

## INTRACRANIAL AEROCELE\*

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Shadows of a cavity containing air or gas within the cranium were seen on Roentgen negatives of a skull that had been fractured in an explosion of a gas well. The patient (Case 5454), referred, June 27, 1914, by Dr. H. E. Pearse of



Fig. 1.—Lateral view, showing the transparent aerocele in the anterior part of the cranial cavity.

Kansas City and Dr. F. H. Morton of Okmulgee, Okla., had sustained a fracture of the right supra-orbital ridge of the skull in a gas well explosion four weeks previously. There was a healed scar over the right eye. The patient apparently had recovered, but complained of severe persistent headaches and dizziness.

Roentgen negatives taken June 27, 1914, showed a round area of increased transparency in the anterior part of the cranial cavity on the right side. In the lateral view the markings on the inner table of the skull and the diploic channels showed with unusual detail. The stereoscopic Roentgen negatives showed better the fracture of the supra-orbital ridge of the right frontal bone, the comminutions of the fracture extending into and through the posterior wall of the frontal sinus.

The Roentgen findings consisted in a comminuted fracture of the right frontal bone in the frontal sinus area with many irregularly placed fragments, and an air or gas bubble about the size of an egg in the anterior part of the right frontal lobe, which was apparently subdural. The interpretation was that it was a subdural air tumor, because it was a round shadow, and if it had been epidural, the air shadow would probably have conformed to the concavity of the inner table of the skull and depressed the dura, forming an elliptic shadow or meniscus-shaped shadow.

Operation was performed by Dr. H. E. Pearse at St. Luke's Hospital, June 29, 1914. The skull was trephined directly over the air tumor shadow 2 inches above the external angular process of the frontal bone. When the dura was exposed, there was a distinct bulge into the trephined opening

with some crepitation and palpatory sense of air beneath. A blunt trocar was prepared with a rubber tube attached, the free end of the rubber tube being inserted into a beaker filled with water which was inverted in a basin of water. The dura was then nicked with a knife and the trocar inserted. Immediately the water was displaced downward in the inverted beaker as it filled with air from the tumor. The bulging dura collapsed. The trephine button was not replaced, but the wound was closed without further surgical venture.

The collected gas was chemically examined by Dr. Roy Cross, who reported as follows:

"Chemical analysis: oxygen, 1.8 per cent.; nitrogen, 98.2 per cent. No ethane, methane or unsaturated hydrocarbons. Air is usually 80 per cent. nitrogen, 20 per cent. oxygen. This gas is practically air from which the oxygen has been absorbed by lymph. Oxygen has about twice the solubility of nitrogen and is infinitely more likely to undergo reduction or chemical reaction and thus be removed than is the case with nitrogen."

The fact that the patient sustained the injury in a gas well explosion prompted the collection of the contents at operation to satisfy the patient, for there was little doubt in the opinion of the surgeon and the roentgenologist that the air had leaked through the dura from the frontal sinus at the site of the fracture. The fact that there was no inflammatory reaction rather dispelled any supposition that the air tumor might have been caused by an infection.

The patient left the hospital in good condition at the end of ten days. Ten days later (twenty days after the operation) the patient developed a severe headache, temperature 104,

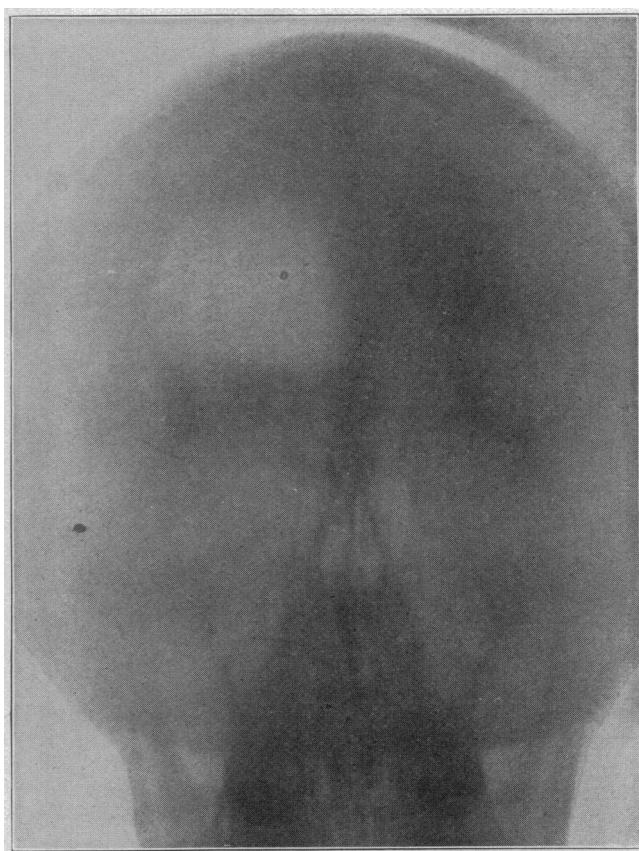


Fig. 2.—Postero-anterior view, showing transparent aerocele above the right orbital area.

pulse from 130 to 140, vomited and became unconscious. The pain was on the left side as far back as the ear. The left eye was swollen and edematous. The patient died the following day. Necropsy revealed leptomeningitis with a large amount of pus at the base of the brain.

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