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ULTRASONOGRAPHIC ASSESSMENT OF EFFECT OF NEOSTIGMINE ON ABOMASAL ATONY IN YOUNG CALVES

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ABSTRACT

Present communication was focused on the ultrasonographic evaluation of the prokinetic effect of neostigmine in buffalo calves with abomasal atony. Six buffalo calves were selected for the study with absence of rumination, loss of feed intake, mild distended abdomen, achezia and frequent history of laying down and getting up with reduced rumen motility. Abomasal atony was confirmed by the ultrasonographic assessment of the abomasum motility. Calves were administered with injection neostigmine 0.02 mg/kg body weight slow intravenously along with 500 ml of 0.9% normal saline under the ultrasonographic monitoring. Abomasal motility was initiated by 18 to 42 minutes and complete abomasal motility was noticed by 150 to 180 minutes after administration of medications. Clinical improvement was noticed on the third day of therapy and efficacy of the neostigmine was noticed by ultrasonography. Present study concludes that neostigmine has prokinetic effect in buffalo calves with abomasal functional motility disorders. Ultrasonography is the best tool for assessment of abomasal motility without any adverse reactions and complications.

Keywords: *Bubalus bubalis*, buffaloes, neostigmine, abomasum, atony, ultrasonography

INTRODUCTION

In buffalo calves, abomasal hypo motility or atony is considered as one of the causing factors for development of displacement of abomasum (Oman *et al*., 2016). Functional abomasal motility disorders caused by drying of the abomasal contents followed by abnormal distension of the organ because of solid matter, abnormal accumulation of gas which results in distention of the abomasum, alteration in digestive process and causing electrolytes imbalance (Erickson and Hendrick, 2011). In young calves, presence of excessive amount of fermentable carbohydrates in the abomasum can cause abomasal bloat which leads to abomasal atony. The primary causative factor in abomasal displacement in bovines was abomasal atony and/ or hypo motility. Abomasal motility and emptying rate assessed by electromyography, sequential radiography, ultrasonography, nuclear scintigraphy, D-xylose test and acetaminophen absorption test in bovines (Constable *et al*., 2017). Further, abomasal atony can cause mild to severe

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dehydration, changes in the electrolytes levels, development of alkalosis and loss of weight. Ultrasonography is useful in determination of the location, size, volume, type of contents, emptying rate of abomasum. Identification of the abomasum can be done by its thin echogenic line with heterogeneous contents with echogenic stippling of abomasal folds (Braun, 2009). Documentation on the prokinetic effect of neostigmine was limited to abomasal atony. Hence, the present study was carried out to document the ultrasonographic evaluation of prokinetic effect of neostigmine on abomasal atony in buffalo calves.

MATERIALS AND METHODS

The present study was conducted at the Department of Veterinary Medicine on the clinical cases referred to the large animal medicine unit. Six buffalo calves were selected for the study with absence of rumination, loss of feed intake, mild distended abdomen, achezia and frequent history of laying down and getting up with recued rumen motility. Confirmation of the abomasal atony was carried out by the ultrasonographic examination of the abdomen. Abdominal ultrasonography was carried out on the calves keeping in the standing position and using the Esoate My Lab Gold 40 Vet ultrasound system with help of 3.0 to 5.0 MHz multi frequency curvilinear transducer (Braun, 2009; Reddy and Sivajothi, 2020). Calves were administered with injection neostigmine 0.02 mg/kg body weight slow intravenously along with 500 ml of 0.9% normal saline (Reddy *et al*., 2018). Ultrasonographic assessment of the abomasum was carried out during the administration of injection neostigmine along with the 0.9% normal saline and motility was assessed. Followed by administration of calcium borogluconate 50 ml/day slow intravenous route, ringers lactate 10 ml/kg body weight intravenously along with injections injection B complex, each ml contains methyl cobalamin 500 mcg, pyridoxine 50 mg and nicotinamide 50 mg were given intramuscularly and it was continued for three days.

RESULTS AND DISCUSSIONS

Ultrasonography of the abdomen was carried out at the ventral abdominal region caudal to the xiphoid process. The abomasum was visualized from both sides to the ventral midline of calves. Abomasum was clearly visualized and differentiated from other adjacent structures by its heterogeneous contents with presence of echogenic striplings, narrow echogenic outline (Figure 1). Initially, abomasum was noticed without any motility and presence of echogenic contents. After administration of medications, abomasal motility was noticed by visualizing the movement of ingesta which was initiated by the 18 to 42 minutes and complete abomasal motility was noticed by the 150 to 180 minutes after administration of injection neostigmine along with the 0.9% normal saline. Ultrasonographic assessment of motility of abomasum was carried out at regular intervals and documented in the Figure 2. It was noticed that variations in the size and shape of abomasum and movements of the ingesta was consider as improvement in the atony. Complete clinical recovery by improving the feed intake, rumination and passing of dung with normal consistency and frequency was noticed by the third day. Ultrasonography was carried out on the three days to visualize the abomasal tonicity and contents and presented in the Figure 3.

Figure 1. Abomasal atony distension of the abomasum with mixed echogenic contents.

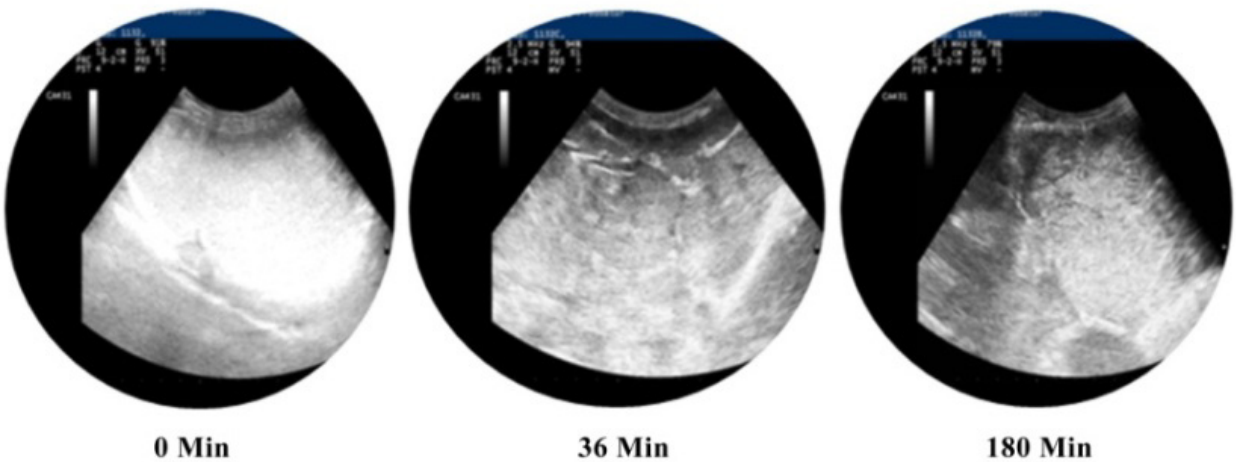

Figure 2. Ultrasonographic assessment of abomasal motility (Minute wise improvement).

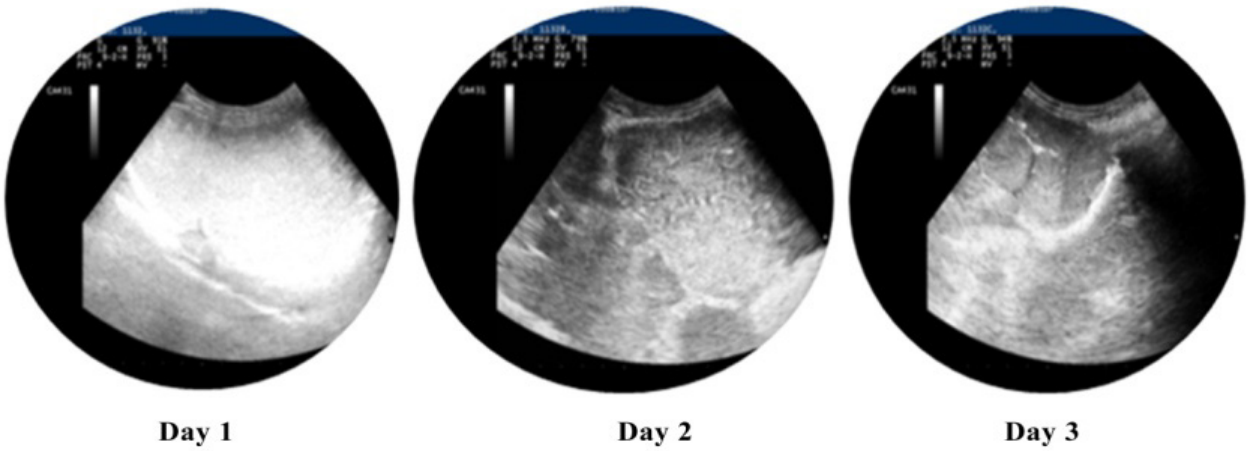

Figure 3. Ultrasonographic assessment of abomasal motility (Day wise improvement).

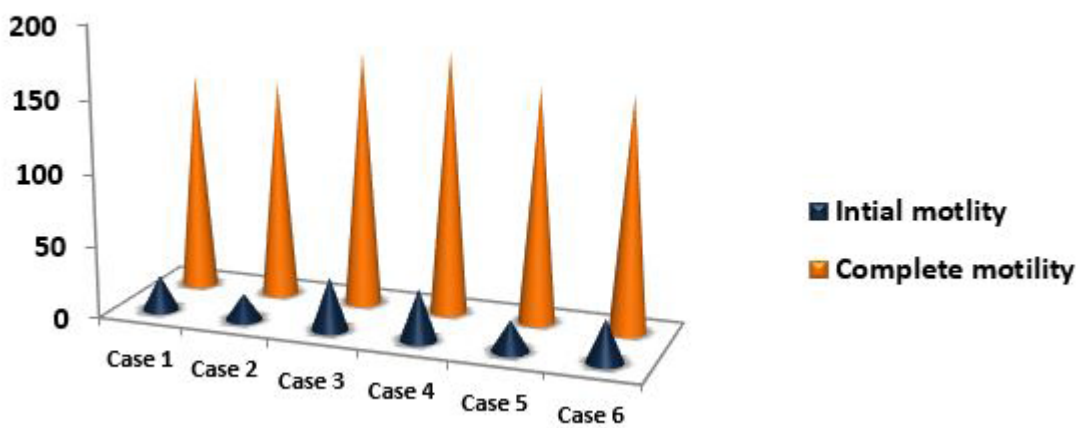

Figure 4. Graphical representation of time taken (minutes) for abomasal motility.

The abomasum was imaged along the ventral abdominal wall, beginning immediately behind the xiphoid cartilage (Constable *et al*., 2017). Assessment of the abomasal functional activity done by size of the abomasum and the abomasal dimensions. Neostigmine is a cholinesterase inhibitor drug which prolongs the activity of acetylcholine by retarding its breakdown at the synaptic junction. The effect of neostigmine (0.02 mg/kg) on myoelectric activity of the ileocecocolic area in normal cows was mainly to increase the number of cecocolic spikes (Steiner, 2003). Wittek and Constable (2005) stated that neostigmine didn't alter the abomasal emptying rate in newborn calves. Reddy *et al.* (2020) reported the prokinetic effect of neostigmine in adult buffaloes with functional intestinal ileus in their study. In the present study developed abomasal atony might be due to abomasal bloat or abomasal impaction due to feeding with only roughage. Further studies are recommended to identify the etiology for development of abomasal atony. In conclusion of the present study reports the neostigmine can be utilized for treatment of abomasal atony in calves and ultrasonography can be utilized for evaluation of effect of prokinetics in treatment of abomasal motility disorders in buffalo calves.

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