



Clinical Research

Geriatric traumatic acute subdural haematomas: A retrospective study

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ABSTRACT

Acute subdural haematomas (ASDH) are severe traumatic brain injuries. Older patients have a higher mortality rate. We retrospectively reviewed 19 geriatric patients with ASDH to demonstrate the outcome of the management of ASDH and to find out which parameters are significant in predicting the outcome. Computer records and patient files of 19 geriatric patients with traumatic ASDH who underwent surgical intervention in Ondokuz Mayıs University School of Medicine at Department of Neurosurgery between January 2006-December 2009 were reviewed. The diagnosis was based on computerized tomography (CT) findings. Examined criteria were age, sex, mechanism of the trauma, Glasgow Coma Score (GCS) on admission, presence of a midline shift and contusio cerebri, thickness of the haematoma, accompanying chronic diseases, anticoagulant therapy, type of surgery and neurological examination on discharge. ASDH of the posterior fossa, subacute-chronic subdural haematomas, patients with serious extracranial injuries and aged below 65 were excluded. A GCS of ≤ 8 on initial presentation, pupillary non reactivity, presence of a midline shift and contusio cerebri was found to be significantly associated with increased mortality and a poor patient outcome. Effect of sex, anticoagulant therapy and type of surgery couldn't have been found to be determinant on prognosis.

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1. Introduction

Traumatic acute subdural haematomas (ASDH) remains one of the most lethal of all head injuries; the mortality rate is reported to be between 40 and 90 % in most large series (Koç et al., 1997).

Investigators have shown that global cerebral blood flow is reduced after ASDH, leading to a critical ionic imbalance with edema and widespread cell death (Sawauchi et al., 2003; Alessandri et al., 2006). Local pressure causes focal ischemia which leads to increased energy metabolism reduced tissue oxygenation which can cause infarction a few hours after ASDH (Miller et al., 1990; Sawauchi et al., 2003; Alessandri et al., 2006). Even after rapid decompression and haematoma evacuation (< 4 hour), many patients therefore die (Seelig et al., 1981).

The elderly are predisposed to bleeding due to normal cerebral atrophy related to aging, stretching the bridging veins from the dura. Prognosis in ASDH is associated with age, time from injury to treatment, presence of pupillary abnormalities, Glasgow Coma Score (GCS) or motor score on admission, immediate coma or

lucid interval, computerized tomography (CT) findings (haematoma volume, degree of midline shift, associated intradural lesion, compression of basal cisterns), post-operative intracranial pressure and type of surgery (Hanif et al., 2009). Advancing age is known to be a determinant of outcome in head injury (Ushewokunze et al., 2004).

We retrospectively reviewed 19 geriatric patients with ASDH who were managed in Ondokuz Mayıs University School of Medicine at Department of Neurosurgery between January 2006-December 2009 to demonstrate the outcome of the management of ASDH and to find out which parameters are significant in predicting the outcome.

2. Methods

Computer records and patient files of 19 geriatric patients with traumatic ASDH who underwent surgical intervention in Ondokuz Mayıs University School of Medicine at Department of Neurosurgery between January 2006-December 2009 were reviewed. The diagnosis was based



Fig. 1. CT of a 75 year old female patient with right temporal ASDH, contusio cerebri and traumatic subarachnoid hemorrhage after falling .



Fig. 2. CT of a 70 year old male patient with right hemispheric ASDH causing midline shift after traffic accident. The haematoma thickness was 3.5 cm and midline shift was 1 cm.

on CT findings.

Examined criteria were age, sex, mechanism of the trauma, GCS on admission, presence of a midline shift and contusio cerebri, thickness of the haematoma, accompanying chronic diseases, anticoagulant therapy, type of surgery and neurological examination on discharge. ASDH of the posterior fossa, subacute-chronic subdural haematomas, patients with serious extracranial injuries and aged below 65 were excluded.

All of the patients were aged over 65. There were 12 male and 7 female patients. 16 patients had accompanying chronic diseases and 10 of them were under anticoagulant therapy. The cause of the ASDH was divided into 3 groups: traffic accidents, falls and situations which a major trauma didn't accompany. Patients were evaluated at the emergency room and their GCS and pupil abnormalities were recorded. The scores were grouped as below and above 8.3 of the patients also had contusio cerebri. At 18 patients, the thickness of the haematoma were over 1 cm and 13 patients had midline shift. The haematoma was evacuated surgically by a craniotomy and subdural drain or by a craniectomy with bone flap removal (decompressive craniectomy).

3. Results

Twelve of the 19 patients were discharged after neurological recovery, 7 patients died.

Sex: Five of the 12 male patients and 2 of the 7 female patients died after surgery. No effect of sex on mortality was found.

The mechanism of the trauma: The cause of ASDH was traffic accidents in 3 of the patients, falls in 10 of the patients and minor traumas except these causes in 6 of the patients. It was detected that falls were more frequent in older patients. Death cause of all the 7 patients in our study was falls. Therefore it was concluded that falls had a higher mortality.

Glasgow Coma Score: Seven patients had a GCS ≤ 8.6 of the 7 patients in this group died after surgery. The death rate in this group was 85.7%. 12 patients had a GCS > 8.11 of the 12 patients in the second group were discharged with a good general health status, 1 patient died. The death rate was 8.33%. It was concluded that GCS was the major factor on mortality.

Pupil reactivity: Two patients had nonreactive dilated pupils at initial presentation. Three patients only had one nonreactive dilated pupil. Twelve patients had reactive pupils bilaterally. Either the patients with bilateral nonreactive dilated pupils and the patients with one nonreactive dilated pupil died after surgery with a death rate of 100%. Only 2 patient with reactive pupils died with a death rate of 28.7%. Pupil reactivity was also considered as a major prognostic factor on mortality.

Presence of contusio cerebri: Contusio cerebri accompanied in 3 of 19 patients. All of the patients with contusio cerebri died. The death rate was 100%.

Midline shift: Of 13 patients with a midline shift, 6 of them died after surgery. The death rate was 46%. Only 1 patient without a midline shift died with a death rate of 16%. With these findings, it was concluded that presence of a midline shift increased mortality significantly.

Thickness of the haematoma: At 18 patients, the thickness of the haematoma were over 1 cm. All of the 7 patients who died after surgery had haematoma thickness over 1 cm. The death rate in these patients was 39%.

Anticoagulant therapy: Ten patients were under

anticoagulant therapy and 2 of them died with a death rate of 20%. 5 of the patients who were not under therapy died after surgery with a death rate of 55. It was concluded that anticoagulant therapy itself didn't increase mortality.

Type of surgery: The haematoma was evacuated with a craniotomy and subdural drainage or by decompressive craniectomy. 11 patients were operated by craniotomy and 4 patients died with a death rate of 36.36%. Craniectomy was performed in the patients with larger haematoma, greater midline shift, low GCS. 3 of the 8 patients with craniectomy died with a death rate of 37.5%. No significant difference was found in surgical methods.

4. Discussion

Patient age is thought to be a strong predictor of morbidity and mortality following severe closed head injury (Dennis et al., 1991). Some authors have suggested that one of the pathophysiological mechanisms behind this effect may be due to increased sensitivity to ischaemic brain damage associated with mitochondrial dysfunction seen both with advancing age and severe head injury (Mendelow, 2006). Although some of this increased mortality may be explained by other factors, age itself is an independent predictor for mortality in geriatric age group (Mosenthal and Lavery, 2002).

Older patients are especially predisposed to subdural haematoma regardless of injury mechanism. The reasons for this haemorrhagic tendency may include cerebral atrophy with change in the viscoelastic properties of the brain, alterations in the mechanical properties of the bridging veins and stress on venous structures (Hanif et al., 2009).

Aetiology of head injury changes across the age spectrum. Falls and pedestrian injury become more common in older age groups. An increasing incidence of sensory deficit, muscle weakness, gait unsteadiness and arrhythmia contribute to the higher risk of falls in older patients (Hanif et al., 2009). In our study ASDH was caused by falls in 10 of the 19 patients and as all the 7 patients died because of falling, mortality was significantly higher as compared with other mechanisms like traffic accidents and another injury mechanisms.

A GCS of 3 – 8 on initial presentation was found to be significantly associated with increased mortality and a poor patient outcome. This finding is in accordance with that of other studies (Dent et al., 1995; Bullock et al., 2006). Initial pupillary reaction was shown to be a very important

prognostic factor for outcome. In the present study, the mortality in patients with both pupils or one pupil dilated and non-reactive to light was 100 %. A number of other studies have also reported that non-reactive pupils predict unfavourable outcome. Marshall et al., (1991) showed that 50 % of patients who developed one pupillary abnormality died and mortality was 74 % when both pupils were fixed and nonreactive. The population studied by Marshall et al., (1991) 151 patients with both pupils nonreactive included younger patients, which could explain the difference in the mortality rate compared to our study.

Presence of contusio cerebri were also predictive of a worse outcome. Other studies have also identified parenchymal lesions and traumatic subarachnoid haemorrhage as unfavorable prognostic factors. In our study all of the 3 patients with contusio cerebri died after surgery (Fig. 1).

A Midline Shift (MS) was also found to be correlated with a high mortality. Other studies give a critical value for MS of 5 – 12 mm (Zumkeller et al., 1996; Bullock et al., 2006). Bullock et al., (2006) reported a critical value of 5 mm for MS in patients with ASDH. Other studies state that thickness of the haematoma is a strong prognostic factor on mortality but in our study, as 18 of the 19 patients had a haematoma thickness over 1 cm, we couldn't comment on the impact on mortality (Fig. 2).

In our study, the choice of surgical strategy did not appear to affect the outcome as in the other studies (Koç et al., 1997).

5. Conclusion

In this retrospective study, patients aged ≥ 65 years with ASDH were investigated with regard to their outcomes after surgery. Prognostic factors included age, sex, mechanism of the trauma, GCS on admission, presence of a midline shift and contusio cerebri, thickness of the haematoma, accompanying chronic diseases, anticoagulant therapy, type of surgery.

Based on the results of this study, a GCS of ≤ 8 on initial presentation, pupillary non reactivity, presence of a midline shift and contusio cerebri was found to be significantly associated with increased mortality and a poor patient outcome. Effect of sex, anticoagulant therapy and type of surgery couldn't have been found to be determinant on prognosis.

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