CLIINICAL RESEARCH

MACROPATHOLOGICAL, HISTOPATHOLOGICAL AND MICROBIAL SCENARIO OF A PASTEURELLA INFECTED SURTI BUFFALO

Urkude Atul, P.[1]; Vihol Priti, D.[2]; Patel J. M.[3]; Patel, J. H.[4]; Makwana, P. M.[5]

ABSTRACT

Pasteurellosis is a dreaded infectious disease of domestic and wild bovids caused by gram negative pasteurella microorganisms, particularly *Pasteurella haemolytica* and *Pasteurella multocida*. It is endemic among Indian buffaloes. However, breed vulnerability on the incidence of the disease in buffaloes have not been reported except a case report on Murrah buffaloes in an organized farm in West Bengal (India). The case fatality rate has been reported to be very high (75%). This paper elucidates the autopsy results, containing the macropathological, histopathological and microbial scenario of a pasteurella infected 4 years old female Surti buffalo carcass, presented for postmortem examination (PME) to the Department of Veterinary Pathology, College of Veterinary Science and Animal Husbandry, Navsari Agricultural University, Navsari, Gujarat in March, 2019. The clinical history of the case portrayed high fever, anorexia, profuse salivation, throat swelling, recumbence, and protruded tongue before death. Macropathological findings revealed accumulation of edematous gelatinous fluid in throat region with consolidated, reddened and thickened interlobular septa. Heart was severely congested with focal ecchymoses on epicardium and endocardium. Myocarditis with necrosis and bacterial emboli indicated septicemia in the deceased animal. Liver was pale and friable with multifocal necrotic areas. Fibrinous inflammation was noted on peritoneum and serosal surface of intestines. Histopathological examination revealed fibrinous suppurative bronchopneumonia with inflammatory cells inside the alveoli and interalveolar septa of the lungs. Bacterial colonies surrounded by inflammatory cells were noticed at various places along with the thickened interlobular septa of the lungs. In a few areas, severe hemorrhages and congestions were also noticed. Histological section of heart revealed multiple necrotic foci with infiltration of inflammatory cells. Impression smears from heart, lungs, liver and spleen were subjected to Giemsa's stain, which revealed numerous typical bipolar organisms suggestive of *Pasteurella* spp. Microscopic examination of the cultured bacterial colonies on blood agar, biochemically confirmed that the organisms belonged to *Pasteurella* spp. Based on clinical signs, macropathological, histopathological and microbiological examinations, the case was confirmed to be Pasteurellosis, which is an unique report in Surti buffalo.

KEY WORDS

Bipolar organism, Fibrinous suppurative bronchopneumonia, Pasteurella, Surti buffalo

---

Author attribution: [1]M.V.Sc. Scholar, [2]Associate professor and Head, [4]Associate professor, Department of Veterinary Pathology, [3]Assistant professor, Department of Veterinary Pharmacology and Toxicology, [5]Assistant professor, Department of Veterinary Microbiology, College of Veterinary Science & Animal Husbandry, Navsari Agricultural University, Navsari, Gujarat, India - 396450. [1]Corresponding author (Email: at.atul.94@gmail.com). Receipt: 27-Aug-2020, Acceptance: 13-Sep-2020. pp. 25-29.

INTRODUCTION

Pasteurellosis is an infectious disease of ruminants, particularly domestic and wild bovids. It is widely prevalent in cattle and buffaloes in India, and inflicts huge economic loss on the livestock breeders. The prevalence rate is 2-12 per cent, while the case fatality rate is 43-79 per cent in cattle and buffaloes in India (Singh et al., 2007). It is endemic among Indian Buffaloes. Buffaloes are more susceptible to pasteurellosis than cattle, while young and young adult animals in both the species are more susceptible than older animals (De Alwis, MCL., 1999). In an outbreak of pneumonic pasteurellosis in an organized farm of Murrah buffalo at Howrah district of West Bengal, India, the overall morbidity and mortality were reported to be 9.0% and 6.7%, respectively, while the case fatality was 75.0% (Sadhukhan et al., 2010).

Pasteurellosis is caused by gram-negative microorganisms, e.g., *Pasteurella haemolytica* and *Pasteurella multocia*, which are commensal microorganisms normally present in the upper respiratory tract of the host, and invade the lungs and other tissues of the respiratory tract, when there is breakdown of the immune potency of the host (Noura et al., 2006), particularly under stressful conditions (Radostits et al., 2007), e.g.; inclement weather, high humidity, sub-standard management, transportation stress, inhabitation in flocks of mixed age groups, high stocking densities, and incidence of previous respiratory infection (Noura et al., 2016; Lopez and Martinson, 2017). Buffalo is the natural host for *Pasteurella multocida* with almost 100 per cent case fatality rate after emergence of clinical symptoms (Rajagopal et al., 2010).

There is no report on the magnitude of susceptibility of different breeds of buffaloes to pasteurellosis, except for an outbreak of pneumonic pasteurellosis caused by *Pasteurella multocida* in an organized farm of Murrah buffaloes in Howrah district of West Bengal, India (Sadhukhan et al., 2010). This paper describes the autopsy results, containing the macropathological, histopathological and microbiological scenario of a pasteurella infected Surti buffalo due to dearth of information in this breed.

MATERIALS AND METHODS

A carcass of 4 years old female Surti buffalo with history of high fever, anorexia, profuse salivation, throat swelling, recumbency, protruded tongue and death was presented for postmortem examination (PME) to the Department of Veterinary Pathology, College of Veterinary Science and Animal Husbandry, Navsari Agricultural University, Navsari, Gujarat in March, 2019.

Thorough post-mortem examination was conducted as per the standard protocol and gross lesions were recorded. Tissue samples of Lung, heart, liver and spleen, with representative lesions were collected in 10% neutral buffered formalin and subjected to routine paraffin embedding technique for histopathological examination. Sections (5µ thick) were stained by Hematoxylin & Eosin (H&E) staining technique as per the standard procedure (Harris, 1900) and examined microscopically. Impression smears from heart, lung, liver and spleen were taken and subjected to Giemsa's stain and examined microscopically for presence of bacteria, if any. Nasal swabs and exudate samples from throat swelling were collected and sent to Department of Veterinary Microbiology, College of Veterinary Science and Animal Husbandry, Navsari Agricultural University, Navsari for isolation of bacteria.

RESULTS

Macropathology: Post-mortem examination of the carcass revealed swellings at throat region and protrusion of tongue. Internal examination revealed petechial hemorrhages at subcutaneous tissues, muscular connective tissues and inter-costal musculature with edematous gelatinous fluid in throat region.

In thoracic cavity, fibrinous exudate was present and pleura was extensively covered with fibrin exhibiting fibrinous pleuritis (Fig.1). Diffuse, generalized yellowish fibrinous covering was present on right lung, while left lung appeared apparently normal. Right lung was consolidated, reddened and sharply demarcated from normal part.

Upon cutting, mottled appearance with thickened interlobular septa (marbling of lung) and foci of necrosis (Fig. 2) were discernible. Creamish yellow granular fluid was present in pericardial sac with fibrin on epicardium (fibrinous pericarditis). Heart was severely congested with focal ecchymoses on epicardium and endocardium. Liver was pale and friable with multifocal necrotic

Fig. 1: Pleura were extensively covered with fibrin showing fibrinous pleuritis.

Fig. 2: Cut surface of lung showing mottled appearance and thickened alveolar septa.

areas. Fibrinous inflammation was noted on peritoneum and serosal surface of intestines.

Histopathology: Microscopically, lungs revealed fibrinous suppurative bronchopneumonia with inflammatory cells into the alveoli and inter alveolar septa (Fig. 3). Bacterial colonies surrounded by inflammatory cells were noted at various places along with the thickened interlobular septa. In few areas, severe hemorrhage and congestion were also discernible. In histological section of heart, multiple necrotic foci were seen with infiltration of inflammatory cells (Fig.4).

Fig. 3: Section of lung showing thickened alveolar septa (arrow head) and bacterial colony (arrow). H&E x 100.

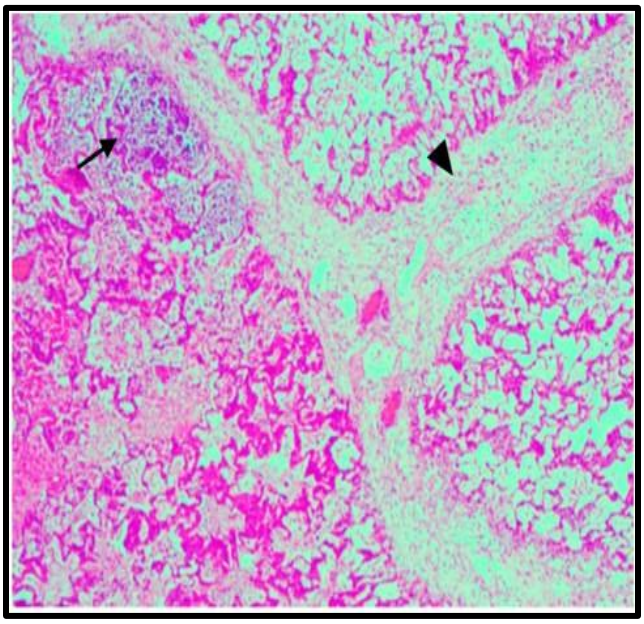
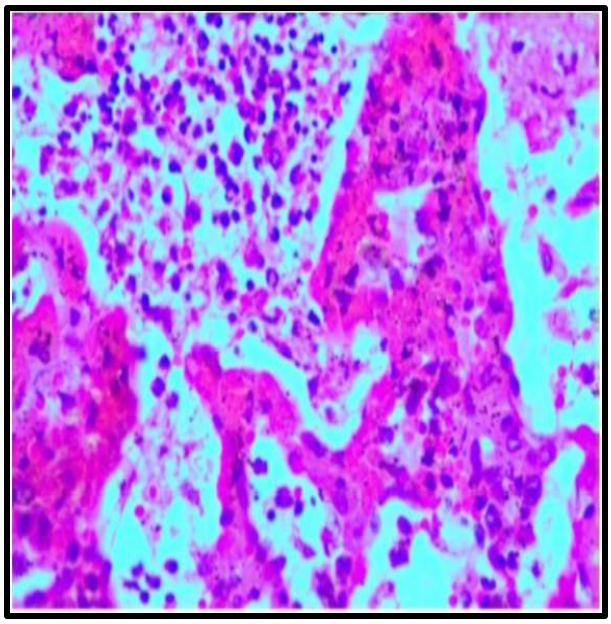


Fig. 4: Section of lung showing fibrin and inflammatory cells in alveoli. H&E x 400.



Microbiology: Impression smears from heart and lungs revealed numerous typical bipolar organisms which were suggestive of *Pasteurella* spp. Microscopic examination of growth of cultured bacterial colonies on blood agar revealed bipolar organisms and were biochemically confirmed as *Pasteurella* spp.

DISCUSSION

Present case history revealed high fever, anorexia, profuse salivation, throat swelling, recumbency, protruded tongue and sudden death which were similar to an earlier report of pasteurellosis (Radostits et al., 2007). Our gross findings concurred with earlier report of pasteurellosis cases, which reported presence of swelling due to subcutaneous edema containing gelatinous material in throat and neck regions (Sastry and Rao, 2006). Epicardial hemorrhages found in the case are in agreement with an earlier report (Rajagopal et al., 2010). There was severe fibrinous pleuritis, contrary to minor fibrinous pleuritis, as reported earlier (Maxie et al., 2015). Lung lesions were characteristic of Pasteurella infection, and supported the previous reports (Maxie et al., 2015). Additionally, microscopic changes noted in lung were also comparable to earlier findings (Noura et al., 2016; Schiefer et al., 1978). In this case, another noteworthy lesion observed was myocarditis with necrosis and bacterial emboli that indicated septicemia in the deceased animal.

CONCLUSION

Based on clinical signs, pathomorphological and microbiological examinations, the case was confirmed as Pasteurellosis in Surti buffalo.

REFERENCES

De Alwis, M.C.L. 1999. Haemorrhagic Septicaemia. ACIAR Monograph No. 57. Australian Centre for International Agricultural Research, Canberra, 1999.

Harris, H. F. 1900. On the rapid conversion of haematoxylin into haematein in staining reactions. Journal of Applied Microscopic Laboratory Methods, 3 (3), 777.

Lopez, A.; Martinson, S. A. 2017. Respiratory system, mediastinum, and pleurae. Pathologic basis of veterinary disease, 6 th edition, 471-560.

Maxie, G. et al. 2015. Jubb, Kennedy & Palmer's Pathology of Domestic Animals- E-Book (Vol. 2), 6thEdn. Elsevier Health Sciences.

Noura E. et al. 2016. Diagnosis of Pneumonic Pasteurellosis in Buffalo Calves with Reference to the Role of Vitamin D. Asian Journal of Animal and Veterinary Advances, 11 (12), 783-793.

Radostits, O. M. et al. 2007. Veterinary Medicine. A text book of the diseases of cattle, sheep, goats and horses.

Rajagopal, R. et al. 2010. Pasteurellosis in a buffalo herd - a brief report. Journal of Indian Veterinary Association, 8 (2), 57-59.

Sadhukhan, T. et al. 2010. Investigation of an outbreak of pneumonic pasteurellosis in water buffaloes in West Bengal associated with fimbriated Pasteurella multocida. Indian Journal of Comparative Microbiology, Immunology and Infectious Diseases, 31 (1&2), 37-40.

Sastry, G. A.; Rao, P. R. 2006. A textbook of veterinary pathology.7th edition, English Paperback, CBS Publishers & Distributors.

Schiefer, B. et al. 1978. Correlation of microbiological and histological findings in bovine fibrinous pneumonia. Veterinary Pathology, 15 (3), 313-321.

Singh, K. P. et al. 2007. Investigation of outbreaks of pasteurellosis in cattle and buffaloes. Indian Journal of Veterinary Pathology, 31 (1), 40-44.

UNDERTAKING

It is certified that the clinical research paper '**MACROPATHOLOGICAL, HISTOPATHOLOGICAL AND MICROBIAL SCENARIO OF A PASTEURELLA INFECTED SURTI BUFFALO'** is an original work carried out by the authors in the College of Veterinary Science & Animal Husbandry, Navsari Agricultural University, Navsari, Gujarat, India. I/We have duly acknowledged all the sources from which the ideas and excerpts have been drawn. The project is free from plagiarism. It has neither been published nor contemplated for publication elsewhere.

Dr Urkude Atul, P.

CORRESPONDING AUTHOR