

Is Skull Asymmetry a Predictor of Severity in Head Trauma?

Kafatası Asimetrisi Kafa Travmasında Bir Ağırlık Göstergesi midir?

NECDET ÇEVİKER, KEMALİ BAYKANER, SEMİH KESKİL, SEDAT IŞIK

Gazi University Medical School, Departments of Neurosurgery and Radiology, Beşevler (NÇ, KB, SI),
Fatih University Medical School, Department of Neurosurgery (SK), Emek-Ankara, Turkey

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Abstract: A major retrospective study of head injury was done on patients admitted over a 13-year period whose clinical records were complete. A total of 583 computerized tomography scans were evaluated, and these indicated that 9 patients had asymmetric skull conformation. Six of these nine were cases of surgical intracranial hemorrhage, an incidence significantly higher than that in the general population.

Key Words: Head injury, outcome, risk factor, skull asymmetry

Özet: 13 yıllık bir dönem içinde başvurmuş olup, klinik gözlem kayıtları tam olan geniş bir kafa travmalı hasta serisi incelendi. Gözden geçirilen toplam 583 bilgisayarlı tomografinin 9 unda kafatası asimetrisi olduğu tespit edildi. Bu 9 hastanın 6 tanesi cerrahi intrakranial kanama olguları idi ve söz konusu bu oran da genel toplumdan anlamlı derecede yüksekti.

Anahtar kelimeler: Kafatası asimetrisi, kafa travması, risk faktörü, sonuç

INTRODUCTION

Although there is no known single factor that accurately indicates severity of head injury, various methods have been used to predict clinical course and outcome for these patients. A number of studies have focused on data such as Glasgow Coma Scale scores, somatosensory evoked potentials, type of injury as determined by computerized tomography (CT), and biochemical markers as predictors of patient outcome (1,4,5,6,8,9,11). In this report, we present the features of cases of asymmetric skull

conformation that were identified incidentally in a major head injury survey.

METHODS AND PATIENTS

Our team conducted a major head trauma survey of patients with the chief complaint of head trauma who were admitted to the hospital at Gazi University Medical School from 1979 through 1991. Of the 583 patients whose CT images were available, 9 (1.5%) exhibited skull asymmetry or deformity. The data collection procedures, scoring, and neurological

and radiological investigation parameters of the head trauma survey have been described in detail elsewhere (1,6,8). For each of the nine cases, two independent radiologists confirmed there was CT evidence of skull asymmetry or deformity based on recently published criteria (7).

RESULTS

Table 1 summarizes the clinical characteristics of the nine individuals who had skull asymmetry or deformity. Six of the nine had surgical intracranial hemorrhage, and these lesions were identical to the intracranial hemorrhage seen in patients with normal skull conformation (Figures 1,2). There was no significant difference between the incidence of skull abnormality in the trauma patients and that in the general population (7), but the incidence of surgical

intracranial hematoma in the skull asymmetry patients was significantly higher than that in the general population ($p:0.023$) (1,6,8).

Table 1: Clinical features of the patients who exhibited skull asymmetry.

The small number of patients with skull abnormality precluded comparison of this group with the general population through multivariate analysis of factors such as mechanism of injury, postresuscitation Glasgow Coma Score, anatomic aspects of intracranial hemorrhage lesions on CT, patient age and secondary issues such as infection.

DISCUSSION

Although it has yet to be proven, skull asymmetry is thought to arise from congenital depression of the neonatal skull, the reported incidence of which is 0.1% (2), or as one of the various forms of craniosynostosis (3). Rotational acceleration is one of most important generators of brain damage. When the skull shape is asymmetrical, the impact pattern may be irregular, with stress concentrated in the area of the deformity. Thus, it is plausible that skull asymmetry may influence both the severity and location of the lesions in head trauma cases (10). Focal compensatory hydrodynamic mechanisms may also be important. Skull deformities are associated with enlarged subarachnoid spaces (3) and disturbances of cerebrospinal fluid flow, both of which may augment the transmission of pulsatile forces.

To date, skull asymmetry has not been highlighted as a possible predictor of severity in head trauma. The small size of our skull asymmetry patient group made it difficult to draw strong conclusions in this regard. Although the number of affected patients in our group was insufficient for risk analysis, we believe it would be valuable to explore this issue further in larger head trauma series.

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Correspondence: Dr.İ.Semih KESKİL
Fethiye Sokak No: 4/6
Gazi Osman Paşa 06700
Ankara/Türkiye
Phone: 90. 312. 446 45 94
Fax: 90. 312. 221 32 76
E mail: sk06-k@tr-net.net.tr

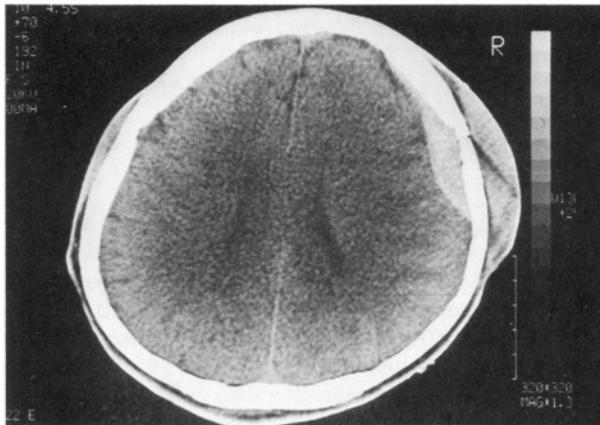


Figure 1: CT shows an epidural hematoma related to the fracture in a patient with marked skull asymmetry.

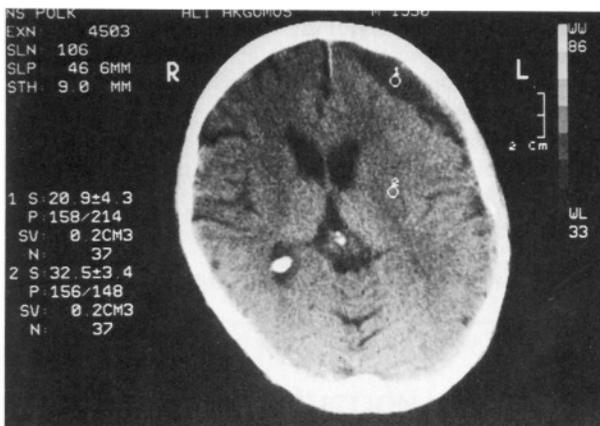


Figure 2: CT clearly demonstrates the suspicious association of positional lambdoid deformity of the skull and subdural hygroma.

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