. Die Symptomatik ist vielfach unspezifisch und geht mit Unfruchtbarkeit, sekundärer Metritis, persistierendem hämorrhagischen Vaginalausfluss und Aborten einher. Leiomyome sind in der Humanmedizin die am häufigsten vorkommenden, benignen Uterustumore mit einer Inzidenz von bis zu 70% im gebärfähigen Alter. Sie zeichnen sich durch verstärkte Menstruationsblutungen, Infertilität, Unterbauchschmerzen, Druckgefühl und Harninkontinenz aus. Zum Erhalt der Fertilität werden sowohl chirurgische Eingriffe durchgeführt, als auch medikamentöse Therapien angewandt. Der vorliegende Fallbericht beschreibt das seltene Auftreten starker Blutungen bei einer Stute, die durch ein benignes, uterines Leiomyom hervorgerufen wurden. Die 22-jährige Reitponystute wurde im Notdienst nach plötzlich einsetzender, hochgradiger Blutung aus der Vulva vorgestellt. Laut Anamnese war die nullipare Stute bis zu diesem Zeitpunkt klinisch unauffällig. Es waren keine Vorerkrankungen und keine Zyklusabnormalitäten bekannt. Das Pony wurde auf der Weide gehalten und altersbedingt nicht mehr geritten. Eine vorliegende Trächtigkeit konnte ausgeschlossen werden. In der Eingangsuntersuchung konnte die vorherberichtet beschriebene, ausgeprägte Blutung nachvollzogen werden. An beiden Hinterbeinen und dem Schweif der Stute zeigten sich große Mengen anhaftender Blutkoagula. Die Laboruntersuchungen (Hämatologie, klinische Chemie) diagnostizierten eine moderate Blutungsanämie. Als Herkunft der Hämorrhagie konnte der Uterus identifiziert werden, die vaginale Adspektion mittels Spekulum zeigte einen anhaltenden Blutfluss aus der geöffneten, für eine Hand passierbaren Cervix uteri. In der darauffolgenden transrektalen Untersuchung wurde eine vom Ovar abgrenzbare, solide Umfangsvermehrung des rechten Uterushorns von ungefähr 10 cm Durchmesser palpirt. Ultrasonographisch stellte sich die Zubildung homogen dar und von der Uteruswand ausgehend. Das übrige Uterusgewebe war von normaler Größe und Struktur. Beide Ovarien waren unauffällig und ohne darstellbare, hormonell aktive Funktionskörper. Die weiterführenden Untersuchungen mittels Hysteroskopie und endoskopischer Entnahme einer Biopsie über den Arbeitskanal konnten die Verdachtsdiagnose einer Neoplasie nicht sicher bestätigen. Aufgrund der Größe des Tumors und der intramuralen Lokalisation war die Zugänglichkeit zur Entnahme einer Probe mit ausreichender Gewebetiefe limitiert. Deshalb wurde, mit dem Verdacht auf eine Neoplasie, eine partielle Ovariectomie mit vollständiger Entnahme des Tumors am stehenden Pferd laparoskopisch erfolgreich durchgeführt. Die histopathologische Untersuchung der Umfangsvermehrung identifizierte ein benignes Leiomyom. Der unmittelbare postoperative Verlauf war ohne Komplikationen, auch 4 und 18 Monate nach Entlassung war das Allgemeinbefinden der Stute ungestört. Hochgradige Blutungen als Leitsymptom eines uterinen Leiomyoms treten bei Stuten selten auf. Neoplasien des Uterus können durch eine gründliche klinische Untersuchung in Kombination mit transrektaler Sonographie des Urogenitaltraktes und hysteroskopischer Darstellung diagnostiziert werden. Dieser Fallbericht zeigt den günstigen Verlauf für Stuten mit starken Blutungen, ausgelöst durch benigne Uterustumoren, bei zeitnah durchgeführter, laparoskopischer Ovariectomie mit partieller Hysterektomie. Wie in zwei Fällen gezeigt werden konnte, schließt die partielle Hysterektomie zudem bei Stuten eine spätere Trächtigkeit und Geburt eines gesunden Fohlens nicht aus, abhängig von der Größe des resezierten Gewebenanteils. Uterine Leiomyome haben nach erfolgreicher Entfernung insgesamt eine sehr gute Prognose aufgrund ihres benignen Charakters und ihrem geringen Potential zur Rezidivbildung.

**Schlüsselwörter:** Pferd, uterines Leiomyom, Blutung, Laparoskopie, Ovariectomie