

Haematological Changes in Azaserine-Induced Pancreatic Cancer in Wistar Rats

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Abstract: Cancer is one of the most dreadful disease affecting human as well as animals. Among all, pancreatic cancer is a common malignancy worldwide; however, reports on pancreatic cancer in livestock and pet animals are less. Azaserine is a potent pancreatic-carcinogen and Wistar rats are documented to be suitable for experimental trials on pancreatic cancer. Present study was undertaken in order to evaluate haematological changes in azaserine-induced pancreatic cancer in Wistar rats. Azaserine was administered at 5 mg/kg b.wt. intraperitoneally and haematological parameters were studied after confirmation of carcinogenesis. Reduced level of haemoglobin and total erythrocyte count (TEC) were significant alterations in haematological parameters suggestive of anemia associated with pancreatic cancer. Other haematological parameters did not reveal significant alterations.

Keywords: Haematological changes, Azaserine, Pancreatic cancer, Wistar Rats, Anemia.

I. INTRODUCTION

Cancer is a devastating disease with a significant impact on the physical as well as psychological wellbeing of an individual. Pancreatic cancer is one of the most common malignancies worldwide and has been reported in various species of animals including dogs and cats. Azaserine is a potent pancreatic carcinogen and has been documented in experimental trials on different laboratory animals [1]. Azaserine damages DNA in pancreas, liver and kidneys [2]. It affects nicotinamide adenine dinucleotides (NADs) [3] in hepatocytes and causes fatty liver [4]. Therapeutics against cancer remains a challenge for human and veterinary stand point of view and little information is available in literature with regards to pancreatic cancer in livestock, pet and wild animals. A study was undertaken to evaluate therapeutic efficacy of herbal extracts of *Phyllanthus amarus*, a plant used for treatment of various condition in human as well as veterinary medicine. The present report deals with haematological changes associated with azaserine-induced pancreatic cancer in Wistar rats in the experiment.

II. MATERIALS AND METHODS

The study was conducted on adult healthy Wistar rats of either sex between 8 of 12 weeks of age. Rats were procured from Zydus Research Centre, Ahmedabad. All the protocols were initiated as per the national and institutional recommendations after ethical approval. All the rats were kept under acclimatization for 5 days prior to grouping and initiation of experiment. A total of 80 Wistar rats were grouped into 8 groups (*viz.*, Group-I to VIII, 10 rats each). Group-I animals were taken as control group animals. Group-II was azaserine control group in which azaserine was administered at 5 mg/kg b.wt. intraperitoneally for experimental carcinogenesis in pancreatic tissues and haematological parameters were evaluated. For this purpose, blood samples were collected in test tubes with K₃EDTA were subjected to estimation of haematological parameters on the day of collection by Automatic Whole Blood Analyzer (Mindray BC-2800 Vet) at ADIO, Ahmedabad. Haematological alterations in azaserine-induced pancreatic cancer group were compared with normal healthy/control group.

III. RESULTS AND DISCUSSION

Haematological changes in normal control (Group-I, n=10) and azaserine-induced pancreatic cancer animal group (Group-II, n=10) are mentioned in Table-01. Haemoglobin is synthesized in the immature erythrocytes in the bone marrow and consists of four haeme molecules as well as it serves for the transportation of oxygen from the lungs and carbon in the opposite direction. The results of the study indicate that possibilities of anemia should be considered while performing experimentation on Wistar rats or while performing therapeutic trials. These findings were in correlation with previous reports [1, 5]. Reduced levels of can be associated with defective haematopoiesis. Exact mechanism of anemia is not clear at present. Reports suggest that cancer associated anemia can be due to decreased erythropoietin production in different types of cancers. Besides the general mechanism, there are other causes of anemia associated with cancer (e.g., autoimmune hemolysis, cachexia, nutritional deficiency and the therapy of the neoplasm itself) [6]. Significant reduction in the lymphocyte counts of azaserine-injected Wistar rats indicates immunosuppression.

Table-01: Comparison of haematological changes in healthy and azaserine-induced pancreatic cancer group of Wistar rats

Parameter	Unit of measurement	Group-I (Normal Rats) (n=10)	Group-II (Azaserine injected rats) (n=10)
Haematological parameters			
Haemoglobin (Hb)	g/dL	14.54±00.28	12.80±00.44*
Total erythrocyte count (TEC)	million/cmm	07.84±00.21	07.31±00.21*
Packed cell volume (PCV)	%	46.77±01.15	44.18±00.39*
Total leukocyte count (TLC)	thousands/cmm	07.37±00.67	09.35±00.38*
Monocytes	%	02.46±00.93	02.80±00.11
Granulocytes	%	12.35±00.73	13.00±00.42
Lymphocytes	%	84.95±00.76	82.50±00.79*
Mean corpuscular volume (MCV)	fl	57.20±01.03	57.35±01.14
Mean corpuscular haemoglobin concentration (MCHC)	%	30.63±00.52	31.39±00.21
g=gram; dL=deciliter; cmm=cubic millimeter; %=per cent; fl=femtoliters (* = P < 0.05)			

IV. CONCLUSION

Altered levels of haemoglobin and TEC are indicative of anemia associated with azaserine-induced pancreatic cancer in Wistar rats. Lymphocytopenia was significant in azaserine-induced pancreatic cancer in Wistar rats which is indicative of immunosuppression. Other haematological parameters did not reveal any significant changes in azaserine-injected rats. Results suggest that evaluation and comparison of haematological parameters in azaserine-induced pancreatic cancer in Wistar rats should be given importance during experimentation on pancreatic cancer.

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