Intracerebral bullet embolism: a rare cause of ischemic stroke

Case illustration

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Key Words • brain embolism • brain vascular trauma • bullet • stroke

This 31-year-old man presented in the emergency department after sustaining a 12-gauge shotgun wound to the neck and face, resulting in multiple perforations. There was no evidence of violation of the cranium. The patient was comatose, received a score of 7 on the Glasgow Coma Scale, and had complete right hemiplegia. A skull radiograph showed multiple shotgun pellets in his face, and a head CT scan revealed hypodensity in the left temporoparietal area with a midline shift (Fig. 1). A carotid arteriogram was performed that confirmed complete occlusion of the left middle cerebral artery (MCA) by a bullet (Fig. 2).

Plain radiographs and a CT scan did not show any skull fractures, and no brain parenchymal injury caused by penetration of the pellets was observed (Figs. 1 and 3 *left*). A carotid artery angiogram revealed a lesion of the common carotid artery, illustrating the site of the origin of the pellet, before migration to the MCA (Fig. 3 *right*). Decompressive craniotomy was unnecessary. Two weeks later, the patient was alert with aphasia and hemiparesis; 6 months later, his Glasgow Outcome Score was 3 and a severe psychological disorder was noted.

Pellets like those involved in this report usually do not have sufficient kinetic energy to violate bone;[4] mostly they penetrate only soft tissues and are more likely to embolize.[4] Therefore, the mechanism of the stroke in this patient may only be explained by the intravascular migration of the pellet (Fig. 3 *right*). Arterial embolization of metallic missiles into the cerebral circulation is a rare occurrence of penetrating vascular trauma.[1,2,3,5] In this case, conservative management led to a good outcome. *(DOI: 10.3171.JNS.2008.109.12.1126)*

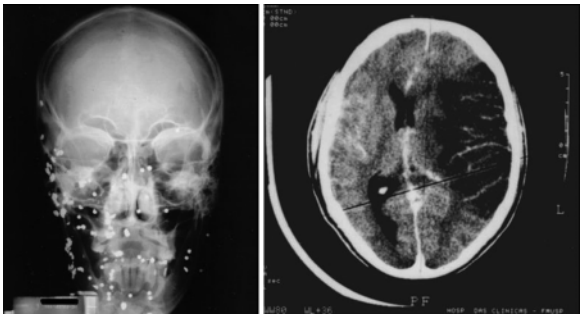

Fig. 1. A skull radiograph *(left)* depicts multiple shotgun pellets in the patient's face and neck. A head CT scan *(right)* shows hypodensity in the territory supplied by the left MCA.

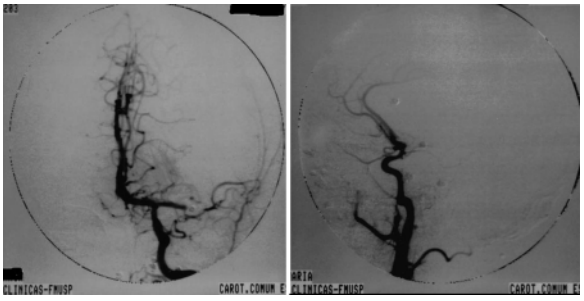

Fig. 2. Left carotid artery arteriograms reveal total occlusion of the left MCA.

Fig. 3. *Left:* Head CT scan with coronal reconstruction shows the pellet in the sylvian cistern without evidence of violation of the cranium, such as skull fractures, bone fragments, or parenchymal lesions. *Right:* Cervical carotid artery arteriogram reveals luminal stenosis in the left carotid artery in the neck, evidence of the origin of the pellet.

Disclaimer

The authors do not report any conflict of interest concerning the materials or methods used in this study or the findings specified in this paper.

References

1. Anda T, Suyama K, Kawano T, Mori K: [Shotgun pellet embolus in the cerebral circulation via the internal carotid artery in the neck; a case report.] **No Shinkei Geka 20:**457–461, 1992 (Jpn)
2. Bahnini A, Petitjean C, Kieffer E: Gunshot pellet embolus to the middle cerebral artery. **Ann Vasc Surg 1:**139–142, 1986
3. Cogbill TH, Sullivan HG: Carotid artery pseudoaneurysm and pellet embolism to the middle cerebral artery following a shotgun wound of the neck. **Trauma 39:**763–767, 1995
4. Gipe BT, Acker B, Smith R: Delayed cerebral embolization of a shotgun pellet with fatal consequences. **J Trauma 21:**326–329, 1981
5. Nagy E: [A projectile embolism of the arteria cerebri media following a gunshot injury to the neck.] **Rofo 152:**742, 1990 (Ger)

Manuscript submitted October 13, 2007; accepted March 4, 2008.

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