Extradural hematoma of the posterior cranial fossa

Report of seven cases with survival

ROMÁN GARZA-MERCADO, M.D.
Division of Neurological Surgery, Department of Surgery, Facultad de Medicina and Hospital Universitario, Universidad Autónoma de Nuevo León, and Hospital ISSSTE, Monterrey, Nuevo León, México

Extradural posttraumatic posterior fossa hematoma is a rare condition estimated to complicate about 0.3% of all craniocerebral injuries, and represents 4% to 12.9% of the entire group of extradural hematomas. Seven cases of posterior fossa extradural hematoma (PFEDH) are presented. There were four males and three females. One case occurred in an adult, the remaining six cases in patients 16 years of age or younger, two of whom were infants. In each case the hematoma resulted from a blow to the posterior part of the head. Each patient showed local evidence of trauma to the scalp, and a radiographic appearance of an occipital linear fracture crossing the path of the torcular Herophili or the transverse sinus. The clinical picture varied. Three patients suffered immediate transient unconsciousness. Three others suffered sudden respiratory arrest after a seemingly stable course of several hours in the hospital, but responded well to resuscitation maneuvers. Computerized tomography scans were obtained in three patients; in three others no specialized neurodiagnostic studies were feasible; in one patient, precise diagnostic documentation was achieved by Conray ventriculography. All seven patients were operated on and all survived. Two patients had associated surgical intracranial lesions: an underlying subdural hygroma of the posterior fossa in one, and a contralateral supratentorial temporal subdural hematoma in the other. Six patients have returned fully to their previous activities. One patient is steadily improving.

KEY WORDS • extradural hematoma • head injury • occipital trauma • posterior fossa extradural hematoma • posterior fossa subdural hygroma

Extradural hematoma (EDH) complicates from 1.14% to 5.8% of all head injuries according to several authors, although a higher incidence of 12.4% is reported in one series and of 19% in another (necropsy) series. This life-threatening complication of blunt head trauma occurs chiefly in the lateral areas of the skull, although 30% to 40% of lesions are unevenly distributed in the rest of the cranium. Posterior fossa extradural hematoma (PFEDH) accounts for about 0.3% of all craniocerebral injuries and represents from 4% to 12.9% of the entire group of EDH cases. Notwithstanding the fact that EDH is the most common traumatic space-occupying lesion of the posterior fossa, PFEDH seems to have been rarely diagnosed. Meredith encountered two cases among “several thousand” head injuries, and only one case was registered in each of the several other reported EDH series. Furthermore, no example of PFEDH is recorded in other EDH reports. Fisher, et al., culled 52 cases of PFEDH from the literature in 1958, and in 1962 Reigh and O’Connell were able to collect 80 such cases. Since then, other reports of PFEDH have appeared in the literature. Only six patients with PFEDH have been treated at the University Hospital, where some 200 patients are admitted annually for head injuries. These cases are presented here, in addition to one patient managed by the author at another hospital (ISSSTE).

Case Reports

Case 1

This 27-month-old baby girl was brought to the emergency room on August 18, 1975. Less than 1 hour earlier she had been hit on the head by a car slowly backing up on the sidewalk. She was rendered unconscious for a few minutes and then she began to moan.
Posterior fossa extradural hematomas

Examination. The patient was drowsy but responded by withdrawal of her extremities in response to painful stimuli. There was a divergent strabismus, but otherwise the pupils were normal. Deep-tendon reflexes were universally diminished and a Babinski sign was present bilaterally. An impressive subgaleal hematoma was observed in the left occipital area, which extended into the soft tissues of the neck and of the left shoulder. Skull roentgenography showed a linear fracture of the occipital bone extending from the left lambdoid suture across the sulcus of the ipsilateral transverse sinus and down into the area of the foramen magnum.

Course. The child became progressively more stuporous. A left hemiparesis was soon detected, and the left pupil dilated slowly. She responded now only to stronger painful stimulation by extension of the limbs. As her breathing became slower and shallower, endotracheal intubation was quickly accomplished and the patient was hurriedly taken to surgery without any further diagnostic studies. After negative exploration of the left temporal fossa through a burr hole, an EDH of the left posterior fossa was removed. Bleeding from a lacerated transverse sinus was controlled with a muscle stamp. The interval between trauma and operation was less than 3 hours.

The patient regained consciousness by the 2nd postoperative day and then improved steadily. When discharged on the 13th postoperative day, mild left mydriasis was observed as well as diplopia, left sixth nerve palsy, spasticity of the limbs on the left side, and slight truncal ataxia. Lateral rectus muscle transplant was carried out by an ophthalmic surgeon 7 months after the injury. At the present time, 7 years after the accident, the patient is attending school normally.

Case 2

This 16-year-old boy entered the emergency room on April 9, 1977, some 4 hours after falling off a moving pick-up truck in a rural area, and striking his head against some rocks on the road. He was unconscious for about 10 minutes.

Examination. The patient was conscious but somnolent. He responded well to verbal and painful stimulation, and complained of headache. There was horizontal nystagmus on lateral gaze to the left. The pupils were normal, and there was no motor deficit. Although the deep-tendon reflexes were normal, a Babinski sign was present on the right side. There was some bleeding from the right nostril. Contusion of the glabella and of the left occipital area was noticed. A diagonal linear occipital fracture extending from the inion into the left petrous bone was demonstrated by skull roentgenography (Fig. 1).

Course. The neurological status remained stable until the next day, although somnolence and nystagmus persisted, and the patient complained of increasing headache. Sudden respiratory arrest occurred some 20 hours after admission, but the patient responded to resuscitation maneuvers which included endotracheal intubation and controlled hyperventilation. Although spontaneous respiration resumed shortly, he reacted only slightly to painful stimuli. The left pupil remained dilated and fixed and a left upper monoparesis was detected. He was immediately taken to surgery. A left PFEDH was removed. A tear in the left transverse sinus was repaired with a muscle stamp. Contusion of the left cerebellar hemisphere was observed through a small dural incision. Additional multiple supratentorial burr holes resulted in negative findings. The interval between trauma and surgery was 27 hours.

The patient regained consciousness 4 hours after surgery. Other than transient right-sided cerebrospinal fluid (CSF) rhinorrhea (glucose 96 mg%), the postoperative course was uneventful. Recovery was complete by the time he was discharged on the 11th day.

Case 3

This 12-year-old boy was admitted to the emergency room on January 12, 1981. Two hours earlier he had tripped and fallen at home, striking the occiput. He did not lose consciousness then, but he was somnolent thereafter, and vomiting and headache ensued.

Examination. Although somnolent, the patient responded to verbal commands. Neurological examination was considered normal. The temperature was 38.9°C and there was some mucopurulent rhinorrhea, and hypoventilation of the right basal pulmonary lobe, where some dry rales could be heard. There was a...
contusion of the left occipital scalp. Skull x-ray films showed a diagonal linear fracture of the left occipital bone extending from the inion to the left petrous bone across the sulcus of the transverse sinus. Chest x-ray films disclosed an opacity in the right lower pulmonary lobe. Blood analysis revealed 27,000 leukocytes/cu mm and 90% polymorphonuclear cells. The patient was admitted directly to the pediatric section with the diagnosis of pneumonia.

**Course.** In spite of considerable improvement of his pulmonary function in the following 2 days, the patient remained somnolent, and headache and vomiting persisted. Other than neck stiffness, the neurological examination was again considered normal. Computerized tomography (CT) demonstrated a biconvex hyperdense lesion of the left posterior fossa (Fig. 2). A PFEDH was removed at surgery, but the source of bleeding could not be discovered. The interval between trauma and surgery was 66 hours. The patient recovered entirely and was discharged on the 5th postoperative day.

**Case 4**

This 14-year-old boy was admitted to the ISSSTE Hospital on December 9, 1981. Three days earlier he had fallen off a horse, striking the occiput. Although momentarily dazed, he could catch his horse and ride back home. In spite of increasing headache and vomiting, the patient was returned home after examination at a local rural clinic on each of the following 3 days. Finally, skull x-ray films were taken and an occipital fracture was observed, so he was transferred to Monterrey.

**Examination.** The patient was conscious and cooperative, but disoriented and confused. The left pupil was moderately dilated and reacted slowly to light stimulation. A coarse horizontal nystagmus was observed on extreme lateral gaze to the left. The gag reflex was absent in the left side, and there was weakness of the left hemipalatal velum. Slight incoordination, without paresis, of the left-sided extremities was also noticed. Deep-tendon reflexes were increased on the right side, and a right Babinski sign was present. A well-healed puncture wound and a bruise on the scalp were observed in the left occipital region. Repeat skull films reconfirmed the presence of a hairline occipital fracture extending diagonally from the left lambdoidal suture into the ipsilateral petrous bone across the path of the transverse sinus. Emergency CT demonstrated a lenticular lesion with the density of blood occupying the left occipital and suboccipital areas (Fig. 3).

**Course.** Immediate surgery disclosed a large left PFEDH, which was removed. Significantly, the clot extended well above the transverse sinus into the occipital region. The left mastoid emissary vein was found torn and bleeding actively, but some oozing from the meningeal arteries was also observed when the clot was removed from the occipital dura. An underlying posterior fossa subdural hygroma containing about 20 ml of xanthochromic CSF was evacuated through a small dural incision. The large skull defect was then repaired with a plate of methyl methacrylate. Time elapsed between trauma and surgery was 84 hours. The patient had recovered completely by the time of his discharge on the 7th postoperative day.

**Case 5**

This 26-year-old woman was admitted to the gynecology department on March 21, 1982, because of profuse vaginal bleeding. The day before she had submitted elsewhere to an abortion of an estimated 3-month pregnancy. She was allowed to go home afterward. By the next morning she was found wandering about her apartment seminude and confused, with a
Posterior fossa extradural hematomas

blood-stained bath towel rolled in her crotch and complaining of headache.

Examination. Her blood pressure was 90/60 mm Hg, temperature 35.5°C, pulse 100/min, and respirations 26/min. She was drowsy and indifferent to painful stimuli. The neurological examination was regarded then as not remarkable. Faint ecchymoses were noted in her extremities, and there was slight neck stiffness. Vaginal bleeding was profuse. Hemoglobin was 8.9 gm/dl and hematocrit 28%, so the patient was transfused with whole blood. A wooden foreign body was retrieved from an ecchymotic open cervical canal, and remains of decidual tissue were removed by a dilation and curettage procedure performed under epidural saddle-block anesthesia.

Course. Sudden respiratory arrest occurred 3 hours after the procedure. The patient responded well to immediate endotracheal intubation and other resuscitation maneuvers but she remained unconscious, reacting minimally to strong painful stimuli. Early bilateral papilledema and a right subhyaloid hemorrhage was observed by the neurosurgical consultant urgently summoned to the case. The right pupil was dilated and fixed. Deep-tendon reflexes were absent, and the plantar responses equivocal. A linear fracture of the right occipital bone crossing the transverse sinus toward the posterior fossa was demonstrated by plain skull films. Since the CT scanner was not available, bilateral carotid arteriography was performed. The anterior cerebral arteries seemed to be stretched in the midline, and there were no supratentorial hematomas. On right frontal twist-drill Conray (meglumine iodothalamate 60%) ventriculography, the contrast material reaching the cisterna magna was separated from the inner table of the suboccipital bone by 1.5 cm (Fig. 4); the aqueduct and fourth ventricle were displaced ventrally also. A faint bruise was observed in the right occipital scalp when the patient's head was shaved for surgery. A right PFEDH was removed. A tear of the right transverse sinus was identified as the source of bleeding, and was repaired with a muscle stamp. It was learned after surgery that the patient had fallen while drinking 1 week earlier, striking the back of her head. No unconsciousness ensued then and subsequent headache was considered as tensional in origin. The interval between trauma and surgery was 7½ days.

The patient regained consciousness by the 2nd day, but the postoperative course was both stormy and protracted, with the patient requiring very close multidisciplinary surveillance in the intensive care unit for several weeks. She was finally discharged 13 weeks postoperatively. Her sensorium was normal and she could take independent oral feedings, but she needed assistance to walk on account of marked right-sided incoordination and staggering. Her speech was slurred and there was paralysis of the sixth to twelfth cranial nerves on the right side. However, she is known to be steadily improving.

Case 6

This 18-month-old baby girl was brought to the emergency room on August 5, 1982. About 1 hour earlier she had been thrown against the pavement when the motorcycle she was riding on with her parents collided with an automobile. She had not lost consciousness but she had vomited on several occasions by the time of her arrival at the hospital.

![Fig. 4. Case 5. Conray ventriculograms. Left: Lateral view showing the contrast medium in the cisterna magna separated from the inner table of the skull in the posterior fossa (arrow). The fourth ventricle is displaced ventrally, and there is mild ventricular dilatation. Right: Towne view showing displacement of the fourth ventricle to the left of the midline. Notice the diagonal linear fracture across the sulcus of the transverse sinus in the right occipital bone (retouched).](image-url)
**Case 6**

**Examination.** The patient was somnolent but arousable. Her eyes were persistently deviated to the right. There were no other localizing neurological signs. A scalp contusion was noticed in the left occipital region. A linear fracture of the left occipital bone extended across the sulcus of the transverse sinus into the posterior fossa, as seen in skull films. Laboratory analysis revealed a hemoglobin level of 7.4 gm/dl and a hematocrit of 29%, so a whole-blood transfusion was administered.

**Course.** The next day, somnolence and vomiting persisted. The eyes still deviated to the right and now the patient would fall to the right when propped up in bed. A CT scan revealed a biconvex lesion with the density of blood occupying the left posterior fossa (Fig. 5). At surgery, a left PFEDH was removed, but the source of bleeding not discovered. The interval between trauma and surgery was 26 hours. The patient was discharged on the 5th postoperative day with normal neurological findings.

**Case 7**

This 7-year-old boy was admitted to the emergency room on October 26, 1982. About 1 hour earlier he had been run over by an automobile when returning home from school. He was unconscious for about 10 minutes.

**Examination.** The patient was drowsy but responded well to verbal and painful stimuli. The neurological examination, other than revealing slight generalized flaccidity, was considered normal. A localized subgaleal hematoma was noticed around the inion and the right suboccipital area. Skull roentgenography demonstrated a diagonal linear fracture extending from the inion toward the right petrous bone (Fig. 6).

**Course.** When examined in clinical rounds the next morning the patient was slightly more alert, but a mild paresis of the right upper extremity was now detected. Pupils, ocular fundi, and extraocular movements were normal. An emergency CT scan was requested, but about 10 minutes later we were hurriedly summoned back by the floor nurse. The patient had suffered a generalized tonic seizure, after which the left pupil had dilated and respiratory arrest ensued. The patient remained comatose in spite of regaining spontaneous breathing in response to resuscitation maneuvers, and did not respond to strong painful stimulation. He was expeditiously taken to surgery. With hardly any scalp preparation, with the child still on a stretcher, an acute left temporal subdural hematoma was drained through a burr hole and a right PFEDH was removed next. A tear in the torcular Herophili was repaired with a muscle stamp. The interval between trauma and surgery was 17 hours.

The patient regained consciousness 12 hours after surgery and improved steadily thereafter. Reinforcement of the suture line controlled some xanthochromic CSF leakage from the temporal incision. Mild right hemiparesis and discrete truncal ataxia were present on discharge on the 10th postoperative day.

**Discussion**

Posterior fossa extradural hematomas (PFEDH's) are classified as acute (less than 24 hours), subacute, and chronic (more than 10 days) according to the interval between the trauma and the operation. Most of the PFEDH cases follow a subacute course, and an estimated proportion of 1:2 or 1:3 are acute cases.
Posterior fossa extradural hematomas

Chronic cases are much less frequent, and a 10-month course, as observed in one case, is exceptional. In the current series, two patients were operated on at 3 (Case 1) and 17 hours (Case 7) after trauma, two at slightly over 24 hours (Cases 2 and 6), and three at 2.7, 3.5, and 7.5 days (Cases 3, 4, and 5). There were four males and three females. Only one patient in this series was an adult (26 years old); the remaining six patients were 16 years of age or younger. In each case, the hematoma resulted from a blow to the posterior part of the head, but only one patient suffered concomitant contusions in the anterior part of the cranium (Case 2). Local midline or lateral evidence of occipital trauma was present in each patient, and is a most reliable indicator for the location of the hematoma. A linear fracture of the posterior fossa extending from the neighborhood of the lambdoid suture or the inion toward the foramen magnum or the ipsilateral petrous bone was demonstrated in each patient by skull roentgenography. In each case, the fracture crossed the path of the transverse sinus, but did not extend beyond the midline. As shown by Fisher, et al., a posterior fossa fracture in a case of occipital trauma is an ominous sign. Serious complications developed in 33% of their patients with such fractures, compared with only 7% of those without. As has been reported for EDH in general, some cases of PFEDH may occur without an associated fracture, but a fracture is nearly always present, and may even be depressed. 

Acute cases of PFEDH may show early signs of medullary failure, with death ensuing if not relieved by surgery. The subacute cases may exhibit signs related to increased intracranial pressure and/or cerebellar, brain-stem, long tract, or cranial nerve signs. A history of initial unconsciousness is not absolutely necessary, nor does it exclude the diagnosis of PFEDH. Four of our patients were not immediately unconscious; drowsiness developed shortly (Cases 3 and 6) or a few days (Cases 4 and 5) after trauma. Three patients were unconscious for less than 10 minutes (Cases 1, 2, and 7), and remained somnolent afterward. Only one patient (Case 2) was alert for a few hours after regaining consciousness; a double lucid interval was not observed in any of these patients.

Unilateral mydriasis is not actually rare in patients with PFEDH. Campbell, et al., stated that this sign was recorded in six of 28 patients in the literature. Jamieson attributed mydriasis to third nerve compression by cerebellar herniation through the incisura. Five of our patients had unilateral mydriasis (Cases 1, 2, 4, 5, and 7). In four, the dilated pupil was ipsilateral to the posterior fossa clot; in one (Case 7) it was contralateral. This latter patient also harbored an acute temporal subdural hematoma in that side. In one patient (Case 6), ipsilateral paralysis of conjugated extraocular movements was noted, with the eyes being persistently deviated to the opposite side. A patient described by Rosary, et al., presented a similar condition. Divergent strabismus was observed in our Case 1, and two patients (Cases 2 and 4) exhibited nystagmus on extreme lateral gaze to the side of the posterior fossa clot. Papilledema was observed in the patient (Case 5) who had the longest clinical course (7 days). Absence of the gag reflex and paralysis of the hemipalate were present in one patient, ipsilaterally to the PFEDH (Case 4). Lateropulsion to the side opposite to the EDH was noted in one patient (Case 6), and ipsilateral motor dysfunction was recorded in two: hemiparesis in Case 1, and upper monoparesis in Case 7. A generalized tonic seizure ensued in the latter patient, who also suffered an associated acute subdural hematoma in the opposite temporal region. A Babinski sign was recorded in three patients: bilateral in Case 1, and contralateral to the PFEDH in Cases 2 and 3. Acute progressive bradypnea was observed in Case 1, and Cases 2, 5, and 7 developed sudden respiratory arrest after a seemingly stable course (in Case 5, following an intended epidural saddle-block anesthesia for a dilation and curettage procedure). The danger of lumbar puncture, which could have been performed inadvertently in this patient, is well known. Death after a lumbar puncture has been reported in some such patients. Sudden respiratory arrest followed by death was reported by Wright in two patients who were apparently neurologically stable. Fortunately, in the current series the three patients affected by respiratory arrest responded successfully to resuscitation maneuvers, allowing enough time for emergency surgery. Since the clinical picture is so varied, a PFEDH should be suspected in any patient with a blow to the posterior half of the head who fails to improve, particularly if an occipital skull fracture is present (Table 1).

As in most of the reported cases, the hematoma was believed to be venous in origin in each patient of the current series, and in each case was confined to one side of the posterior fossa. In Cases 1, 2, and 5, a tear in the transverse sinus, and in Case 7 in the torcular Herophili, was identified as the source of bleeding and was repaired at surgery with a muscle stamp. In Case 4, brisk bleeding arose from a torn mastoid emissary vein when the lateral portion of the clot was removed, but some oozing from distal branches of the middle meningeal artery in the occipital area was also present. Bleeding from dural sinuses or emissary veins has been implicated in most of the reported cases of PFEDH. Diploic bleeding, although uncommon, may be responsible for some of the hematomas of which the source could not be discovered. This may have occurred in Cases 3 and 6 of this series. Venous bleeding may account for chronicity, but acute courses have been documented in many patients with venous PFEDH.

Arterial clots, on the other hand, have been noticed in a few of the reported cases of PFEDH.

Computerized tomography of the cranium has become the undisputed diagnostic method of choice in head injuries. In addition to showing intracranial hematomas and associated lesions, it provides a panoramic visualization of the ventricular system. Ty-
TABLE 1
Clinical data on seven patients with PFEDH*

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Case 1</th>
<th>Case 2</th>
<th>Case 3</th>
<th>Case 4</th>
<th>Case 5</th>
<th>Case 6</th>
<th>Case 7</th>
</tr>
</thead>
<tbody>
<tr>
<td>age</td>
<td>27 mos</td>
<td>16 yrs</td>
<td>12 yrs</td>
<td>14 yrs</td>
<td>26 yrs</td>
<td>18 mos</td>
<td>7 yrs</td>
</tr>
<tr>
<td>sex</td>
<td>F</td>
<td>M</td>
<td>M</td>
<td>M</td>
<td>F</td>
<td>F</td>
<td>M</td>
</tr>
<tr>
<td>automobile accident</td>
<td>yes</td>
<td>yes</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>fall</td>
<td>—</td>
<td>—</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>initially unconscious</td>
<td>yes</td>
<td>yes</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>lucid interval</td>
<td>drowsy</td>
<td>yes</td>
<td>drowsy</td>
<td>drowsy</td>
<td>drowsy</td>
<td>drowsy</td>
<td>drowsy</td>
</tr>
<tr>
<td>local trauma</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>fracture</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>side of PFEDH</td>
<td>left</td>
<td>left</td>
<td>left</td>
<td>right</td>
<td>left</td>
<td>left</td>
<td>left</td>
</tr>
<tr>
<td>mydriasis</td>
<td>left</td>
<td>left</td>
<td>none</td>
<td>right</td>
<td>right</td>
<td>right</td>
<td>left</td>
</tr>
<tr>
<td>nystagmus</td>
<td>none</td>
<td>left</td>
<td>none</td>
<td>right</td>
<td>none</td>
<td>none</td>
<td>none</td>
</tr>
<tr>
<td>motor dysfunction</td>
<td>It</td>
<td>It</td>
<td>It</td>
<td>none</td>
<td>none</td>
<td>none</td>
<td>rt</td>
</tr>
<tr>
<td>Babinski sign</td>
<td>palpation right</td>
<td>palpation right</td>
<td>palpation right</td>
<td>none</td>
<td>none</td>
<td>none</td>
<td>none</td>
</tr>
<tr>
<td>respiratory arrest</td>
<td>skull x-rays</td>
<td>skull x-rays</td>
<td>skull x-rays, CT</td>
<td>skull x-rays, CT</td>
<td>skull x-rays, angio, ventric</td>
<td>skull x-rays, CT</td>
<td>skull x-rays</td>
</tr>
<tr>
<td>other complications</td>
<td>divergent strabismus</td>
<td>pneumonia</td>
<td>papilledema; incomplete abortion</td>
<td>eyes deviated to rt; interopulsion to rt</td>
<td>generalized seizure</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* PFEDH = posterior fossa epidural hematoma; CT = computerized tomography; angio = bilateral carotid angiography; ventric = Conray ventriculography.

TABLE 2
Surgical data in seven patients with PFEDH*

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Case 1</th>
<th>Case 2</th>
<th>Case 3</th>
<th>Case 4</th>
<th>Case 5</th>
<th>Case 6</th>
<th>Case 7</th>
</tr>
</thead>
<tbody>
<tr>
<td>time interval trauma-admission</td>
<td>1 hr</td>
<td>4 hrs</td>
<td>2 hrs</td>
<td>78 hrs</td>
<td>7 days</td>
<td>1 hr</td>
<td>1 hr</td>
</tr>
<tr>
<td>trauma-operation surgery</td>
<td>3 hrs</td>
<td>27 hrs</td>
<td>66 hrs</td>
<td>84 hrs</td>
<td>7.5 days</td>
<td>26 hrs</td>
<td>17 hrs</td>
</tr>
<tr>
<td>survival</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>source of hematoma transverse</td>
<td>sinus</td>
<td>sinus</td>
<td>not determined</td>
<td>mastoid emissary vein &amp; MMA</td>
<td>transverse sinus</td>
<td>not determined</td>
<td>torcular Herophilphi</td>
</tr>
<tr>
<td>associated lesions CSF rhinorheal</td>
<td>PFSD hygroma</td>
<td>mild hydrocephalus</td>
<td>PFDH hygroma</td>
<td>Cerebrospinal fluid</td>
<td>Subdural hematoma</td>
<td></td>
<td></td>
</tr>
<tr>
<td>discharge</td>
<td>13th day</td>
<td>11th day</td>
<td>5th day</td>
<td>7th day</td>
<td>13th week</td>
<td>5th day</td>
<td>10th day</td>
</tr>
</tbody>
</table>

* PFEDH = posterior fossa epidural hematoma; PFSD = posterior fossa subdural; MMA = middle meningeal artery; CSF = cerebrospinal fluid; SDH = subdural hematoma.
Posterior fossa extradural hematomas

proximity of a PFEDH has been displayed by vertebral angiography.20,36

Posterior fossa EDH carries a high mortality rate, the highest for all EDH's in some series.16 Of the 52 patients listed by Fisher, et al.,9 33% did not survive. Hooper16 reported a 44% mortality rate, and Jamieson and Yelland33 and Wright46 reported 33%. This latter author noted that about half of these patients died without operation. Acute PFEDH has an even higher mortality rate (70%).23 A rather reduced fatality rate of 12.5% was reported for these patients by Fisher, et al.,9 and Zuccarello, et al.,47 and in a small series of four PFEDH patients described by Stone, et al.,41 none died. All seven patients in the current series also survived.

Concomitant infratentorial or supratentorial lesions may increase mortality and morbidity rates, particularly when they go unrecognized. Of 80 cases of PFEDH reviewed by Reigh and O'Connell,38 17 had coexisting supratentorial lesions, and only six patients survived (35%). Seven of eight patients reported by Zuccarello, et al.,47 had associated supratentorial lesions as seen by CT (three with hematomas, four with brain contusions): of these, one patient died and three were moderately disabled. Concurrent PFEDH and underlying subdural hematoma has been reported occasionally,43 and one patient was described as harboring a posterior fossa subdural hygroma under a PFEDH.26 Ciemborowicz6 considers the posterior fossa subdural hematoma as a very rare condition in itself, and subdural hygroma occupying the posterior fossa is unusual as well.42 In the current series, there were two patients with concomitant associated lesions: Case 4 had a posterior fossa subdural hygroma under a PFEDH.26 Ciemborowicz6 considers the posterior fossa subdural hematoma as a very rare condition in itself, and subdural hygroma occupying the posterior fossa is unusual as well.42

In the current series, there were two patients with concomitant associated lesions: Case 4 had a posterior fossa subdural hygroma under an extensive extradural clot extending well above the transverse sinus, and Case 7 presented a contralateral acute subdural hematoma of the temporal fossa. Other coexisting lesions, albeit not requiring direct surgical treatment, occurred in Case 2 (cerebellar contusion, and postoperative transient CSF rhinorrhea), and in Case 5 (mild hydrocephalus). Coexisting extracranial complications are exemplified in this series by Case 3 (admitted to the pediatric department with pneumonia) and by Case 5 (hospitalized in the gynecology department because of an incomplete abortion).

All the patients in this series were submitted to surgery, and they all survived. The acute course in Case 1 led to immediate surgery upon admission. Three patients (Cases 3, 4, and 6) were drowsy but somewhat responsive at the time of the operation, and three patients (Cases 2, 5, and 7) were unconscious when taken to the operating room. In the latter cases sudden medullary failure occurred after several hours of hospitalization and was fortunately overcome in each instance by rapidly instituted resuscitation maneuvers. It is obvious that had they been properly diagnosed earlier, this grave potential danger might have been averted (Table 2).

The PFEDH in each patient was evacuated through a standard unilateral suboccipital craniectomy under general endotracheal anesthesia. Case 4 was operated on in the sitting position. Case 5 in the park-bench position. Case 7 laterally on a stretcher, and the remaining patients in the face-down position. The posterior fossa subdural space was investigated in each case through a small dural incision, and additional supratentorial burr holes were performed when deemed necessary.

Six patients showed mild or normal neurological findings at the time of their discharge between the 5th and the 13th postoperative day, and are leading a normal life. Case 5 remained hospitalized for 13 weeks, and significant neurological impairment was present at the time of discharge. It is known, however, that this patient has shown steady improvement.

This small series provides evidence that PFEDH patients can be saved, even if they are acutely ill or moribund, and have a good expectancy of a future normal life.

Acknowledgments

The author wishes to acknowledge Mario Trujillo, M.D., Jesús Martínez-Garza, M.D., Enrique Mires-Charles, M.D., and Luis Leal-Hernández, M.D., Senior Residents in Neurosurgery, who under supervision operated on Cases 2, 3, and 6.

References


J. Neurosurg. / Volume 59 / October, 1983 671

Manuscript received February 14, 1983.
Address reprint requests to: Román Garza-Mercado, M.D., Aleutianas 396, Col. V. Hermosa, Monterrey, Nuevo León, México.