MINOR HEAD INJURIES — AN ADMISSION POLICY

by

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INTRODUCTION

Approximately one million patients are seen at United Kingdom hospitals each year after head injury. About 20 per cent are admitted (Jennett, 1978) and the majority of those admitted go home within 48 hours. The question arises, are many patients admitted for insufficient reasons, and this raises the related problem. Should all head injuries have a skull x-ray?

A review of the literature was undertaken with these questions in mind, in an effort to relate it to the experience of this centre and to formulate an admission policy for head injuries with particular emphasis on the mild head injury.

REVIEW OF LITERATURE

Head injury statistics

The 1974 Scottish Head Injury Management Study (Strang, 1978) produced some interesting statistics on head injuries. Three thousand five hundred patients with head injuries who attended Scottish Accident and Emergency (A and E) departments during two weeks in 1974 were studied. This represented 10 per cent of all attenders at these departments. Of all the adult males attending, 25 per cent had recent alcohol consumption.

Fifty-eight per cent had skull x-rays taken and of these, 2.7 per cent had a skull fracture. Although 20 per cent had altered consciousness at some time, only five per cent showed any impairment of consciousness when seen in hospital. If those who were not x-rayed are assumed to have no fracture, then the overall incidence of fracture was 1.5 per cent of attenders with head injury. A skull fracture was found in only 1.3 per cent of the 51 per cent of patients with no evidence of brain damage (i.e., altered consciousness at some time) who had x-rays taken. Strang found that 23 per cent of patients with head injuries attending A & E departments were admitted. Forty per cent of these had no evidence of brain damage (i.e., any degree of altered consciousness either before coming to the A & E department or when examined). Out of 826 patients admitted, 81 per cent were fully conscious in the A & E department and had no fracture (half of these patients gave a history of altered consciousness prior to coming to the A & E department). In this group of patients, many admissions may have been unnecessary.

Another interesting fact shown in Strang’s study was that 41 per cent of the patients presented between 5.00 pm and midnight, 10 per cent between midnight and 8.00 am. Thus the majority of head injuries presented outside normal working hours, when the A & E department is staffed mainly by juniors. This underlines the importance of having clear guidelines for admissions.
Reasons for admission

Strang (1978) showed that there were two main reasons for admitting patients with head injuries for observation. Firstly, for continuous observation so that the development of an intracranial haematoma (in particular an extradural haematoma) may be diagnosed at an early stage; and secondly, for the correct diagnosis and management of minor head injuries so that post-concussion symptoms may be kept to a minimum (Potter, 1973). No proof exists that admission does minimise late symptoms, but Potter is not alone in believing that it does so.

The problem which most worries the casualty officer is that a patient with an apparently minor head injury who is sent home, may later develop an extradural or subdural haematoma. The course of an extradural haematoma may be very rapid, so the outlook should be much better if the patient has been kept in hospital and the deterioration recognised early. The onset of other complications of head injury such as intracranial infection and epilepsy is somewhat slower, so if the patient has been sent home there is time for him to return to hospital.

Patients who ‘talk and die’

Attention has been drawn to the problem of those patients with head injuries who talk and die (Reilly et al, 1975). If the patient talked sensibly at some time after the head injury, then the degree of brain damage was not overwhelming. Three-quarters of patients with a head injury who ‘talk and die’ have an intracranial haematoma. Rose et al (1979) looked at 116 patients who ‘talked and died’. They found 74 per cent had one or more avoidable factors and in 54 per cent an avoidable factor was judged to have certainly contributed to death. The commonest avoidable factor was delay in evacuation of an intracranial haematoma (others were epilepsy, meningitis, hypoxia and hypotension).

Mendelow (1979) studied the effect of delayed treatment of an extradural haematoma in 145 patients. The mean delay in patients who died was 15.7 hours and in good quality survivors mean delay was 1.9 hours (the time of delay being measured from the first recorded depression in the patient’s level of response). He and his colleagues recommend direct admission to a neurosurgical unit for severe head injuries. However, this may well be impractical in many areas. If, therefore, delay in evacuation of an extradural haematoma is the commonest avoidable factor in death after head injuries and delay in treatment, so worsens the prognosis, we must try to avoid sending home any patients likely to develop this condition.

Skull fracture and intracranial haematoma

Galbraith and Smith (1976) studied 307 cases of acute traumatic intracranial haematoma in Glasgow. A total of 19 per cent had no fracture (vault, nose, skull base, the latter being diagnosed clinically). Further analysis showed 15 per cent of the extradurals and 17 per cent of the intracerebral haematomas had no visible skull fracture. Fourteen patients (five per cent of the total) had no skull fracture and no neurological signs nor symptoms. They calculated that this
represented 1 in 5,000 of head injuries admitted to Scottish hospitals in the 12 years of study. Clinical findings in these 14 patients are interesting. Five were children who developed signs in less than 48 hours. Five were aged 60 to 80 years who developed signs after 48 hours. They all had subdural haematomas (therefore 24 hours observation is unlikely to have been of any value). Four were aged 30 to 50 years who developed signs in less than 48 hours. These represented cases in adults in 12 years in a population of three million, which were possibly preventable. It is such a group of patients that the present admission policy is designed to detect.

**Problems of diagnosis**

Galbraith (1976) showed that 36 per cent of 307 intracranial haematomas had been deteriorating for over 12 hours in another hospital before being referred to a neurosurgical unit. He showed that in 66 per cent of these the delay was due to erroneous diagnosis, either of cerebrovascular accident or of alcoholic intoxication. However, in 77 per cent of these ‘drunk’ patients and in 88 per cent of these ‘strokes’ a skull fracture was present. Hence the detection of a skull fracture either clinically or radiologically is a very helpful method of avoiding these errors. The intoxicated patient with a head injury is a very common problem. In city hospitals up to 25 per cent of the adult head injuries have consumed alcohol (Strang, 1978). One aid to diagnosis is to measure blood alcohol levels and if the value is less than 200 mg per 100 ml then the head injury is probably the cause of the confusion. Alcoholic confusion should always decrease with the passage of time. Fresh deterioration in the level of consciousness should be viewed with the gravest suspicion.

Another area of difficulty is in children. They are poor historians, difficult to examine and a larger proportion of children have an intracranial haematoma without a skull fracture. In adults 90 per cent of extradural haematomas and 75 per cent of those with other intracranial haematomas have a skull fracture (Jennett, 1978). Therefore, unless loss of consciousness can be confidently excluded, children with head injuries are best admitted.

**Admission of more patients**

Some papers in the literature propose admitting more patients with a mild head injury. Feiring of New York (1979) states that all closed head injuries should be admitted for observation, except those with the very briefest periods of unconsciousness (less than two minutes).

Potter (1973) gives three reasons for not admitting fewer head injuries. Firstly, the history of the patient and or that of a third party is frequently unreliable. Secondly, skull x-rays are not available in all A & E departments and are frequently misread. Thirdly, if one takes the patient seriously by admitting, this may decrease the incidence of the post-concussional syndrome. There is, however, a danger of causing neurosis by making the patient more worried about his condition than is necessary.
Value of skull x-rays

There is much debate in the literature on the value of skull x-rays in the A & E department. Many radiologists argue for fewer skull x-rays. Evans (1977) states that the presence or absence of a skull fracture rarely influences treatment after admission. However, it may well influence admission criteria and admission itself is a form of treatment. Eyes et al (1978) argue similarly and state that two-thirds of diagnostic radiological workload comes from casualty departments. They studied 504 patients who had skull x-rays after head injury. Demonstrable fractures were seen in 1.9 per cent and in only two cases did the radiographic findings (depressed fractures) initiate any active medical intervention. However, Jennett and Strang (1978) and Sarkies (1978) emphasise the importance of detecting a fracture, as a means of anticipating serious complications. Briggs and Potter (1978) give similar arguments for skull x-rays.

Medica-legal aspects

De Lacey (1979) found that five per cent of casualty x-rays were ordered for purely medico-legal reasons, i.e., the doctor feared litigation. This contrasted with other reports where requests for x-rays for purely medico-legal reasons amounted to 44 per cent of the total (Evans, 1977).

Jennett (1976) emphasised the importance of reading accurately the skull x-ray. He looked at 53 cases reported to the Medical Defence Union and Medical Protection Society of head injuries which later developed serious complications. Of these 53, 21 were sent home from an A & E department (16 of these died). In all 21, there was some abnormality about the skull x-rays. Therefore, if casualty officers are to send patients home, at least partly on the basis of the skull x-ray, the onus falls on them (and their teachers) to ensure they can detect fractures and gross abnormalities on the x-ray film.

Aspects of cost

Much has been written about the cost of skull x-rays in head injuries with reference to the low incidence of positive findings (Raison, 1976, Boulis et al, 1978, and Newman, 1977). However, the negative skull x-ray is important in helping the clinician decide which patients with head injury can be allowed to go home safely. The approximate cost for a skull series is £6.00 including the radiographer's and technician's time and the cost of the films (personal communication 1979). However, the cost of 24 hours in-patient care in a teaching hospital is approximately £65 (1979). Hence, the skull x-ray seems beneficial from both patient care and cost point of view.

RECOMMENDATIONS

In the light of our review of the literature, our indications for admission for patients with head injuries are shown in Table I.
TABLE I

*Indication for admission of patients with acceleration/deceleration closed head injuries with a period of amnesia or unconsciousness.*

1. All patients whose conscious state shows any impairment in the A & E department, or who have a post-traumatic amnesia of over one hour.
2. Marked headache or vomiting.
3. Abnormal neurological signs.
4. Skull fracture of vault, diagnosed by x-ray of base, diagnosed clinically (periorbital haematomas, CSF rhinorrhoea, otorrhoea or retromastoid haematoma).
5. Patients whose head injury is combined with marked alcoholic intoxication, cerebrovascular accident, or other pathology.
6. If no responsible person is at home.
7. In children there should be a higher degree of suspicion and a greater readiness to admit.

An adult after a head injury can be discharged from an A & E department if the criteria outlined in Table II are fulfilled. The patient and accompanying friend or relative should be given written head injury instructions. These advise the relatives to speak to the patient at intervals of two or three hours over the first 24 hours, and to bring the patient back to hospital if his responsiveness deteriorates. Patients who are not being admitted should have x-rays taken, a PA and one lateral view. Those who are being admitted do not necessarily require x-rays.

TABLE II

*Indications for allowing adult patients with head injury to go home*

1. Fully conscious in the A & E department.
2. Symptom free.
3. No abnormal neurological signs.
4. No skull fracture.
5. There is a responsible person at home.
6. Post-traumatic amnesia of less than one hour.

Patients who are sent home should be recalled for review preferably within 24 hours to reassess the patient, to confirm that the amnesia was due to head injury and not to some other cause, to establish and record the length of retrograde and post-traumatic amnesia, and to commence a follow-up designed to reduce post-concussional symptoms to a minimum (Rutherford et al, 1979).
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