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Evaluation of Efficacy of Neostigmine and Azithromycin as Motility Modifiers in the Medical Management of Functional Ileus in Twenty Cows - A Pilot Study*

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Abstract

Cows with the history of achezia were subjected to detailed anamnesis, as clinical, rectal and rumen fluid, haematobiochemical and ultrasonographic examination. Cows with functional ileus were administered with neostigmine or azithromycin along with intravenous fluids, streptopenicillin and flunixin meglumine, for 3 days. It was found that cows administered with azithromycin could pass dung earlier when compared to the cow administered with neostigmine although both drugs did not produce any deleterious effects during the therapy.

Key words: Ileus, neostigmine, azithromycin, cows

Ileus represents one of the potentially life-threatening abdominal emergencies in cattle. Various motility modifiers are used clinically for treatment of gastrointestinal dysfunction in animals. However, very few literature is available on the use of prokinetic drugs in the management of bovine intestinal motility disorders. The present study was undertaken to assess the efficacy of neostigmine and azithromycin in the management of functional ileus in cows.

Materials and Methods

Cows brought to Veterinary College and Research Institute, Namakkal with the history of achezia were screened. Detailed anamnesis, as clinical, rectal and rumen fluid examinations were carried out in these animals (Cockcroft, 2015). Packed cell volume (PCV), haemoglobin (Hb), total leucocyte count (TLC) and total erythrocyte count (TEC) were estimated. Serum was collected and used for estimation of protein, albumin, sodium, potassium, chloride, gamma glutamyl transferase (GGT), calcium, inorganic phosphorus and creatinine kinase (CK) as per the standard procedures. Rectal and trans abdominal ultrasonography were carried out using 2 - 3.5 MHz transducer of MyLab Vet 40 ultrasound scanner (Braun, 2009). Exclusion criteria for the study were raspberry jam appearance of dung during rectal examination (Fig 1A), anechoic sacculations and echogenic contents within sacculations on ultrasonography examination (Fig 2) (both suggestive of mechanical ileus) and cattle with peritonitis, pericarditis or with infectious diseases. Out of forty cows presented to Veterinary College and Research Institute, Namakkal with ileus, twenty cows with functional ileus were selected for the study. These cows were divided into two groups (group -I and II) with ten animals in each. Animals of group I were administered with neostigmine (0.02 mg / kg body weight IV) while group II cows were administered with azithromycin (1.0 mg @ kg body weight IV). All the cows were also administered with 5 % dextrose normal saline (@ 10 ml / kg body weight, IV), Ringers lactate (@10 ml/kg body weight, IV), procaine penicillin (20,000 IU/ kg body weight IM) and flunixin meglumine (2.2 mg/kg body weight IM) were given for three days. Therapeutic efficacy of these 2 drugs was evaluated on the basis of clinical improvement in terms of voiding of dung, resumption of rumination, feed and water intake (Steiner, 2003; Constable *et al.,* 2012).

Results and Discussion

The salient clinical signs observed included anorexia (100%, 24/24), cessation of rumination (100%, 24/24), achezia (100%, 24/24), dehydra-

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Table I : Haemato biochemical values of cows with functional ileus before and after therapy (Mean ± S.E.)

Sl.No	Parameters	Group I (Cows treated with Neostigmine)		Group II (Cows treated with Azithromycin)		F
		Before therapy	After therapy	Before therapy	After therapy	
1	Haemoglobin (g/dl)	12.32 ± 0.32	11.63 ± 0.22	12.39 ± 0.41	11.13 ± 0.15	1.44 ^{NS}
2	PCV (%)	38.11 ± 1.98	35.00 ± 0.81	38.91 ± 1.18	34.65 ± 0.78	2.55 ^{NS}
3	TEC x10^6/cumm	5.82 ± 0.21	5.78 ± 0.20	6.01 ± 0.26	5.82 ± 0.16	1.62 ^{NS}
4	TLC /cumm	11022.5 ± 311.5	10068.5 ± 226.5	11121.5 ± 300.8	10072.5 ± 233.7	2.52 ^{NS}
5	Total protein (g/dl)	6.62 ± 0.32	6.77 ± 0.20	6.82 ± 0.24	6.87 ± 0.18	3.56 ^{NS}
6	Albumin (g/dl)	2.82 ± 0.16	2.95 ± 0.12	2.78 ± 0.14	2.84 ± 0.15	2.86 ^{NS}
7	Calcium (mg/dL)	9.50 ± 0.52	9.79 ± 0.23	9.40 ± 0.50	9.91 ± 0.68	1.45 ^{NS}
8	Phosphorus (mg/dL)	4.82 ± 0.21	4.99 ± 0.15	4.61 ± 0.23	4.81 ± 0.18	1.42 ^{NS}
9	Sodium (mEq/L)	115.6 ± 6.11	128.9 ± 3.17	113.5 ± 5.66	125.7 ± 4.10	1.26 ^{NS}
10	Potassium (mEq/L)	3.86 ± 0.21	3.98 ± 0.08	3.89 ± 0.18	4.02 ± 0.10	1.41 ^{NS}
11	Chloride (mEq/L)	61.22 ± 4.01	101.15 ± 3.3	63.10 ± 4.51	100.98 ± 2.8	1.33 ^{NS}
12	CK (units/L)	511.6 ± 59.5	313.40 ± 34.5	588.6 ± 67.7	332.35 ± 29.5	2.10 ^{NS}
13	GGT (units/L)	58.10 ± 4.50	42.75 ± 3.01	66.10 ± 6.50	43.11 ± 3.11	2.41 ^{NS}

NS: Not Significant (P > 0.05)

Table II : Showing the clinical assessment of therapeutic efficacy of the drugs

Sl. No	Time taken for first	Group I (Time in minutes)	Group II (Time in minutes)	t
1	Passage of dung	750.0 ± 117.36	380.0 ± 64.52	2.22 *
2	Water intake	1180.0 ± 143.10	1150.2 ± 131.67	0.15 ^{NS}
3	Feed intake	1920.0 ± 204.67	1680.0 ± 60.0	1.70 ^{NS}
4	Rumination	3000.0 ± 263.40	2553.6 ± 188.0	1.48 ^{NS}

NS: Not Significant (P > 0.05); * Significant (P<0.05)

tion (100 %, 24/24), tachycardia (62.5 %, 15/24), ruminal atony (50 %, 12/24) and bruxism (8.3 %, 2/24). Rectal examination revealed empty rectum (75 %, 18/24) and distended loops of intestines (8.3 %, 2/24) in some cases. Similar clinical signs were reported by Constable *et al.* (2017) in cows with functional ileus. Ultrasonography revealed dilated intestinal segments in cattle with functional ileus (Fig 3) which is in accordance with the findings of Khalphallah *et al.,* (2016). Haematobiochemical values in these animals are given in Table I. Elevated packed cell volume but reduced serum albumin, sodium, potassium, chloride, calcium, phosphorous, elevated gamma glutamyl transferase and creatinine kinase level was recorded. These could be due to ileus as reported earlier (Constable *et al. loc. cit*) in cattle with functional ileus. However, there is no significant difference in haematobiochemical values between the two groups following the recovery. There was significant difference in the mean time taken for the first defecation by group I cows when compared to group II cows, while there was no significant

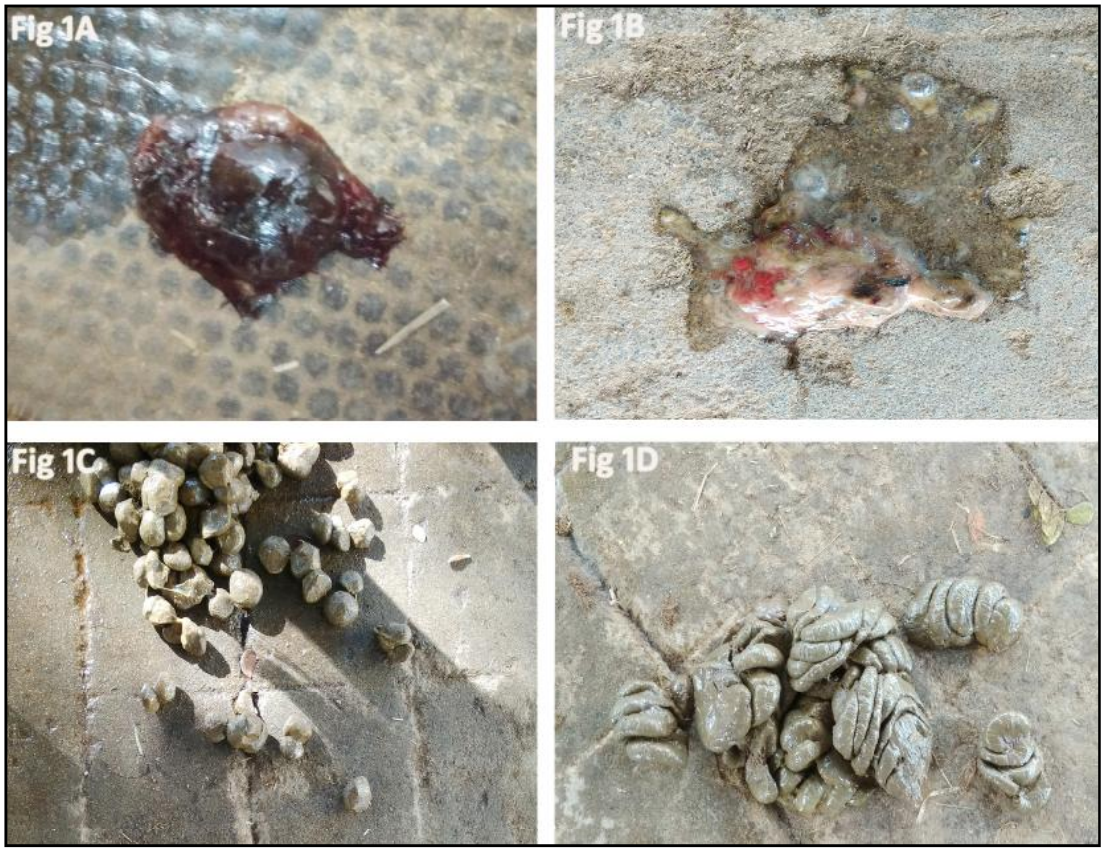

Fig 1A. Raspberry jam appearance; **Fig 1B.** Presence of mucus coated dung; **Fig 1C.** Pellety dung; **Fig 1D.** Disk of dung

difference between the two groups in time taken for resumption to water intake, rumination and rumen motility (Table II). During the therapy, clinical improvement in the consistency of dung was recorded which is presented in Fig 1B, 1C and 1D.

The prokinetic effect of erythromycin is marked and consequently has been extensively investigated in humans and animals (Wittek *et al.,* 2008; Emirleroglu *et al.,* 2011). Erythromycin induced phase III of the interdigestive migrating motor complex, increases the amplitude of antral contractions and improves antroduodenal coordination in a number of species (Sanger *et al.,* 2013). Erythromycin excerts its prokinetic effect by bonding to motilin receptors in the pyloric antrum and proximal portion of the small intestine (Wittek and Constable, 2005). Neostigmine can also be used to increase the motility in cows (Constable *et al., loc. cit*). Findings of the present study, support the beneficial effects of the neostigmine / azithromycin in the management of ileus in cows. The time taken for normalization of motility as assessed by the early passage of dung by the group II animals was lesser than group I animals. Hence, it can be concluded that azithromycin is more effective than neostigmine for the management of motility disorders in functional ileus in cows.

Summary

Twenty cases with functional ileus were administered with either neostigmine or azithromycin along with intravenous fluids, streptopenicillin and flunixin. It was found that cows administered with azithromycin passed dung earlier when compared to those administered with neostigmine.

Fig 2: Transabdominal ultrasonography: Ultrasonogram of cross-sections and longitudinal views of dilated loops of intestine in a cow with a mechanical ileus. The contents of the loops proximal to obstruction are echogenic while distal to it are anechoic.

Fig 3: Transabdominal ultrasonography: Ultrasonogram of cross-sections through loops of the intestine. Several loops of jejunum, seen in cross-section, are situated immediately adjacent to one another with echogenic contents.

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