Opis przypadku *Case report*

Omental failure due to a ruptured urachus in a foal – a case report

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Summary

Problems within the urinary tract are relatively well known in foals and include, among others, persistent urachus. In most cases, treatment is carried out in the stable and does not require hospitalization of the foal. In the case described, the problem of persistent urachus was accompanied by uroperitoneum and deteriorating general condition, which prompted the attending veterinarian to refer the patient for hospital treatment. After the animal was admitted to the clinic, routine procedures were implemented – antibiotic therapy, anti-inflammatory treatment, a catheter into the urinary bladder and a drain were inserted into the abdominal cavity, and intensive fluid therapy was implemented to correct electrolyte imbalances. An abdominal ultrasound was performed, which confirmed the presence of a large amount of fluid in the abdominal cavity, but did not reveal the site of the bladder wall damage. During hospitalization and stabilization of the patient, a very rare complication occurred – a fragment of the omental prolapsed through the open urachus, which allowed a diagnosis of urachus rupture to be made. The omentum was immediately ligated and removed, and the navel was secured with a dressing. After stabilising the electrolyte levels in the blood, surgery was performed under general anaesthesia, during which the persistent urachus was removed along with the apex of the bladder. The foal's recovery and postoperative period were proceeded without complications.

Keywords: foal, uroperitoneum, persistent urachus, omentum prolapse

The presence of urine in the peritoneal cavity of a foal is a symptom of perforation, most commonly in the urinary bladder (5), but injuries to the kidneys, ureters, urethra or urachus are also encountered (12). Both the presence of urine in the abdominal cavity as a result of bladder rupture and persistent ureter are well-known issues with established treatment protocols.

The case in question concerns an unusual situation in which the presence of urine in the abdominal cavity was due to damage to the ureter as a result of a progressive infection of the umbiliculus. This resulted in a fragment of the omentum protruding outside the abdominal cavity.

Persistent urachus occurs in an average of 60% of foals with umbilical problems after birth (10). The most characteristic symptom is urine leakage from the umbilical stump during urination.

The persistent urachus may rupture, resulting in symptoms similar to those of a ruptured bladder. Initially, frequent urination may be observed. The urine stream may be weaker and the frequency of urination may be significantly reduced. The symptoms may worsen as the process progresses. Urine accumulating in the peritoneal cavity will lead to enlargement of the abdominal contour, electrolyte and metabolic disorders, which may result in neurological symptoms and cardiac dysfunction (12).

The management of foals with uroperitoneum involves the insertion of a drain to remove urine from the peritoneal cavity while the patient is being stabilized. A possible complication described after abdominal puncture in a foal is the prolapse of the omentum at the puncture site (3, 14). However, there are no reports in the literature on the possible prolapse of the omentum

through a surviving, damaged urachus, as occurred in the present case.

Case description

A four-day-old American Quarter Horse colt, was admitted to the Veterinary Clinic of the Nicolaus Copernicus University in Toruń due to deteriorating general condition. The interview revealed, that the birth was physiological, but in the postnatal period meconium retention and reduced IgG antibody levels were noted. Treatment prior to arrival at the clinic included enema and intravenous administration of 0.5 l of serum and 0.5 l of 5% glucose solution on the second and third days of life. Antibiotic therapy (cefquinom) and anti-inflammatory treatment (meloxicam) were initiated, and a single intramuscular injection of selenium was administered. Due to the incomplete medical history provided by the owner, the exact dosage and all medications used were unknown.

Fig. 1. Ultrasound examination after the foal was admitted. A large amount of free fluid in the abdominal cavity can be observed

Upon admission, clinical examination revealed a heart rate of 56 bpm and a pulse rate of 136 bpm, body temperature of 38.4°C, and a significantly enlarged abdominal contour. An ultrasound examination was performed, which revealed a large amount of free fluid in the abdominal cavity (Fig. 1), allowing a preliminary diagnosis of uroperitoneum to be made. A blood test was performed, which revealed hyponatraemia (114 mmol/l), hypochloraemia (77.3 mmol/l), hyperkalaemia (5.79 mmol/l) and azotaemia (creatinine 335.2 µmol/l, urea 10 mmol/l), as well as a significantly elevated serum amyloid A level (5938.7 mg/l) (Latex aglutination test).

Parenteral fluid therapy with sodium chloride solution was initiated. A catheter was inserted into the bladder (Mila Foley Catheter®, 10 Fr × 45 cm), and a catheter (Mila IV Catheter®, 14 GA × 9 cm) was inserted into the peritoneal cavity to drain accumulated urine. Intravenous antibacterial therapy with ceftriaxone 50 mg/kg bw (Biotraxon®, 2 g, Polfarma) every 12 hours, amikacin 30 mg/kg bw (Biodacyna® 1 g/4 ml, Polfarma) every 24 hours, and anti-inflammatory treatment with meloxicam 0.6 mg/kg bw (Contacera® 20 mg/ml, Zoetis) every 12 hours was continued.

Based on the results of laboratory tests, imaging tests and the clinical picture of the foal, it was qualified for surgery due to uroperitoneum. The procedure was preceded by stabilization of the foal's condition and equalization of potassium levels in the blood.

During preoperative fluid therapy, a fragment of tissue protruding from the umbilical region was noticed (Fig. 2). The tissue, which turned out to be a fragment of the omentum, was ligated and removed, and a sterile dressing was applied to the umbilical region. Persistent urine flow was observed both through the catheter and the catheter inserted into the peritoneal cavity.

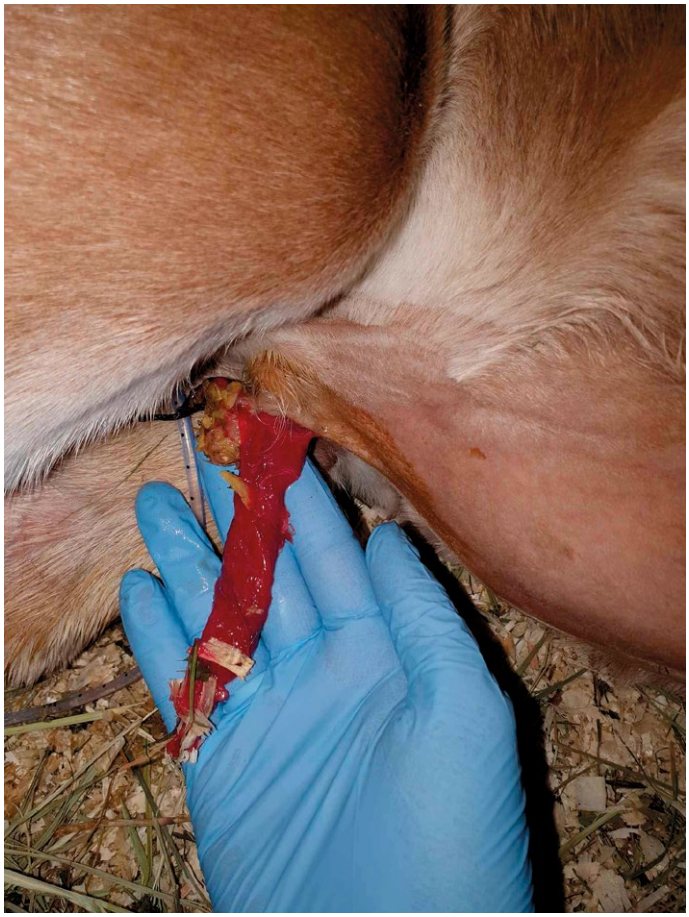

Fig. 2. Omentum that fell out through the urachus is visible

The procedure was performed under general anaesthesia, Diazepam at a dose of 0.3 mg/kg bw (Solupam® 5 mg/ml, Dechra) and butorphanol at a dose of 0.1 mg/kg bw (Torbugesic® 10 mg/kg, Zoetis) was used to premedication. Induction was performed with ketamine at a dose of 3 mg/kg bw

(Vetaketam® 100 mg/ml, Vet Agro). Isoflurane (Isothesia® 1000 mg/ml, Covetrus) was used to maintain anaesthesia. The foal was placed in a dorsal position and the surgical field was prepared. After examination of the umbilical region, a prolapsed omentum was noted. An incision was made along the linea alba. A ruptured urachus was found, but no perforation of the bladder was noted. The umbilicus was removed along with the urachus and the apex of the bladder, which was sutured with two layers of stitches. No abnormalities were found in the other abdominal organs. The abdominal cavity was rinsed with sterile sodium chloride solution, followed by administration of heparin at a dose of 100 U/kg bw (Heparinum® WZF 5000 IU/ml, Polfa Warszawa). The wound was sutured and a sterile dressing was applied. Recovery went off without complications.

Antibiotic therapy was continued for 10 days after the surgery, and anti-inflammatory treatment for 7 days. Intravenous fluid therapy (Ringer's lactate solution, Fresenius) was administered during the first 24 hours and blood glucose levels were monitored. If necessary, intravenous glucose infusion was administered at a dose of 4-8 mg/kg bw. Venous blood was also collected – both morphological and biochemical parameters returned to normal, only elevated SAA levels were noted, which also returned to physiological range after 4 days. After the procedure, the foal was in good general condition, willing to stand up and feeding normally. The postoperative wound healed properly, after 10 days the animal was discharged home.

Discussion

In the initial stage, the case presented typical symptoms of a ruptured bladder. Both the large amounts of free fluid in the abdominal cavity visible on ultrasound and the changes in blood biochemistry were typical of uroperitoneum, so routine treatment was implemented, including antibiotic therapy, anti-inflammatory treatment and parenteral fluid therapy. The urine accumulating in the peritoneum was drained until the potassium ion concentration stabilized. The fragment of the omentum that had fallen out of the umbilical region was an additional, albeit unusual, factor indicating the need for surgery.

The urachus is a structure that allows urine to drain from the foetal bladder directly into the allantoic cavity during foetal life. The causes of persistent urachus include increased abdominal pressure and increased abdominal wall tension due to meconium retention, as well as ascending infection of the umbilical stump (12). There are reports of a ruptured urachus as the cause of urine accumulation in the abdominal cavity of a foal (7, 8, 11), but so far the authors have not encountered a case of omentum prolapse due to a ruptured urachus.

Omental prolapse in foals is described as one of the possible complications following abdominocentesis (3, 14). According to the literature, the risk of accidental puncture of the intestine or prolapse of the omentum when attempting to collect fluid from the peritoneal cavity is higher in foals than in adult horses (14), despite the fact that the procedure for preparing and performing the procedure is the same. In foals, it seems particularly important to perform an ultrasound examination beforehand to reduce the risk of accidental intestinal puncture.

In the case described, the initial suspicion of a ruptured bladder as the cause of uroperitoneum proved to be incorrect. The site of urine leakage into the peritoneal cavity was a ruptured urachus, and the space created by this rupture allowed the omentum to protrude outside the abdominal cavity. In this foal, the situation occurred in a hospital where the animal was constantly monitored, allowing for rapid intervention. Both the procedure and the postoperative period were ended after 10 days and the animal was discharged home. However, it should be remembered that many cases of persistent ureteral obstruction are limited to field treatment. It is therefore important to be aware of the possibility of such a complication. It is also important to make those who care for foals on a daily basis aware of this. The omentum that protrudes from the abdominal cavity is a gateway for bacteria. Septic peritonitis and sepsis are considered the most common causes of death in newborn foals (1, 2, 4).

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