

Radioisotope Scintigraphy of Cerebral Metastatic Tumors

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Scarcely any surgical treatment has been carried out for metastatic brain tumor in the past. Recently, however, operations are carried out positively for life prolongation and improvement of symptoms. The necessity for early detection of accurate localization and number of the tumor has been realized. We have studied 16 cases with serial cerebral angiography and brain scan. Angiographic findings of metastatic brain tumor are classified into 5 types and compared with

positive scan. The phase of appearance of angiographic density (circulation time) was divided into arterial, venous and capillary phase to compare with the angiographic findings and the rate of positive scan was studied. The concentration ratio of radioisotope at the site of the tumor was calculated by the memory system and differential diagnosis was attempted through the chronological change.

Sequential Brain Scan with ^{99m}Tc Pertechnetate

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Experimental and clinical studies have suggested that the optimum time for ^{99m}Tc -pertechnetate brain scanning is approximately three hours after injection. This injection-time relationship has been confirmed by collaborative clinical studies comparing scans taken at one and at three or four hours after injection.

The purpose of our study was to determine what additional information would be available if sequential scintillation camera scans were obtained at multiple intervals at and following injection.

In 200 patients, where one-hour scans showed abnormal or suspicious findings or where there was a high index of clinical suspicion, eight interval scans were obtained. These were made during injection; at 10, 20 and 30 minutes; and at 1, 2, 3 and 4 hours after injection.

While our studies confirmed that delayed

scans at 3 or 4 hours were optimal for diagnosis in the majority of intracranial lesions, there were several notable exceptions. Arterio-venous malformations could be diagnosed only with the combination of immediate and subsequent scans; while pituitary adenomas were best identified on early scans at 30 to 60 minutes and were difficult and occasionally impossible to diagnose on later scans. Some ependymomas showed peak differential uptake at 1 or 2 hours and were not discernible on early or late scans in the series.

A most important observation was that in many instances small lesions, which could not be differentiated from normal variation on any single scan, were easily identified by observing interval changes with time. These lesions most commonly involved the occipital lobe, cerebellum and brain stem.