

A VERTEX VIEW ARTIFACT ON ^{99m}Tc-PERTECHNETATE BRAIN SCAN IN A CHILD

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The following case report is presented to demonstrate an unusual artifact on the vertex view of a brain scintigram study in a small child.

CASE REPORT

The patient, a small 3-year-old mentally retarded female, was transferred to the University Hospital of San Diego County in a semi-comatose state with a clinical history of progressive weakness, decreased sensorium, and intermittent seizures of 3-week duration. A four-view rectilinear brain scan as well as a five-view Anger camera study of the brain had been performed at another hospital 1 week before her transfer here. The studies were normal at that time.

On physical examination the patient was semi-comatose. She had hypertonia in the lower extremities and alternate hypertonia and hypotonia of the upper extremities. The remainder of the physical examination was unremarkable. Because a diagnosis of possible brain abscess was being considered, an emergency brain scan was performed. The brain scan was normal but demonstrated an unusual artifact on the vertex view. The patient was eventually discharged after marked clinical improvement with the diagnosis of encephalopathy and hepatitis of unknown etiology.

METHODS AND RESULTS

After an intravenous injection of 16 mg of sodium iodide to block the uptake of the radiopharmaceutical by the choroid plexus, 6 mCi of ^{99m}TcO₄⁻ was administered intravenously and five scintiphoto views of the brain were performed on the Pho/Gamma III scintillation camera. Studies were begun at 2 hr and repeated at 12 hr postinjection. Figure 1 shows the results of the 2-hr study. Only the vertex view is abnormal, revealing an apparent intense area of increased uptake on the left. Because this could not be corroborated on the other views, an artifactual

finding was suspected. However, the origin of the artifact was not immediately obvious. For this reason, the patient was returned to the nuclear medicine

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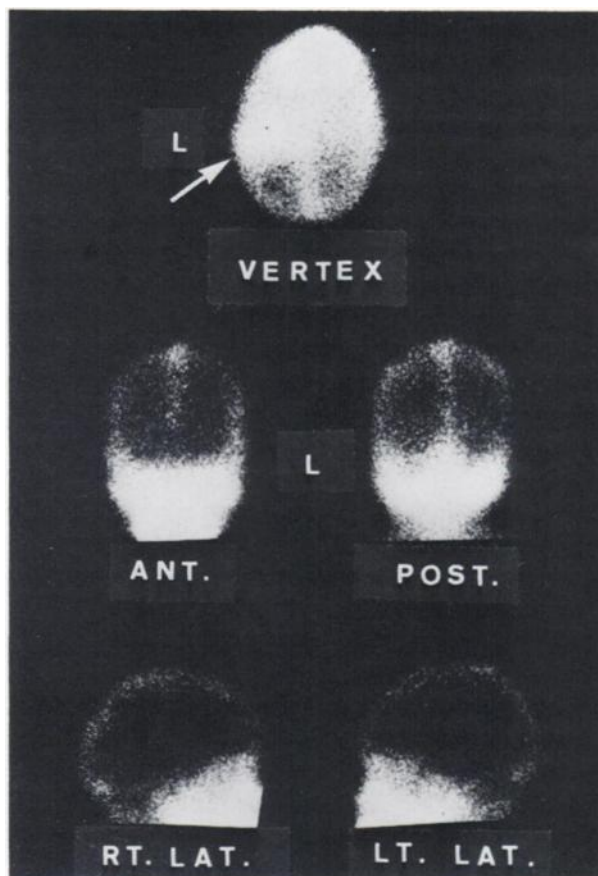


FIG. 1. Five routine views of head taken at 2 hr postinjection. Arrow points to abnormal uptake on vertex view only.

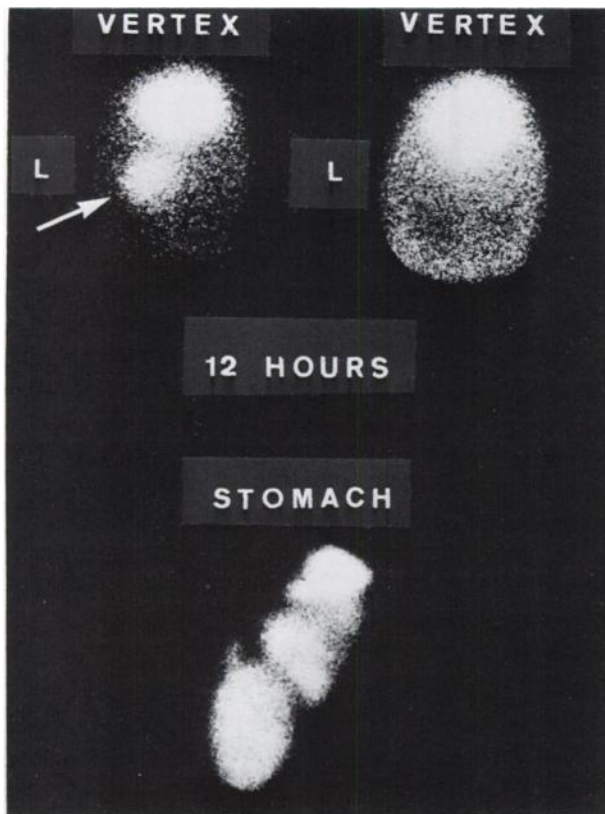


FIG. 2. Upper left scintiphoto shows the vertex view at 12 hr postinjection. Arrow points to persistent area of abnormal tracer accumulation. Upper right scintiphoto shows vertex view taken at 12 hr postinjection with baby's body out of view of camera. Abnormal tracer accumulation has disappeared. Lower scintiphoto shows radionuclide uptake in child's stomach.

laboratory at 12 hr postinjection, and scintiscanning was repeated. Figure 2 shows the vertex view performed in the standard position, i.e., collimator face against the head perpendicular to the long axis of the patient's body with neck and shoulders shielded. The view was then repeated with the body hyper-

extended out of view of the camera crystal. The change is dramatic with complete removal of the artifact. Scanning of the chest and abdomen proved the artifact to be due to the pooling of $^{99m}\text{TcO}_4^-$ in the stomach and intestines.

DISCUSSION

Artifacts are frequent occurrences on the vertex view of brain scintiphotos; however, the vast majority are secondary to areas of tracer accumulation in the salivary glands, sinuses, scalp, or calvarium (1). In an adult, gut activity would not be expected to produce artifacts on the vertex view because the number of photons reaching the crystal surface from that distance would be diminished by the inverse square law. Also there would be a greater mass of tissue between the gut and the crystal, thereby decreasing the probability of penetration of a photon to the detector surface. In the case presented, the child was only 3 years old and small in size, permitting penetration of the 140-keV photons from the stomach to the camera crystal. Atropine was not given to reduce uptake of the pertechnetate by the nasal and oral mucosa and salivary glands as has been advocated (2). Atropine would also be expected to reduce uptake of pertechnetate by the stomach and intestinal mucosa. Nevertheless, this artifact can be eliminated by positioning for the vertex view as described. It should be noted that this artifact will be expected to apply only to the straight-bore collimator system since the focusing device would eliminate the problem by removing it from the focal plane.

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