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"EAR" ARTIFACT IN BRAIN SCANS

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The ear closest to the camera may be imaged in high-resolution lateral views of the brain as a structure anterior to the lateral sinus. The artifact can usually be eliminated by taping the auricle down. Artifacts such as this can be expected to become somewhat more of a problem as image resolution improves.

During the past few years there has been a significant improvement in the resolution available from nuclear medicine imaging systems. Commercial scintillation cameras currently specify resolutions of 3/16 inch or better. Some anatomic structures that could not be resolved in earlier systems are now being seen commonly.

We noted a frequently recurring structure just anterior to the lateral sinus on lateral views of the brain (Fig. 1). The structures corresponded in location to ears as seen on skull x-rays. To test the possibility that the auricle might be the structure seen, a simple test was devised.

MATERIALS AND METHODS

For a period of 2 weeks all lateral brain scans were reviewed as soon as they were completed. Images were taken 3 hr after intravenous injection of 15 mCi of ^{99m}Tc-pertechnetate, using the Searle Radiographics Pho/Gamma III HP (12 studies) or Pho/Gamma IV scintillation camera (33 studies). Scans were reviewed independently by both authors. The "ear" artifact was graded on the following scale: 0, not seen; 1, barely visible; 2, visible but not marked; 3, marked. The artifact was considered to have been seen only if its clarity was 2 or 3.

RESULTS

Structures resembling ears were seen in 26 of 90 lateral views (29%). They were seen in at least one view in 19 of 45 consecutive studies (42%) and in both views in seven (16%). There was no significant interobserver difference in detecting the ear artifact. The camera used (Pho/Gamma III HP or IV) made little difference; the ear was seen in five of 24 scans done on the Pho/Gamma III (21%) and in 21 of 66 scans done on the Pho/Gamma IV (32%). The difference is not significant ($\chi^2 = 1.03$, $p > 10\%$), though it is in the expected direction.

In ten scans in which a structure resembling an ear was seen anterior to the lateral sinus, the auricle next to the camera was taped down and the view was repeated. Of the ten "ear" artifacts, eight disappeared completely after the ear was taped (Fig. 1), one moved downwards but did not completely disappear, and one did not clear at all. In this last patient the structure corresponded well with the vein of Labbé. There was no interobserver difference in deciding whether the "ear" artifact cleared after taping.

DISCUSSION

Relatively few articles have appeared in the literature describing the anatomy of the normal brain scan (*1–4*). Most of the articles published are based on imaging devices of lower resolution than those cur-

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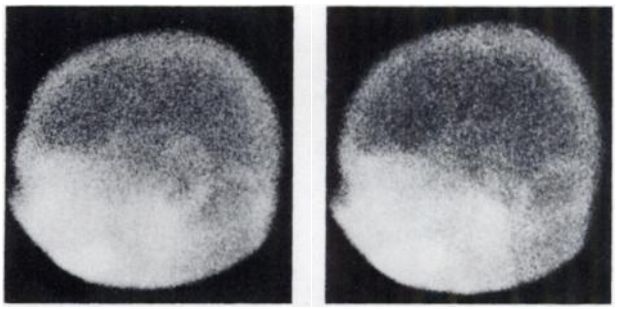

FIG. 1. On lateral views auricle may be clearly visualized (left). Artifact disappears after auricle is taped down (right.) This example is unusually clear.

rently available. With improved resolution it might be expected that many previously unidentified anatomic structures would appear on brain scan images.

Following injection of pertechnetate, the radiopharmaceutical is distributed through the vascular space and equilibrates rapidly with the extracellular fluid (*5*). A sizable fraction of pertechnetate (19–20%) is taken up in the skin (*5*).

One might expect that a structure with the geometric configuration of the auricle would be visible on the lateral view, since it presents an edge that can be viewed tangentially by the camera. The sensitivity of the camera is highest for sources close to the collimator. Thus, given sufficient resolution, one might predict that the ear closest to the camera should be seen in a significant number of patients.

On lateral brain scans, the area in which the lateral sinus touches the base of the skull and the area just anterior to it are important for detecting lesions in the cerebellopontine angle, brain stem, and cerebellar hemispheres. Artifacts that may mimic lesions in these areas should be carefully considered during interpretation; in some cases the auricle should be taped down.

In this study the observers were looking for a known pattern, and the frequency with which it was found is probably higher than the frequency with which it would be noted in a day-to-day clinical setting. Nevertheless, the results suggest that the auricle is often imaged on brain scans.

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REFERENCES

1. BELL EG, MCAFEE JG, WOLF KJ: The anatomy of the normal brain scan. *Prog Nucl Med* 1: 163–235, 1972

2. MACK JF, WEBBER MM, BENNETT LR: Brain scanning: Normal anatomy with technetium-99m pertechnetate: *J Nucl Med* 7: 633–640, 1966

3. PENNING L, FRONT D: Technetium scintianatomy of the head. *Neuroradiology* 1: 210–216, 1970

4. WEBBER MM: Technetium-99m normal brain scans and their anatomic features. *Am J Roentgenol Radium Ther Nucl Med* 94: 815–818, 1965

5. OLDENDORF WH, IISAKA Y: Interference of scalp and skull with external measurements of brain isotope content: Part I. Isotope content of scalp and skull. *J Nucl Med* 10: 177–183, 1969