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CIRCULATING IMMUNE COMPLEXES AS A TUMOUR MARKER IN CARCINOMA OF ETHMOID MUCOSA IN CATTLE

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Introduction

The presence of circulating immune complexes in human diseases has attracted considerable attention in recent years. They have been demonstrated by various workers in the sera of patients with various types of neoplastic diseases. (Hoffken *et al.*, 1977; Theofilopoulous *et al.*, 1977; Poulton *et al.*, 1978.. Ristaw *et al.*, 1981; Seth and Sreenivas 1981; Rossen *et al.*, 1983; Thomas *et al.*, 1987). The significance of the levels of circulating immune complexes in assessing clinical status of the disease or its use as a prognostic factor still remains controversial. Some reports point towards a correlation between the levels of immune complexes, tumour burden and prognosis (Hoffken *et al.*, 1977, Carpentier *et al.*, 1977; Gupta *et al.*, 1979), while other reports indicated that there is no correlation between the two (Rossen *et al.*, 1977; Ristow *et al.* 1979; Papoidero *et al.*, 1979; Herberman *et al.*, 1981). Increasing evidence suggest that circulating immune complexes affect the immune response adversely by blocking the function of immunologically reactive cells.

Carcinoma of the ethmoid mucosa was first recorded in 1960 in Kerala. Since the first report, the incidence is on the increase and now it has established itself in an endemic form, and has become an important clinical problem. The early diagnosis of this condition will help in initiating treatment at the right time and thus prevent the economical loss.

Therefore, a study to assess the usefulness of this technique in early diagnosis of the carcinoma of the ethmoid mucosa was undertaken.

Materials and methods

Twenty cows with ethmoid carcinoma and six healthy cows as controls were selected at random for this study. Blood collected by venipuncture from the cows were allowed to clot at 37°C for one hour, sera were separated and stored at -70°C till the assay was carried out.

Detection of circulating immune complexes (CIC)

Polyethylene glycol (PEG) precipitation method of Creighton *et al.* (1973) with slight modification was used for this purpose. The serum was diluted 1:3 with 0.1 M phosphate buffered saline (PBS pH 8.4). Diluted serum (0.44 ml) was mixed with 4 ml of 4.16% Polyethylene glycol (Mol. wt. 6000) in PBS. The final serum dilution was 1:30, and the final PEG concentration was 3.75 per cent. The mixture was incubated at 4...C overnight and the absorbance was measured in a Spectrophotometer at 450 nm to assess its turbidity due to the precipitation of immune complexes. Each sample was matched with a control tube containing the serum sample and PBS alone. The amount of immune complex present in the serum sample was expressed as PEG index. P.E.G. index = (Abs. 450 with PEG-Abs 450 with PBS) x 1000.

Results

Circulating immune complexes in cancer animals and normal controls

Sera from	P.E.G. Index
Normals (6)	200 ± 20
Cancer Animals (20)	296 ± 28

The levels of circulating immune complexes were assessed in sera from cattle bearing carcinoma of the ethmoid mucosa and normal controls. The sera from cancer animals contained higher levels of circulating immune complexes when compared to those in the control group. It was observed that only slight increase in the CIC levels was recorded in four animals in advanced stage of the disease compared to animals in the developing stage.

Discussion

The results of this study clearly point to an increased level of CIC in tumour bearing animals. Tumour associated antigens have been reported to be constantly released into the circulation where they evoke an immune response and finally combine with the antibodies produced. This could be a possible explanation for the increase in CIC. A correlation between the CIC levels and the stage of the disease has been reported by Hoffkin *et al.* (1977), Carpentier *et al.* (1977) and Gupta *et al.* (1979). Eventhough more of tumour antigens are shed into the system as the severity of the disease increases only a part of it binds with the antibodies to form CIC. A fall in circulating antibody levels, in the course of rapid tumour growth due to absorption to tumour cell membranae was also recorded (Klein 1971). An elevation in CIC was also attributed to the changes in levels of complement fixing and non complement fixing of tumour specific antibodies (Hoffken *et al.*, 1978). Serial monitoring of the CIC levels over a long period might be useful in predicting the prognosis of the patient. A consistently high CIC level could possibly indicate a bad prognosis (Thomas *et al.*, 1987). Polyethylene glycol precipitation method was found to be a reproducible and easy method for detecting the presence of circulating immune complexes in early stages and thus can be used as a tumour marker for early diagnosis of the neoplastic condition.

Summary

The levels of circulating immune complexes (CIC) were estimated in cattle bearing carcinoma of the ethmoid mucosa. The sera of cancer animals had high levels of circulating immune complexes when compared to that of non tumour bearing cattle.

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