They found little difference between the two up to 2 hr after injection but a tendency for the clearance curves to diverge between 2 and 5 hr, with the ^{169}Yb-DTPA having the faster clearance. Nevertheless, because the difference at 5 hr was not marked, they concluded that "clearances of labeled albumin and chelate from the CSF were similar." These results must be applied with caution to clinical studies which extend over 48 hr, particularly when the 24- and 48-hr measurements are generally accorded greater significance in calculating clearance than measurements at earlier time points.

Hosain, et al (*1*) also found that ^{169}Yb-DTPA injected into the lumbar subarachnoid space below a complete spinal block "was mostly cleared in two days." The same phenomenon has been noted in the author's laboratory. Hence, clearance of ^{169}Yb-DTPA from the CSF compartment even in this grossly pathologic situation is not much slower than normal. In contrast, ^{131}I-IHSA injected into the lumbar subarachnoid space below a complete spinal block disappears approximately ten times more slowly than in patients with communication to the upper subarachnoid spaces (*6*). It seems likely, therefore, that any differences between ^{169}Yb-DTPA and ^{131}I-IHSA are accentuated under conditions of defective CSF absorption.

A recent paper by Harbert, et al (*7*) shows some disturbing differences between ^{169}Yb-DTPA and ^{131}I-IHSA with respect to both anatomic delineation of the CSF pathways and CSF compartment kinetics. Their finding that diffusion of ^{169}Yb-DTPA into the cerebral tissue may obscure cisternal detail casts doubt even on the suitability of ^{169}Yb-DTPA for CSF compartment scanning. Timing of the arrival of peak activity in the head was also noted to be "strikingly different" with the two radionuclides, the ^{169}Yb-DTPA peak arriving on an average in half the time of the ^{131}I-IHSA peak. Although a trend towards faster clearance of ^{169}Yb-DTPA was noted, this did not reach statistical significance in the small series presented. Nevertheless, the marked difference in clearance noted in individual patients is not reassuring. For example, in one patient with normal pressure hydrocephalus, ^{169}Yb-DTPA activity fell from 94% of peak at 24 hr to 34% of peak at 48 hr (a relative drop of 64%), whereas in the same patient ^{131}I-IHSA activity fell from 100% of peak at 24 hr to 71% of peak at 48 hr (a relative drop of only 29%).

Further, more detailed comparison of the kinetics of these two radiopharmaceuticals is urgently required. In the meantime, whatever the relative merits of ^{169}Yb-DTPA and ^{131}I-IHSA for CSF compartment scanning, it is premature to suggest that ^{169}Yb-DTPA is a satisfactory tracer for CSF albumin in studies of CSF compartment kinetics. Until a better case can be made for ^{169}Yb-DTPA, the writer will continue to use ^{131}I-IHSA by cisternal injection for both high-quality scans and valid kinetic data.

PETER M. RONAI
Institute of Medical and Veterinary Science
Adelaide, Australia

REFERENCES

1. HOSAIN F, SOM PRANTIKA, JAMES AE JR, et al: Radioactive chelates for cisternography: the basis and the choice. In *Cisternography and Hydrocephalus*, Harbert JC, et al, eds, Springfield, Ill, CC Thomas, 1972, p 185

2. ABBOTT M, ALKSNE JF: Transport of intrathecal I^{125} RISA to circulating plasma. A test for communicating hydrocephalus. *Neurology* 18: 870–874, 1968

3. WOLPERT SM, CARNEY PM, RABE EF: Studies on the fate of intraventricular ^{131}I-HSA in infants and children with progressive macrocephaly: Comparative study of computer-analyzed gamma camera data with quantitative ventriculoplasma transport. In *Cisternography and Hydrocephalus*, Harbert JC, et al, eds, Springfield, Ill, CC Thomas, 1972, p 453

4. HOCKWALD GM, WALLENSTEIN M: Exchange of albumin between blood, cerebrospinal fluid, and brain in the cat. *Am J Physiol* 212: 1199–1204, 1967

5. CURRAN RE, MOSHER MB, OWENS ES, et al: Cerebrospinal fluid production rates determined by simultaneous albumin and inulin perfusion. *Exp Neurol* 29: 546–553, 1970

6. HARBERT JC, MCCULLOUGH D, ZEIGER LS, et al: Spinal cord dosimetry in ^{131}I-IHSA cisternography. *J Nucl Med* 11: 534–541, 1970

7. HARBERT JC, REED V, MCCULLOUGH DC: Comparison between ^{131}I-IHSA and ^{169}Yb-DTPA for cisternography. *J Nucl Med* 14: 765–768, 1973

THE AUTHOR'S REPLY

Dr. Ronai's adjuration concerning ^{169}Yb-DTPA in studying CSF compartment kinetics should be carefully heeded. With regard to his comments about CSF scanning, we were careful in comparing ^{131}I-IHSA and ^{169}Yb-DTPA to ask ourselves whether our diagnostic impression would have been altered if we had used only a single tracer (Ref. 7, Ronai). In none of the 12 cases reported in that paper would

we have changed our assessment of the degree of hydrocephalus. As we pointed out, however, we certainly would have missed some cases of altered subarachnoid anatomy using only ^{169}Yb-DTPA. How important these alterations may be to the accurate assessment of each case is precisely the kind of information which is needed. The growing number of reports of large quantities of retained ^{169}Yb does cast serious doubts upon the accuracy of published dosimetry studies. For this reason we are now largely using ^{111}In-DTPA.

JOHN C. HARBERT
Georgetown University Hospital
Washington, D.C.

CALCIUM, PHOSPHORUS, AND ^{99m}Tc "UPTAKE"

The abnormal area of increased "uptake" of ^{99m}Tc-polyphosphate reported by Grames and Jansen (*1*), as well as the findings reported at the recent Radiological Society of North America meeting concerning diphosphonate localization in breast tumors and areas of myocardial infarction, may well share the same mechanisms of localization with abnormalities detected on bone scanning: increased blood flow to the area and increased calcium content (probably hydroxyapatite).

Work from this laboratory has shown that ^{99m}Tc-labeled diphosphonate deposition correlates with increased molar calcium and phosphorus content of the tissues studied (*2*). Increased blood flow from neovascularization of the lesion is probably the determining factor in the abnormal "bone scan" of Sugitani, et al (*3*).

Abnormal areas of increased uptake in breast tumors and areas of myocardial infarction could well be related to the calcium content of the abnormal tissue. It would be helpful for investigators reporting abnormalities of ^{99m}Tc-diphosphonate, pyrophosphate, or polyphosphate uptake to obtain tissue from the area of abnormal uptake and measure the molar calcium and phosphorus content.

EDWARD B. SILBERSTEIN
Cincinnati General Hospital
Cincinnati, Ohio

REFERENCES

1. GRAMES GM, JANSEN C: The abnormal bone scan in cerebral infarction. *J Nucl Med* 14: 941–943, 1973

2. SILBERSTEIN EB, FRANCIS MD, TOFE A, et al: Studies on the distribution of a technetium-99m diphosphonate in cartilaginous and osseous tissues and the effect of age on this process. *J Nucl Med* 14: 637–638, 1973

3. SUGITANI Y, NAKAMA M, YAMAUCHI Y, et al: Neovascularization and increased uptake of ^{99m}Tc in experimentally produced cerebral hematoma. *J Nucl Med* 14: 912–916, 1973

ERRATUM

In the article entitled "Use of ^{99m}Tc-DTPA for Measuring Gastric Emptying Time," by Ta. K. Chaudhuri (*J Nucl Med* 15: 391–395, 1974) the captions for Figs. 5 and 6 were transposed due to a printer's error. The text for these captions should be:

FIG. 5. Typical elevation in middle of curve in case of jejunal overlap.

FIG. 6. Linear relationship between counting rate and decrease of volume of stomach phantom.