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INTRACEREBRAL TUBERCULOMA IN CHILDREN WITH TUBERCULOUS MENINGITIS*

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SUMMARY: Altunbaşak Ş, Alhan E, Baytok V, Aksaray N, Önenli N. (Departments of Pediatric Neurology and Infectious Disease, Çukurova University Faculty of Medicine, Adana, Turkey). Intracerebral tuberculoma in children with tuberculous meningitis. Turk J Pediatr 1996; 38: 323-327.

Not all patients with tuberculosis develop tuberculoma during the disease or anti-tuberculous therapy. Therefore, we compared various parameters in patients with and without tuberculoma and presented the results. We formed two groups from the patients with tuberculous meningitis: Group I consisted of 18 patients with tuberculoma, and Group II consisted of 18 randomly selected patients without tuberculoma. Significant difference between the groups was found with respect to level of consciousness and CSF-glucose level ($p<0.05$). The consciousness level was more depressed and the CSF-glucose level more decreased in the group without tuberculoma. These findings were discussed. *Key words: tuberculous meningitis, tuberculoma.*

In developing countries, five to eight percent of space-occupying lesions of the central nervous system (CNS) are tuberculomas[1]. Intracranial tuberculoma can develop or enlarge in patients treated for tuberculosis during supervised anti-tuberculous chemotherapy[2-4]. Most of them resolve, however, if adequately treated with anti-tuberculous therapy and a course of corticosteroids[3].

Not all patients with tuberculosis develop tuberculoma during the course of the disease or anti-tuberculous therapy. Therefore, we compared various parameters in patients with and without tuberculoma and presented the results.

Material and Methods

Between May 1988 and 1992, 52 patients with tuberculous meningitis (TBM) were treated in the Clinic of Pediatric Infectious Disease, Medical Faculty of Çukurova University. We formed two groups from these patients: Group I consisted of 18 patients with tuberculoma, and Group II consisted of 18 randomly selected

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patients without tuberculoma. Lymphocytic meningitis accompanying at least one of the criteria below was accepted as the minimal diagnostic criteria for TBM[5]. These criteria were: 1) positive cerebrospinal fluid (CSF) or gastric fluid culture; 2) positive acid-fast bacilli on CSF or gastric fluid smear; 3) 10 mm or more induration on Mantoux test; and 4) family history of tuberculosis. Patients were divided into three clinical stages according to the classification of Lincoln et al.[6] with respect to their clinical status on admission: stage I: nonspecific fever with no neurological sign; stage II: signs of meningeal irritation and neurological findings with no alteration of consciousness; stage III: major neurological findings with unconsciousness extending to coma.

Multiple computed tomographic (CT) examinations with and without contrast were obtained while patients were hospitalized. Hydrocephalus determined on CT scans was categorized as mild and moderate to severe.

After a follow-up period of two to 40 months, patients were categorized according to the prognostic criteria defined by Smith[7]. Category I included patients who were totally cured or patients with psychic abnormalities that did not affect their daily lives. Patients with slight mental retardation, hemiparesis, slight deafness, epilepsy or emotional disorders were included in Category II. Category III involved patients with severe mental retardation or hydrocephalus associated with severe neurological sequelae such as hemiplegia. Patients who died were included in Category IV.

Chi-square test within the SPSS-X program package[8] was used for data analysis.

Results

There were no significant differences between the groups with and without tuberculoma with respect to age, sex, family history of tuberculosis, time before onset of therapy, symptoms before admission, clinical stage and neurological findings on admission, Mantoux test, convulsion within the first15 days of therapy, peripheral blood leukocyte count, blood sedimentation rate, serum sodium and glucose concentrations, CSF-protein level, cell count and lymphocyte ratio, radiological findings on chest x-ray, basal arachnoiditis, the degree of hydrocephalus on CT scan of the brain or prognosis ($p>0.05$).

A significant difference between groups was noted with respect to level of consciousness and CSF-glucose level ($p<0.05$). The consciousness level was more depressed and the CSF-glucose level more decreased (27.9±12.9 vs 46.4±30.8 mg/dl) in the group without tuberculoma (Table I).

Tuberculomas were located within the cerebral hemispheres in eight cases, within the cerebellum in five, within the thalamus in five, within the cisternas in five and in the suprasellar region in five and had multiple localizations in seven cases.

Table I: Distribution of Patients According to Level of Consciousness

	Group I		Group II	
Consciousness	No	%	No	%
Normal	4	27.2	3	16.7
Lethargy or irritability	10	55.6	3	10.7
Stupor	1	5.6	3	16.7
Coma	3	16.7	9	50.0
Total	18	100	18	100

* $p<0.05$

The images of the tuberculomas on CT scan were dics-like, ring-like or irregular in shape. The irregular masses consisted of multiple discs or rings coalescing to produce such irregular contours. All had some perilesional edema (Fig. 1).

Discussion

Intracranial tubercuoloma is one of the most serious complications of tuberculosis, and generally accompanies tuberculous meningitis. It may be single or multiple and develops before or during the specific therapy. The pathogenesis of developing or enlarging tuberculoma in succssfully treated tuberculosis is unknown[9]. An exaggerated host reaction against tuberculous protein is thought to play an important role[10].

Tuberculomas are generally located within the cerebral hemispheres. Gupta et al.[10] reported that 41 of 44 tuberculomas in their patients were located within the hemispheres. Some authors have reported disc-like or ring-like tuberculomas, as well as varied sized masses with irregular contours, as in our case. Also, the ring-shaped hypodense area within the tuberculomas is interpreted as a caseification necrosis[9,11].

There was no difference between the two groups with respect to most parameters. Only three of our cases had tuberculoma on admission. This can account for our groups' similarity in terms of neurologial findings and clinical stages on admission.

We found a significant relationship between the clinical stages on admission, hydrocephalus and prognosis in our previous extensive study[12]. However, there was no significant relationship between these two groups regarding prognosis.

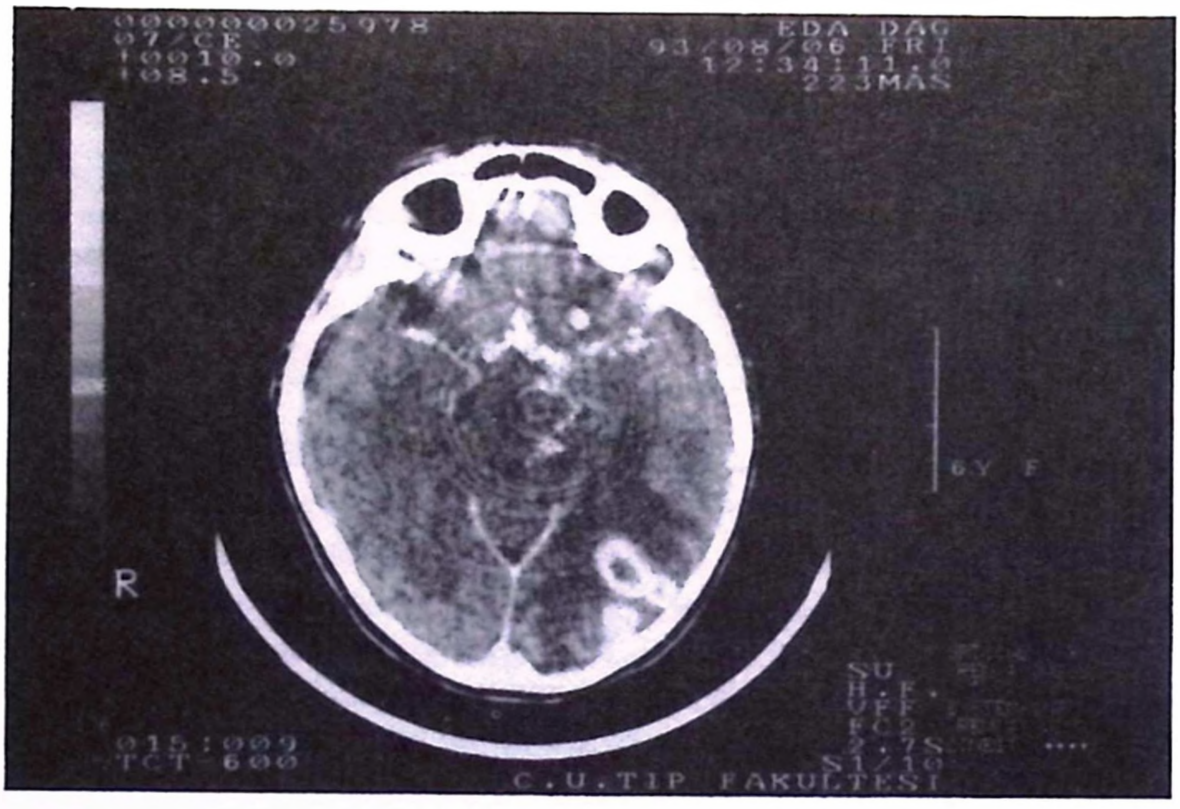

Figure 1. Enhanced CT scans of the brain from two patients in Group I showing multiple ring- and disk-shaped tuberculomas located in various regions of the brain.

The consciousness level of the patient with TBM during admission is affected by two factors. One of these is the degree of hydrocephalus, and the other is the degree and extent of inflammatory pathological changes within the cerebral tissue. We found no significant difference between the groups in terms of the degree of hydrocephalus, but the level of consciousness was more depressed in the group without tuberculoma. This finding suggested that the pathological changes within the cerebral tissue were more severe in this group.

The CSF-glucose level is known to be related to the consumption of glucose by bacteria in either bacterial or tuberculous meningitis. The decreased CSF-glucose level in the group without tuberculoma suggested greater bacteria invasion into the CNS in this group. This also implies a higher level of tuberculoprotein.

We found more bacteria and therefore more pathological changes within the cerebral tissue of Group II than Group I. Tuberculomas would be expected to form in Group II, but appeared in Group I. As a result, we can say that immunity, especially cell-mediated immunity, of the patients in the two group must be investigated separately.

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