

CASE REPORT

Congenital Esophago-tracheal Fistula as the Cause of Bloat in a Calf

D.P. KEANE, F.D. HORNEY AND T.H. OGILVIE

*Department of Clinical Studies, Ontario Veterinary College,
University of Guelph, Guelph, Ontario N1G 2W1*

Summary

A four day old Holstein calf was presented with a history of recurrent free gas bloat. An exploratory laparotomy was performed and no abnormalities were discovered in the gastrointestinal tract. An esophago-tracheal fistula was suspected and confirmed by endoscopy. Surgical correction was performed by ligating the tubular connection between the trachea and esophagus and suturing closed the defects in these structures.

Résumé

Une fistule oesophago-trachéale, comme cause de météorisme chez un veau

Cet article rapporte le cas d'un veau Holstein, âgé de quatre jours, dont l'anamnèse mentionnait un météorisme récurrent. Une laparotomie exploratrice ne révéla aucune anomalie du tractus gastro-intestinal. Les auteurs soupçonnèrent alors la possibilité d'une fistule oesophago-trachéale et l'endoscopie leur permit de confirmer ce soupçon. Leur intervention chirurgicale consista à ligaturer la communication entre l'oesophage et la trachée, ainsi qu'à suturer les fentes congénitales de ces deux organes.

Introduction

Congenital esophago-tracheal fistulas have been reported only rarely in the veterinary literature. Of those reported, two have been in calves (1,2).

This report discusses the history, diagnosis and surgical correction of an esophago-tracheal fistula in a four day old Holstein calf.

History and Clinical Signs

A four day old Holstein calf was referred to the Ontario Veterinary College with a history of intermittent abdominal distention first evident at six hours of life. The distention, caused by an accumulation of free gas, was easily expelled *via* a stomach tube. Decompression was repeated on several occasions over the following three days without difficulty. Concurrent with the above problem, it was reported that the calf had not sucked well since birth.

On presentation, (Day 1), the calf had marked, bilateral abdominal distention which was easily relieved with the passage of a stomach tube. General physical examination revealed a large umbilical swelling which was painful on palpation but had no associated heat. The animal was moderately dehydrated and hypoproteinemic with a plasma protein of 52 g/L.

Within 30 minutes of decompression the calf was again distended with gas and required deflation.

Diagnosis and Treatment

The calf was rehydrated intravenously with 3 L of balanced sterilized electrolyte solution.¹ A diagnostic exploratory laparotomy was then undertaken to investigate both the gastrointestinal problem and the umbilical lesion.

Following face mask induction with halothane, anesthesia was maintained *via* endotracheal intubation. A ventral midline incision circumscribing the umbilical swelling revealed a patent and infected urachus. The umbilical vein and both arteries were isolated and

ligated. The urachus was transected at the level of the bladder and the bladder sutured with 00 vicryl.²

Further exploration of the abdominal cavity revealed a gas filled abomasum to be the apparent cause of the abdominal distention. Following decompression of the abomasum with a 20 gauge 3.3 mm long needle, further investigation did not reveal any other abnormality. Because the abomasum began to refill with gas as positive pressure ventilation was carried out by the anesthetist, an esophago-tracheal fistula was suspected. By endoscopy a fistula was found approximately 20 cm caudal to the larynx. (Figure 1). The abdominal incision was closed, and a 11 mm diameter nasogastric tube was placed down the left nostril with the end sutured to the side of the animal's head.

Recovery from anesthesia was uneventful and the calf was treated with trimethoprim-sulfa³ at a dose of 16 mg/kg intravenously twice a day. The calf's total protein had decreased from 52 g/L to 37 g/L subsequent to rehydration and surgery. This deficit was corrected by the intravenous administration of 1.5 L of fresh bovine plasma.

On day 2, after intravenous administration of 1.5 L of whole blood, surgery was performed for correction of the esophago-tracheal fistula. The calf was anesthetized with halothane and placed in dorsal recumbency. A ventral midline incision was made from the level of the larynx to the thoracic inlet. The sternohyoid and sternothyroid muscles were separated to expose the ventral aspect of the

¹Electrolytes, Austin Laboratories (Canada) Ltd., Guelph, Ontario.

²Ethicon coated vicryl, Ethicon Sutures Ltd., Peterborough, Ontario.

³Trivetin, Burroughs Wellcome Inc., Kirkland, Quebec.

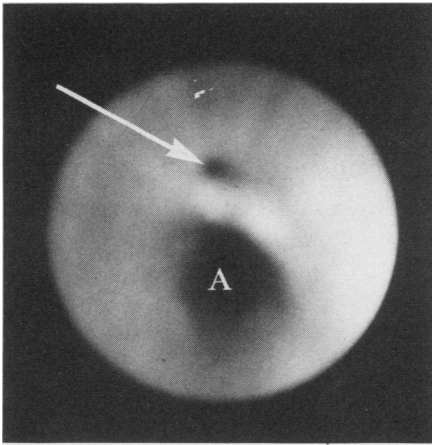


FIGURE 1. Endoscopic view from the trachea of the opening of the esophagotracheal fistula (arrow) dorsal to the tracheal lumen (A) in a four day old Holstein calf.

trachea. Blunt separation of tissues to the left of the trachea was carried out until an irregularity was identified on palpation of the dorsal aspect of the trachea approximately 20 cm caudal to the larynx. The defect appeared crater shaped and was primarily cartilaginous with a 2 cm tubular connection extending posteriorally to join the esophagus (Figures 2a and 2b). The structure was clamped and severed close to the normal esophagus. Subsequent gross examination revealed it to be a mucosal lined tube. The tracheal defect was closed with simple interrupted sutures of 00 vicryl² using a portion of the cartilaginous flap to oversew and reinforce the defect. The esophageal opening was closed using a Parker-Kerr oversew and 00 vicryl.² A Penrose drain was placed alongside the trachea prior to closure of the cervical wound and the previously positioned nasogastric tube was left in place. Recovery from anesthesia was uneventful and the animal was continued on balanced electrolyte solution intravenously.

The following day, (Day 3), there was no evidence of abdominal distention and the calf was bright and sucked well from a nipples bottle. The nasogastric tube was removed, the intravenous fluids were discontinued and the calf was continued on trimethoprim-sulfa.³ On auscultation the lungs sounded harsh and increased moist sounds were audible over the trachea.

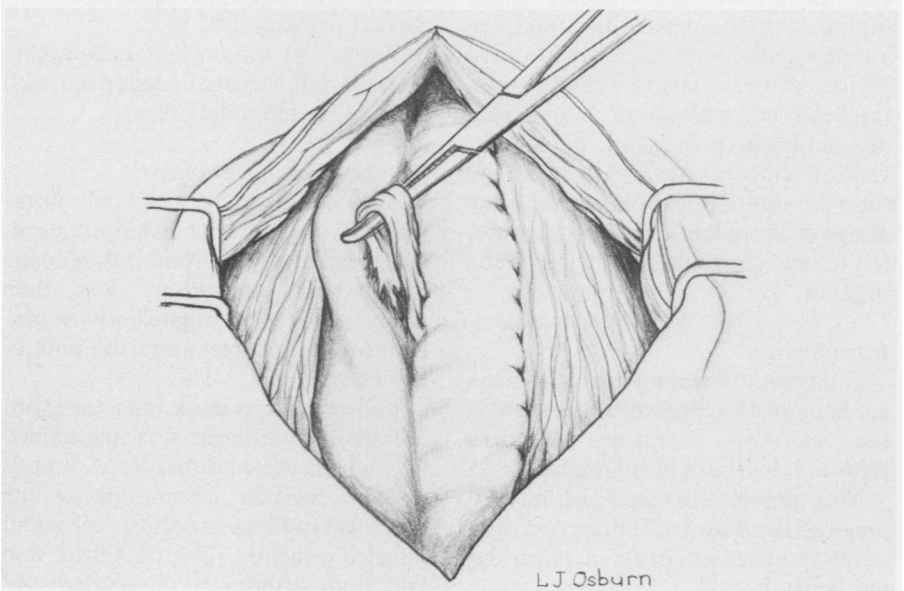
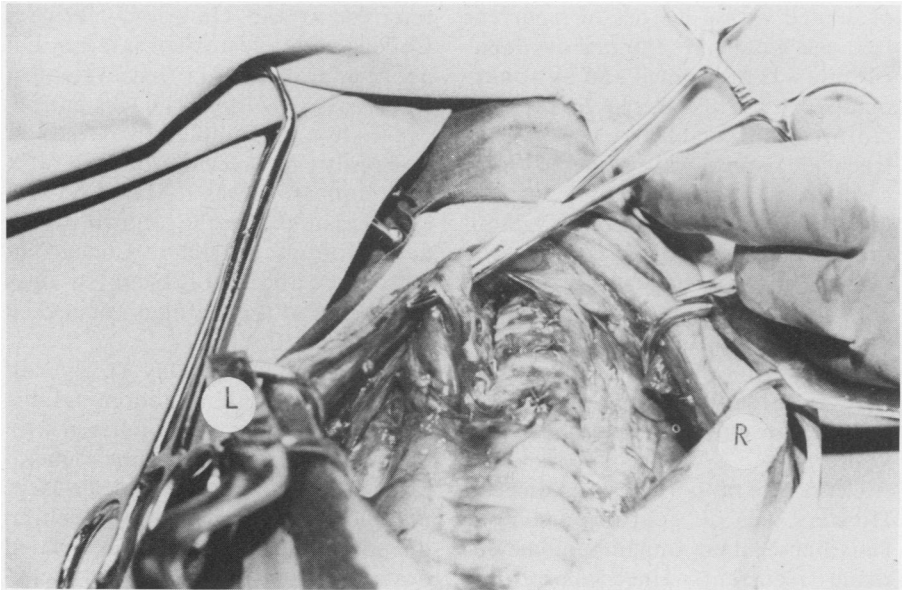
On day 6 tracheal and lung sounds were normal and as there was no drainage from the surgery site the Penrose drain was removed. The calf developed an unexplained fever at this time which did not respond to chloramphenicol⁴ at a dose of 20 mg/kg intravenously twice daily but which did respond to gentamicin⁵ at a dose of 5 mg/kg intramuscularly twice daily.

The calf was normal at the time of discharge (day 16) and was reported to be doing well at home, two months after the initial diagnosis.

Discussion

In the veterinary literature esophagotracheal fistulas have been reported in the feline (3), the bovine (1,2), the canine (3,4) and the equine (5) species.

In man, acquired fistulas occur more commonly than congenital fistulas and are often associated with one of the following: malignant, infectious or traumatic esophageal problems, infectious or malignant lung disease or periesophageal lymphadenopathy (6). The clinical picture in man is best described by a triad of signs and symp-



FIGURES 2a and b. Photograph and line drawing of the esophagotracheal fistula elevated by a hemostat in the four day old Holstein calf. The calf's head is towards the foreground.

⁴Rogar-Mycine, 500, Rogar/STB, London, Ontario.

⁵Gentocin, Schering Canada Inc., Pointe Claire, Quebec.

toms which includes (a) paroxysms of coughing precipitated by feeding, (b) gaseous distention of the gastrointestinal tract and (c) pneumonitis (7).

Clinically this calf had no evidence of pneumonia prior to surgery and there was no history of paroxysms of coughing associated with feeding. However, this animal had severe and recurrent abdominal distention which resulted from the passage of air, *via* the fistula, from the trachea into the esophagus.

The report by van der Gaag *et al* (2) is on a nine month old calf that had also been affected with bloat at birth. The calf had had difficulty in drinking as a young animal but had not shown any clinical signs during the grazing period. It was not until the animal had been housed at an age of nine months that recurring bloat resulted from

inflation of the rumen *via* the fistula.

Although the cervical approach at surgery is relatively straight-forward, difficulties may arise in identifying the fistula if it is very small. Postoperatively, paralysis of the recurrent laryngeal nerve may occur because of its close approximation to the trachea and its susceptibility to trauma during surgery.

Although esophago-tracheal fistulas are a rare occurrence they must be considered as a possible cause of acute abdominal distention in the young bovine.

Acknowledgments

The authors would like to thank Drs. Dohoo and Nymeyer for their anesthetic assistance.

References

1. AVELLINI G, MORETTINI B. Congenital esophago-tracheal fistula in a calf. *Atti Soc Ital Sci Vet* 1961; 15: 688-690.
2. GAAG I VAN DER, KUIPER R, KRONEMAN J. Esophago-tracheal fistula in a calf. *Tijdschr Diergeneeskde* 1976; 101: 347-354.
3. TESIC D, DIMITRIJEVIC B. Esophago-tracheal fistula in a dog and cat. *Acta Vet Beogr* 1955; 5: 101-106.
4. SCHEBITZ M. X-ray appearance of an esophago-tracheal fistula due to foreign body perforation in a dog. *Tierärztl Umsch* 1960; 15: 87.
5. TVEDTEN HW, KEANEY K. Esophago-tracheal fistulation after esophageal stenosis in a horse. *Vet Med Small Anim Clin* 1974; 69: 868-869.
6. ANSARI A, BROWN M, BUECHNER MA. Roentgenogram of the mouth: Malignant esophago-tracheal fistula presenting as a lung abscess. *Dis Chest* 1968; 53: 101-102.
7. HELMSWORTH J, and PRYLES C. Congenital esophago-tracheal fistula without atresia. *J. Pediatr* 1951; 38: 601.

BOOK REVIEW

Mastitis Control and Herd Management. Edited by A.J. Bramley, F.H. Dodd and T.K. Griffin. Published by National Institute for Research in Dairying, England. 1981. 290 pages. Price \$14.00.

This book is the proceedings of a course organized by the National Institute for Research in Dairying for the British Cattle Veterinary Association in September 1980, and is published jointly by the National Institute for Research in Dairying and the Hannah Research Institute Ayr. The aim of this continuing education course was to summarize the principle management factors that influence mastitis and the development of practical recommendations to improve mastitis control. The book is a series of technical bulletins written for the dairy practitioner, those engaged in dairy farming and dairy processing, members of dairy farm advisory services and students.

The book is presented in five sections: 1) Introduction — The princi-

ples underlying a sound mastitis control system based on teat disinfection and dry cow therapy is presented. 2) Hygiene and Etiology — A control program must be effective against the various types of mastitis and to set up the program an understanding of the etiology and hygiene factors related to each type is essential. This material is very well covered in this section. 3) Antibiotic Therapy — The appropriate use of antibiotic therapy to eliminate infections in mastitis control and the therapy for peracute and acute mastitis is discussed. 4) Machine Milking and Cattle Housing — This section covers the methods of milking and housing which are very important factors related to the level of herd infection. The ways that milking machine design, use and cleaning can reduce this level are presented. 5) The Practitioner and Veterinary Services — The last section stresses the need for practitioners to expand their role from treating acute mastitis cases and supplying antibiotics to include supplying advice on management methods and the use of advisory services in the develop-

ment of effective total control programs.

The book meets its objectives very well and material is well written and easily understood. Each paper finishes with clear, concise summary followed by references. There is very good use of tables and figures and the pictures on teat lesions are excellent.

The book, as expected, is directed to a United Kingdom audience but most of the information has world-wide application.

The section on machine milking and housing will be greatly appreciated by dairy practitioners as this information is not readily available elsewhere.

The only criticism I have of this book is the binding, which after minimal use is breaking down. I believe increasing the cost of the book, which is modest, and improving the binding is indicated.

This book is an outstanding example of applying basic knowledge of mastitis control to practical milk production and is a must for those interested in mastitis control and herd management. *K.R. Armstrong*.