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Review Paper

SURGERY OF UMBILICAL CORD REMNANTS IN CALVES

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Summary: Umbilical remnants in calves may be diagnosed by thorough clinical examination of the umbilicus and the general status. Ultrasonography, using a 5 MHz probe, represents the most accurate imaging technique for preoperative differentiation of the size and delineation of intraabdominal umbilical remnants. Therapy of such conditions consists of laparotomy and excision of the affected structures in toto under local or general anaesthesia with the animal in dorsal recumbency. Prognosis is generally good except for cases with spread of infection into other organs and infections of the umbilical arteries that extend to far towards the abdominal aorta.

Key words: catlle diseases; umbilicus – ultrasonography; umbilical cord – abnormality – surgery; infection – pathology; treatment outcome; cattle

Introduction

Umbilical cord remnant infections include omphalophlebitis, omphaloarteriitis, and infection of the urachus. *Arcanobacterium pyogenes* is the most commonly isolated microbe from infected umbilical cord remnants. In about a fourth of the cases, infection of umbilical cord remnant occurs concurrently with umbilical hernia. The prevalence of umbilical infection is judged to be 5%. The most important predisposing factors include insufficient hygiene at birth and thereafter and failure of passive transfer.

Diagnostic procedures

The following techniques are routinely used to differentiate among umbilical pathologies: Thorough general clinical examination with special emphasis on palpation of the joints, visual inspection and palpation of the external umbilicus, bimanual palpation of the intraabdominal umbilical structures in the sedated animal, puncture, and ultrasonography. The latter is the most time consuming diagnostic procedure, but allows for the most accurate diagnosis (1,2). Probing of a fistulating process is possible, but may only be performed with special care in order not to perforate the wall of the umbilical remnant.

Figure 1: Umbilical Sonography
A= urinary bladder
B= urachal abscess

Ultrasonography is indicated for diagnosis of intraabdominal umbilical cord remnant infections; it allows differentiation of processes affecting umbilical arteries, the umbilical vein, and the urachus. Furthermore, the extent of the septic process may well be defined, such as potential involvement of urinary bladder and liver. The

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examination is performed in the standing animal with the examiner positioned to right of the calf. The region delineated cranially by the xyphoid and caudally by the teats/scrotum must be clipped, cleaned with water, and contact gel is administered. Using a 5 MHz probe, the areas cranial and caudal to the umbilicus are meticulously scanned for the presence of intraabdominal umbilical cord remnants (Fig. 1; A = urinary bladder; B = urachal abscess). Alternatively, a 7.5 or 8 MHz transrectal probe may be used. Because of the limited depth of penetration of such probes, imaging of structures in the depth of the abdomen i.e. liver abscesses or the course of infected umbilical arteries in the area of the urinary bladder may no be possible. Physiologic involution of intraabdominal umbilical structures allows identification of the umbilical vein for no longer than 3 weeks and of the umbilical arteries for no longer than 10 days after birth (2).

Surgical procedures

Depending on the age, animals are kept off milk and roughage for at least 12 hours prior to surgery, and Sodium-Penicillin (30,000 IU /kg of bodyweight) is administered intravenously at 1 to 2 hours before surgery. The intervention is performed either under deep sedation and local, including lumbosacral epidural anaesthesia (3), or under general intravenous or inhalation anaesthesia. Calves are positioned in dorsal recumbency, umbilical fistulas tightly sutured, and the surgical field is prepared for aseptic surgery. An elliptical incision of the umbilicus at its base is performed, and the abdominal cavity is opened starting lateral to the umbilicus. The infectious process is bluntly dissected from adhered tissues such as the greater omentum and/or intestinal structures and excised in *toto*. If the urinary bladder is involved into the process, partial resection of the bladder is indicated. The bladder is sutured with 2 seromuscular inverting continuous sutures, using 3-0 monofilament absorbable suture material. If the liver is involved, marsupialisation of the umbilical vein abscess is indicated (4,5). We do not advise to perform partial liver resection in such cases, because severe bleeding represents a serious complication. The abdominal wall is closed routinely: The peritoneum and the rectus sheaths are approximated with one interrupted cruciate suture pattern, using size 2 PDS suture material. The subcutaneous tissue is sutured with one or two continuous sutures, using absorbable material (metric 7 chromic catgut) and the skin with a Ford-interlocking suture, using nonabsorbable suture material. Laparoscopically assisted resection of umbilical cord remnants has been described in foals (6) and experimentally in healthy calves (7).

Postoperative care and prognosis

Antimicrobials are administered for at least 3 days postoperatively, and the calf should be confined to a box stall for at least 1 month in order to minimize the chance of wound dehiscence. Analgesics are not routinely administered. Prognosis is good except for abscesses of the umbilical arteries that extend too far towards the abdominal aorta. If spread of the umbilical infection has occurred into other organs such as the liver (multiple abscesses), the heart, or multiple joints, the prognosis is poor, and euthanasia of the calf should be considered.

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KIRURŠKO ODSTRANJEVANJE OSTANKOV POPKOVINE PRI TELETIH

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Povzetek: Ostanki popkovine pri teletih se diagnosticirajo s kliničnim pregledom področja popka in splošnega stanja živali. Najboljše diagnostično sredstvo za predoperacijsko določanje velikosti in opredelitev intraabdominalnih ostankov popkovine je ultrazvočni pregled s 5-megaherčno sondo. Zdravljenje teh stanj je kirurško. V hrbtnem položaju živali z lokalno ali splošno anestezijo opravimo laparatomijo in izrežemo vso prizadeto tkivo. Prognoza je v večini primerov dobra, razen kadar se okužba razširi na druge organe oz. se okužba popkovnih arterij razteza predaleč k abdominalni aorti.

Ključne besede: govedo, bolezni; popek – ultrasonografija; popkovina – nepravilnosti – kirurgija; okužba – patologija; zdravljenje, izid; govedo