

a widened mediastinum and tumor histology was reported as lymphosarcoma. Gamma camera scintiphotos showed clearly the site of obstruction, stagnant flow of the ^{99m}Tc bolus and collateral circulation. After 1500R irradiation, relief of obstruction was noted on follow-up scintiphotos as well as on scintiphotos. Scintiphotography was useful at the time of initial diagnosis as well as in follow-up evaluation of radiation therapy.

2) A patient of obstruction of the superior vena cava (Behçet's disease) was presented. This case was so serious that could not be performed angiogram. Complete obstruction, dilatation of subclavian vein and collateral

circulation was confirmed by scintiphotos. Gamma Camera was very valuable for such serious patient.

3) A patient was suggested thoracic aneurysm by plain chest film and easily demonstrated by scintiphotos as sclerotic change of aorta. Aneurysm was sometimes differentiated from another disease by scintiphotos without roentgen aortogram.

4) Scintiphotos showed the site of narrowing of major vessels and simplify to roentgen angiography. Some cases of aortic arch syndrome and thrombosis of iliac arteries were also presented.

Application of Scintillation Camera to Diagnosis of Cardiovascular Diseases

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Value of Scintillation Camera as "radio-nuclide angiogram" is investigated. The camera employed in this study is the Pho/Gamma manufactured by Nuclear-Chicago. Technetium ^{99m}Tc pertechnetate 5~10 mc. is injected in right antecubital vein. The camera is operated immediately after injection. Serial image exposures of 0.5 or 1 second are obtained with the Polaroid camera and 35 mm Automatic time-lapse camera (1~2 photo/sec.).

In general, the figures of the right heart system could fairly clearly be visualized, but as to the left heart system the figures were not clear. In order to quantify the figure of scintiphoto of the heart, first, 1600 channel memory apparatus was used. The figures accumulated 5 or 10 seconds after injection of ^{99m}Tc were obtained in several cases of cardiac diseases, but the resolution power was not enough for clinical application. Secondly, the

densitometry was used. On each scintiphoto the density of the central part in about 2 mm breadth was measured by a densitometer. In each case, the curves measured by a densitometer can be divided in 4 groups. (1) group represents the density of the right atrium and right ventricle, (2) group mainly pulmonary artery system, (3) group in addition to (1) and (2) both side pulmonary vascular system, and (4) group is situated between (1) and (2) and represents left atrium and ventricle. In our present knowledge, characteristic pattern of densitometry cannot be definitely demonstrated. But, in mitral insufficiency (4) group curve is increased in amplitude and breadth, and the peak of this curve is deviated to right. In a case of aortic stenosis (1) group curve is increased in amplitude and breadth and (4) group curve increased in

breadth with rightward deviation of the curve-peak.

With above mentioned data, it is considered that the measurement by a densitometer is one simple and useful method to quantify the scintiphoto. The authors have not experi-

enced the more detail memory method or "Autofluoroscope", but consider the significance of scintillation camera as "radionuclide angiogram" to be somewhat limited.

Scintillation camera as venogram is considered fairly valuable in clinical uses.

Hemodynamic Studies on the Prolonged Coma Using Radioisotope Techniques

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We studied cerebral blood flow by ^{133}Xe and hepatic blood flow index by radioactive colloidal ^{198}Au , mainly in "Apallisches Syndrom" group of patients with prolonged coma following severe head injury and of patients of inoperable brain tumor.

1. Hepatic blood flow index

a) Using $3'' \times 2''$ NaI honey-comb collimator average hepatic blood flow index (KL) was 0.41 ± 0.04 in "Apallisches Syndrom" group, while normal was 0.20 ± 0.02 .

b) Using $2'' \times 2''$ NaI $6 \times 6 \times 8$ cm cylinder collimator, average KL was 0.28 ± 0.03 in "Apallische Syndrom" group and 0.12 ± 0.03 in normal group.

Both studies show that KL value is higher in twice in "Apallisches Syndrom". It may suggest that splanchnic circulation increases due to decrease in cerebral blood flow and in extremities circulation. We must note that KL value varies according to detector and collimator used.

2. Cerebral circulatory studies—

Phantom studies

Purpose of this study is to determine the most adequate portion for measuring CBF_r (regional cerebral blood flow) and to study the effect of ^{133}Xe which passes a lateral cerebral hemisphere and cerebral main artery on contralateral counting.

a) Phntom was made by removing left cerebral hemisphere from cadavaric head and

inserting a sealed plastic bag of 600 cc solution containing ^{133}Xe 0.5 mCi. Using $2'' \times 2''$ NaI $6 \times 6 \times 8$ cm cylinder collimator we measured external monitoring of ^{133}Xe in several areas of phantom symmetrically on both sides. Difference between right and left is greatest in temporal area just above external auditory meatus when detector is set 15° to head top. Contralateral counting was less than 13% of that on bag inserted side and showed lowest value comparing other portions and directions. Accordingly temporal area is preferable for measuring CBF_r.

b) Vinyl tube of I.D. 1.5 mm was set along with running of main branch of the anterior cerebral artery and the middle cerebral artery in left cerebral hemisphere of the cadaver. Water was running rapidly through this tube continuously and ^{133}Xe 0.5 mCi. was injected. External counting was made on temporal area using same method described in a).

When ^{133}Xe was injected only to the middle cerebral artery tube, contralateral counting was 16.6% of ipsilateral counting. When ^{133}Xe was injected only to the anterior cerebral artery, contralateral counting was 42.3% of ipsilateral counting.

Therefore, existence of cross circulatory blood flow to contralateral hemisphere through circle of Willis should be considered only when initial contralateral counting is higher than 42.3%.

3. Mean CBF_r—Clinical Studies

^{133}Xe 0.5 mCi. was injected selectively into