CLINICAL, HAEMATO - BIOCHEMICAL, RADIOLOGICAL AND HISTOPATHOLOGICAL STUDIES OF HORN AFFECTIONS IN BUFFALOES

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ABSTRACT

A study was conducted in buffaloes suffering with horn affections. The physiological and haematological parameters were within the normal limits in all the horn affections, but the plasma cortisol and C-reactive protein were more than the normal levels in all the horn affections for initial periods. A radiological sign like increased radio-opacity was noticed in the septic horn cases. Microscopic examination of biopsy samples of horn and skin following amputation revealed normal histology except in horn cancer where squamous cell nests and mitotic figures in the squamous cells were observed.

Key words : Haemato-biochemical changes, Radiology, Histopathology, horn, buffaloes

INTRODUCTION

Buffaloes play a significant role in agricultural economy of several tropical countries and occupies a unique position amongst livestock. The diseases that affect the productivity of the animal should be attended to prevent economic loss to the farmer. The production losses due the horn affections in buffaloes count a major share to the farmer. The horn is prone to various affections like avulsion, fracture, overgrowth, sepsis, fissures and cancer. The promising venture of buffalo farming therefore calls for a detailed investigation during affections of horn which causes stress to the animal and in turn affects the productivity. Hence, the present study was undertaken to study the clinical, haematological and radiological changes of horn affections in buffaloes.

MATERIALS AND METHODS

The buffaloes suffering with horn affections were examined and the Rectal temperature(°F), Respiratory rate (per min) and Pulse rates (per min) were recorded on the day of their presentation to the clinic in all the animals. Five milliliters of blood was also collected from jugular vein from all the buffaloes and serum samples were prepared separately. The haematological parameters like Packed Cell Volume (percentage), hemoglobin content (gm/dl) and total leucocyte count (millions/microlitre) were estimated using Auto Hematology analyzer. The biochemical parameters like plasma cortisol using cortisol kit with ELISA reader and C-reactive protein (ng/dl) with turbidometry CRP using spectrophotometer were also estimated. Most of the horn affections in buffaloes do not
respond to the routine medical management and demand amputation of the horn. The amputated horns from such animals were utilized for the radiological study. The transected bony structure was radio graphed using X-ray machine (Siemens India 500 mA Machine) at 12mAs and 60 KV exposure factors using 100 cm focal film distance and hi speed films. Biopsy specimens of bone and skin for histopathological examination were collected while performing horn amputation of affected animals and preserved in 10% neutral buffered formalin. The specimens were processed, embedded in paraffin and 5 micron thickness sections were made using microtome and stained with Hematoxylin and Eosin as per procedures of Singh and Sulochana (1997) to study the histological findings.

RESULTS AND DISCUSSION

The physiological parameters recorded in various affections of the horn in buffaloes under present study were recorded and tabulated in Table 1. The mean Rectal temperature(°F) values were 101.00±0.15; 100.91±0.10; 100.92±0.20; 100.93±0.24 and 101.20±0.00 in buffaloes suffering with avulsion, fractures, septic horn, over grown horn and horn cancer respectively. The mean pulse rate (beats /minute) values were 41.62±1.67; 43.32±0.49; 42.50±1.55; 40.50±0.50 and 43.00±0.00 in buffaloes suffering with avulsion, fractures, septic horn, over grown horn and horn cancer respectively. The mean respiratory rate (breaths /minute) values were 24.25±0.56; 33.56±0.55; 30.00±3.54; 31.67±3.18 and 32.00±0.00 in buffaloes suffering with avulsion, fractures, septic horn, over grown horn and horn cancer respectively. The mean rectal temperature, pulse rate and respiratory rate values were within the normal physiological limits in all the buffaloes with horn affections indicating that horn affections have no bearing on these parameters. The haematological parameters like packed cell volume, haemoglobin and total leucocyte count were within the normal levels in all the affections except in septic horn condition in which there was a non significant increase in total leucocyte count. Mistry (2009) also observed leucocytosis in septic horn of buffaloes.

The haemato-biochemical changes recorded in various affections of the horn in buffaloes under present study were recorded and tabulated in Table 1. The mean Packed Cell Volume (%) values were 27.12±0.48; 29.96±0.59; 32.50±1.85; 31.54±0.54 and 27.00±0.00 in buffaloes suffering with avulsion, fractures, septic horn, over grown horn and horn cancer respectively. The mean Haemoglobin (g/dl) values were 8.59±0.13; 8.52±0.03; 7.69±0.79; 8.97±0.18 and 8.60±0.00 in buffaloes suffering with avulsion, fractures, septic horn, over grown horn and horn cancer respectively. The mean values Total leucocyte count (10³/cmm) were 7.34±0.24; 8.57±0.04; 9.09±0.84; 7.61±0.08 and 7.46±0.00 in buffaloes suffering with avulsion, fractures, septic horn, over grown horn and horn cancer respectively. The mean Plasma cortisol (µg/dl) values were 1.08±0.06; 0.76±0.03; 0.63±0.01; 0.54±0.01 and 2.01±0.01 in buffaloes suffering with avulsion, fractures, septic horn, over grown horn and horn cancer respectively. The values increased above the normal range in all the affections except over grown horn. The mean C-reactive Protein (ng/ml) values were 7.15±0.11; 4.13±0.24; 4.68±0.24; 3.09±1.04 and 8.26±0.00 in buffaloes suffering with avulsion, fractures, septic horn, over grown horn and horn cancer respectively. The values
increased above the normal range in all the affections except over grown horn.

In the present study, the mean Plasma cortisol and C-Reactive Protein values in buffaloes suffering from horn affections were increased above the normal range except in over grown horn condition. This may be due to the body’s early defense in response to trauma, inflammation or infection. The acute phase response is a complex set of systemic reactions seen shortly after exposure to a triggering event. One of the many components is an acute phase protein response in which increased hepatic synthesis leading to increased serum concentration of positive acute phase proteins. The serum concentration of these acute phase proteins returns to base levels when the triggering factor is no longer present. These parameters did not show any increase on over grown horn condition since it does not cause any serious pathological changes. Chauhan et.al. (1981) reported that adrenal cortical hyperplasia and increased number of basophilic cells in pituitary gland in horn cancer affected animals might be responsible for the increase in cortisol levels. Baumann and Gauldie (1994) mentioned that C-reactive protein was one of the most abundant acute phase proteins in the animal serum and the liver rapidly synthesizes C-reactive protein when animals were sick or under severe stress.

The lateral view selected for radiography of amputated horn was found appropriate. The radiographic features of normal horn revealed radiolucent horn core with osseous demarcation in between from the base of the horn to almost tip of the horn. A radiological sign like replacement of radiolucency by a homogenous soft tissue mass without osseous tissue demarcation and increased radio-opacity was noticed in the septic horn cases and no abnormality was noticed in fracture and cancer cases (Fig 1to3). The normal horn revealed radiolucent horn core with osseous demarcation in between from base of the horn to almost tip of the horn and the tip of the horn appeared radio dense with homogenous density as reported by Singh et.al. (1986) and Shivaprakash et.al. (2007) in cattle. In the present study, on radiological examination of septic horns the revealed radio opacity in the amputated horn sinuses indicates pus accumulation in the horn. A radiological sign like increased radio-opacity was noticed in the septic horn cases and no abnormality was noticed in fracture and cancer cases. Number of growths observed in the frontal and horn sinuses during amputation of horn indicate that the cancer was in the initial stage. On the contrary Kumar and Thilagar (2000) observed mild involvement of frontal sinus with foul smelling friable necrotic tissue in the amputated horn sinus. Naik et.al. (1989) observed osteolytic changes like loss of sinus pattern and dense soft tissue occupying the middle 2/3 of the cornual sinus radio graphically in a Kankrej cow affected with horn cancer. Shivaprakash et.al. (2007) opined that radiographic technique could be the 100% reliable method for diagnosing horn cancer in bullocks at an early stage when the clinical signs are absent. Udharwar et.al. (2008a) described radiological signs like loss of architecture of sinus plates with negative air contrast indicating osteolytic changes in early stages of horn cancer, while a dense soft tissue occupying horn core without demarcating the osseous landmarks in the advanced cases of horn cancer.

Histological examination of the collected specimens following horn amputation
in fracture cases revealed normal histology of skin and bone (Fig 4) whereas in the tissue collected from a horn cancer case showed concentrically arranged keratin pearl in the center of the cancerous tissue (Fig 5) and mitotic figures in the carcinoma cells (Fig 6). Similar findings were observed by Sastry (1983), Naik et al. (1988) and Manjunath et al. (2007). It is concluded that the horn affections in buffaloes the physiological and haematobiochemical values were normal except in septic horn. The radiological and histopathological studies confirmed the diagnosis.

**Fig - 1:** Radiograph showing structure of the horn in a buffalo. Note the trabecular Pattern of the bone (corium) and solid portion as radio opaque portion (A). Note the change in the trabecular pattern of the bone and radioleucency in a septic horn (B).

**Fig - 2:** Radiograph showing structure of the horn in a buffalo. Note the loss of trabecular Pattern of the bone in a septic horn.
Fig 3 Radiograph showing fracture horn (A). Horn filled with iodine (B)

Fig 4 Photograph showing normal histology at the junction of skin and horn bone matrix. H & E 100X S-skin, HBM-horn bone matrix
Fig. 5 Photograph showing concentrically arranged keratin pearl in the center of the cancerous tissue (arrow). H & E 100X

Fig. 6 Photograph showing mitotic figures in the carcinoma cells of the horn cancer tissue. H & E 100X
### Table 1: Physiological and haemato-biochemical changes in horn affections of buffaloes

<table>
<thead>
<tr>
<th>Horn affections</th>
<th>Physiological parameters</th>
<th>Haemato-biochemical parameters</th>
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<tbody>
<tr>
<td></td>
<td>Temperature (°F)</td>
<td>Pulse rate (beats/min)</td>
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<tr>
<td>Avulsion (N=8)</td>
<td>101.00±0.15</td>
<td>41.62±1.67</td>
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<tr>
<td>Fractures (N=25)</td>
<td>100.91±0.10</td>
<td>43.32±0.49</td>
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<tr>
<td>Septic horn (N=4)</td>
<td>100.92±0.20</td>
<td>42.50±1.55</td>
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<tr>
<td>Overgrown horns (N=2)</td>
<td>100.93±0.24</td>
<td>40.50±0.50</td>
</tr>
<tr>
<td>Horn cancer (N=1)</td>
<td>101.20±0.00</td>
<td>43.00±0.00</td>
</tr>
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REFERENCES


