Metrizamide Cisternography and Computed Tomography for the Investigation of Pituitary Lesions

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Summary. Metrizamide cisternography and computed tomography (CT) have been performed on 22 patients suspected of having pituitary or suprasellar lesions, using a low dose of metrizamide. These patients would otherwise have been subjected to air encephalography. The technique is described and the results are presented. The lesions demonstrated included empty sellae and suprasellar extensions of pituitary tumours. We also identified those patients in whom there was no suprasellar extension of a pituitary tumour. The diagnostic information required was obtained in all cases by a combination of the two techniques and air encephalography was avoided in all but one case. The side effects were mild and no serious complications were encountered. We consider this combination of methods to be very useful for the investigation of pituitary lesions.

Key words: CT – Pituitary lesions – Cisternography – Metrizamide – Amipaque

Introduction

Metrizamide (Amipaque, Nyegaard) is a non-ionic water-soluble contrast medium which has been in use since 1973 for the investigation of the subarachnoid space. Metrizamide was first used to demonstrate the basal cisterns in 1974 by Grepe [2]. It has been available in the UK under licence from the Committee on Safety of Medicines for the clinical evaluation of its use for cervical myelography and cisternography. It is now available for general myelography and computed cisternography though it has not yet been approved for direct cisternography in Great Britain.

The low neurotoxicity of metrizamide compared with existing water-soluble contrast media is well documented [4, 7].

The use of metrizamide for cisternography and for outlining the basal cisterns by CT has been described by several authors [1, 3, 6]. Since a common present neurosurgical approach to intrasellar masses is by the transsphenoidal route, a neuroradiological investigation is required to show that a suspected mass is present in the sella, has no or only very limited suprasellar extension, and that there is no herniation of the subarachnoid space into the sella.

We have introduced metrizamide by lumbar puncture for the demonstration of pituitary and suprasellar lesions. This has given excellent visualization of the suprasellar cisterns on conventional radiography and tomography, and on CT. It has proved an acceptable alternative to air encephalography for the diagnosis of pituitary lesions.

Material and Methods

All patients examined had evidence of sellar or suprasellar lesions on clinical, biochemical or radiological grounds and these patients would otherwise have been subjected to an air encephalogram.

All patients received a premedication of phenobarbitone 120 mg orally at least 1 h before the procedure. A history of epilepsy or recent phenothiazine medication was considered a contraindication to the examination. The examination was carried out on an Elema Schonander Mimer III neuroradiology unit with a tilting table (RCT-2) and TV fluoroscopy system.

The lumbar puncture was performed in the lateral decubitus position using a 21 or 22 gauge needle while the table was horizontal. After a small speci-
men of CSF had been taken, a syringe containing 4 ml of metrizamide at a strength of 250 mg iodine/ml was attached to the needle with a plastic connecting tube. The table was then tilted to a 15°–20° head-down position with the patient's head elevated on thick pads and the metrizamide was injected very slowly into the subarachnoid space to avoid mixing. Under screening control the contrast was observed flowing to the cervical region where it pooled. When all contrast had reached the cervical region, the patient was turned prone keeping the head up and neck extended; simultaneously the table was flattened to a horizontal position. The tilt of the table and the degree of extension of the patient's head were then adjusted under screening control until enough contrast medium had flowed along the clivus and into the chiasmatic cistern to outline the upper surface of the pituitary. Plain lateral films and lateral tomograms were then made to outline the suprasellar cistern.

After satisfactory radiographs had been obtained the patient was turned supine and taken to the CT room where plain and high definition scans of the pituitary region were obtained on an EMI 1010 CT scanner.

Results

Twenty-two patients have been examined by the technique described and satisfactory opacification of the chiasmatic cistern has been obtained in 21 with good delineation of the cistern on lateral radiographs and with lateral tomography.

<table>
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<th>Table 1</th>
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<td>Pituitary adenoma with suprasellar extension</td>
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<td>Empty sella</td>
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<td>Normal (No suprasellar extension)</td>
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<td>Mass lesions above the pituitary</td>
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<td>Brain stem lesions (pontine mass)</td>
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In one patient the contrast was too dilute for adequate radiographic contrast but the CT scan after the attempted cisternogram clearly outlined a pituitary stalk mass. In a second patient there was some doubt whether there was a high density intrasellar mass or prolapse of the subarachnoid space into the sella. An air encephalogram confirmed the presence of an intrasellar mass in this case although there was some herniation of subarachnoid space into the sella alongside the mass.

The CT scan was performed shortly after the cisternogram (15–30 min) in all but one patient, and the concentration of contrast medium in the basal cisterns was found to be ideal for providing good enhancement of the cerebrospinal fluid (CSF) without the Hounsfield value being so high that the brain/CSF interface was obscured. The attenuation value of the enhanced CSF was between 110 and 150 Hounsfield units.

In one patient in whom there was a delay of 2 h before the CT scan was performed the enhancement of the CSF was inadequate for good visualization. The lesions demonstrated by the technique are listed in Table 1.

Figures 1a and b show the normal cisternogram and CT scan. Figures 2–5 are examples of the pathological lesions demonstrated by this technique.