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# Post-partum indigestion with reference to hepatic insufficiency and its therapeutic management in buffaloes

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**Abstract**
A study was undertaken to know the hepatic insufficiency in buffaloes suffering with post partum indigestion (PPI). Urinalysis and serum biochemistry were carried out in target population on 0 and 7 days postpartum. Out of 181 recently calved buffaloes (zero to two months post calving) with the history of reduced feed intake and decreased milk yield, 64 (35.36%) buffaloes revealed PPI. On detailed clinical examination and urinalysis of suspected PPI cases, revealed 30 (46.87%) buffaloes had hepatic insufficiency. Therapeutic regimen was planned with control group (I) comprising ten apparently healthy post partum buffaloes, besides 30 PPI buffaloes divided into3 groups of 10 each (G- II, G- III and G-IV). Group II animals were treated with Intalyte 0.5 g/kg b.wt I/V for one day and inj. Tribivet 10 ml I/M for 5 days. Group III animals were given Intalyte 0.5 g/kg b.wt I/V for one day and inj Catosol 5 ml/100kg b.wt I/M for 5 days. Group IV animals were administered with Intalyte 0.5 g/kg b.wt I/V for one day inj Toxol 10 ml I/M for 5 days respectively. In group III there was significant improvement in serum glucose, AST, GGT, total protein and albumin levels and hence the regimen followed in group III is recommended.

**Keywords:** Postparturient indigestion, buffaloes, biochemical changes, hepatic insufficency, therapy

## Introduction
Post partum period is the time interval from parturition to first heat (Dhami and Kodagali, 1988) [1]. Ruminant indigestion is invariably associated with functional disturbance of hepatic cells (Pienkowski, 1970) [2]. Post partum indigestion animals exhibit partial to complete loss of appetite, reduced milk yield with normal temperature and reduced rumen motility (Padmaja, 2009) [3]. Once the appetite is reduced, the animal enters a vicious circle of metabolic crisis and there is decrease in milk yield. The ruminal dysfunctions including post-parturient indigestion have also been emerging as an important group of diseases of high yielding animals. To attain maximum production, postpartum indigestion needs to be corrected at an early time (Padmaja and Rao, 2012) [4]. The present paper reports the biochemical and therapeutic studies on post parturient indigestion in buffalos associated with hepatic insufficiency.

## Materials and Methods
The present study, which lasted for 8 months, *i.e* is from December 2010 to July 2011. A total of 181 buffaloes within two months of calving, without any systemic involvement and with the history of reduced feed intake and decreased milk yield, presented at Ambulatory Clinic, Mylardevpally; Campus Veterinary Hospital, College of Veterinary Science, Rajendranagar and a few periurban dairy farms located in and around Rajendranagar, Hyderabad, 64 buffaloes were found suffering with PPI. On detailed clinical examination and urinalysis of cases of PPI, it was observed that 30 buffaloes had hepatic insufficiency.
PPI with hepatic insufficiency of 30 buffaloes were divided in to three groups II, III, IV for conducting therapeutic trials. Ten apparently healthy post-parturient buffaloes (group I) were subjected to clinical observations and biochemical investigations, and they served as healthy control group.

Urine was collected on day 0 and 7 in all buffaloes, while they were voiding it naturally in clean, sterile glass beakers for urinalysis in respect of bile pigments, ketone bodies and calcium by conducting Wallace Diamond test, Ross modified Rothera's test and Sulkowitch test respectively (Benjamin, 2001) [5]. The animals that were positive for bile pigments were selected for post parturient indigestion due to hepatic insufficiency and samples positive for ketone bodies and calcium along with bile pigments were also considered for the present study. In II group (n=10) animals were given. Intalyte 0.5 g/kg b.wt i/v for one day and inj. Tribivet 10 ml i/m for 5 days. Group III (n=10) animals were given Intalyte 0.5 g/kg b.wt i/v for one day and inj. Catosol 5 ml/100kg b.wt i/m for 5 days. Group IV (n=10) animals were administred Intalyte 0.5 g/kg b.wt i/v for one day inj. Toxol 10 ml i/m for 5 days.

Blood was collected on day 0 and 7 from external jugular vein using 7 ml serum vacutainers under aseptic conditions. After collection, blood was allowed to clot at room temperature and centrifuged for serum separation. Sera samples were transferred into eppendorf tubes and were maintained at 4 ºC till they reached the laboratory for estimation of biochemical parameters like serum glucose, calcium, total protein and albumin was carried out by using Digital Photo Colorimeter Model 312&313 while AST and GGT were estimated by using Star 21 plus Biochemistry Semi Auto Analyser and diagonistic kits promoted by Crest Biosystem, a division of Coral Clinical System, Goa. Statistical analysis of the data was carried out by employing paired "t" test and ANOVA (Snedecor and Cochran, 1994) [6].

## Results and Discussion

Of 181 buffaloes within two months after calving with the history of reduced feed intake and decreased milk yield presented, 64 (35.36 per %) were suffering from PPI. Based on urinalysis, it was observed that 30 animals were positive for PPI with hepatic insufficiency (46.88%).

The urine samples of groups II, III and IV animals before therapy had cherry red colour and after treatment had light red for bile pigments by subjecting Wallace-Diamond test (Fig.1). Detection of urobilnogenuria was a sensitive index of impaired hepatocellular function (Rosenberger, 1979) [7]. Group III animals were also positive for Rothera's test before treatment and negative after therapy (Fig. 2). Rothera's test is ideal for diagnosing the PPI associated with hepatic disorders and production diseases in buffaloes (Padmaja, 2009) [3]. All the groups of animals had low calcium level before therapy and attained normal after treatment (Fig.3). Low urinary calcium levels in PPI animals indicate a breakdown of compensation capability of animals (Gelfert *et al.*, 2006) [8].

The mean serum glucose levels in healthy control (Group I) buffaloes were 54.83 ± 0.96 mg/dL where as in groups II, III and IV buffaloes they were 42.65 ± 1.07, 43.14 ± 1.21, and 42.43 ± 0.99 mg/dL respectively before therapy. Decreased glucose concentrations could be attributed to negative energy balance possibly due to decreased propionate production in rumen, decreased hepatic output and decreased hepatic gluconeogenesis (Haloi *et al.*, 1997) [9]. After therapy serum glucose levels in group II, III and IV were 54.20 ± 0.81 mg/dL, 72.23 ± 2.98 mg/dL and 53.40 ± 0.67 mg/dL. Serum glucose levels increased significantly ($p$<0.01) in all the three groups (Table 1 and 2). The elevation of glucose level indicates improved functional state of liver, there by correcting the appetite and feed intake, and storage and release of liver glycogen. After therapy, there was a significant ($p$<0.01) improvement in serum glucose levels as reported by (Padmaja, 2009) [3].

The mean serum calcium level in the healthy control buffaloes was 8.80 ± 0.15 mg/dL where as the values in group II, III and IV buffaloes before therapy were 6.68 ± 0.17, 6.86 ± 0.18 mg/dL and 6.70 ± 0.13 mg/ dL, respectively and after therapy the values were 6.80±0.17, 7.26±0.17 and 6.83±0.14 mg/ dL. Increased serum levels were significant ($P$<0.05) in all the three groups (Table 1and 2). The decreased serum calcium levels in the present investigation before therapy could be attributed to the excess drainage of calcium through milk (Dahate *et al*. 2004) [14]. Decreased serum calcium, resulted in rumen dysfunction *i.e.*, manifested as reduced appetite (Padmaja 2009) [3].

**Table 1:** Mean serum parameters of control animals and the animals with Hepatic insufficiency

| Parameter | Group I | Group II | | Group III | | Group IV | |
|---|---|---|---|---|---|---|---|
| | Control | Before | After | Before | After | Before | After |
| Glucose (mg/dL) | 54.83±0.96 | 42.65±1.07 | 54.20±0.81** | 43.14±1.21 | 72.23±2.98** | 42.43±0.99 | 53.40±0.67** |
| Calcium (mg/dL) | 8.80±0.15 | 6.68±0.17 | 6.80±0.17* | 6.86±0.18 | 7.26±0.17* | 6.70±0.13 | 6.83±0.14* |
| AST(U/L) | 113.13±3.9 | 155.76±1.9 | 145.77±2.13** | 156.05±1.25 | 118.98±2.16** | 152.74±1.03 | 142.60±1.08** |
| GGT(U/L) | 34.84±1.65 | 53.45±0.97 | 43.40±0.99** | 53.72±1.05 | 26.90±0.90** | 53.15±0.92 | 43.10±0.90** |
| Total protein (g/dL) | 6.75±0.10 | 5.53±0.09 | 6.62±0.09** | 5.80±0.05 | 7.58±0.14** | 5.51±0.10 | 6.67±0.08** |
| Albumin (g/dL) | 2.34±0.12 | 1.21±0.11 | 2.15±0.08** | 1.59±0.14 | 3.76±0.09** | 1.40±0.13 | 2.09±0.06** |

* Significant at $p$<0.05 ** Significant at $p$<0.01

**Table 2:** Comparative means of parameters as per ANOVA results

| S. No. | Parameter | Group I (Healthy) | Group II | Group III | Group IV |
|---|---|---|---|---|---|
| 1. | Glucose(mg/dL) | 54.83 ± 0.96 a | 54.20 ± 0.81 a | 72.23 ± 2.98 b | 53.40 ± 0.67 a |
| 2. | Calcium(mg/dL) | 8.80 ± 0.15 | 6.80 ± 0.17 b | 7.26 ± 0.17 b | 6.83±0.14 b |
| 3. | AST (U/L) | 113.13 ± 3.90 | 145.77 ± 2.13 b | 118.98±2.16 a | 142.60±1.08 b |
| 4. | GGT (U/L) | 34.84 ± 1.65[b] | 43.40 ± 0.99 a | 26.90 ± 0.90 c | 43.10 ± 0.90 a |
| 5. | Total Protein (g/dL) | 6.75 ± 0.10 a | 6.62 ± 0.09 a | 7.58 ± 0.14 b | 6.67 ± 0.08 |
| | Albumin (g/dL) | 2.34 ± 0.12 a | 2.15 ± 0.08 a | 3.76 ± 0.09 b | 2.09 ± 0.06 a |

Means with different alphabets as superscripts differ significantly ($p$<0.01)

The mean serum AST activity in the healthy animals was 113.13 ± 3.90 U/L, where as in groups II, III and IV it was 155.76 ± 1.9, 156.05 ± 1.25 and 152.74 ± 1.03 U/L, respectively, before therapy and and followed by 145.77±2.13, 118.98±2.16 and 142.60±1.08U/L (Table 1 and 2) after therapy. The increased serum AST activity after parturition, which reflected liver damage or over loading as a result of metabolic changes during parturition and lactation

(Rao, 2008) [10] in buffaloes and (Diaz *et al*. 1999) [11] in cows suffering with PPI. Decreased serum AST levels were significant (P<0.01) in all the three groups, after treatment reflected the possible restoration of damaged hepatic cells (Padmaja, 2009) [3]. The mean serum GGT activity in the healthy control buffaloes was 34.84 ± 1.65 U/L, where as the mean GGT levels in buffaloes of groups II, III and IV were 53.45 ± 0.97, 53.72 ± 1.05 and 53.15 ± 0.92 U/L, respectively before therapy and after therapy 43.40±0.99, 26.90±0.90 and 43.10±0.90 U/L. Decreased serum levels of GGT were significant (P<0.01) in all the three groups after therapy (Table 1 and 2), indicating the repair of liver damage (Padmaja and Rao, 2012) [4]. The mean total protein concentration in the healthy control buffaloes was 6.75± 0.10 g/ dL, whereas in groups II, III and IV the values were 5.53 ± 0.09 g/ dL, 5.80 ± 0.05 g / dL and 5.51 ± 0.10 g/ dL, respectively before treatment and after treatment the values were 6.62±0.09 g/dL, 7.58±0.14 g/dL and 6.67±0.08 g/dL. Increased serum levels of total protein were significant (P<0.01) in all the three groups. Decrease of total protein (TP) and globulins on calving day, was ascribed to the post partum stress and to loss of proteins through colostrum (Diaz *et al*. 1999) [11]. The liver insuffiency results in low protein levels which leads to low calcium and resulted in rumen dysfunction (Padmaja and Rao 2012) [4]. The mean serum albumin concentration in the healthy control buffaloes was 2.34 ± 0.12 g/ dL, whereas in groups II, III and IV buffaloes they were 1.21 ± 0.12 g/ dL, 1.59 ± 0.14 g/d L and 1.40 ± 0.13 g/ dL, respectively before therapy and 2.15±0.08 g/dL, 3.76±0.09 g/dL and 2.09±0.06 g/dL after therapy. In treated animals, mean serum values were increased significantly (P<0.01) in all the three groups (Table 1 and 2). Hypoalbuminaemia was more frequent during early post partum periods as stated earlier by (Parker 1976) [12] and (Sutkevicius and Cernauskas, 2003) [13]. After therapy, the levels reached normal, which was an indication of liver repair (Padmaja and Rao, 2012) [4].


**Fig 1:** Wallace -Diamond test

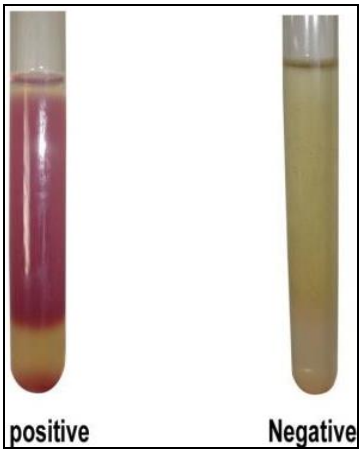


**Fig 2:** Ross modified Rothara's test


**Fig 3:** Sulkowitch test

## Conclusion

From the present investigation, it was established that high prevalence of PPI associated with hepatic insufficiency was clinically manifested as partial to complete loss of appetite with decreased ruminal motility and decreased milk yield, which was supported by the hepatic enzymes and urine analysis. The condition was treated with different parenteral drugs.

Based on ANOVA results and comparative means, it can be concluded from the present study that the combination of inj. Intalyte for one day and inj. Catosal given for 5 days found to be more effective in the treatment of PPI with hepatic insufficiency.

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