Caecal dilatation as a sequel to colonic fecalith obstruction - A report on four bovines

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SUMMARY

This report describes the colonic fecalith as an etiology to caecal dilatation leading to complete intestinal obstruction in bovines. Four bovines (3 buffaloes and one Holstein Friesian crossbred cow); aged 2-4 years were presented with the primary complaint of loss of defecation, anorexia and mild pain from 4-11 days. Per rectal findings revealed rectum with white thick mucus or scanty feces, dilated small intestines and distended caecum. The heart rate was marginally increased in all bovines and abnormally increased in one buffalo. The respiration rate and rectal temperatures were within the normal range. Ultrasonography revealed swirling motility in small intestines with moderately increased peritoneal fluid and a distended cecum in right upper flank. All the bovines were anemic and showed increased total protein in serum.

Right flank laparotomy under local anaesthesia was done in all the bovines in recumbent (n=2) or standing (n=2) position as they were not responding to medicinal therapy. The surgical findings were dilated descending duodenum, dilated small intestine, moderately distended caecum with soft contents, increased peritoneal fluid and a hard intraluminal mass (fecalith) in the ascending colon. In the cow, the caecal volvulus was also detected. The exteriorization of the fecalith was not possible in all the buffaloes, so it was gently moved towards the dilated part of colon and was kneaded/broken down to relieve obstruction. In the cow, the fecalith was successfully exteriorized and enterotomy was done to remove it. Intra and post-operative treatment included fluid therapy, antibiotics, analgesics and pro-kinetics (injection lignocaine hydrochloride @ 1.3mg/Kg, intravenous divided in 5 liters of saline). All the bovines passed profuse semisolid feces within 8 hours of surgery.

In conclusions, colonic fecalith may be included as an etiology for caecal dilatation in bovines. Surgical kneading or retrieval of fecalith from the colon through right flank laparotomy is successful in treating the bovine.

KEY WORDS

Buffalo, cow, caecal dilatation, colon, fecalith.

INTRODUCTION

Obstructive lesions anywhere in the intestinal tract may cease defecation, therefore, identification of the site and nature of lesion is important for making further therapeutic decisions [1-2]. Caecal dilatation in cattle is predominantly caused by volatile fatty acid induced hypomotility associated with excessive feeding of concentrate diet [3-4]. The distended caecum in conjunction with torsion or retroflexion, displacement, and distended spiral colon are noticed in caecal dilatation [5]. Colonic fecalith has been rarely described and documented as an etiology to cecal dilatation in bovines. There is a single report on six bovines mentioning dilated cecum along with colonic fecalith [6]. The work done by Singh et al, [6] lacks case wise description of the bovines with cecal dilation and the primary focus was on the ultrasonographic features of cecal dilatation versus impaction. The present study describes the occurrence of colonic fecalith as an etiology to cecal dilatation in four bovines and their successful surgical management by kneading or enterotomy through right flank.

MATERIALS AND METHODS

Four young bovines (two buffaloes, a buffalo bull and a Holstein Friesian crossbred cow) aged 2 to 4 years, were presented with the primary complaint of loss of defecation since 4 to 11 days and complete anorexia for 5-9 days and mild abdominal pain. The detailed information pertaining to signalment, history, clinical signs, Ultrasonography and surgical findings are described in **Table 1**.

Surgical Treatment

All the four bovines were subjected to exploratory laparotomy as they did not respond to the medicinal therapy for 24-72 hrs and did not passed feces. The right flank celiotomy was done in standing (n=2) and left lateral recumbency (n=2) under local infiltration anaesthesia (inj. lignocaine Hcl 2%, 100-120ml) after aseptic preparation.

A mid flank skin incision of 20-25 cm length was made in the paralumbar fossa, starting 4-5 cm below the transverse

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processes of lumbar vertebrae. The abdominal cavity was entered after incising muscles and peritoneum. The greater omentum was reflected cranially for exploration. Abdominal exploration was carried out in a systematic way so as to localize the lesion. The surgical findings in buffaloes revealed dilated descending duodenum, dilated small intestine, moderately distended cecum with soft contents and increased peritoneal fluid. Further exploration identified a hard intraluminal mass (fecalith) in the ascending colon, the exteriorization of which was not possible in 3 buffaloes (**Figure 3c**). In buffaloes, the fecalith

Table 1 - Table showing the case wise signalment, history, clinical examination findings, pre and post-operative ultrasound findings, surgical findings and outcome of bovines suffering from colonic fecalith. (USG=ultrasound, ICS=intercostal space).

Classes		FBS	RJ (0.625)	RJ (1.25)	P
Signalment	Parameter	Buffalo	Buffalo	Cow	Buffalo Bull
	Age (year)	4 years	2 years	3 years	2 years
	Breed	Murrah	Murrah	HF Cross	Murrah
	Gender	Female	Female	Female	Male
	Calving Status	Calved	Heifer	Recently calved	Not applicable
History	Appetite	Anorexia, 7 days	Anorexia, 6 days	Anorectic 9 days	Anorexia, 5 days
	Water intake	Reduced	Normal	Reduced	Normal
	h/o diarrhea	No	No	Yes, 2 weeks back	Yes, 5 days back
	Defecation status	Scanty feces, 7 days	No feces, 4 days	No feces, 11 days	No feces, 5 days
	Abdominal contour	Round	Round	Right sided distention (Figure 1a)	Left side distention
Clinical Examination Findings	Heart rate/Min	136	80	88	94
	Resp. rate/min	44	36	20	40
	Rectal temp (°F)	101.8	101.0	102.4	102.0
	Rumen motility/3min	2	3	0	0
	Mucus membrane	Pink	Pink	Pale	Brick red
	Rectal Exam	Distended caecum	Distended caecum + intestines	Distended caecum + intestines	Distended caecum
	Passing of Mucous (Figure 1b)	Yes	No	Yes	Yes
	Flatulence	No	Yes	No	No
Pre-operative USG findings (Figure 2a)	Cecum	Distended caecum with gas-fluid content at right flank and extending 11th and 12th ICS	Distended caecum with gas-fluid content at right flank and extending 11th and 12th ICS	Distended caecum with gas content at right flank and extending 11th and 12th ICS	Distended caecum with gas-fluid content at right flank and extending 11th and 12th ICS
	Small intestines	Not seen at Paralumbar fossa and 12th ICS. Swirling motility at caudal to pylorus and amotile near udder	Not seen at Paralumbar fossa, 12th ICS and flank. Swirling motility at caudal to pylorus and amotile near udder.	Not seen at Paralumbar fossa and 12th ICS. Swirling motility at caudal to pylorus and near udder.	Not seen at Paralumbar fossa and 12th ICS. Swirling motility at caudal to pylorus and amotile in caudal abdomen region.
	Duodenum	At 10th ICS with swirling motility 5/min, max dia. 4.47cm, mixed contents	At 11th ICS, amotile, max dia 4.29cm, mixed contents	At 9th ICS with max dia 3.34cm and fluid contents and motility 9/min	At 9th ICS with max dia 2.91cm, fluid content and motility 12/min.
	Pylorus	Distended 7.36cm, Amotile at 9th ICS with fluid contents	Distended 6.4cm, Amotile at 9th ICS with fluid contents	Size: 6.64cm, at 8th ICS with mixed contents	Distended 7.51cm, Amotile at 9th ICS with fluid contents
	Peritoneal fluid	Mildly increased	Mildly increased	Moderately increased	Mildly increased
Surgical findings (Figure 3)	Position	Lateral recumbency	Lateral recumbency	Standing	Standing
	Peritoneal effusions	Yes	Yes	Yes	Yes
	Exteriorization of fecalith	Partially exteriorized	No	Yes (Figure 3a)	Partially exteriorized (Figure 3c)
	Volvulus	No	No	Volvulus of cecum apex	No
	Management of Fecalith	Kneading	Kneading	Enterotomy (Figure 3b)	Kneading (Figure 3d)
Post-operative USG findings (Figure 2b)		Not done	Not done	The size of cecum reduced to right flank and 12th ICS. The motility of small intestines changed to normal peristaltic.	Small intestines motility increased to 18/min with no distension. The size of the caecum was reduced to right flank and 12th ICS.
Peritoneal fluid Cytology		Chronic active inflammation	Transudate	Chronic inflammation with hepatitis	Transudate
Outcome	Short term outcome (Figure 4)	Passed feces within 5 hours of surgery	Passed feces with 8 hours of surgery	Passed feces within 1 hour of surgery	Passed feces within 2 hours of surgery
	Long term outcome	Complete appetite resumed in 2 days No surgical wound related complications	Complete appetite resumed in 3 days No surgical wound related complications	Complete appetite resumed in 2 days No surgical wound related complications	Complete appetite resumed in 2 days. No surgical wound related complications

Figure 1 - Photograph of the Holstein Friesian crossbred cow suffering from colonic fecalith and cecal dilatation and showing distension in right lower flank (white star) (a), photograph showing mucous in the rectal findings of the same cow (b).

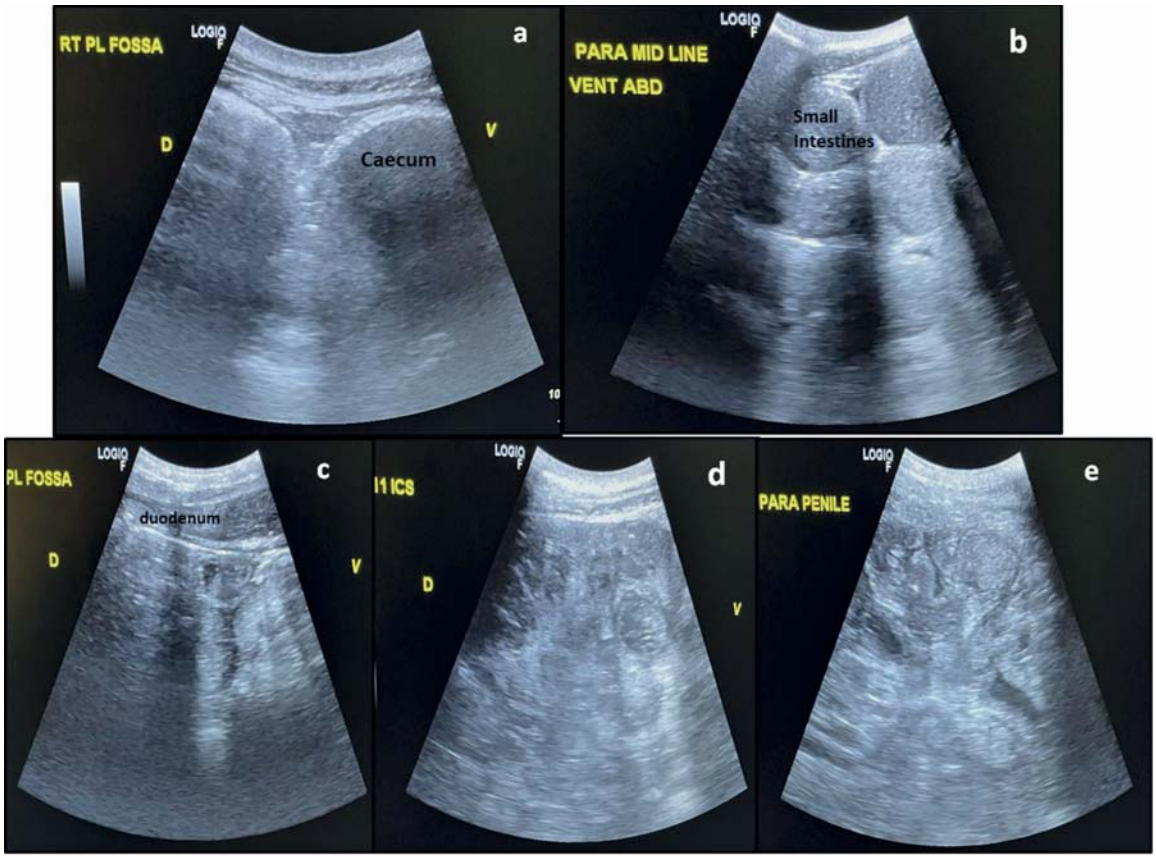

Figure 2 - Pre-operative ultrasonogram using 5MHz curvilinear transducer in a buffalo with distended caecum (a) at right paralumbar fossa (RT PL Fossa) and dilated small intestines at para midline in ventral abdomen (b).
Post-operative ultrasonogram at 24 hours in the buffalo bull with collapsed duodenum (c) in the paralumbar fossa (PL fossa), collapsed small intestines in lower flank at 11th ICS and (d) and in para-penile region of right abdomen (e) using 5MHz curvilinear transducer. D=dorsal, V=ventral.

was gently moved towards the dilated part of colon and was kneaded/ broken to relieve obstruction. However, in the cow, apart from findings present in buffaloes, the apex of the cecum was twisted cranially confirming volvulus; however the caecal wall was not compromised. The obstructed fecalith was exteriorized sufficiently for enterotomy (**Figure 3a and b**) following adequate packing of the peritoneal cavity. The abdominal wound was closed in a routine manner.

Fluid therapy (Normal saline @ 50ml/Kg body weight in 24 hrs, Intravenous) for 3 days, antibiotics (inj. Ampicillin and cloxacillin @ 10 mg/kg IV, inj. Gentamicin @ 4 mg/kg IM, twice daily) for 5 days, analgesic (inj. Meloxicam @ 0.5 mg/kg, once a day, IM) for 3 days. Inj. Lignocaine Hcl 2% @ 1.3 mg/kg IV equally diluted in 5 litre Normal saline was administered in immediate post-operative period as a prokinetic. All the bovines passed semisolid to loose feces within 8 hours of surgery.

The postoperative ultrasonography findings have been described in **Table 1**.

RESULTS

The haematology in mean ± SD revealed, haemoglobin 8.88 ± 0.63 g/dl (range 7.7-10.1), total leukocyte count 12210 ± 3990

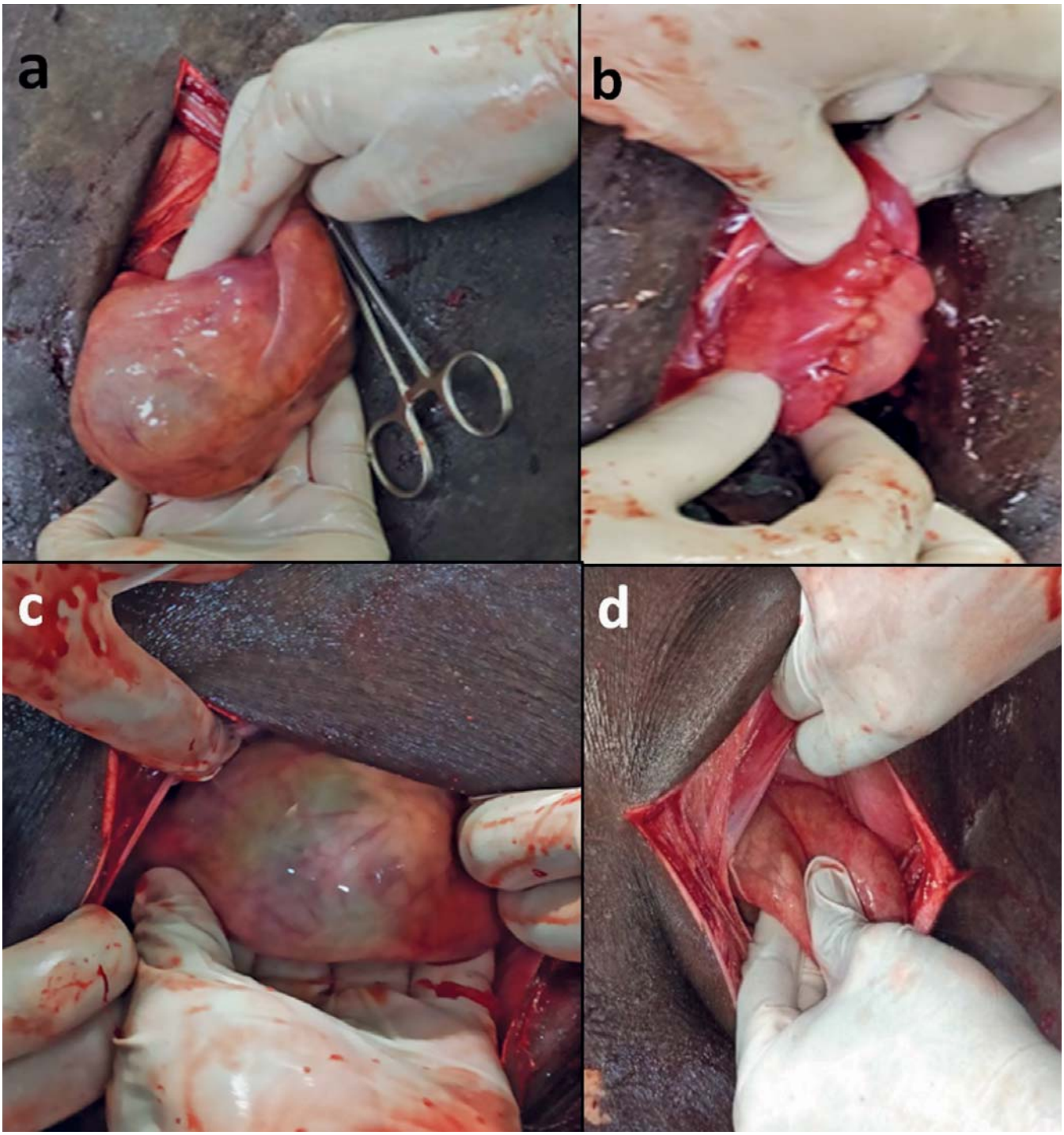

Figure 3 - Intra-operative photographs of the bovines suffering from colonic fecalith. HF crossbred cow where exteriorization of colonic fecalith was possible (a) and enterotomy was done to remove the fecalith (b). Photograph of the buffalo bull where exteriorization of fecalith was difficult (c) and kneading was done by moving the fecalith to the dilated portion. Photograph of obstructive site in the buffalo bull after kneading (d).

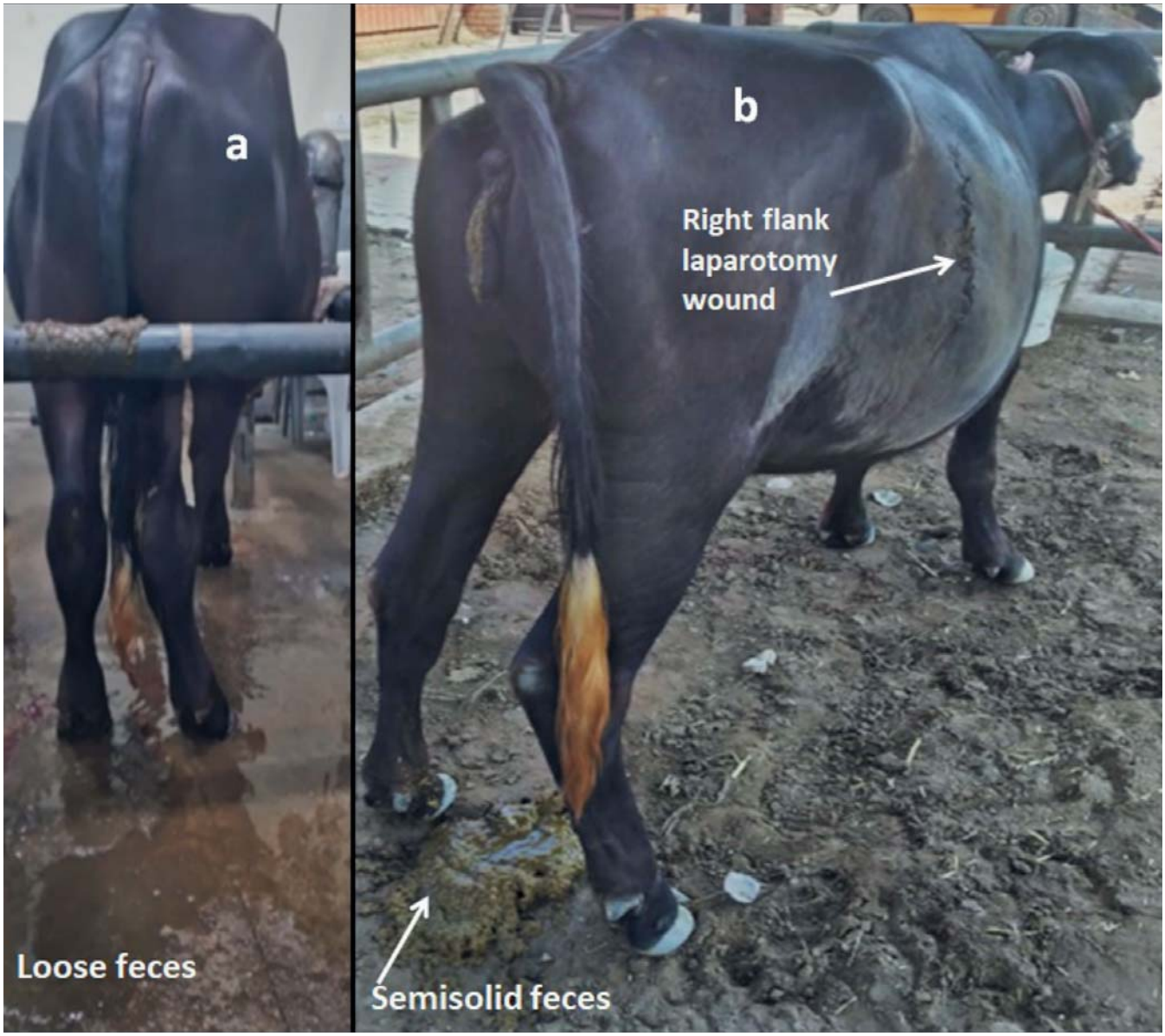

Figure 4 - Post-operative photographs of the buffalo bull and a buffalo suffering from colonic fecalith and cecal dilatation and now passing loose and semi-solid faeces respectively.

/μL (range 6730-16390), neutrophils 56±11% (range 34-70), lymphocytes 44±11% (range 30-66), packed cell volume 26.55±1.82% (range 23.5-30.2) and total platelets 454±238.2 x 10^3/μ) (range 233-763).

The biochemical evaluation of peritoneal fluid revals markedly elevated levels of total protein suggestive of secondary variable peritonitis in all the cases (**Table 2**).

All the bovines passed feces within one to 8 hours of surgery. The cow in which enterotomy was done passed feces wihtin one hour of surgey.

The postoperative ultrasonography and follow up outcome findings have been described in **Table 1**, with all the bovines returning to normal appetite within 2-3 days.

Table 2 - Table showing the biochemical values (mean ± SD) of pre and post-operative blood samples and peritoneal fluid in bovines suffering from colonic fecalith.
(Na=sodium, Cl-chloride, K=potassium, Ca=calcium, BUN=blood urea nitrogen, Creat.=creatinine, CK=creatinine Kinase, Lact.=lactate, TP=Total protein, Alb=albumin)

	Na+ (mEq/L)	Cl- (mEq/L)	K+ (mEq/L)	Ca+ (mEq/L)	BUN (mg/dL)	Creat. (mg/dl)	CK (μ/L)	Lact. (mg/dL)	TP (mg/dL)	Alb (mg/dL)
Pre-operative serum	114.7±13.7	71.5±14.5	3.15±0.42	8.62±0.97	25.75±14.75	1.52±0.67	319.5±73	6.62±3.02	6.2±0.7	2.52±0.48
Post-operative serum	124.75±4.25	87±2	3.45±0.32	8.85±0.85	24.25±11.3	1.13±0.24	575.25±111.13	3.7±3.55	6.4±0.2	2.38±0.11
Peritoneal fluid	127.7±1.3	77.25±11.7	3.36±0.7	5.95±1.72	40.5±14.5	1.75±0.4	1043.3±503.6	4.52±1.42	3.4±1.25	1.52±0.23

DISCUSSION

Obstruction in any part the digestive tract leads to distension of the intestine proximal to it that varies according to the degree and chronicity of the block. The extent of proximal bowel dilatation might change with the site of obstruction (proximal vs. distal) [7]. Therefore, the colonic fecalith in the present study was considered as a primary etiology to cecal dilatation rather than the consequence. Besides, removal/kneading of the colonic fecalith led to uneventful recovery in all the cases of present study.

The dilated cecum is palpable per rectally [5-6], as compared to the colonic fecalith; thus, the clinical signs are similar irrespective of the aetiology[8]. Presence of diarrhoea before the cessation of defecation and reduced intake of water in winter season could be the probable cause of fecalith in colon [9].

Ultrasonography helps in assessing the status of other parts of the intestines and the status of peritoneal fluid/fibrin and also the cecal dilatation/impaction [5-6]; however, due to massive viscera, it is incapable of diagnosing colonic fecalith in bovines. Further accumulation of excessive gas or fluids in the cranial part of the obstructed bowel stretches the wall and leads to paralytic ileus evident on ultrasonography [7].

Primary caecal dilatation can be treated conservatively using para-sympathomimetic drugs such as neostigmine [10] or bethanechol [11] along with intravenous fluids, and calcium borogluconate [2, 6] for 24-48 hrs [2, 5] but, if not rewarding, surgical exploration is recommended. Use of lignocaine Hcl 2% @ 1.3mg/Kg body weight diluted in intravenous fluid has also been reported as a post-operative prokinetic in bovines, camelids [2, 12] and horses [13]. In the present study the bovines did not respond to the conservative treatment and hence were subjected to the right flank exploratory surgery that diagnosed colonic fecalith as the primary cause of obstruction.

The surgical intervention for the treatment of cecal dilatation has been reported with better prognosis [6, 14]. Left flank rumenotomy followed by kneading of the colonic fecalith from the same side has also been reported to be rewarding [6].

In buffaloes, caecal dilatation has not been reported with volvulus, may be due to species-specific differences in the gross and histomorphology of the caecum of domestic buffalo and cattle [15]. Due to difficult mobility of the colon, it is not possible to exteriorize various parts of the colon in bovines [8]. However, movement of fecalith to the dilated healthy segment of colon is a better alternate [5]. Right flank cecotomy is recommended in standing bovines under local anesthesia [5-6] as it is easy to explore the intestines without taking them out but in the present study 2 bovines showed signs of pain with frequent sitting, so the surgery was done in recumbent position through right flank. In recumbent position, the exploration of intestines is difficult and if once taken out, it is difficult to place them back, but in the present study, the exploration was done within the abdominal cavity and the fecalith found was kneaded there only.

CONCLUSION

The report recommends the exploration of intestines/colon for fecalith in cases of caecal dilatation. Moving the obstructed colonic fecalith towards cranial dilated part and breaking / kneading without enterotomy may be rewarding compared to enterotomy if otherwise the intestines are healthy.

The certificate of ethical approval

It is a clinical study for the treatment of bovines presented to the hospital by the owners of the bovines. Ethical approval is not applicable in this case.

Conflicts of Interest

The authors have no conflicts of interest with anyone.

Authors Contribution

Author 1 is the MVSc scholar and is the part of his research; Author 2 is the primary surgeon, Author 3 is the assistant surgeon, Author 4 is the pathologist.

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