OCCLUSION OF MIDDLE CEREBRAL ARTERY BY FOREIGN BODY EMBOLUS
REPORT OF A CASE
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Foreign bodies within the vascular system have been the subject of numerous reports, especially in the medical literature of the last two wars.

In case of intracardiac foreign bodies, the possibility that they may migrate and act as emboli (in particular to the brain) is stressed unanimously.

Harken et al.3-5 in a series of articles devoted to foreign bodies in, and in relation to, the heart and great vessels, pointed out the necessity of early surgery to avoid the dangers of a cerebral embolism, caused by either the missile itself, or by an associated thrombus. However, the former occurrence seems to have remained only a possibility, since it was not found among their 134 reported cases.

In addition to the report presented here, only 2 other proven cases of cerebral embolism by a foreign body free in the blood stream were found in a survey of the literature.

The first case of this unusual occurrence is an autopsy report by Lécéne and Lhermitte:6 a soldier, wounded by shell fragments, had onset of right hemiplegia 24 hours after injury and died 1 week later. At autopsy the left middle cerebral artery was found obliterated by a small steel fragment at its origin.

The second case was reported by Dowzenko:1 it concerns a Polish blacksmith in whom left hemiplegia developed 15 minutes after he had been wounded in the right side of his neck by a small steel splinter. Plain roentgenograms of his skull revealed the presence of a small radio-opaque foreign body, located just above, and slightly to the right of, the sella turcica, which was interpreted as an embolus to the Sylvian vessels.

The third of the 5 cases reported by Raney7 in a paper on cerebral embolism following minor wounds of the carotid artery may, in retrospect, be regarded as another possible occurrence of a cerebrovascular occlusion by a foreign body. However, the contralateral hemiplegia which followed a small penetrating wound in the patient’s neck, with no evidence of carotid occlusion, was interpreted, at the time of observation, as the result of injury and mural thrombosis of the carotid artery, with secondary embolism. Unfortunately, no other details were available to support or disprove either of the two possibilities.

As far as we have been able to ascertain, the case we are now reporting is the only one with an angiographic demonstration.

CASE REPORT

M.E., male aged 22, a farm worker, was shot accidentally by a friend while hunting on Sept. 4, 1957. He remained unconscious for about 20 minutes, and was taken to another hospital where he was treated for multiple buckshot wounds of his chest, face, and arms.

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On the night of the accident it was noticed that he did not seem to move the left side of his body as well as the right. Throughout the night he was quite restless and at times disoriented. The following morning a left hemiplegia had developed and he was quite irrational. Plain roentgenograms of his skull revealed the presence of one buckshot pellet approximately 3 cm. to the right of, and 1 cm. above, the sella turcica. Two other pellets were visible, flattened against the left frontal bone (Figs. 1 and 2).

The patient was transferred to our department about 36 hours after the accident, with the diagnosis of intracerebral hematoma.

*Examination.* On admission the patient was quite restless and poorly cooperative, although he realized where he was. Numerous buckshot wounds were visible on his face, on the anterior part of his neck and thorax, and on his arms. Blood pressure was 125/75, and pulse rate was 90. There was a left flaccid hemiplegia with a left lower facial weakness. Deep tendon reflexes were decreased on the hemiplegic limbs. Left cremasteric and abdominal reflexes were absent.

The plantar response was flexor. Localization of pin-prick was fairly accurate, although a good sensory examination was impossible. Pupils were myotic but reacting. The fundus showed no abnormalities.

*Right carotid angiography* demonstrated occlusion of the right middle cerebral artery by the buckshot pellet which had evidently entered through the chest wall or neck, and found its way into the arterial blood stream and the internal carotid artery (Figs. 3 and 4).

*Operation.* Emergency right frontotemporal craniotomy was performed (Dr. M. Milletti), with the patient under hypotension and slight hypothermia. The Sylvian fissure was split, and the bifurcation of the internal carotid artery was exposed. The pellet was then visualized within the lumen of the right middle cerebral artery, a few millimeters from its origin. The wall of the vessel appeared dangerously thinned and transparent.

Embolectomy was deemed impossible and with long blunt forceps applied to the wall of the vessel, the pellet was slowly and gingerly “milked” upstream for about 1.5 cm., until blood was again seen to fill the middle cerebral artery from the contralateral side.

The foreign body thus seen to be lodged in the intracranial portion of the internal carotid artery, a silver clip was applied distally to it, to prevent its mobilization (Fig. 5).

*Postoperative Course.* The patient was able to leave his bed on the 14th postoperative day. Improvement of his hemiplegia was very slow, probably because of the fact that occlusion of the right middle cerebral artery had been present for 24 to 36 hours when relieved.

Left carotid angiography was then carried out, showing the left internal carotid artery supplying both hemispheres (Fig. 6).
In the course of about 6 months the patient received intensive physical therapy until he was again able to walk by himself without the aid of a cane, to raise his left arm above his head, and, although fine movements of his fingers were still not possible, he had regained some use of his left hand. A slight hyperreflexia of the affected limbs was still present, but there was no Babinski sign and no sensory loss. While on physical therapy right-sided Jacksonian seizures developed. He was put on anticonvulsive therapy and has been seizure-free since then.

Comment. Postoperative angiograms showed a complete return to normal of the circulation in areas previously rendered ischemic by the vascular occlusion. This was accomplished by displacing the buckshot pellet from its original position and trapping it below the level of the circle of Willis, thus allowing the blood to flow.
from the contralateral side. However, in spite of the fact that postoperative angiograms showed a completely normal vascular bed, down to the finest terminations, the lack of a complete neurological recovery in our case is probably to be ascribed to the time elapsed from the vascular occlusion to the removal of the obstacle.

It is known from experimental work\textsuperscript{2} that occlusion of the Sylvian vessels at their origin, even if temporary, may cause a neurological damage which is irreversible after re-establishment of the blood flow. It seems likely that the anastomotic mechanisms which play an important role when branches of the middle cere-

![Fig. 6.](image)

bral artery become occluded, are not equally effective when the occlusion takes place at the origin of the Sylvian group.

Embolectomy of the cerebral blood vessels has been reported by Welch\textsuperscript{8} in 2 cases. However, these were occlusions of branches of the middle cerebral artery, and not of its main trunk; the excision of an embolus from this vessel, because of its deeper location, presents even greater surgical difficulties. In our case the operative hazards of such an embolectomy were judged to be too high. Also the state of the wall of the vessel was precarious.

REFERENCES


3. Harken, D. E. Foreign bodies in, and in relation to, the thoracic blood vessels and heart. I. Tech-


