Original Article

There is high Incidence of Skull Fracture associated with Extradural Hematoma in Patients with Head Injury

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ABSTRACT

Objective: To determine the correlation of skull fracture with extradural hematoma in head injury patients presenting to a tertiary care hospital in Pakistan.

Patients and Methods: This descriptive study was carried out at Shifa International Hospital, Islamabad from January 2002 to January 2007. All patients who were operated for extradural hematoma during the study period were included in the study. Standard skull X-rays were done and type and location of fractures were noted on X-rays, CT scan and per-operatively. The incidence of skull fracture associated with extradural hematoma in various age groups was noted. The results were analyzed using SPSS version 14.0.

Results: A total of 110 patients underwent surgery for extradural hematoma. A linear fracture was demonstrated in 60 patients and a depressed skull fracture in 15 patients. Another 8 patients who did not have radiologically visible fracture were found to have a fracture line per-operatively. Thus, a total of 83 (75%) patients had skull fracture. There was no statistically significant difference in the incidence of skull fracture in various age groups.

Conclusion: There is a strong association of skull fracture to extradural hematoma, however, a normal X-ray does not exclude extradural hematoma. (Rawal Med J 2008;33:228-230).

Key words: Head injury, extradural hematoma, skull fracture, radiography.
INTRODUCTION
Head injuries account for almost half of all deaths from trauma.\(^1\) Skull X-rays are a valuable tool for assessment of patients with head injury.\(^2\) Incidence of skull fracture in patients with extradural hematoma has been reported between 63-85% in various series.\(^3\)-\(^6\) Level of consciousness is the most important prognostic factor which deteriorates with delay in surgery,\(^7\) which results due to a delay in diagnosis and referral.\(^8\) CT scan is not readily available in Pakistan especially in rural areas but X-rays are readily available for diagnosis of skull fracture, which may guide for early referral to a neurosurgical facility. This study was carried out to determine the correlation of skull fracture with extradural hematoma in patients presenting to a tertiary care hospital in Pakistan.

PATIENTS AND METHODS
This study was carried out at Shifa international hospital, Islamabad with a large catchment area. A total of 110 consecutive patients of extradural hematoma who were operated during a period of five years from January 2002 to January 2007 were included in the study. Those with other associated hematomas like subdural hematoma, intracerebral hematoma or intraventricular hematoma were excluded from the study.

Table 1. Distribution of fractures in various age groups.

<table>
<thead>
<tr>
<th>Age(yrs)</th>
<th>No. Of pts.</th>
<th>Linear fracture</th>
<th>Depressed fracture</th>
<th>Total (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 – 10</td>
<td>11</td>
<td>06(55%)</td>
<td>02(18%)</td>
<td>08(73%)</td>
</tr>
<tr>
<td>11-20</td>
<td>22</td>
<td>12(55%)</td>
<td>03(14%)</td>
<td>15(68%)</td>
</tr>
<tr>
<td>21-30</td>
<td>25</td>
<td>15(60%)</td>
<td>03(12%)</td>
<td>18(72%)</td>
</tr>
<tr>
<td>31-40</td>
<td>18</td>
<td>11(61%)</td>
<td>03(17%)</td>
<td>14(78%)</td>
</tr>
<tr>
<td>41-50</td>
<td>13</td>
<td>08(62%)</td>
<td>02(15%)</td>
<td>10(77%)</td>
</tr>
<tr>
<td>51-60</td>
<td>08</td>
<td>05(63%)</td>
<td>01(13%)</td>
<td>06(75%)</td>
</tr>
<tr>
<td>&gt;60</td>
<td>13</td>
<td>11(85%)</td>
<td>01(08%)</td>
<td>06(92%)</td>
</tr>
<tr>
<td>Total</td>
<td>110</td>
<td>68(62%)</td>
<td>15(14%)</td>
<td>83(75%)</td>
</tr>
</tbody>
</table>

Standard antero-posterior and lateral skull X-rays were done in all cases. The type and location of skull fractures were noted. The X-rays findings were confirmed on CT scan of head. The per-operative findings were correlated with the radiological findings. The total number of skull fractures diagnosed on the basis of skull X-rays, CT scan and per-
operatively were correlated with extradural hematoma diagnosed on CT scan and per-operatively. The results were analyzed using SPSS version 14.0.

RESULTS

Age and Frequency of Skull Fracture: The frequency of skull fracture in most of the age groups was similar i.e. 68–78% except 92% in above 60 years age group (Table 1).

Skull x-rays: A linear fracture was found in 60 patients and a depressed skull fracture in 15 patients. Therefore, a total of 75 patients had a skull fracture visible on radiography.

Table 2. Prevalence of various sources of bleeding.

<table>
<thead>
<tr>
<th>SOURCE OF BLEEDING</th>
<th>NUMBER OF CASES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Middle meningeal artery</td>
<td>60 (54%)</td>
</tr>
<tr>
<td>Middle meningeal vein</td>
<td>13 (12%)</td>
</tr>
<tr>
<td>Dural sinus</td>
<td>15 (13.5%)</td>
</tr>
<tr>
<td>Fracture / Diploic veins</td>
<td>14 (12.5%)</td>
</tr>
<tr>
<td>No identifiable source</td>
<td>09 (08%)</td>
</tr>
</tbody>
</table>

Per-Operative Correlation: Eight patients with no evidence of fracture on radiography had skull fractures observed at the time of surgery, whereas fracture was confirmed in all the cases shown to have fracture on radiography. Therefore, a total of 83 patients (75%) had fracture skull.

Source of Extradural Hematoma: Arterial bleeding (middle meningeal artery) was the most common source of extradural hematoma. Source of hematoma could be identified in most of the cases (Table 2).

DISCUSSION

The role of skull X-rays in patients of mild head injury has been controversial and the yield of X-rays might not be helpful. In a large study, more than 22,000 patients of head injury underwent skull radiography; skull fracture was seen in only 3%, while only 0.6% of the total patients had an intracranial hematoma. Only 9% of patients with skull fracture had an intracranial lesion, and a significant number (51%) of patients with an intracranial injury did not have a skull fracture. According to Mendelow et al. oriented patients in neurosurgical wards with a fracture had 190 times greater chance of having an intracranial hematoma than other conscious patients without a skull fracture.

Table 3. Frequency of Skull Fracture in Extradural Hematoma in Various Series.
Patients who are alert and have no symptoms, in the emergency department, pose a problem in deciding whether they should be admitted or not. It is observed that demonstration of a skull fracture may be the only index of the severity of the blow in such cases. In these patients, the risk of development of an acute intracranial hematoma is increased by 300-400 folds if there is a fracture skull. Extrudural hematoma above 30 years of age without a skull fracture is rare. In our study, we did not find any significance of age in relation to the incidence of skull fracture. Out of 52 patients above thirty years age, 10 (20%) did not have a skull fracture. 

In large scale studies, the overall incidence of skull fracture ranged between 60-85%, while it was 75% in our series (Table 3). Out of 83 fractures in our series, 15 (18%) were depressed skull fractures. The incidence of depressed skull fractures is higher in our series as compared to other studies. This may be related to different mode of trauma in our population. In our study, 27 patients neither had a skull fracture on radiography, nor could be appreciated per-operatively. Thus, extradural hematoma can not be ruled out even if there is no fracture of skull. In conclusion, we found a strong association of fracture skull with extradural hematoma but a normal X-ray does not rule out extradural hematoma. We recommend that patients with fracture skull should be referred to a neurosurgical facility without delay, even if they do not have any other evidence of significant head injury. Those patients who do not have a fracture skull and who are conscious should be watched with a high index of suspicion for the development of extradural hematoma.

REFERENCES