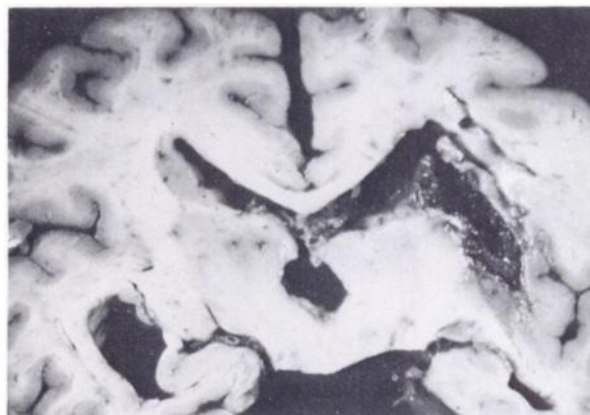


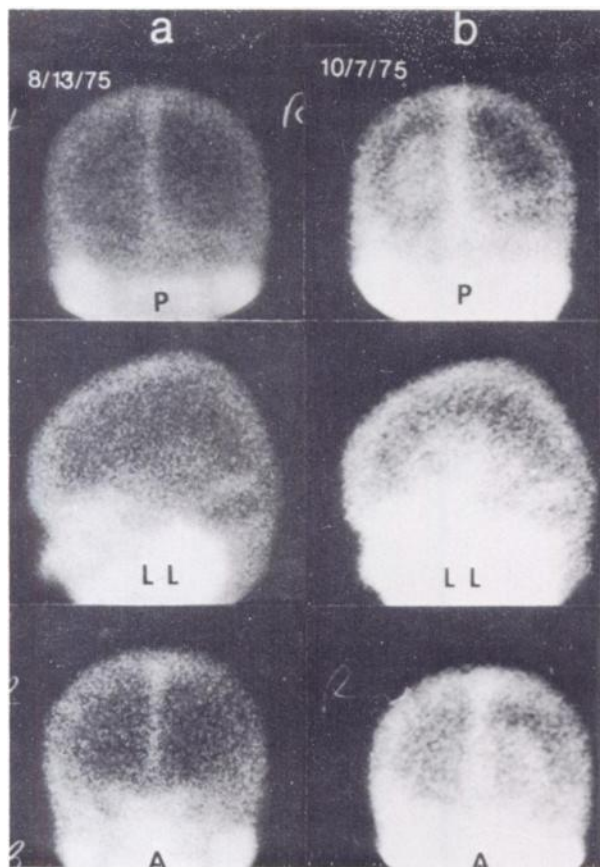
# Unilateral Pyogenic Ventriculitis

Brain-scan visualization of the cerebral ventricles due to ventriculitis is rarely documented in the literature. In their *Atlas of Nuclear Medicine*, DeLand and Wagner (1) describe a case of bilateral tuberculous ventriculitis, and Fulmer and Sfakianakis (2) recently reported four cases of cerebral ventricular visualization during pertechnetate brain scanning in children. Bacterial infection of the ventricles (*Klebsiella* and *E. coli*, respectively) was confirmed in two of these. Recently we encountered a case where pertechnetate brain imaging yielded a unilateral ventricular shadow associated with staphylococcal ventriculitis.

An 81-year-old woman was admitted because of the sudden onset of right hemiplegia and aphasia. The initial brain scan with <sup>99m</sup>Tc-pertechnetate was normal (Fig. 1a). Eight weeks after her admission, she developed a fever of 104°F



**FIG. 2.** Coronal section of brain showing dilated left ventricle with inflammatory changes.



**FIG. 1.** (a) Initial pertechnetate brain scan was normal. (b) Repeat brain scan shows well-defined area of increased activity which seems to outline left lateral ventricle. (P) Posterior view; (LL) left lateral; (A) anterior.

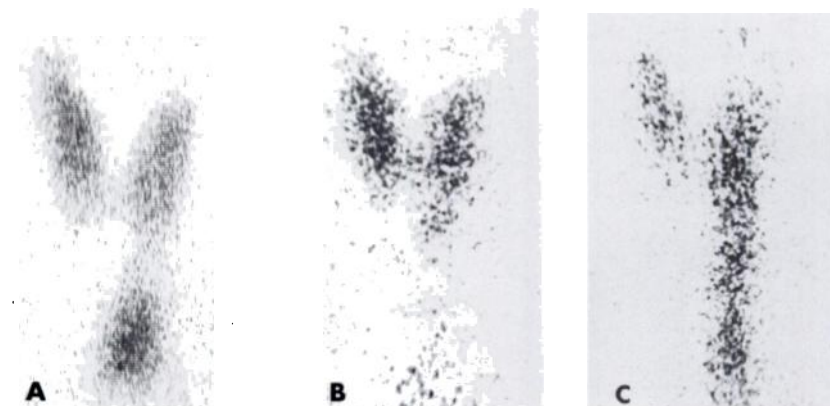
and a leukocytosis of 13,700, with 89% segmented polymorphonuclear cells. A chest x-ray was normal. However, a pertechnetate brain scan revealed a well-defined region of increased activity outlining the left lateral ventricle (Fig. 1b). No premedication such as potassium perchlorate was used in either the initial or repeat scans. An angiogram of the left cerebral artery suggested an obstructive type of hydrocephalus. Subsequent cisternal tap revealed purulent xanthochromic cerebrospinal fluid, and a CSF culture yielded *Staphylococcus aureus*. Despite intensive antibiotic therapy, including oxacillin and chloramphenicol, the patient died 3 days after the diagnosis was established. Autopsy revealed a dilated left ventricle containing pus, with inflammatory changes in the ependymal linings (Fig. 2).

Cerebral ventriculitis is known to occur most often with the utilization of indwelling prosthetic devices, shunting techniques, or prolonged intraventricular surgery (3). Ventriculitis not related to brain surgery is rare or, at least, rarely detected. This communication adds another entity, unilateral pyogenic ventriculitis, to the limited list of abnormal brain-scan findings associated with infectious ventriculitis.

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**FIG. 1.** (A) Scan of neck and chest performed 10 min after intravenous injection of 4 mCi of pertechnetate. (B) Repeat scan of neck and chest performed after patient drank some water. (C) Radioesophagogram performed while patient was swallowing dilute pertechnetate solution.

### Esophageal Tracer Retention Simulating Substernal Goiter

Thyroid imaging is most commonly used to evaluate thyroid size and to assess regional function (e.g., the detection of "hot" and "cold" nodules). Other indications include the detection of accessory thyroid tissue and the differential diagnosis of a superior mediastinal mass. Certain situations may mimic a substernal goiter during thyroid imaging, and awareness of these conditions will increase the specificity of thyroid scans and avoid unnecessary further studies or surgical intervention.

In this communication we report a case study in which the initial thyroid scan suggested a substernal goiter. Further investigation proved that the abnormality was due to the presence of tracer in the esophagus and not to a substernal goiter.

**Case report.** A 24-year-old woman reported to her family physician with left cervical lymphadenopathy. She denied having a cough, expectoration, or weight loss. On examination, a 1–2-cm freely movable lymph node was palpated anterior to the upper left sternocleidomastoid muscle. Although no nodules were palpable in the thyroid, the patient was referred for a thyroid scan.

Four millicuries of pertechnetate was injected intravenously, and an anterior thyroid image was obtained 10 min after the injection. The scan showed a normal-sized thyroid gland with uniform distribution of the tracer, without evidence of any hypo- or hyperfunctioning nodules. A midline linear area of increased tracer concentration was seen inferior to the thyroid, continuous with the left lobe, and suggested the presence of a substernal goiter (Fig. 1A). However, since the patient had no history of dysphagia and a normal chest radiograph, and because of the linear shape of the midline tracer activity, the possibility of accumulation in the esophagus was considered. The scan was there-

fore repeated after the patient had drunk a glass of water, and the linear extension was not seen in the repeat scan (Fig. 1B). Subsequently, a radioesophagogram was performed using an oral 1-mCi dose of pertechnetate solution. Serial images of the chest at 5-sec intervals outlined the course of the esophagus, which was directly superimposable on the apparent inferior linear extension of the thyroid image (Fig. 1C).

**Discussion.** Intravenously injected pertechnetate is concentrated and secreted by the salivary and gastric glands. The salivary secretion of the tracer, if swallowed, may lodge anywhere along the course of the esophagus. If an esophageal obstruction secondary to a tumor, stricture, or transient spasm is present, the endoesophageal delineation of radio-pertechnetate may be accentuated and may even simulate a substernal goiter, as illustrated in this case.

During the investigation of substernal mass believed to be goiter, therefore, any abnormal accumulation of the tracer in the midline, either above or below the thyroid gland and especially one with a linear shape, should be interpreted with caution and should arouse the suspicion of tracer accumulation in the esophagus. Having the patient drink a glass of water will wash the tracer through the esophagus, and a repeat scan should result in a normal thyroid image. This maneuver will avoid the false interpretation of a substernal goiter.

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