SPASM OF THE INTERNAL CAROTID ARTERY
MAJOR ARTHUR D. ECKER, M.C., A.U.S.

(Received for publication April 19, 1945)

IT HAS LONG been known that sudden occlusion of the internal carotid artery may produce enough interference with the blood supply of the cerebral hemisphere on the same side as to cause severe symptoms. However, the role of minor trauma to the internal carotid artery in the production of cerebral dysfunctions appears to have been given insufficient attention, although Makins^{3} did raise the question whether spasm might be involved in cases of contusion of this vessel. The purpose of this report is to record a series of observations in which cerebral symptoms were produced from penetrating war wounds of the neck in which there was neither laceration nor thrombosis of the internal carotid artery.

CASES OF WOUNDS OF THE NECK

Case 1. This soldier suffered a bullet wound on 7 June 1944 at Normandy. The missile was a 0.30 calibre machine gun bullet, which entered the left cheek and came to rest just under the base of the skull, and just medial to the left mastoid process (Fig. 1). Little is

---

Fig. 1 (left). Case 1. Anteroposterior view of the skull.
Fig. 2 (right). Case 1. Encephalogram, anteroposterior view, showing dilatation of the 3rd ventricle and left lateral ventricle. The bullet has been removed.

known about the patient's condition for the first three days. He arrived in a fixed hospital in England on 10 June 1944. At this time he was very drowsy and apparently was suffering from
motor aphasia, although he responded with muscular movements to pain or noise. The blood pressure was 156/100, and the pulse rate 76. There were right hemiparesis, which was more marked in the upper limb, and transitory right ankle clonus. The corneal, pupillary, plantar and swallowing reflexes were normal. The right pupil was dilated, but responded to light. There was blood in the patient's mouth; the eardrums were normal. There was ecchymosis of the left side of the neck. The respiratory rate was 12.

X-ray films revealed the retained bullet just beneath the base of the skull and just medial to the left mastoid process, but on the films there was evidence of neither fracture of the skull nor intracranial foreign body (Fig. 1). Lumbar puncture revealed clear and colorless fluid under pressure of 300 mm. of water. On unilateral jugular compression and release on each side, there was prompt rise of spinal fluid pressure to 400 mm. and a prompt fall. The patient seemed brighter following lumbar puncture. For a few hours, the paresis of the right arm—especially the fingers—seemed to increase, and a tentative diagnosis of "intracranial hemorrhage (possibly epidural)" was made. However, within another few hours the respiratory rate increased to 20, the paresis of the right upper limb diminished, and the patient seemed less drowsy.

On 11 June 1944 the bullet was removed, but the internal carotid artery was not carefully examined. In the course of the next two weeks, the patient's general condition gradually improved so that he began to talk and say a few words. By 18 July 1944 the patient had regained moderate speech, and was able to take care of himself on the ward. On this date an air encephalogram was made. The spinal fluid contained 45 mg. total protein per 100 cc. The film (Fig. 2) revealed slight dilatation of the left lateral ventricle and of the third ventricle.

In summary, a "near miss" of the left internal carotid artery caused aphasia, right hemiplegia, increased intracranial pressure and residual left ventricular dilatation.

Case 2. This soldier was wounded in action in France on 23 June 1944. He suffered a perforating wound due to a small missile of unknown type. The missile entered the left cheek, caused a comminuted fracture of the left side of the mandible near the angle of the jaw, and left the patient's body from the right side of the neck. There was no fracture of the skull. The patient suffered immediate right hemiplegia, aphasia and respiratory difficulty. A tracheotomy was performed at a field hospital.

On 7 July 1944, the patient came under the care of the author in a fixed hospital in England. At that time examination revealed restlessness, aphasia, flaccid right hemiplegia, slight hyperactivity of the right tendon reflexes and the presence of Babinski's sign on the right. The small wound in the posteroinferior portion of the left cheek and on the right side of the neck were healed. The tracheotomy wound was healing. For a few days the patient could not phonate, but the ability to make sounds soon returned although speech did not return for a few weeks.

On 16 July 1944, encephalography was carried out and revealed considerable dilatation of the left lateral ventricle and of the third ventricle and slight dilatation of the right lateral ventricle (Fig. 3). The subarachnoid markings were normal. Cerebral arteriography was carried out on both right and left sides on 7 August 1944. The middle and anterior cerebral arteries and their branches on the left side were smaller than those on the right. Around 15 August 1944 the patient began to say a few words and there was slight return of strength of the right limbs, more in the lower than the upper.

In summary, a "near miss" of the left internal carotid artery caused aphasia, right hemiplegia, dilatation of the lateral ventricles more on the left than on the right, and diminution in calibre of the left middle and anterior cerebral arteries.