

Estimation of Transferred ^{169}Yb -DTPA Amounts from Cerebrospinal Fluid to Blood in Normal Pressure Hydrocephalus

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Isotope cisternography has been the reliable method for the diagnosis of Normal Pressure Hydrocephalus.

Isotope cisternography, however, has some difficulties in estimating actually how much amounts of intrathecally injected radioisotope were absorbed from cerebrospinal fluid to blood.

The purpose of this study is to obtain the amounts of radioactivity transferred at intervals from cerebrospinal fluid to blood in patients with progressive dementia of varying degrees and durations.

We used ^{169}Yb -DTPA for this study, because of its stability and short biological half-life time (quickly excreted from kidney) for the diagnosis of Normal Pressure Hydrocephalus.

Blood and urine samples were counted at intervals every hour for first 6 hours, and 12, 24, and 48 hour following intrathecal administration of radionuclide and hourly urine volumes were also measured.

Transfer curves of radioisotope from cerebrospinal fluid to blood was obtained by plotting subsequent blood radioactivity at intervals, which was calculated from the equation, using rate constant of urinary excretion.

This curve obtained was strongly helpful for the diagnosis of Normal Pressure Hydrocephalus with simultaneous Isotope cisternography and clearly showed us the pre and postoperative changes of cerebrospinal fluid absorption from the brain.

Scintigrams of the Cerebrospinal Space (Report 3)

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Scintiscanning of the cerebrospinal space has hitherto been made by the authors on a total of 200 cases, and in the present paper are shown the findings on 65 cases on whom the scanning been made since October, 1971.

Methods 100–200 μCi . of ^{131}I -HSA and 0.5–1.0 mCi. of ^{169}Yb -DTPA were used as the nuclides. These radioisotopes were infused either by puncture of the lumbar vertebra or by puncture of the infraoccipital region, and the scanning was started an hour after the respective infusions.

Results Myeloscintigraphy revealed that 13 cases were free of abnormalities, 16 cases were suspected of intervertebral herniation and have been placed under observation and given some therapies as outpatients, 14 patients were admitted for treatment by traction and so forth but have not been operated on as yet, and 20 cases were suspected of intervertebral herniation or spinal cord tumor, and based on oil myelography made after the scanning, have been operated on. Out of the 20 cases operated on, three were found to have spinal cord tumors,

and the tumors were proved to be neurinoma, respectively. Of the other operated cases, nine were found to have intervertebral herniation, six to have thickening of the ligamentum flavum, two to have epidural varix, and one to have spinal canal stenosis. Myeloscintigram makes it

possible to find the status of the cerebrospinal cavities to a considerable extent. Because oil myelography is accompanied with considerably serious side effects, the authors believe that myeloscintigram is a test which should be made prior to oil myelography.

The Application of Profil Scanning to Diagnose the Stenosis of Cerebro-Spinal Space

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Myeloscintigram with RI (RISA) is generally used for the observation cerebro-spinal space (CSS) anatomically.

The authors tried to pursue the mobility of RI in CSS observing profil scanning in series in addition to myeloscintigram. RI was injected into CSS gently by means of lumbar puncture and the patient kept supine posture at absolute rest for 3 hours. Profil scannings were made at 3 times, i.e. immediately after injection and at 1 hour, 3 hours intervals. Distribution of RI in CSS was measured quantitatively and we figured out the proportion of the brain activity to total. We call it "mobility rate to brain". 6 hours and then 24 hours later, the same procedures were made. We guess that when RI is injected into CSS without any dynamic change to CSF, the mobility of RI is due to the natural circulation and diffusion of CSF.

In normal case "mobility rate to brain" after 3 hours is above 10%, after 6 hours above 20%,

but in the case of stenosis, the mobility of RI above the lesion delays remarkably. This phenomenon is very sensitive to the slight change of CSS and the finding which was caught by myelography could be examined in very detail. "Mobility rate to brain" has significant reversed correlation to the protein of CSF, but not to the pressure of CSF. In case of positive Queckenstedt phenomenon, "mobility rate to brain" is low.

Abnormal foci found out by scanning were coincided with the of abnormal position ascertained by descending myelography or operation.

We can carry out this procedure with the least discomfort and side effect. Therefore to the patient who is suspected of the stenosis of CSS this procedure should be applied as a routine examination.

Recently, ^{169}Yb -DTPA has been used, but this substance is metabolized quickly, therefore the background of whole body large. The validity is now under checking up.