

# Tc-99m Glucoheptonate Brain Scintigraphy: A Clinical Comparison Between One- and Two-Hour Delayed Images: Concise Communication

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**Sixteen patients with known cerebral disease had one- and two-hour delayed brain scans following intravenous injection of 15 mCi of technetium-99m glucoheptonate. No abnormalities were seen on the two-hour images that were not detected on the one-hour delayed scan. There were two false negative scans. Of the 14 true positives, 10 were visualized equally well on the one- and two-hour delayed images, two were better seen on two-hour images, and two were better on one-hour scans. As no difference in lesion detection was found, consideration of reducing the post-dose delay time from two hours to one seems warranted.**

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Technetium-99m glucoheptonate brain scanning is a sensitive and specific modality for detecting cerebral disease. A disadvantage to the method, however, is the long post-dose delay suggested by some authors before imaging can begin (1,2). To determine whether this delay could be reduced, a clinical comparison between one- and two-hour delayed brain scans was undertaken.

## METHODS

Sixteen patients with proven brain abnormalities, initially detected by TCT scan and including CVAs, primary tumors, abscesses, and metastatic tumors, were imaged at 1 and 2 hr after the intravenous injection of 15 mCi of technetium-99m glucoheptonate. All images were obtained using an Anger scintillation camera with a high-sensitivity parallel-hole collimator. Five views (anterior, posterior, two laterals, and vertex), or the two views that could be expected to demonstrate the lesion, were obtained, with 500,000 counts per view. Correlation of image finding was made with angiography, surgery,

autopsy, or clinical course. The studies were independently reviewed by three observers, and recorded as either positive or negative. When positive, the degree of clarity of the abnormality was assessed by subjectively estimating a lesion-to-calvarium ratio. Scans were then graded as either having lesions less than, equal to, or greater than, the uptake in the bony skull. When observers disagreed, the majority opinion prevailed.

## RESULTS

Fourteen of the 16 patients with proven cerebral disease (Table 1) were detected scintigraphically. There were two false-negative scans: one in a patient with an

**TABLE 1. CLASSIFICATION OF LESIONS**

Lesion type	Number
Primary brain tumor	2
Metastatic brain disease	4
Meningioma	2
AVM	2
CVA	4
Abscess	1
Subdural hematoma	1

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**TABLE 2. COMPARISON OF LESION DETECTION WITH ONE-HOUR VERSUS TWO-HOUR DELAYED Tc-99m GLUCOHEPTONATE BRAIN SCINTIGRAPHY**

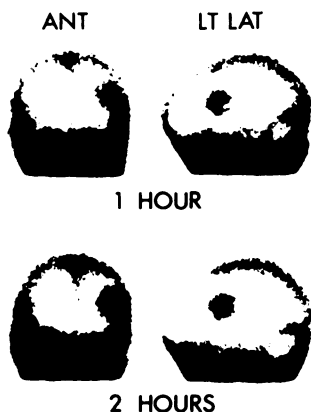
Lesion type	E - D+	E < D	E = D	E > D	E + D-	E - D-
Primary brain tumor			2			
Metastatic brain tumor		1	2	1		
Meningioma			2			
AVM		1		1		
CVA			3			1
Abscess			1			
Subdural hematoma						1

E = Scan one hour after dose.  
D = Scan two hours after dose.

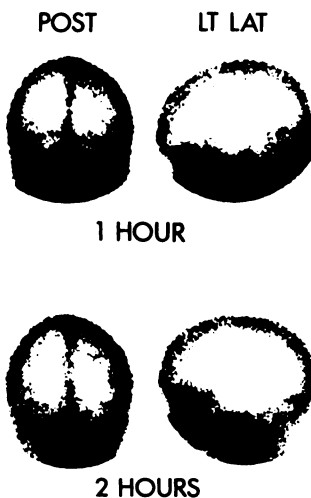
ischemic CVA, the other with a recently sustained subdural hematoma. Of the 14 detected brain-scan abnormalities, none were identified on 2-hr scans that were not

detected on the 1-hr delayed image. Lesion clarity was identical between 1- and 2-hr scintigrams in 10 of the 14 patients, better at 2 hr in two, and better at 1 hr in the remaining two cases (Table 2). The average time for a single 1-hr delayed view was 3 min. The average time after a 2-hr delay was 5 min.

Figures 1 through 3 are representative examples of brain scans whose abnormalities were equally well, less well, or better detected, respectively, on the one- versus the two-hour images.



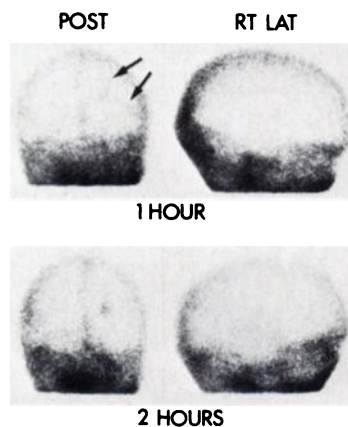
**FIG. 1.** One- and two-hour delayed brain scans in a patient with a metastasizing lung tumor. Note that there is no difference in lesion clarity between the two studies.



**FIG. 2.** One- and two-hour delayed brain scans in a patient with a left cerebellar arteriovenous malformation. The lesion is seen better at one hour than at two hours after injection.

**DISCUSSION**

Technetium-99m stannous glucoheptonate is an excellent brain-scanning radiopharmaceutical. It has been found superior to pertechnetate and Tc-99m DTPA in detecting cerebral abnormalities (2-4). The study is routinely performed 2 to 3 hr after the intravenous injection of the radiopharmaceutical, and it is this delay that has resulted in scheduling difficulties as well as prolonged imaging time, with the latter being a mani-



**FIG. 3.** One- and two-hour delayed brain scans in a patient with a metastatic right cerebral lesion. There is better visualization on the two-hour scan. Arrows mark site of radiotracer uptake within the calvarial flap.

festation of the rapid renal clearance of the tracer. To determine whether this time could be reduced, a clinical comparison between 1- and 2-hour delayed brain scans was undertaken. As there was no difference in lesion detectability between 1- and 2-hr delayed studies, and since there was no significant difference between lesion clarity, we believe that the need for a 2-hr delay may well be unnecessary. We also feel that because our sample population is small, additional studies confirming our findings should be undertaken.

#### ACKNOWLEDGMENTS

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#### REFERENCES

1. TANASESCU DE, WOLFSTEIN RS, BRACHMAN MB et al: Early and delayed Tc-99m glucoheptonate brain scintigraphy: Are routine early images indicated? *J Nucl Med* 20:287-290, 1979
2. ROLLO FD, CAVALIERI RR, BORN M, et al: Comparative evaluation of <sup>99m</sup>Tc GH, <sup>99m</sup>TcO<sub>4</sub><sup>-</sup>, and <sup>99m</sup>Tc DTPA as brain imaging agents. *Radiology* 123:379-383, 1977
3. LÉVEILLÉ J, PISON C, KARAKAND Y, et al: Technetium-99m glucoheptonate in brain-tumor detection: An important advance in radiotracer techniques *J Nucl Med* 18:957-961, 1977
4. WAXMAN AD, TANASESCU D, SIEMSEN JK, et al: Technetium-99m glucoheptonate as a brain-scanning agent: Critical comparison with pertechnetate. *J Nucl Med* 17:345-348, 1976

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