

Letters to the Editor

The Level of Serum Adenosine Deaminase Activity in Leprosy and Tuberculosis

To the Editor: The aim of this study was to investigate whether there could be a resemblance of the expected values of serum adenosine deaminase activity in tuberculosis and leprosy. The study was carried out with 85 tuberculosis patients and 46 leprosy patients within the age range of 15-65 years, and the results were compared with those obtained from 76 healthy control group subjects.

The specific activity of adenosine deaminase is high in the human spleen, duodenum and T lymphocytes. In recent years, clinical interest in this enzyme has been focused on immunodeficiency. The deficiency of this enzyme can be observed in severe combined immune deficiency disease.^{1,2} Leprosy and tuberculosis are caused by the same group of bacteria, *Mycobacterium tuberculosis* and *Mycobacterium leprae*. In these diseases, the cellular immunity was stimulated.

Blood samples were obtained from 85 patients (32 female, 53 male) between the ages of 15 and 66 years in Elazig Tuberculosis Dispensary, Turkey. Sixty-five of these patients were diagnosed with active tuberculosis and 20 had inactive tuberculosis. The diagnosis was supported by clinical, bacteriological and x-ray radiography. The group termed as inactive tuberculosis was the clinically recovered group followed without medication, but with calcification findings in x-ray radiography. Blood samples were obtained from 46 leprosy patients (15 female, 31 male) aged between 18 and 65 years in Elazig Leprosy Hospital. All patients were LL (lepromatous leprosy) type without clinical evidence of reaction, and three of these patients were bacilli-positive under multidrug therapy, and the remainder were bacilli-negative. The control group was composed of 77 subjects (25 female, 52 male) in the same age group who applied to the blood bank as donors. Human blood serum was kept at -20°C until the analysis. The serum adenosine deaminase activity was determined by Giusti's spectrophotometric method—adenosine hemisulfate 12 mmol/L and phosphate buffer 50 mmol/L (pH: 6.5).³ The zero time blank was run. Enzyme activity was expressed as U/L.

The mean serum adenosine deaminase activity in tuberculosis patients (28.5 ± 9.9 U/L) was 1.88 times higher than in the control subjects (15.1 ± 3.7 U/L), and 2.33 times higher in leprosy (35.2 ± 13.9 U/L) than in the control subjects ($P < 0.0001$). In the inactive tuberculosis group, the mean serum adenosine deaminase activity (14.2 ± 2.2) was lower than in the active tuberculosis group and was not significantly different from the control group.

Because the origin of serum adenosine deaminase is lymphatic, and the immunity in tuberculosis is cellular, the increase in lymphocyte adenosine deaminase activity and

turnover of lymphocyte in active tuberculosis were found to be high. For this reason, serum adenosine deaminase activity will increase, and after the treatment (in active tuberculosis) this activity will drop to normal control value. The same explanation can be true for leprosy patients. Adenosine deaminase enzyme was found to be higher in T-lymphocytes than other cells. For macrophage formation and chemotaxis, this process needs adenosine deaminase. Active macrophages have two times higher adenosine deaminase activity than normal macrophages.^{1,2} The etiologic origin of tuberculosis and leprosy is the same kind (*Mycobacterium tuberculosis* and *Mycobacterium leprae*), and immunity is cellular, but the cellular immunity in leprosy is slow and long term. The high serum adenosine deaminase activity found in leprosy, as compared to active tuberculosis, can be explained by this mechanism. The high serum adenosine deaminase activity found in leprosy patients in our study could not be compared with other studies, since there has been only one previous study,⁴ and in this study, the level of lymphocyte adenosine deaminase activity was measured in leprosy (not serum adenosine deaminase). In addition, we studied two patient groups and compared the results at the same time, and to our knowledge, this is the first instance of this being done.

In summary, the difference in serum adenosine deaminase activity in tuberculosis and leprosy caused by the same group of bacilli can show parallelism, and can also be explained by the same mechanism.

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Hepatocellular Carcinoma Metastasis to

Maxillary Antrum

To the Editor: About 1% to 3.2% of all malignant tumors involving oral cavity and surrounding areas are metastatic in nature.¹⁻⁴ Involvement of nasal sinuses is extremely rare.⁵ We present a case report of hepatocellular carcinoma metastasis to maxillary antrum and surrounding areas (an extremely rare site).

An 84-year-old Saudi male presented with a two-month pain and swelling of the left side of the face, which was gradually increasing in size and was associated with headache and nasal obstruction. There was no epistaxis, nausea or vomiting. He had previously been admitted to hospital with cardiac problems for which he had been fitted with a pacemaker two years earlier. During his previous admission a CT scan of the abdomen detected a 6x6 cm mass in the right lobe of the liver. He was diagnosed as a case of cirrhosis with hepatocellular carcinoma, and was advised to undergo liver biopsy. He refused and was subsequently lost in the follow-up process.

On examination the patient had proptosis, blindness of the left eye and a fleshy mass occupying the nasal cavity, which bled on touch. The mass was pushing the left soft palate downwards and forwards with swelling over the maxillary and ethmoid sinuses. No regional lymph node was seen. There was a mass in the right hypochondrium, but abdomen and chest examinations were normal. No

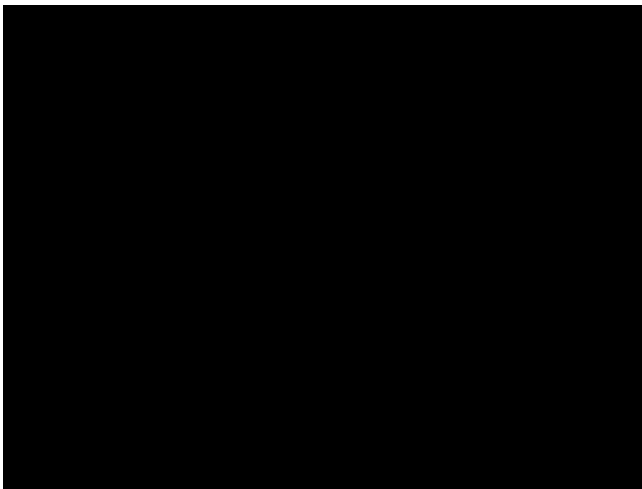


FIGURE 1. Histopathology of the mass from the left maxillary antrum and nasal cavity showing trabeculae lobules of cells which are polygonal, large nuclei, prominent nucleoli and moderate pink clear cytoplasm. lymph nodes, ascites or jaundice were detected.

Investigations were as follows: Hb 11.5 g/dL; TLC 3900 mm³; platelets 59,000/mm³; sugar 119 mg%; urea 56 mg%; creatinine 1.3 mg%; SGOT 56 IU and SGPT 50 IU/mL.

CT scan of the mass showed extensive involvement, including left axillary antrum, ethmoid sinus, extension from pterygoid plate to the cervical spine, osteolytic destruction of the base of the anterior and middle cranial fossa. Ultrasonography of the abdomen showed a mass

lesion of the lobe of the liver. No regional lymph node or ascites was seen. X-ray of the chest and skeletal system showed no abnormality.

Histopathology of the mass via intranasal antrostomy from the left maxillary antrum and nasal cavity showed trabeculae lobules of cell which are polygonal, have large nuclei, prominent nucleoli and moderate pink clear cytoplasm. Similar cells were seen invading the blood vessels. The sinusoidal pattern and trabecular arrangement of the malignant cells were features consistent with the diagnosis of metastatic hepatocellular carcinoma. The patient refused to undergo a liver biopsy. Subsequent alpha-fetoprotein level was 423 IU.

With the diagnosis of hepatocellular carcinoma with metastasis to maxillary sinus, the patient was referred to King Faisal Specialist Hospital and Research Centre, Riyadh, for further treatment. Relevant investigations confirmed the diagnosis and he was treated with palliative radiotherapy to the left orbit, nasal cavity, antrum and hard palate. Because of his incurable condition, he was referred back to King Fahad Hospital, Taif, for terminal care.

Hepatocellular carcinoma is a common tumor seen in Saudi Arabia,⁵ and the preferred site of the metastasis includes regional lymph nodes, lungs, adrenals, peritoneum and bone.⁶ Oral cavity and surrounding areas get involved secondarily in about 1% of cases from the sites below the clavicle.³ Maxillary sinuses and nasal cavities are very rare sites for the involvement of the tumor. Koriech et al. have reported primary involvement of this site in less than 0.5% of cases.⁵ No metastatic tumor in this site has been reported by them. It is widely believed that jaw bones do not contain a lymphatic system and the metastasis occurs at blood stream. Slowing of blood flow and abundance of spongiosa favor the entrapment of metastatic foci, but it is not clear why the involvement of maxilla is less than the mandible.³ In this case, there was no evidence of ascitic fluid, involvement of regional lymph nodes and pulmonary metastasis. This kind of phenomenon has been reported in 22% to 33% of cases.^{3,7} The mode of spread is suggested to be through Batson's plexus.⁸ In this case there was extensive destruction of the surrounding areas. Because of the rarity of this type of case, authors like Sim et al.⁹ do not subscribe to the routine use of MRI and CT scan of paranasal sinuses, as they are not considered cost-effective, even though they are the most accurate methods for diagnosis. However, sinus endoscopy is considered an important aspect of the physical examination in all patients with primary cell carcinoma of the liver, in order to rule out any metastasis to the nose and paranasal sinuses. In our case, sinus endoscopy was not necessary because the metastatic mass was quite extensive and obvious enough for punch biopsy.

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An Epidemic of Obesity in the Kingdom of Saudi Arabia

To the Editor: There has recently been a series of articles in your journal¹⁻⁵ regarding the important public health problem of obesity, which appears to have reached an epidemic proportion in the Kingdom of Saudi Arabia and other areas of the Middle East.

Al-Nuaim has addressed an important local issue of the prevalence of overweight and obesity, along with regional variations of the problem in the Kingdom. As pointed out in the study, the prevalence of obesity among subjects over the age of 40 years has reached an epidemic proportion and is expected to get worse.³ The prevalence of overweight and obesity among Saudi subjects over the age of 15 years is reported to be 29% and 15%, respectively, for males, and 27% and 24%, respectively, for females.⁶ El-Hazmy and Warsy have reported similar figures of the prevalence of overweight and obesity, in a large population-based study consisting of 14,660 Saudi males and females over the age of 14 years, drawn from 35 different areas of the country.⁴ These are some of the highest published figures. As the authors state, there is an urgent need to establish a national program for prevention and treatment of obesity and related complications. For this to materialize, it is necessary to

undertake a scientific approach to define clearly the factors responsible for this epidemic that is confronting the Saudi people.

Al-Nuaim points out that the factors affecting the prevalence of obesity in Saudi Arabia are open to speculation and may include social, cultural, economic and nutritional. El-Hazmi has also attributed it to multiple factors.⁴ Genetic factors are also important. In most humans, body fatness is a continuous quantitative trait which reflects the complex interactions between genetic and environmental factors. In view of the high incidence of consanguinity in Saudi Arabia, genetic factors would unquestionably be very important. Studies in families, twins and adoptees indicate that as many as 80 variances in the body-mass index could be attributed to genetic factors.⁷

With regards to environmental factors, we agree with El-Hazmy and Warsy that high consumption of dates and carbohydrate-rich foods may have an important contributory role in the pathogenesis of obesity and related complications. We have studied the metabolic consequences of date fruit ingestion, and compared these with those of a standard Saudi meal (unpublished observations). The combination meal was designed to mimic very closely the real life situation in the Saudi culture. Ingestion of twice as many (600) calories and greater carbohydrate content as those contained in the date meal alone resulted in significantly greater ($P < 0.5$) insulin and C-peptide responses. The combination meal resulted in substantial positive deflections in both plasma glucose and insulin values—a metabolic milieu potentially conducive to positive caloric balance, including lipogenesis. Adipocytes store fatty acids along with carbon atoms in the form of triacylglycerols under conditions of excess substrate availability. Consumption of surplus calories, duplicated under the conditions of the combination meal ingestion, could lead to deposition of surplus calories in adipose tissue as reserve energy resulting in obesity. This may represent a unique instance of obesity as a consequence of culturally inbred eating habits among Saudis, a population reportedly harboring the world's highest incidence of diabetes mellitus,¹⁰ a situation that has potential for correction, since as small a weight loss as 5 kg is shown to decrease the risk of non-insulin dependent diabetes by 50%.¹¹

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