Multiple organs metastatic mesothelioma in a White Tiger

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Abstract

Aim: An attempt has been made to know the cause of the death of the female white tiger, who was considered as Queen of the Zoo and has given birth of 22 white tigers in her life time.

Materials and Methods: Complete clinical examinations were carried out such as heart rate, respiratory rate and body temperature and haematology etc. After death, the detailed and complete post mortem examination was performed and representative tissue samples were processed for histological investigation by formalin fixation and paraffin embedding technique as described by Luna.

Results: Mesothelioma is a form of neoplasm having mesenchymal cell origin. In this investigation clinical signs were recorded and Clinical examination revealed no abnormality except anaemia with Neutrophilia and Lymphocytosis. At necropsy, the thoracic and abdominal cavities contained a large amount of serosanguineous and blood tinged fluid. The peritoneum showed Multiple, grayish – white nodules of varying size of 1 to 2cm diameter were scattered throughout surfaces. Neoplastic growths were also found in the parenchyma of the liver, lungs, spleen, intestine and mesenteric, tracheobronchial, mediastinal lymph nodes. Microscopic examination revealed Pleural and peritoneal surfaces were markedly thickened by multiple layers of neoplastic mesothelial cells with well supported by collagenous connective tissues. The neoplastic cells of different organs (lungs and liver) showed larger vesicular nuclei, prominent nucleoli and neoplastic cell emboli.

Conclusion: Gross lesions and histopathological studies were suggestive for malignant mesothelioma and originated from the peritoneum with secondary metastasis to other organs and lymphnode.

Key words: Mesothelioma, metastasis, neoplastic cells, pathomorphology, white tiger,

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Introduction

Mesothelioma are neoplastic proliferation of the serous lining mesothelial cells of the thoracic, abdominal and pericardial cavities [1]. It is a rare form of cancer that develops from transformed cells originating from the mesothelium. Spontaneous malignant mesothelioma appears to be very rare but sporadic cases have been reported in various animal species [2,3]. The present paper documents the occurrence of a rare case of peritoneal mesothelioma with multiple organ metastases in a female white tiger.

Materials and Methods

The subject of this study was of an eighteen years old female white tiger (*panthera tigris*) in the Zoological Park, Nandanakanan, Odisha in the year 2007. Sickness of the animal was reported to the centre for wild life, Bhubaneswar with clinical history of depression, anorexia, and emaciation. It was kept in special enclosure for the better treatment. The clinical examinations such as temperature, heart rate, respiration rate were recorded. Observation of visible mucus membrane and body coat was done to find out anaemic status, dehydration level and presence of external parasitic infestation. Faecal sample test was also conducted to find out any internal parasite infestation. In haematological examination, Blood smear both (dry and wet) were taken to examine for blood protozoan parasites. The tiger was treated with fluid therapy (RL) and broad-spectrum antibiotics with parenteral administration of multivitamins and steroids. In spite of the intensive care, fluid therapy and other symptomatic treatment the tiger died just

Figure-1. Weak emaciated carcass with distended abdomen of female white tiger

Figure-2. Mesothelioma: Peritoneum: variable size multiple grayish – white nodules

Figure-3. Tumour Nodules on theserosal surface and deep in to parenchyma of the liver

Figure-4. Neoplastic growth: intestine and mesenteric lymph node

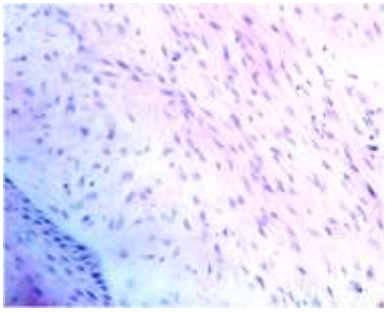

Figure-5. Mesothelioma peritoneum - multiple layers of neoplastic mesothelial cells with well supported by collagenous connective tissues. (H &E 40X)

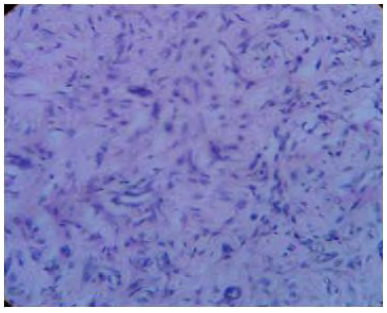

Figure-6. Mesothelioma hepatic metastasis - larger vesicular nuclei and prominent nucleoli and were arranged in cord and nest types. (H &E 40X)

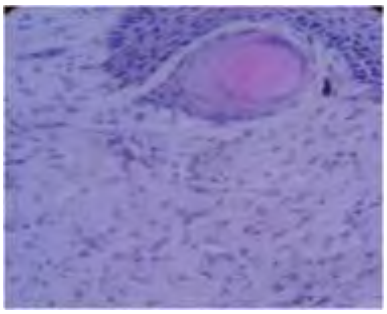

Figure-7. Mesothelioma liver - the neoplastic cell emboli in the central vein of liver. (H &E 40X)

one week after the treatment started. A complete post mortem examination was performed. Representative tissue pieces from various areas of the tumour were collected in 10% neutral buffered formalin embedded in paraffin and cut at 5µm thickness [4]. Sections were stained with routine haematoxylin and eosin.

Results

Clinical signs were recorded as loss of appetite, rapid weight loss, occasional vomiting, dehydration, pale mucus membrane, rough and loose skin and ruffled hair coat, extreme rapid emaciation and with distended abdomen (Fig.-1). The tiger was free from internal and external parasitic infestation. Blood smear examination was negative for blood protozoa. Clinical examination revealed, normal body temperature (100.5^{0}F), heart rate was 60/min and respiration rate was 32/ minute. Haematological examination revealed anaemia with 8.5g/dl and PCV only 28%. Total leukocyte count revealed Neutrophilia and Lymphocytosis.

At necropsy, the thoracic and abdominal cavities contained a large amount of serosanguineous and blood tinged fluid. On examination of the abdominal cavity, the peritoneum showed Multiple, grayish – white nodules of varying size (1 to 2cm diameter) were scattered throughout surfaces of the peritoneum. (Fig. - 2). Such nodules also recorded on surface and deep in to parenchyma of the liver, lungs, spleen, intestine and mesenteric lymph node (Fig.-2,3,4). The liver was severely congested and swollen. Tracheobronchial and mediastinal lymph nodes were enlarged with neoplastic growths.

Microscopic examination of H & E sections of different organs revealed glandular tubuloalveolar pattern of growths lined by cuboidal cells to low columnar types with eosinophilic granular cytoplasm [1,5]. Pleural and peritoneal surfaces were markedly thickened by multiple layers of neoplastic mesothelial cells with well supported by collagenous connective tissues (Fig.-5). The neoplastic cells of different organs (lungs and liver) showed larger vesicular nuclei and prominent nucleoli and were arranged in cord and nest types (Fig. - 6). The mitotic figures were very rare to observe. The neoplastic cell emboli were observed in the central vein of liver (Fig.-7). Aggregations of neoplastic cells were also present in the bronchial and mediastinal lymphnode and the lymphoid follicles were obliterated by metastatic tumour nodules.

Discussion

Based on the gross and histopathological examination, the growths were confirmed as mesothelioma of peritoneum and metastasing to multiple organs. Harbison and Godleski [6] and Smith and Hill [7] found that neoplastic growths were mesothelial in origin and these findings are in accordance our studies. Harbison and Godleski [6] also reported about the local and nearby organs metastasis of the neoplastic growths but we have recorded the distance metastasis of the tumour cells which contradicts with the findings. The mesothelial cells have granular cytoplasm, larger vesicular nucleus with prominent nucleolus and the neoplastic cells of different organs were nest types of arrangement with less no of mitotic figures were reported by several workers [1,8]. These Histologic features are quite similar to our findings. Due to the presence of tumour in the body cavities there were always accumulations of fluids as reported by Head *et al.*, [9]. In our case, large amount serosanguineous and blood tinged fluid were also accumulated in the peritoneal cavity.

Conclusion

In view of the overall observations through present study it could be concluded that, it is a case of mesothelioma arising from mesothelial lining cells of serous cavities, especially peritoneum with secondary metastasis to other organs and lymphnode. The mesothelioma is very rare and sporadic among animals. To our best knowledge, this is the first report of multiple organs metastatic mesothelioma in a white tiger under captivity in India.

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