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Research Article

CLINICO-HAEMATOBIOCHEMICAL AND THERAPEUTIC STUDIES ON ASPIRATION PNEUMONIA IN BUFFALOES

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ABSTRACT

A study was conducted on 12 clinical cases of buffaloes which were presented to Veterinary Clinical Complex, NTR CVSc, Gannavaram with signs of aspiration pneumonia. The chief complaints from the owner were severe cough and mucopurulent discharge from nostrils and reluctant to lie down after faulty drenching of medications. Detailed clinical examination revealed open mouth breathing with nasal discharge, arched back, pyrexia and wheezes and crackles on lung auscultation. Thoracic radiography was performed for confirmatory diagnosis of aspiration pneumonia in buffaloes. The affected animals were randomly divided into two groups**,** first group was treated with Inj. ceftiofur-tazobactum@2.2 mg/kg bwt. and second group was treated with Inj. Moxifloxacin @ 5mg/kg b.wt. Inj. Flunixin meglumine @ 1.1 mg/kg bwt. and Inj. Chlorpheneramine maleate @ 0.5mg/kg b.wt were administered as supportive therapy in both groups for 7 days. Group I animals showed marked clinical improvement when compared to Group II animals after one week of therapy.

Keywords: Aspiration pneumonia, Buffaloes, Crackles, Haematology, Thoracic radiography

Aspiration pneumonia is a pulmonary infection characterized by inflammation, followed by necrosis due to inhalation of foreign material. The foreign material aspirated to the lungs causes mucosal desquamation, damage to alveolar lining cell and capillaries, and acute neutrophil infiltration. The damage produced in the respiratory tract highly depends on the amount and nature of aspirated material (Marik, 2001). Impaired respiratory tract defences predispose to secondary pulmonary infection. Inappropriate administration of therapeutic agents is a common cause of aspiration pneumonia in buffaloes. In this present study, faulty drenching of feed supplements and deworming solution was found to be the root cause for aspiration pneumonia. Buffaloes naturally struggle more when being drenched or dosed orally. This may cause the operator to hurry the procedure, resulting in choking of the animal. The present study was aimed to study the incidence of aspiration pneumonia in buffaloes, to record the clinical and haemato-biochemical findings and to evaluate two therapeutic regimens for its management.

MATERIALS AND METHODS

The study was conducted in 152 buffaloes brought to the large animal outpatient Medicine ward of Veterinary Clinical Complex (VCC), College of Veterinary Science, Gannavaram with clinical signs suggestive of respiratory system involvement and were subjected to detailed clinical examination. Approximately 5 ml of blood was collected from the jugular vein for routine haematology and serum biochemistry. Haematological parameters *viz.* Total leukocyte count (TLC), Hemoglobin (Hb), Packed cell volume (PCV) and Differential leukocyte count (DLC) were determined as per the standard methods. Serum samples subjected to biochemical analysis of total serum protein and albumin by Biuret end point assay method and Bromo cresol green, end point assay method, respectively. Serum Aspartate amino transferase (AST) was estimated by kinetic method by using by semiautomatic serum analyzer (ERBA Mannheim, CHEM-5 PLUS V2, Germany). Lung changes were studied by using lateral thoracic radiograph (Care stream, direct view classic CR radiographic Machine, U.S.A). The animals were further divided into two treatment groups, group I and group II, consisting of 6 buffaloes each. The treatment protocol adopted as follows:

The results were analyzed using one-way ANOVA for comparing healthy and treatment groups (Snedecor and Cochran, 1989).

RESULTS AND DISCUSSION

Out of 152 animals screened, 12 (7.89%) animals were diagnosed with aspiration pneumonia by correlating the history and clinical signs with thoracic radiographic

Category	Treatment Protocol
Group-I (negative control) (n=6)	Healthy buffaloes/ No treatment
Group-II (n=6)	Inj. Ceftiofur-tazo @ 2.2mg/kg b.wt. I/M along with Inj. Flunixin-meglumine @1.1mg/kg b.wt. I/M and Inj. Chlorphener-aminemaleate @ 0.5mg/kg b.wt. by I/M
Group-II (n=6)	Inj. Moxifloxacin @ 5 mg/kg b.wt. I/M Inj. Flunixin-meglumine @ 1.1 mg/kg b.wt. I/M and Inj. Chlorpheneramine maleate @.0.5 mg/kg b.wt. I/M.

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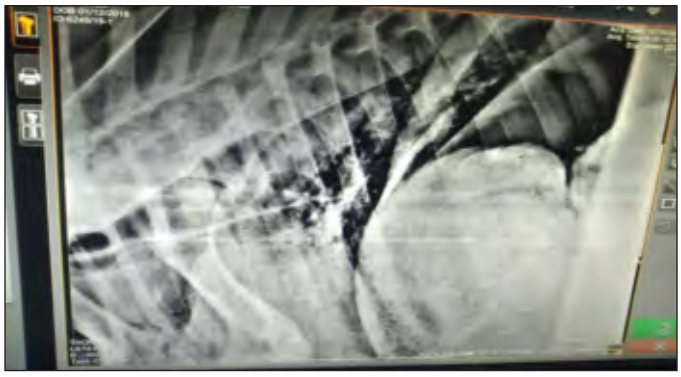
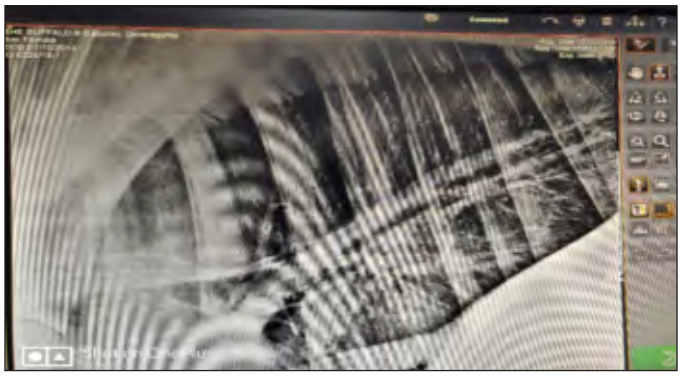
findings (Fig. 1-4). Out of 12 animals diagnosed with aspiration pneumonia, 4 (33.33%) animals were in advanced stage of gestation, 7 (58.33%) animals were in early lactation stage and 1 (8.33%) animal was in mid lactation. High occurrence in advanced stage of gestation and early lactation period could be due to improper and unscientific drenching of feed supplements with a misconception of more milk yield with these practices and the detailed history collection from the affected cases proved the same. The major clinical signs observed in aspiration pneumonia were respiratory distress with a distinct abdominal contour, cough, anorexia, purulent nasal discharge (Fig. 2), open mouth breathing (Fig. 1) and arched back posture. The present findings concur with earlier studies (Shakespeare, 2012; Scott, 2013; Reddy *et al.*, 2018). Open mouth breathing (Fig. 1) was observed in some animals along with other clinical signs in severe form, which might be due to advanced pathological changes in lung tissue. The physical examination of the affected buffaloes showed pyrexia (91.66%), dyspnea

Fig. 1. Open mouth breathing

Fig. 2. Mucopurulent nasal discharge



(i) Before Treatment : Fuid splash with diffuse mottling pattern of lung parenchyma.



(ii) After Treatment : Normal air density and complete recover from fluid opacity.

Fig. 3. Effect of Ceftiofur-tazobactam treatment in a buffalo with aspiration pneumonia

(i) Before Treatment : Fluid filled bronchi and increased fluid opacity in lung parenchyma with minimal air density

(ii) After Treatment : Mild increase in aeration in lung parenchyma but persistence of fluid density and interstitial pattern

Fig. 4. Effect of Moxifloxacin treatment in a buffalo with aspiration pneumonia

Table 1

Hemato-Biochemical Alterations (Mean ± S.E) in group I

S.No.	Parameter	Control group	Affected group	
			Before treatment	After treatment
1.	Hb (g/dl)	10.60±0.16	9.1±0.04*	11.43±0.18**
2.	PCV (per cent)	31.8 ±0.57	24.7±0.42*	30.31±0.13*
3.	TEC (106 /cmm)	5.35±0.66	5.2±0.13*	6.12±0.42**
4.	TLC (103/cmm)	5.6±0.26	13.85±0.27**	6.14±0.08**
5.	DLC (103/cmm)			
	N	1.82±0.13	5.3±0.05**	2.6±0.09**
	L	3.4±0.20	4.8±0.15*	3.3±0.13**
	M	0.06±0.01	0.12±0.03*	0.13±0.03*
	E	0.02±0.01	0.04±0.02*	0.02±0.02
6.	Total protein (g/dl)	7.19±0.13	7.23±0.03*	6.9±0.05**
7.	Albumin (g/dl)	4.36±0.91	3.3±0.40	3.4±0.12
8.	AST (IU/L)	67.23±0.75	87±1.44*	70.39±1.43**

**- Statistically highly significant (P≤ 0.01); *- Statistically significant (P≤ 0.05)

Table 2

Hemato-Biochemical Alterations (Mean ± S.E) in group II

S.No.	Parameter	Control group	Effected group	
			Before treatment	After treatment
1.	Hb (g/dl)	10.60 ± 0.16	9.25±0.18*	10.05±0.18*
2.	PCV (per cent)	31.8 ±0.57	30.5±0.42*	30.9±0.42*
3.	TEC (10^6 /cmm)	5.35±0.66	5.17±0.42*	5.27±0.42*
4.	TLC (10^3/cmm)	5.6±0.26	11.87±0.27**	8.17±0.27*
5.	DLC			
	N	1.82±0.13	4.85±0.16**	2.85±0.16*
	L	3.4±0.20	4.7±0.18*	2.8±0.18*
	M	0.06±0.01	0.12±0.03*	0.12±0.03*
	E	0.02±0.01	0.05±0.02*	0.05±0.02*
6.	Total protein (g/dl)	7.19±0.13	7.67±0.15*	7.07±0.15
7.	Albumin (g/dl)	4.36±0.91	3.38±0.71	3.39±0.71
8.	AST (IU/L)	67.23±0.75	71.16±0.69*	70.15±0.69*

**- Statistically highly significant (P≤ 0.01); *- Statistically significant (P≤ 0.05)

(75%), auscultation of thorax revealed low pitched whistling expiratory wheezes (67%) and crackles (57%) widespread and more concentrated in cranio-ventral lung lobe, tachypnea (33.33%) and tachycardia (25%). Similar findings in buffaloes were also reported by Reddy *et al.* (2018) and Shakespeare (2012). The predominant abnormalities found in haemogram were neutrophilic leuckocytosis, reduction in haemoglobin, PCV and total erythrocyte count (Table 1). The increase in neutrophils and leuckocyte counts were probably due to stimulation of immune system of animal (Weiss *et al.*, 2006; Thirunavukkarasu *et al.*, 2006). The estimated serum biochemical values of total protein, albumin and AST were within the normal range (Table 1 and 2). The thoracic radiographic findings were fluid filled bronchi, consolidation of lungs with alveolar interstitial pattern in the lung parenchyma, fluid splash changes below the level of aorta and fibrous pleurisy. Similar findings were reported by Shakespeare (2012) during his study. The clinical recovery was found to be much faster in Ceftiofur

tazobactum treated group when compared to Moxifloxacin treated group (Fig. 3 & 4). After initiation of therapy at each stage of observation, the magnitude of improvement in clinical parameters were within the period of 3-7 days as compared to 4-10 days in Moxifloxacin group. Moreover, hematology revealed significantly ($P \leq 0.01$) improved Hb, TEC, TLC, neutrophils, lymphocytes, total protein and AST whereas PCV monocytes significantly ($P \leq 0.05$) reached towards normalcy in ceftiofur tazobactam treated group (Table 1). While in Moxifloxacin treated Group, Hb, PCV, TEC, TLC neutrophils, lymphocytes, monocytes reached significantly ($P \leq 0.05$) towards normalcy and no statistical improvement in total protein and albumin was observed. These findings were in agreement with Singh *et al*. (2015) who reported superior therapeutic results of Ceftiofur tazobactum in pneumonic calves. This might be due to extended spectrum activity of Ceftiofur with tazobactum which has excellent efficacy against respiratory pathogens resulted in most effective control of secondary bacterial infections in lungs.

CONCLUSION

Inappropriate administration of oral medications is the major cause of aspiration pneumonia in lactating buffaloes and it is most common in early stage of lactation and advanced stage of pregnancy. Typical radiographic findings are reliable for confirmatory diagnosis. Proper awareness and education to the owners about the consequences and right procedure of oral drenching is mandatory to prevent aspiration pneumonia as the prognosis is grave.

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