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Rumenotomy for rumen impaction from rubber latex ingestion: A review of 7 cases

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Abstract
Seven crossbred cattle belonging to different age groups were presented to University Veterinary Hospital, Mannuthy with anorexia and having the same aetiology of accidental ingestion of rubber latex. The condition was diagnosed from the history, clinical examination and confirmed impaction of rumen through palpation and per rectal examination. Rumenotomy was performed for all seven cases to remove the impacted materials from the rumen. Six out of seven animals had an uneventful recovery.

Keywords: Bovine, rumen impaction, rubber latex, rumenotomy

Introduction
Rumen impaction is defined as the condition resulting from the accumulation of indigestible materials in the rumen and it will obstruct the normal flow of ingesta leading to distension of the rumen and scanty to no faeces (Abdullahi *et al*., 1984) [1]. Ingestion of foreign bodies in cattle leads to great economic loss due to loss of production and high mortality rate (Radostitis *et al*., 2000) [12]. Latex is found in nature as a milky fluid in some flowering plants and trees. It is an emulsion consisting of proteins, alkaloids, starches, sugars, oils, tannins, resins, and gums. It coagulates on exposure to air. Rubber tree (*Hevea brasiliensis*) belongs to the family Euphorbiaceae. The milky latex extracted from this tree is the primary source of natural rubber. In Kerala rubber trees are extensively cultivated by farmers, latex is extracted, collected and processed into sheets in the household premises. The intake of this latex accidentally by the animals can lead to impaction due to the coagulation and hardening of the latex within the different compartments of ruminant stomach.

Materials and Methods
Seven cattle of ages ranging from one to three years were presented to University Veterinary Hospital, Mannuthy from the period 2019 September to 2021 February with history of accidental ingestion of rubber latex. All the animals exhibited anorexia, absence of rumination and rumen atony, distended left paralumbar fossa (Fig-1), scanty and pasty dung with rubbery consistency. On clinical examination normal temperature, increased respiration and pulse rate were noticed. Abdominal percussion revealed solid sound in the ruminal area and while palpation and per rectal examination solid consistency of the rumen could be felt. Complete blood count and blood smear examination revealed marked anaemia, leukocytosis and the presence of haemoparasites like *Theileria* spp, *Babesia bigemina and Anaplasma spp*. All the cases were managed surgically after stabilising the animals with fluid therapy and treatment against haemoparasites.

Fig 1: Animals with distended left para lumbar fossa

Table 1: Haematological analysis of the affected animals

SI. No.	RBC (10^6/µL)	WBC (10^3/µL)	HGB (g/dL)	HCT (%)	Platelet (10^3/µL)	Haemoparasitic Infection
Animal No. 1	6.93	76.4	9.5	30.1	369	Negative
Animal No. 2	5.1	89.1	6	20	120	Theileria (+)
Animal No. 3	4.01	46.1	3.8	15.7	513	Negative
Animal No. 4	4.34	11.9	7.7	20.1	409	Theileria (+)
Animal No. 5	6.48	14.4	6.2	26.8	459	Theileria (++), Anaplasma (+)
Animal No. 6	4.60	8.9	5.2	21.2	549	Theileria (+++) *Babesia bigemina* (+)
Animal No. 7	5.2	16.2	7.3	23.5	429	Theileria(+)

Standing rumenotomy was done in all animals with distal paravertebral nerve block using 2% lignocaine HCL injection. Made a vertical incision in the left paralumbar fossa, equidistant from the wing of ilium and last rib through the skin and abdominal muscles to reach the impacted rumen. Stay sutures were applied for attaching the ruminal wall to the skin. Rumen stay suture (RSS) and rumen skin suturing fixation (RSSF) technique were used in the present study. Incised the rumen and removed the impacted material manually. Checked the reticulum, rumeno- reticular groove and reticulo-omasal orifice for any obstruction. One out of seven cases had presence of foreign body in reticulum and it appeared totally indifferent due to the ruminal churning motion (Fig-5). Irrigated the ruminal wall and surrounding tissues with normal saline and suctioned out the remaining contents from the rumen. Rumen was partially filled with chopped grass and Rumisacc bolus (prebiotic + probiotic). Rumen was closed with polyglactin 910 size 2 in Cushing's followed by Lembert's suture pattern. Apposed muscles and skin as per the standard procedure.

Post-operatively all animals were treated with inj. strepto-penicillin at a dose rate of 15000 IU/kg body weight for seven days, inj. meloxicam at a dose rate of 0.2 mg/kg body weight for three days, B-complex vitamins as intramuscularly and fluid therapy intravenously. Animal were maintained with fluid therapy and nil per os for first three days of surgery and gradually returned to normal feed intake. Six out of seven animals had an uneventful recovery after 10 days and sutures removed. Whereas one animal succumbed to death after three days and it may be due to severe *Theileria* and *Babesia* infection. Post-operative complications of the suture site were nil in rumen skin suturing fixation technique compared to stay suture rumenotomy technique. In stay suture rumenotomy technique abscess develop at the site of incision.

Fig 3: Rumen Skin Suturing Fixation (RSSF) technique

Fig 4: Open the rumen for manual removal of the contents

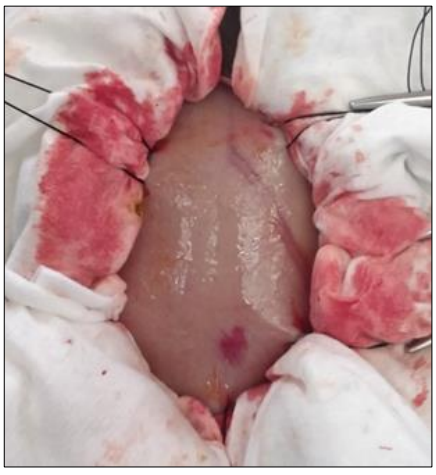

Fig 2: Rumen Stay Suture (RSS) method

Fig 5: Foreign body from the reticulum

Results and Discussion

All animals recovered uneventfully except one. Postoperative complications like abscess formation in the suture site was less in the case of rumen skin suturing fixation (RSSF) method compared to rumen stay suture (RSS) method. Sutures were removed on second week post surgery and animal regained its normal diet within three weeks. The details of the animals included in this study are shown in table No.2.

Table 2: Details of the animals under study

SI. No.	Breed	Age (years)	Month	Sex	Foreign body retrieved	Rumen fixation technique	Post-operative Complications
1	CBHF	2	February (2020)	F	Nil	RSS	Abscess formation at the suture site
2	CBHF	2	February (2020)	F	Nil	RSS	Abscess formation at the suture site
3	CBJ	3	June (2020)	F	Leather	RSS	Abscess formation at the suture site
4	CBHF	3	Nov(2020)	F	Nil	RSSF	No
5	CB	1	Dec(2020)	M	Nil	RSSF	No
6	CBJ	1.5	Dec(2020)	M	Nil	RSSF	No
7	CBJ	1.5	February (2021)	F	Nil	RSSF	No

Incidence of rumen impaction in sheep and goats are very less because they are selective feeders compared to cattle (Hailat *et al*., 1996) [6]. Rumen impaction is most commonly encountered in females than males because the females have more appetite due to the nutritional demands of estrus, pregnancy and lactation. Clinically, rumen impaction is characterized by clear signs of emaciation, dehydration, abdominal distension and asymmetry of the abdomen. Affected animals showed a lack of faeces in the rectum, foamy salivation, recumbency and inappetence (Akraiem *et al*., 2020) [2]. Emptying of the rumen through rumenotomy is the only method for the management of the foreign body rumen impaction (Boodur *et al*., 2010) [3]. Rumenotomy provides direct access to the rumen, in that way allowing removal of indigested foreign bodies, sharp penetrating objects and foreign bodies lodged in the distal portion of the esophagus (Kulesh *et al*., 2022) [9]. According to Dehghani and Ghadrdani (1995) [4], rumen skin suturing fixation technique (RSSF) is superior than any other rumen fixation methods and it advantages include clean wound after rumen closure, fewer postoperative complications, good for all purpose rumenotomy, no special instruments needed and no assistance required. Niehaus (2008) [11] also stated that with this technique, the rumen is sutured to the skin using a continuous inverting suture pattern such as a Connell or a Cushing. If done properly, this suture everts the rumen and inverts the skin edge to form a continuous seal. Kamalakar *et al*. (2021) [8] stated that the occurrence of rumen impaction is more common among 4-6 years age group of cattle. In large ruminants most common surgeries were done in standing position. Standing position for surgery will eliminate the dangers with restraining and prolonged recumbency complications like bloat and regurgitation of ruminal contents (Fubini and Ducharme, 2004) [5]. According to Mamutt and Gjino (2013) [10] distal paravertebral nerve block with linear infiltration was more useful in field conditions for performing long surgery without complications due to its longer duration of effects. In distal paravertebral nerve block (Magda method) the dorsal and ventral rami of the spinal nerves T13, L1 and L2 were desensitized at the distal ends of L1, L2 and L4. The duration of anaesthesia for this method (distal paravertebral nerve block + inverted L) is about 91 minutes and induction occurred within 7 minutes. Haven and colleagues showed that prophylactic use of penicillin significantly decreased the incidence of abscess formation following rumenotomy.

Conclusion

Successful management of rumen impaction induced by the rubber latex in seven crossbred cattle aged one to three years were done with rumenotomy, manual removal of the impacted hardened latex and dedicated post-operative care.

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Conflict of Interests

There is no conflict of interest

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