Congenital omphalocele in four calves, their surgical management and outcome

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ABSTRACT

Four newborn dairy calves with omphalocele including one additionally with atresia ani and anury were presented for treatment. The mass (diameter: 12.0 and 23.0cm respectively) in two calves was covered by continuation of the umbilical cord. In the remaining two calves the covering had disrupted and the intestines were hanging from the umbilicus. Herniorrhaphy was performed under sedation using diazepam and local infiltration analgesia with lignocaine hydrochloride (2%). In the calf with atresia ani, anal opening was created under caudal epidural block. Three of the calves recovered completely and the remaining one died. It was concluded that the surgical treatment of calves with omphalocele have good prognosis provided they are presented promptly without mutilation of the mass.

Key words: Anury, Atresia Ani, Calves, Congenital, Herniorrhaphy, Omphalocele.

INTRODUCTION

Omphalocele is a rare type of congenital abdominal wall defect that allows intestines (and sometimes a portion of liver) covered by a paper thin membrane (amnion) to protrude from the body. The condition occurs when one of the four body folds fails to migrate normally in embryologic development (Baird, 2008). The true prevalence in animals is difficult to determine owing to the unreported deaths (Baird, 1993, Smeak, 1993). However, in one study, the incidence of omphalocele among full-term calves was 0.1 per cent (Mee, 1994). Other associated congenital abnormalities have not been described in veterinary reports (Baird, 2008). In this paper, the authors put on record the details of omphalocele in four neonatal dairy calves (including one additionally with atresia ani and absence of tail/anury), their surgical management and the outcome.

MATERIALS AND METHODS

Four crossbred (Jersey-3, Holstein Fresian-1) calves (female-3, male-1), with body weight ranging from 18.0 to 25.5 kg, were presented within 10 hours of birth at Teaching Veterinary Clinical Service Complex, Faculty of Veterinary Sciences, Srinagar, India with an unusual soft tissue mass protruding from the umbilical area. The calves were full term and born unassisted. At the time of clinical examination, the calves were mildly hypothermic (mean rectal temperature: 37.4°C) and mildly dehydrated (skin fold retention test time: 2 to 4 seconds). The mass (diameter: 12.0 and 23.0cm respectively) in two calves (No. 1 & 2) was covered by continuation of the umbilical cord (Fig 1). In the remaining two calves (No. 3 & 4) the covering had disrupted and the intestines were hanging from the umbilicus (Fig 2). The exposed intestines and the amniotic membrane covering were congested and grossly contaminated with dirt and bedding material in all the animals. The diameter of the umbilical opening varied from 1.5 to 3.0 cm. One of these calves (No. 4) was additionally suffering from atresia ani and anury (Fig 1).

A veterinarian had unsuccessfully tried to push the protruding intestines into the abdominal cavity in one of the calves (No. 3) resulting in bluish discoloration of a portion (13.0 cm) of it. This calf showed sinus tachycardia (200 heart beats per min) on electrocardiography using the standard bipolar limb lead-II. The electrocardiographic values in the remaining cases were within normal limits (Mendes et al., 2001). Routine hematological and serum biochemical values were within normal limits (Benjamin, 1998) in all the cases.

The calves were given 500mg either of Amoxicillin-Dicloxacillin (Moxel-D, Alembic Pharmaceuticals, India) or Ceftriaxone (Intaceph; Intas Pharmaceuticals Ltd, India), and meloxicam (Melonex; Intas Pharmaceuticals Ltd, India) @ 0.2mg/kg all intramuscularly (IM) and controlled in dorsal recumbency. Diazepam (Calmpose, Ranbaxy, India) @ 0.20 mg/kg intravenously (IV) was followed by establishment of a fluid line (@ 10ml/kg) using 20% dextrose electrolyte combination (Intalyte, Intas Pharmaceuticals Ltd, India) followed by dextrose-normal saline (DNS, Punjab Formulations, India). The protruding mass was rinsed meticulously with lukewarm normal saline and kept covered with a moist sterile drape in a tray. The area around umbilicus was carefully prepared for aseptic surgery. The body wall in the periphery of the umbilical opening was given field block with 6 to 8 ml of lignocaine hydrochloride (Xylocaine 2%, Astra Zeneca Pharma India Limited). An elliptical skin incision around the umbilical ring was extended cranial

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along the linea alba for a distance of 2.0 to 3.0 cm beyond its margin. The urachus was meticulously separated, ligated by transfixation using No. 1 chromic catgut (Ethicon & Ethicon-Johnson, India) and severed. The amnion and the skin edges were excised. The viability of intestines was determined by observing the color change, motility and arterial pulsation subsequent to temporarily placing them into the abdominal cavity for 10 minutes. In all the calves the intestines appeared viable except the one (No. 3) that had been treated earlier. In this calf enterectomy of the non-viable segment was followed by end-to-end anastomosis using 3-0 chromic catgut (Stericat Gutstrings Private Limited, India) with a single row of perforating interrupted sutures. The eviscerated intestines were replaced and the abdominal incision closed in layers using No. 1 chromic catgut (simple continuous pattern) for muscles and No. 1 braided silk (horizontal mattress pattern) for skin approximation.

The anal opening was created in the calf with atresia ani (No. 4) under caudal anaesthetic block using 1.5 ml of lignocaine hydrochloride (2%). After surgical preparation
of the area, a 2.5cm diameter circular piece of skin was removed ventral to the tail, where bulging of the rectum was detected. After opening the subcutaneous tissue, the blind end of the rectum was mobilized. Skin and full thickness rectum wall were apposed in a simple interrupted pattern using No 1, braided silk (Ethicon, Johnson & Johnson, India). A circular piece of rectal blind end was excised 1.0cm central from the sutures.

The calves were discharged after prescribing same antibiotic and analgesics that were given preoperatively for 5 and 3 postoperative days respectively. Daily antiseptic dressing of the incision sites was continued for two weeks. During this period, the animals were managed by a veterinarian at the owner’s premises. The progress of the cases was ascertained from the owners by telephone on alternate days till suture removal on day 10th postoperative and thereafter on monthly basis for a total period of 12 months.

RESULTS AND DISCUSSION

All of the calves continued to pass feces normally, however the calf subjected to enterectomy stopped defecation 96 hours postoperatively. The animal showed anorexia, abdominal distension and lethargy. It was not presented for further treatment and reportedly died 48 hours later. Autopsy of the calf was not performed. In the remaining cases, the wound healing was uneventful.

Omphalocele is a developmental problem that is not necessarily a heritable abnormality, however, other congenital defects and chromosomal abnormalities may be seen concurrent with an omphalocele (Baird, 1993). Although other associated congenital abnormalities have not been described in veterinary reports (Baird, 2008). One of calves reported in this study was additionally suffering from atriaconal atresia ani and anury. On the basis of clinical examination, auscultation and electrocardiography, the cases reported here were not suffering from cardiac problems or arrhythmias. The sinus tachycardia detected in one calf that had been handled could have resulted from pain and distress (Radostits et al., 2007).

Unlike umbilical hernia, omphalocele is an emergency surgical condition of neonatal animals that requires utmost care right from the moment it is noticed and early treatment has to be instituted. More important than the ultimate treatment is the initial first aid delivered by the attendant who first sees the affected calf (Baird, 2008). The calves with omphalocele included in this report were full term, had normal body weight and appeared fair to good in general body condition.

All of the calves reported in the study involved evisceration of intestines only. Baird (1993) reported piece of liver in addition to the intestines in a calf with omphalocele. Such a hernia in children often contains the liver and intestines (Klien and Hertzier, 1981).

In an omphalocele, the herniated contents are initially covered by a transparent membrane (amniotic tissue) attached to the edges of the umbilical defects until minor trauma ruptures the membrane, exposing the prolapsed contents to contamination (Howard, 1973, Klien and Hertzier, 1981). Two of the four calves with omphalocele described here had intact but congested amniotic covering at the time of examination.

Gross contamination of the omphalocele was noticed in all the calves of this study at the time of presentation for treatment. However, the calvings had been attended by the owner’s that prevented gross mutilation of the fragile protruding viscera. It has been advocated that the mass should be covered with moist sterile sponges and wrapped in a bandage to prevent it from rupturing (Baird, 1993, Mee, 1994), contamination, and further water and heat loss (Burchfield, 1997, Wesley, 1997).

Patients with evisceration require early aggressive supportive therapy. Therefore, these calves were given intravenous fluid, antibiotic and analgesics preoperatively. Appropriate fluid, blood and antibiotics therapy is critical to stabilize the patient (Daniel, 2002).

Diazepam and local infiltration of the anaesthetic being comparatively safer in patients with dehydration, was satisfactorily used in all the cases in this study. Sedation and local anaesthesia are considered adequate and appropriate in the surgical management of umbilical masses in most cases (Baird, 2008). Neonates, particularly the calf undergoing anal reconstruction and omphalocele surgery in one sitting could have alternatively been managed under lumbo-sacral epidural block. In order to avoid complications like hypotension and hypothermia, this regional anaesthetic technique was not adopted in this study (Thurmon et al., 1996).

An elliptical skin incision around the umbilical ring extended cranial along linea alba to enlarge the opening, ensured easy replacement without harming the eviscerated intestines and also preserved sufficient abdominal wall and skin for effective closure of the rent. No other abnormality was detected on laparotomy. Reconstruction of the anal orifice in the calf with atresia ani was urgently required and was therefore accomplished immediately after managing omphalocele.

Three of the calves had an uneventful recovery. Complications like incisural hernia (Baird, 2008) or anal stricture (Dreyfuss and Tulleners, 1989) were not encountered in the postoperative follow up.

The calf that was treated earlier before presentation at Teaching Veterinary Clinical Services Complex (TVCSC) did not survive even after aggressive supportive therapy and resection of the nonviable portion of the intestine. However, the actual cause of death could not be ascertained as autopsy...
was not performed. It has been reported that severe contamination of the exposed intestines with torn mesentery may even require euthanasia (Baird, 1993).

From this case study, it was concluded that the surgical treatment of calves with omphalocele have good prognosis. The initial vigil by the owner or attendant at calving, quick separation from the dam, intact amniotic cover over the eviscerated mass, early presentation for surgery without mishandling are important prerequisites for survival of the neonates suffering from congenital omphalocele.

REFERENCE