

# Student Clinical Reports

**Editor's Note:** The AABP Board of Directors meeting in Washington, D.C., on July 21, 1980 approved a recommendation from the Forward Planning Committee to encourage veterinary medicine students to write case reports for *The Bovine Practitioner*. Prizes were \$200, \$100 and \$50 for the top three reports. The Editorial Board awarded the following for 1983 and their papers are published herewith.

- First Prize (\$200): Lynne M. Dzuba, Michigan State University (Dr. J. Grymer, advisor)
- Second Prize (\$100): Janet L. Winter, Kansas State University (Dr. John Noordisy, advisor)
- Third Prize (\$50): Linda Kassebaum, Kansas State University (John Noordisy, advisor)

## Reconstructive Teat Surgery for Complete Teat Canal Obstruction

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I would like to take this opportunity to thank J. Grymer, DVM, Ph.D. for his guidance in preparing this report. I would also like to thank N. K. Ames, DVM, MS for editing and also for the opportunity to work with this case. Also a special thanks to my classmate Marty Mlynarek for the drawings and figures.

### SUMMARY

A new surgical technique to reestablish teat canal patency in obstructed teats is described. The technique entails opening the teat canal and inserting a prosthetic tube to reestablish milk flow.

### INTRODUCTION

Although the incidence of partial or complete teat obstruction is unknown, 1338 cows (3%) culled in Michigan in 1981 were removed from herds for udder related problems, exclusive of mastitis.<sup>1</sup> Trauma to the teat and congenital impatency are the primary predisposing factors for partial or total teat obstruction.<sup>2</sup> The location of the obstruction is variable. In one report, 652 cases of obstructed teats were reviewed. One-fifth (20.5%) of these cases were obstructed proximal to the streak canal.<sup>3</sup> (Figure 1) The remaining 79.5% involved the streak canal. Treatment of this latter group will not be discussed.

A functional sphincter is necessary to retain milk within the teat canal.<sup>4</sup> Injury or destruction of the sphincter results in continuous milk flow and often subsequent mastitis. Cows with an injury sphincter are usually culled.

The obstructing material has been described pathologically as a teat spider;<sup>2</sup> a condition where the accessory glands located in the mucosa of the teat wall proliferate and form tumor-like masses of fibrous tissue which block milk flow. This same pathology has been described by others<sup>5</sup> as discrete proliferation of granulation tissue covered by mucosa. These may be pedunculated and free moving or solitary, resulting in interference with the free passage of milk through the teat canal.<sup>5</sup> Proliferation can also occur at Furstenberg's rosette or the annular fold and result in total or partial obstruction of milk flow.<sup>2</sup> (Figure 1) The etiology is believed to be trauma to the teat. The location of the obstructing mass is variable. Palpation of the masses often elicit movement.

Treatment of obstructions proximal to the streak canal has been attempted with bistoury knives and cautery with silver nitrate.<sup>4</sup> Open teat surgery with removal of the obstruction and the use of self-retaining teat cannulae has also been tried.<sup>5</sup> Although many techniques have been described, the result is often further fibrosis and subsequent total obstruction of the teat.<sup>3</sup> Howard et. al.<sup>6</sup> in 1978 described a technique using a french catheter to prevent pressure on the incised teat while allowing milk drainage. This is similar in principle to the technique described in this report.

### HISTORY

A nine year old holstein cow was presented to the Michigan State University (MSU) Large Animal Clinic on December 27, 1982 with the complaint of an obstruction in the left rear teat. The cow was four days postpartum and had produced 13,182 kg (29,000 lb) of milk the previous lactation. No abnormalities had been noted in any previous lactations. The cow had been dry treated with antibiotics at the end of her last lactation. The referring veterinarian had treated the cow for a respiratory condition prior to referral to MSU. The cow was anorectic on the morning of presentation and the referring veterinarian had given fluids per os.

The cow was bright and alert on physical examination. The heart rate was 76 beats per minute, rectal temperature was 38.9°C (102°F), and the respiratory rate was 40 breaths per minute. The cow had normal mucous membranes and her rumen was contracting at 2 contractions per 3 minutes. Digital palpation of the cow's left rear teat revealed it was firm and appeared to be occluded by a fibrotic mass. No milk could be expressed out of the teat and passage of a 7.5 cm (3 inch) teat cannula was also unsuccessful. The cannula could only be inserted 5 cm into the teat before resistance. The preliminary diagnosis was partial teat canal obstruction of the proximal two-thirds of the left rear teat. The cow was held off feed and water, and scheduled for surgery the following afternoon.

A presurgical hemogram revealed the following: total protein - 8.1 gm/dl, PCV - 28.8%, Hgb - 10.1 gm/dl, 6.05 x 10<sup>6</sup>/ul RBCs, and 11,600/ul WBCs. The differential count was normal and adequate platelets were observed.

### SURGICAL TECHNIQUE

The cow was placed under general anesthesia in right lateral recumbency. The surgical area was routinely prepped with 10% betadine solution<sup>a</sup> and isolated with drapes. A 6 cm long incision was made into the lateral aspect of the left rear teat, extending into the teat canal. Hemostasis was controlled using electrocautery. The teat canal was completely occluded by a 4 x 6 cm fibrotic mass, which prohibited the free passage of milk from the gland. The mass

<sup>a</sup>Purdue-Frederick Co., Norwalk, CT

was carefully dissected from the mucosa and submitted for histopathology. After removal of the fibrotic tissue, approximately 5 liters of caseous nonidiferous material flowed from the gland. A sample of this material was submitted for culture and sensitivity. The quarter was massaged empty and then flushed with 3 liters sterile saline. A 12 cm artificial teat canal made of 9.5 mm silastic tubing<sup>b</sup> (Figure 2) with perforations at the proximal end was then placed in the teat canal from the sphincter to 2 cm above the annular fold. (Figure 3) The tube was secured with simple interrupted stay sutures using nonabsorbable material (3-0 Prolene<sup>c</sup>). These 'stay' sutures passed through the mucosa, submucosa, and the superficial part of the tube wall. (Figure 4) The teat wall was closed into two layers using absorbable monofilament (PDS<sup>d</sup>) suture in a simple interrupted pattern. The skin was closed with interrupted vertical mattress sutures (#1 Verafil<sup>e</sup>). Finally, the teat was infused with three million units Procaine Pen G,<sup>f</sup> diluted in 500 ml saline.

Figure 1. Teat Anatomy

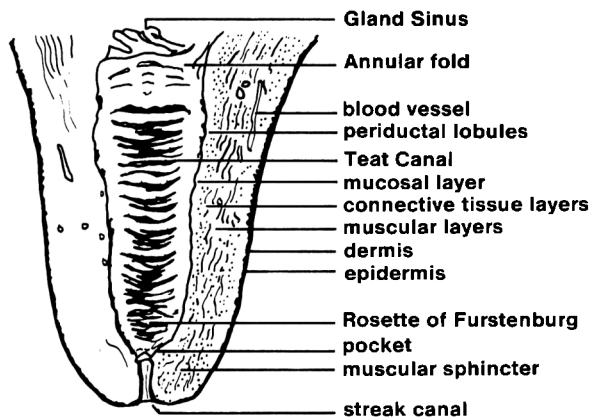
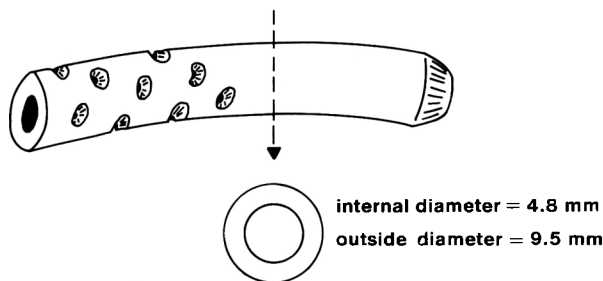


Figure 2. Silastic<sup>®</sup> Tube



### LABORATORY FINDINGS

Histopathology indicated the fibrous mass was composed principally of fibrous connective and granulation tissue. There were also isolated islands of acinar epithelium. Within these islands were cystic areas, other areas of necrosis and infiltrates of neutrophils, lymphocytes and plasma cells. These findings were interpreted to represent a proliferative response of the teat sinus epithelium to traumatic injury.

The culture submitted to microbiology showed a light growth of *Streptococcus mutans*.

<sup>b</sup>Silastic<sup>®</sup>, Dow Corning, Midland, MI  
<sup>c</sup>Ethicon Inc., Somerville, NJ  
<sup>d</sup>Ethicon Inc., Somerville, NJ  
<sup>e</sup>Haver Lockhart Labs., Shawnee, KS  
<sup>f</sup>Pfizer Inc., New York, NY

Figure 3. Placement of Silastic<sup>®</sup> Tube

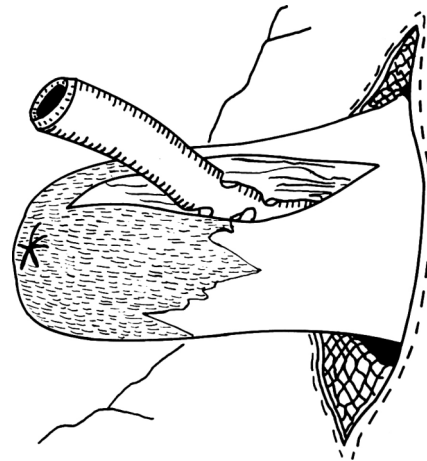
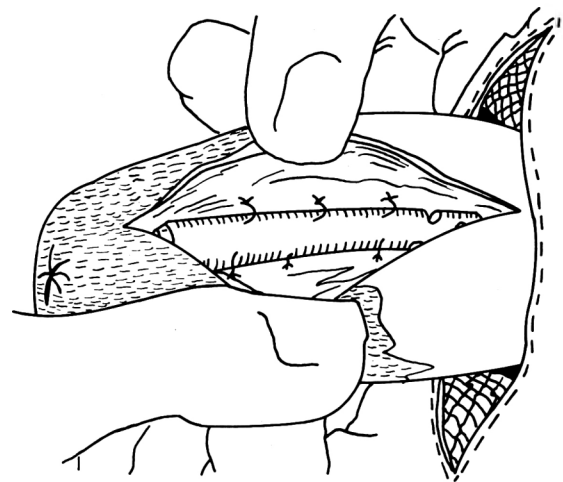


Figure 4. Placement of simple-interrupted stay sutures.



### POSTOPERATIVE CARE

Recommendations for postoperative care are to return the cow to normal machine milking as soon as possible and continue antibiotic infusion with 3 million units Procaine Pen G in 500 ml saline for 3-5 days. The case presented here had a prolonged recovery from anesthesia, she remained recumbent for 48 hours. The quarter was milked by hand. The cow also developed a left displaced abomasum 3 days postoperatively which was corrected in a routine manner through a right flank laparotomy and omentopexy. The cow recovered well postoperatively and was discharged on January 3, 1983. At the time of discharge, there was no evidence of mastitis and the operated teat milked satisfactorily.

### DISCUSSION

This case report presents a new technique to reestablish patency in obstructed teat canals. The silastic tube is a permanent implant. A foreign body reaction would be expected with a concurrent increase in somatic cells. This reaction may provide another protective mechanism against invading microorganisms. However, this same tubing material has been used in human surgery and has been shown to be relatively nonreactive.<sup>7</sup>

The histopathology results indicated that this cow probably traumatized her teat during the dry period and the fibrotic mass resulted from this injury. The milk culture from this cow showed light growth of *Streptococcus mutans*, which was believed to be a

contaminant. Chronic mastitis could also result in formation of fibrotic tissue in the teat canal or the gland, but in these cases, surgery cannot be recommended until after the infection has been treated to avoid surgical complications. Furthermore, milk curds obstructed the teat implant resulting in failure following successful surgery.

The results to this point look promising; however a complete follow-up of this case and experience with additional cases is essential to completely evaluate this procedure.

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# Food Animal Gastroenterology Case

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Cecal torsions are becoming more and more common. They appear to be related to high grain diets. The following is a case report of such an incidence, that occurred in a high production, Nebraskan, dairy herd.

**SIGNALMENT**

Client: Wallman Dairy  
 Veterinary Clinic: Blue Valley Veterinary Clinic, Dr. Thomas Dragastin, attending veterinarian.  
 Species: Bovine  
 Breed: Holstein - Registered  
 Age: 4 year old (9-20-78)  
 Sex: Female  
 Weight: 1250 lb.

**HISTORY**

This cow was born and raised on the dairy. She had all common calthood vaccinations, plus the yearly Lepto and wormer injections given when in the milking herd. She had no past medical problems. Her last calving occurred September 20, 1982, with no complications. Her diet consisted of 27 lb. haylage, 7 lb. long alfalfa, 12 lb. high moisture corn and 8 lb. ground feed (S.B.M., corn & oats - 18% Protein). The milking herd is kept in confinement, consisting of free stalls and a concrete lot. The dry cows are on a dirt lot, and are fed sorghum silage and long, third cutting, alfalfa hay.

The history of present concern started November 11, 1982. At 7 a.m. the cow produced her usual 38 lbs. of milk, but appeared listless. Also, her ears were cold and she had a temperature of 100.5°. By 5 p.m. the same day, she was depressed, anorexic, and hurt when she moved. She finally laid down and wouldn't get up. At this point, the veterinary clinic was called.

**PHYSICAL EXAMINATION**

Temperature: 102.8°; Pulse: 90+ /min.; Respiration: Rapid.  
 General Appearance:  
 In sternal recumbency, and refused to get up until an electric prod was used. When standing, there was a slight distension of the right paralumbar fossa, dorsally. She was grinding her teeth and kicking at her abdomen. Her udder appeared full.  
 Digestive System:  
 Ruminal atony was found. Upon auscultation, there was gas in the left paralumbar fossa, and resonance was heard on percussion, from the right seventh rib through to the right paralumbar fossa. The rectal showed only a slight amount of fecal material present, and gas filled loops of intestine predominately on the right side.

**WORKING PROBLEM LIST:**

1. Painful, gas distended abdomen
2. Depression
3. Anorexia

**INITIAL PLAN:**

Problem #1 Assessment:  
 Abomasal Torsion  
 Cecal Torsion  
 Intestinal Torsion  
 Plan:  
 Dx. - History  
 Clinical Signs  
 Rectal Palpation  
 Rx. - Fluids 3 l. I.V., with Pre-def added  
 Banamine 12 ml. I.V.  
 Surgery - report to follow  
 Problem #2 Assessment:  
 Depression secondary to abdominal distress  
 Plan:  
 Dx. - Observe  
 Problem #3 Assessment:  
 Anorexia secondary to abdominal distress  
 Plan:  
 Dx. - Observe

**Surgery Report**

A local line block of Lidocaine was administered. A right paralumbar incision was made. The dilated intestines bulged out of the incision. The apex of the cecum was pointing cranially. A 14 gauge needle was used to decompress the cecum, but deflated very slowly. Therefore, the cecum was exteriorized and a 1" incision was made into the apex. Gas and fluid fecal material flowed out of the cecum. After the cecum was decompressed and cleaned off, the incision was sutured using chromic catgut. There was a 180° twist at the base of the cecum. The cecum was rotated back to normal position. At this time, the gas in the small intestine above the cecum began to move through. The tissue at the site of the cecal twist was only slightly reddened. Due to time and the threat of the cow trying to go down, nothing more was done to the cecum. Six grams of tetracycline was diluted in 500 ml. saline, and this was poured into the abdominal cavity. The paralumbar incision was closed with chromic catgut for the muscular layers and heavy vetafil for the skin.