

### The Jugular Reflux in Dynamic Brain Flow

We have been greatly interested in the case report of Ogawa et al. (1) concerning the problem of cervical venous reflux during brain-flow imaging.

Since radiopertchnetate flow studies are an integral component of all our brain studies (1500/year since 1969), we agree with the authors that cervical venous reflux is indeed a very rare finding. We have found only 18 such cases in 9000 studies—an incidence of 0.2% (2). Many explanations have been offered (2-4) but as cervical venous reflux could also be a normal variant in a radionuclide cerebral blood flow study, we can't agree with the suggestion of Ogawa et al. to proceed immediately with invasive radiographic venography.

A simple noninvasive radiopertchnetate dynamic study of the superior vena cava and innominate vein by means of two peripheral-venous injections will simply and rapidly discriminate between the pathologic and normal variants of cervical venous reflux. With this approach, as observed in our practice, nuclear medicine will contribute to the detection of some unsuspected diseases, as is nicely illustrated by the case report of Ogawa et al., without encouraging unnecessary invasive techniques in otherwise normal patients, which their report might suggest.

FRANCOIS LAMOUREUX  
JACQUES LAMOUREUX  
Notre-Dame Hospital  
Montreal, Quebec, Canada

#### REFERENCES

1. OGAWA TK, SO SK, GERBERG E, et al.: Jugular-dural sinuses: Jugular reflux in dynamic brain-flow imaging as a sign of unilateral innominate vein obstruction: Case report. *J Nucl Med* 18: 39-41, 1977
2. LAMOUREUX J: Cervical venous reflux. A normal variant on radionuclide cerebral blood flow study in nuclear medicine. *Am J Roentgenol Rad Ther Nucl Med* 124: 276-280, 1975
3. FRIEDMAN BH, LOVEGROVE FTA, WAGNER HN: An unusual variant in cerebral circulation studies. *J Nucl Med* 15: 363-364, 1974
4. HAYT DB, PEREZ LA: Cervical venous reflux in dynamic brain scintigraphy. *J Nucl Med* 17: 9-12, 1976

#### Reply

Several patterns of cervical reflux during brain-flow imaging have been described: diffuse reflux into numerous veins (1), internal jugular reflux (2), and jugular to dural sinuses to jugular (J-DS-J) reflux (2,3). In our report (3), we did not recommend indiscriminate use of radiographic venography to investigate every case of reflux. We referred specifically to the J-DS-J pattern as suggestive of unilateral innominate vein obstruction, and affirmed the correlative value of radiographic venography.

Most reported instances of jugular or J-DS-J reflux have occurred on the left side (2,3). We suspect that aortic compression of the left innominate vein (4) may be responsible for some of these cases, and for a number of findings on radionuclide venography: slight compression causing a defect in this vein without reflux (5), moderate compression causing a defect with jugular reflux, and marked compression

causing a defect with J-DS-J reflux (2). Obviously, mechanisms other than arterial compression may produce venous obstruction. Radiographic venography can not only depict the extent and degree of obstruction, but may also clarify its cause; aortic compression has been shown (4), as well as the presence of masses not disclosed by plain radiography (3). In spite of the slightly increased risk and discomfort, we feel that this procedure may be justified when precise correlative information is needed in the management of an individual patient.

TIMOTHY K. OGAWA  
STEPHEN K. SO  
ERWIN GERBERG  
STEPHEN KANTER  
City of Hope National Medical Center  
Duarte, California

#### REFERENCES

1. HAYT DB, PEREZ LA: Cervical venous reflux in dynamic brain scintigraphy. *J Nucl Med* 17: 9-12, 1976
2. STEINBACH JJ, MATTAR AG, MAHIN DT: Alteration of the cerebral bloodflow study due to reflux in internal jugular veins. *J Nucl Med* 17: 61-64, 1976
3. OGAWA TK, SO SK, GERBERG E, et al: Jugular-dural sinuses-jugular reflux in dynamic brain-flow imaging as a sign of unilateral innominate vein obstruction: case report. *J Nucl Med* 18: 39-41, 1977
4. FRED HL, WUKASCH DC, PETRANY Z: Transient compression of the left innominate vein. *Circulation* 29: 758-761, 1964
5. MIYAMAE T: Interpretation of <sup>99m</sup>Tc superior vena cavograms and results of studies in 92 patients. *Radiology* 108: 339-352, 1973

#### Nuclear Medicine in Motion

Congratulations to Henry Wagner for his editorial "Nuclear Medicine in Motion" in the January issue of the *Journal of Nuclear Medicine*. Dr. Wagner emphasized the need for reappraisal of nuclear medicine's direction with the knowledge that even first-generation computerized transaxial tomographic devices are excellent tools for anatomical diagnosis. The success of these anatomical diagnostic machines will force nuclear medicine to do what it can do exceptionally well, that is the measurement of regional physiology.

The nondestructive, noninvasive properties of diagnostic nuclear medicine permit a preventive approach to the detection of disease. The promise of nuclear medicine is to detect disease prior to the occurrence of anatomic abnormalities.

Several nuclear medicine adages should be considered here:

1. Nuclear medicine is to physiology what diagnostic radiology is to anatomy.
2. Biochemical and physiologic abnormalities occur months to years before the anatomic manifestations of disease can be detected radiographically.
3. How something works is more important than how it looks.

Nuclear Medicine is alive, well, and growing.

DAVID F. PRESTON  
University of Kansas Medical Center  
Kansas City, Kansas