

^{99m}Tc-POLYPHOSPHATE IN DIAGNOSING MENINGIOMAS OF THE SPHENOID WING

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A sphenoid-wing meningioma undetected by ^{99m}Tc-pertechnetate brain scan but easily detected by ^{99m}Tc-polyphosphate bone scan is presented. The use of this radiopharmaceutical in diagnosing this type of meningioma is discussed.

Numerous case reports have been published to demonstrate the salient features in the investigation of sphenoid-wing meningiomas in order to improve the diagnosis and treatment (1-4). Some of these reports have alluded to the use of radiopharmaceuticals indicating the limited role they play (1,4). The reason for the frequent failure to detect these neoplasms on the brain scan is the high activity in the surrounding structures (7). This problem has been overcome by the use of ^{99m}Tc-polyphosphate and an illustrative case is the subject of this report.

CASE REPORT

A 44-year-old white woman presented in February 1974 for investigation of proptosis and ptosis of the right eye. A vague history of drooping of the right eyelid had been noted for approximately 2 years. It was not until 3 months before admission that minimal proptosis was documented.

In January 1973 the patient underwent a right radical mastectomy for Stage I carcinoma. As a child she had poliomyelitis with resultant weakness of the right leg.

The patient was in good general physical condition, the main abnormalities being limited to the right eye. The visual acuity was 20/40. There was mild right proptosis (2-3 mm), which could be reduced. There was limitation of movement in all six directions most marked in the direction of the gaze of the superior rectus. The optic fundi were normal.

The serum alkaline phosphatase was 25 King-

Armstrong units, calcium 9.5 mg%, and phosphorus 4.3 mg%. A brain scan using 15 mCi of ^{99m}Tc-sodium pertechnetate and a Searle Radiographics Pho/Gamma camera was normal (Fig. 1). A bone scan using 15 mCi of ^{99m}Tc-polyphosphate showed an area of increased uptake in the right sphenoid just lateral to the midline (Fig. 2). No other lesions were seen in the skeleton. On cerebral angiography there was marked concentric narrowing of the cavernous portion of the internal carotid artery (Fig. 3). This was associated with sclerosis of the sella turcica and a distinct vascular blush within and about the right cavernous sinus (Fig. 4). The differential diagnosis included a meningioma of the sphenoid wing and metastatic carcinoma of the breast.

A right frontal craniotomy was performed. This showed the presence of tumor involving the middle third of the sphenoid wing encompassing the optic and third nerve. About 80% of it was removed. The pathologic diagnosis was meningioma.

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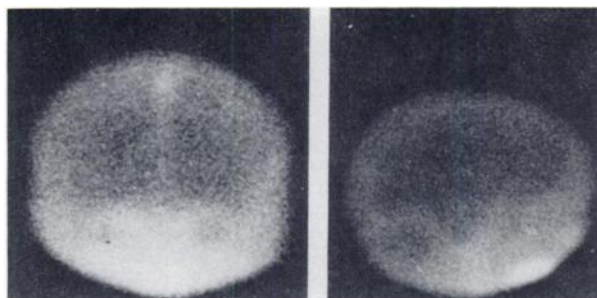


FIG. 1. Brain scan using 15 mCi of ^{99m}Tc-sodium pertechnetate. Anterior and right lateral view showing no abnormality.

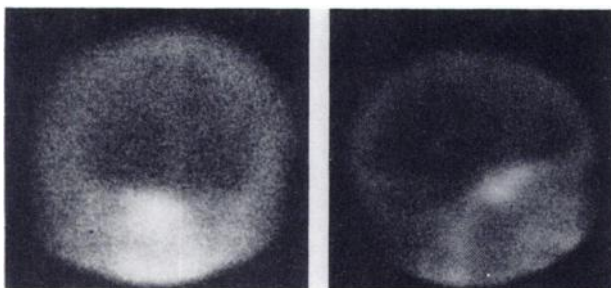


FIG. 2. Bone scan using 15 mCi of ^{99m}Tc -polyphosphate. Anterior and right lateral view of skull showing area of increased uptake in right sphenoid just lateral to midline.

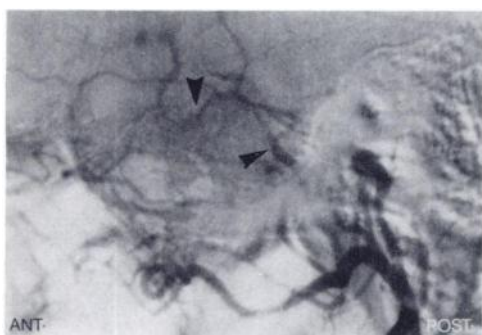


FIG. 3. Right carotid arteriogram, lateral view (detail). This shows concentric narrowing of cavernous portion of internal carotid artery (between arrows).

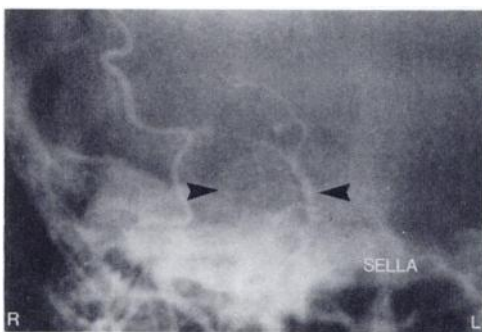


FIG. 4. Right carotid arteriogram, AP view (detail), showing distinct vascular blush (between arrows) within and about right cavernous sinus.

DISCUSSION

It is generally considered that intracranial meningiomas comprise about 14% of all primary brain tumors (5). In Cushing and Eisenhardt's review about 17% occurred in the region of the sphenoid wing (6). The onset of symptoms is insidious. The presentation is variable, including headaches, focal seizures, cranial nerve involvement, and, as in this case, with slowly developing proptosis and ptosis.

Condensation of the lesser wing with an associated

vascular blush on arteriography is considered almost diagnostic. There may also be narrowing and displacement of the cavernous and even the precavernous portion of the internal carotid artery (3). According to Blahd, the arteriogram has a greater diagnostic accuracy than the brain scan particularly with meningiomas of the sphenoid wing. Again, the same author has stressed that considering the three factors necessary to detect intracerebral neoplasms on the scan—namely, differential uptake pattern, location, and size—that in the case of meningiomas of the sphenoid wing, although they have a high uptake, they may be lost in the background of the facial muscles and normal vascular pools and therefore not be identified (7). However, if they are large enough, they will be detected. This was shown by DeLand and Wagner who demonstrated two such tumors presenting as round areas of increased uptake at the base of the skull, usually at the junction of the middle and anterior cranial fossa to one side of the midline (8).

As bone reaction is a sine qua non of this entity, it is not surprising to get a positive scan using ^{99m}Tc -polyphosphate as our case demonstrates. It will not distinguish reactive bone from that infiltrated by tumor but shares with tomography the ability to outline the extent of bony involvement as Stern has pointed out (1). Once such a lesion is detected, biopsy will be necessary to distinguish it from other conditions including metastatic carcinoma, Paget's disease of bone, and fibrous dysplasia (3,7,9).

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