

## SURGICAL MANAGEMENT OF RECTAL PROLAPSE IN AN INDIAN RHINOCEROS (*RHINOCEROS UNICORNIS*)

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**Abstract:** An acute rectal mucosal prolapse in a 26-yr-old Indian rhinoceros (*Rhinoceros unicornis*) was repaired surgically by mucosal resection. Two days postoperatively, suture line dehiscence accompanied by substantial hemorrhage was managed by ligation and hemostasis during a second immobilization. Medical management with nonsteroidal anti-inflammatory drugs and diuretics reduced the mucosal edema and prevented recurrence of the prolapse. A combination of butorphanol and detomidine provided excellent reversible chemical restraint for this animal.

**Key words:** Indian rhinoceros, *Rhinoceros unicornis*, rectal prolapse, mucosal resection.

### BRIEF COMMUNICATION

Rectal prolapse can occur in all domestic animals. Although it occurs relatively frequently in the Perissodactyla, it is rare in horses,<sup>1,9,10</sup> but more common in tapirs.<sup>4</sup> Reports involving rhinoceroses are rare.<sup>3,6,7</sup>

Any condition causing prolonged tenesmus may result in rectal prolapse development. Predisposing conditions in horses include constipation, diarrhea, intestinal parasitism, dystocia, urinary obstruction, proctitis, rectal tears, and neoplasia.<sup>10</sup> Prolapse may also be idiopathic.<sup>10</sup> Although conservative management and treatment of any underlying disease is the preferred approach in mild cases,<sup>1,9</sup> surgical intervention by mucosal resection is the standard approach in severe or recurrent equine cases.<sup>2,5,9,10</sup> The technique has been used successfully in a juvenile black rhinoceros (*Diceros bicornis*),<sup>7</sup> and we used the technique on an adult rhinoceros.

During a 4-yr period, a 22-yr-old male Indian rhinoceros (*Rhinoceros unicornis*) developed mild rectal mucosal prolapses at approximately 1-mo intervals. The prolapses were noticeable primarily in the morning after the animal had been lying down for the night. Fecal analysis revealed no evidence of parasitism, and signs of gastrointestinal problems, including diarrhea, were notably absent.

In early 2002, a 20-cm, edematous, congested rectal prolapse was observed (Fig. 1). It did not resolve spontaneously, and the everted tissue was increasingly edematous. Because the rhinoceros

had been behaviorally conditioned to handling, the tissue was replaced manually without chemical restraint. A cursory deep palpation of the rectum revealed marked mucosal edema and the presence of a focal area of harder tissue at the 1 o'clock position.

The next morning the prolapse had recurred, was considerably larger, and bleeding from superficial cuts and tears. Manual reduction was no longer possible and mucosal resection was attempted. The rhinoceros was immobilized with a combination of butorphanol (Torbugesic, Wyeth Pharmaceuticals, Markham, Ontario L3T 7Y2, Canada; 120 mg, i.m.) and detomidine (Dormosedan, Pfizer Canada, Kirkland, Quebec H9J 2M5, Canada; 80 mg, i.m.). Deep sedation was achieved at 10 min, and the rhinoceros assumed sternal recumbency after 18 min.

The prolapsed tissue was a thick fold of edematous mucosa extending from the 9 o'clock to the 12 o'clock position, protruding 30 cm from the anal sphincter. One liter of lidocaine gel (2% lidocaine [Xylocaine, AstraZeneca, Mississauga, Ontario L5Y 1M4, Canada] mixed into powdered lubricant [J-lube, Jorgensen Laboratories, Loveland, Colorado 80538, USA]) was instilled into the rectum, and 2% lidocaine (150 ml) was injected into the prolapsed tissue in several sites. The rectum and the prolapsed tissue were lavaged copiously with sterile saline and dilute (1:40) chlorhexidine solution (Hibitane, Ayerst Veterinary Laboratories, Guelph, Ontario N1K 1E4, Canada). A sterile towel was inserted into the rectum, and four stay sutures were placed on the adoral side of the proposed elliptical incision. Two incisions were made extending from the 1 o'clock to the 9 o'clock position: the first after the mucocutaneous junction, the second parallel to this, but adoral to the prolapsed tissue. The mucosa and a large portion of submucosa were then removed by blunt dissection, avoiding the lamina

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**Figure 1.** Rectal mucosal prolapse in an Indian rhinoceros at initial presentation.

muscularis. Many large vessels, including arteries 6–7 mm in diameter, were individually ligated with 2-0 Vicryl (Ethicon, Somerville, New Jersey 08876, USA). The incision was closed with a simple interrupted suture pattern (2-0 Vicryl) and, after reduction, another 200 ml of lidocaine gel was instilled into the rectum.

Trimethoprim–sulfadoxine (Tribrissen 48%, Schering Canada, Pointe-Claire, Quebec H9R 1B4, Canada; 30 g, i.m.) was administered intraoperatively.

After surgery, sedation was reversed with naloxone (Narcan, Endo Pharmaceuticals, Chadds Ford, Pennsylvania 19317, USA; 7 mg, i.v.) and methoxyidazoxan (RX821002A, Pierre Fabre Medical, 92654 Boulogne, France; 5 mg, i.v.), and the animal stood 10 min after reversal.

For postoperative management, the daily ration was reduced to a soft mash of crushed, pelleted concentrate in mineral oil, and hay was withheld. Oral prescriptions of trimethoprim–sulfadoxine (Tribrissen oral paste, Schering Canada; 75 g p.o. b.i.d.) and amoxicillin (Apo-Amoxi 500 mg, Apo-

tex, Weston, Ontario M9L 1T9, Canada; 40 g p.o. b.i.d.) were implemented.

The day after surgery, no bleeding or any signs of recurrence of the prolapse were observed, and the incision line was intact. The animal was less alert than typical, but ate well. During that night heavy bleeding occurred, and by the next morning, an estimated 5–7 L of blood was present in the enclosure. Because hemorrhage continued, a second immobilization was performed, again using butorphanol and detomidine. Massive edema was palpated at the edges of the incision, two-thirds of the suture line had dehisced, and a shallow submucosal pocket had formed at the ventral aspect of the incision. Hemorrhage was localized to several large submucosal vessels within this pocket. These were ligated (0 Vicryl, Ethicon), and the entire area was lavaged generously with saline. A continuous mattress suture was placed (1 Vicryl, Ethicon) to reduce the pocket, but attempts to resecure the primary incision were unsuccessful. Flunixin meglumine (Banamine, Schering Canada; 400 mg, i.m.) was administered. Overnight and through the next day, occasional blood clots were passed with feces. The animal was bright and alert, and the mucous membranes were pink.

Two days after the second procedure, feces contained small amounts of blood. Palpation revealed reduced edema at the incision, but marked edema in the more adoral mucosa that protruded into the lumen. Overnight, prolapsed mucosa was manually reduced four times. The next morning, a full telescoping prolapse of the distal rectum, involving the original incision and 30 cm of mucosa adoral, occurred when the animal strained. The entire suture line had dehisced, with a 3- to 4-cm gap exposing the submucosa. Granulation tissue was visible at the edges of the incision, and minimal undermining of the exposed subcutaneous tissue was observed. The prolapse was easily reduced, and ibuprofen (Apo-Ibuprofen, Apotex; 4.8 g p.o. b.i.d.) and furosemide (Apo-furosemide, Apotex; 1.6 g p.o. s.i.d.) were administered for 3 days to reduce the edema.

During the next few days the edema subsided. Eleven days after presentation, rectal palpation revealed no swelling, and significant reduction in the mucosal defect. Nine days later, this defect was closed almost completely and the mineral oil supplementation was discontinued. At 35 days postoperatively, only an irregular, slightly raised line marked the site of the incision. At this time, the rhinoceros was returned to its usual diet, and no further problems were encountered in the next 18 mo.

One of the critical factors in the successful outcome of this case was the good rapport between the animal and its caretakers that allowed palpation and visual inspection of the prolapse without chemical restraint, thus greatly facilitating treatment.

Although a semiconservative approach for managing mucosal prolapse in an Indian rhinoceros using topical hydroscopic therapy had been successful in the past,<sup>3</sup> it was believed that the chronicity and extent of the prolapse in this case necessitated surgical intervention. The technique described largely followed the approach developed in cattle<sup>5</sup> and adapted to equine surgery.<sup>2,10</sup> An approach closing the mucosa in two layers has been recommended,<sup>10</sup> which may have prevented or limited the dehiscence experienced in this case. Further measures that may have been beneficial include hydroscopic therapy to reduce edema and electrocautery for more efficient hemostasis.<sup>1,2,10</sup>

The combination of detomidine and butorphanol had been used at a lower dose to provide standing sedation for transrectal ultrasonography and vaginal biopsy on several occasions in another Indian rhinoceros. The same combination used for this case, resulted in excellent sedation with good relaxation and some analgesia and was fully reversible. In five anesthetic episodes, the heart rate, respiration rate, and SpO<sub>2</sub> remained near nonanesthetized values. Although naloxone was used successfully in this case, renarcotization was observed after a subsequent procedure, and naltrexone likely is preferable because of its longer half-life.<sup>8</sup>

The etiology of the prolapse in this case was unknown, as in other documented cases of rectal prolapse in rhinoceroses.<sup>3,7</sup> Histologic evaluation of the excised tissue showed marked edema and areas of chronic submucosal fibrosis but no evidence of in-

flammation or infection. In the rhinoceros' time at the zoo (13 yr), no reports of constipation or diarrhea had been recorded, and routine fecal analysis consistently did not demonstrate endoparasitism.

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