THROMBOSIS OF SUPERIOR SAGITTAL SINUS
CAUSED BY TRAUMA WITHOUT PENETRATING INJURY
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TRAUMA is an uncommon cause of intracranial venous sinus thrombosis, especially in the absence of penetrating injury. Two patients died recently at the Hospital for Sick Children as the result of head injuries suffered in automobile accidents. At autopsy both patients revealed recent thrombosis of the superior sagittal sinus without fracture of the skull. As we were able to find only 1 similar case in the literature and as some of our observations on subsequent cases of head injury appear to elucidate the pathogenesis of this condition, it was felt that a report of these 2 cases was justified.

CASE REPORTS

Case 1. A 10-year-old boy was hit by a motor car travelling at approximately 30 miles per hour. On admission to hospital he was unconscious and cyanotic. A large amount of blood was removed from the trachea by suction and an endotracheal tube was inserted. There were two abrasions and a haematoma over the left frontal region and abrasions over the left maxilla. No blood was seen behind the ear drums. The pupils were equal and reacted to light, and the corneal reflexes were present. Initially the reflexes were normal and the plantar responses were downgoing. There was an obvious fracture of the right femur, which was immobilized in a Thomas splint. The patient manifested mild shock on admission which responded quickly to the administration of plasma. The blood pressure then remained normal until immediately prior to death.

His neurological state deteriorated quite rapidly and 5 hours after admission he showed a bilateral extensor Babinski response, slight dilatation of the left pupil, increased muscular tone in the extremities and decreased movements of the right arm and leg. The right side of the chest did not move well and this was not improved by bronchoscopic suction. A lumbar puncture revealed blood-tinged fluid without xanthochromasia under a pressure of 450 mm. of water. About 36 hours after admission fixed pupils developed and the patient died as preparations were being made to do burr holes.

Autopsy. The body was that of a well developed male child showing the superficial abrasions of the skin that had been noted on clinical examination. The right leg was externally rotated. The findings included a transverse fracture of the shaft of the right femur, a linear fracture of the left iliac bone and a small tear in the lower pole of the left kidney which had resulted in moderate haemorrhage into the retroperitoneal and peripelvic tissues. Multiple subpleural and parenchymal haemorrhages were seen throughout both lungs.

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Patchy haemorrhagic extravasations involved the deep surface of the scalp over the left frontal, parietal and occipital regions. The skull was intact throughout. A firm, friable thrombus occluded the lumen of the superior sagittal sinus in its entire length but not including the confluence of the sinuses. The lacunae as well as the other dural sinuses were patent and grossly free of thrombus. The superficial cerebral veins appeared congested and there were diffuse patches of subarachnoid haemorrhage over both cerebral hemispheres, particularly on the left side.

The brain weighed 1500 gm. The cerebral convolutions were slightly flattened but there was pronounced swelling of the brain stem and pons. No other lesions were noted on gross inspection. The spinal cord was not examined.

Microscopical examination of the brain stem and pons confirmed the presence of edema with considerable vascular congestion, widening of perivascular spaces and early degenerative changes in neurons. No haemorrhages were encountered. Sections of the cerebral hemispheres also showed vascular congestion but this was less conspicuous than in the brain stem and pons.

The lumen of the superior sagittal sinus was completely occluded by a laminated thrombus of recent origin (Fig. 4). Its wall showed extensive haemorrhage which had reached the lumen in several areas. The endothelial cells in these areas were swollen and appeared to be desquamating.

Case 2. A 4-year-old boy ran into the rear fender of a moving car and was thrown to the ground. When first seen by a physician he was not deeply comatose but presented being handled. He gradually became more restless and vomited frequently. He moved his right extremities more than the left.

On admission to the Hospital for Sick Children on the following day he was unconscious, flailing the left arm and leg aimlessly with spasticity of the right leg and flaccidity of the right arm. There was very severe swelling of the left temporal region and a convergent left squint, the left eye being turned downwards. The pupils were small and reacted to light. The corneal responses were absent. The right plantar response was upgoing, the left equivocal.

Skull x-rays showed no evidence of fracture. Lumbar puncture revealed slightly yellow fluid under a pressure of 145 mm. of water. A fixed right pupil developed, with elevated temperature and Cheyne-Stokes breathing.

Bilateral burr holes were done 5 days after admission but no evidence of extradural or subdural blood clot was found. The patient died 7 days after admission in respiratory failure.

Autopsy. The body was that of a well developed male child showing superficial abrasions of the skin above the right eye and bridge of the nose. One recent surgical incision was present in each temporoparietal region.

Internal examination of the thorax and abdomen revealed no significant findings apart from marked congestion and early consolidation of the lower lobes of both lungs and the presence of large amounts of tenaceous mucus in the trachea and bronchi.

Apart from the operative wounds the skull was intact. There was diffuse subdural and subarachnoid haemorrhage, particularly over the right cerebral hemisphere. The brain weighed 1580 gm. There was flattening of gyri, most marked over the left temporal, right parietal and occipital lobes. Multiple small areas of cortical concussion were seen over the right occipital lobe. On section, after fixation, marked swelling of the brain stem and pons was noted. The superior sagittal sinus was completely occluded by loosely adherent thrombus throughout its extent.