Unusual Pneumoencephalogram Following Fragment Wound of the Brain

Case Report

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We are reporting the unusual pneumoencephalographic findings in a young soldier who received multiple fragment wounds of his body including the head.

Case Report

On June 5, 1968, this 19-year-old soldier was wounded by an explosive device in the Republic of Viet Nam. He received multiple wounds of the head, trunk, and extremities. He was sluggish, restless, and agitated on admission to his first medical unit, but apparently moved all extremities. There were small superficial wounds of the right frontotemporal and posterior auricular areas and large wounds of the right arm, leg, buttock, and abdomen. X-rays of the cranium revealed several small metallic fragments in the left parietal area. There was no evidence of indriven bony fragments.

Under local anesthesia the superficial wound of the right frontotemporal area was explored; the calvarium was intact, and the wound was therefore closed uneventfully. The patient then underwent an exploratory laparotomy for closure of penetrating wounds of the sigmoid colon and ileum and for a laceration of the urinary bladder. A colostomy and a suprapubic cystotomy were performed. Initial treatment of the extremity and buttock wounds was carried out at the same time.

In the immediate postoperative period his level of consciousness improved. Within a few days, however, low-grade papilledema was evident. Echoencephalography carried out at that time was reported as normal. He was evacuated by air to Japan 9 days after the injury.

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noted. Electroencephalography performed on June 18, 1968, was considered abnormal, showing excessive slowing and disorganization throughout both hemispheres but more predominantly in the right frontotemporal region.

*Hospital Course.* Because of the presence of bilateral papilledema, it was felt that a developing intracranial mass lesion had to be ruled out, especially in the left hemisphere. Therefore, shortly after admission, bilateral carotid angiography was performed under local anesthesia. There was no displacement of the midline vasculature but in the lateral view the left Sylvian group of vessels appeared to be unequivocally elevated when compared with the right side. The probability of an intracranial mass related to the left parietal fragment seemed reasonable at this time, and pneumoencephalography was performed. Lumbar puncture revealed clear spinal fluid under a pressure of 260 mm of water with 18 mg% of protein; 35 cc of air were instilled with no further removal of fluid than that sent for laboratory examination. The air outlined a diagonal path extending from the right cerebellum to the site of the fragment in the left parietal lobe (Fig. 1). A small bulbous enlargement at the point of the fragment was noted. The fourth ventricle was questionably displaced to the left, but an absolute midline position of the head could not be maintained because of the patient’s inability to cooperate completely. There was no deviation of the lateral or third ventricles.

However, with the left side of the head in the dependent position, the tract emptied only to fill again with the left side placed in the “up” position (Figs. 1 right and 2 left). This suggested a patent communication with the ventricular system or the subarachnoid pathways. The temporal horns filled normally and showed no displacement. There was satisfactory filling of the subarachnoid spaces over the convexity. The cause of the apparent elevation of the left Sylvian group of vessels could not be ascertained and was considered to be a spurious finding. The procedure was well tolerated.

The patient’s clinical condition showed steady improvement over the ensuing 2 weeks. As he became more cooperative and better oriented, detailed examination was possible. This revealed signs of a combined left cerebral and right cerebellar lesion, including bilateral nystagmus, mild weakness, and dysdiadokokinesis of the right arm, increased deep tendon reflexes on the right, and an intermittent right Babinski sign. These findings were all quite compatible with the pneumoencephalographic changes. The patient was eventually able to walk with help prior to transfer to a medical facility in the United States for long-term follow-up care. Cerebrospinal fluid pressure prior to discharge was 160 mm of water, and the papilledema had resolved.

![Fig. 1. Pneumoencephalograms of initial posterior fossa series with 10 cc of air showing diagonal tract of air from the right cerebellum to left parietal area. *Left:* Anteroposterior view. *Right:* Lateral view.](image-url)