

Paraphysial Cysts of the Third Ventricle

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SUMMARY

The radiographic appearances of the third ventricle in 26 patients with colloid cysts, have been reviewed. The constant radiographic features and the investigations in which the diagnostic yield is good are stressed.

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Tumours within the third ventricle of the brain adjacent to the foramen of Monro cannot be diagnosed with any degree of certainty from clinical evidence alone. This is due to a wide variety of presenting symptoms and the absence of any pathognomonic signs. For this reason, the importance of establishing definite radiographic criteria for the diagnosis of these tumours within the anterior part of the third ventricle becomes obvious, since many of these cases can now be diagnosed and successfully operated upon.

The radiological appearances have been adequately described.¹⁻³ The purpose of this article is to review the radiographic appearances of cysts in 26 patients prior to their surgical removal, and to stress from them the constant radiographic features and those investigations in which the diagnostic yield is good.

PATHOLOGICAL ANATOMY

Paraphysial cysts are now recognised as arising from the paraphysial body — a gland situated in the midline of the rostral portion of the roof of the third ventricle.^{2,4} It is a midline structure and lies directly behind the foramina of Monro. As the cysts increase in size, they become heavier and sag downwards to lie upon the tela choroidea and in this way are eventually enfolded by layers of the tela choroidea.⁴ They are therefore in intimate relationship with the choroid plexus, and being at first mobile, can cause an intermittent blockage of the foramina of Monro. Although the cysts originate in the rostral extremity of the third ventricle, they usually bulge through distended foramina of Monro into the lateral ventricles. Occasionally the colloid cyst may be found entirely within the third ventricle and may occupy much of the anterior portion of it. Because this is a midline tumour, when obstruction of the foramina of Monro occurs, this is usually symmetrical. Thus there may be persistent or intermittent obstruction of the foramina of Monro, with resultant dilatation of both lateral ventricles.

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RADIOLOGICAL ASPECTS

Plain Roentgenograms of the Skull

This investigation was non-contributory. In only one patient were the dorsum sellae and floor of the pituitary fossa destroyed. In all the other patients, the pituitary fossa was normal. The pineal was central when seen, and in none of the cases was there any evidence of abnormal calcification.

Carotid Angiography

Twenty-four patients demonstrated an obstructive hydrocephalus. A feature seen in 14 of these patients was that the temporal horn did not appear as dilated as the rest of the lateral ventricle. This was evidenced by lack of elevation of the middle cerebral group of arteries, a feature that one would have expected with the degree of obstructive hydrocephalus that was present. This feature was further confirmed on the air investigations.

When an adequate lateral venous phase was obtained, the downward displacement of the internal cerebral vein was a striking appearance.

The extra-anterior curve of the internal cerebral vein distorting the anterior portion of the internal cerebral vein,⁵ was not easily appreciated.

The remaining 2 patients demonstrated a normal appearance of the ventricular system on carotid angiography.

Vertebral Angiography

This investigation was not performed as a routine. However, it only demonstrated the extent of the hippocampal herniation when present (Fig. 1), but gave no indication as to the underlying pathology.

Air Ventriculography

This is the diagnostic procedure of choice. In 24 of the patients both lateral ventricles were tapped, and every patient showed lateral ventricular dilation. In these patients the lateral ventricles were symmetrically dilated. The septum pellucidum was usually central, and when displaced to one or other side, was thought to be due to unequal filling of the ventricles by the neurosurgeon (Fig. 2). The size of the cerebral mantle depended upon the duration and the extent of the obstructive hydrocephalus. No patient in this series demonstrated unequal obstruction of the foramina of Monro, and it is therefore suggested that in this condition, obstruction of the foramina of Monro is usually symmetrical.

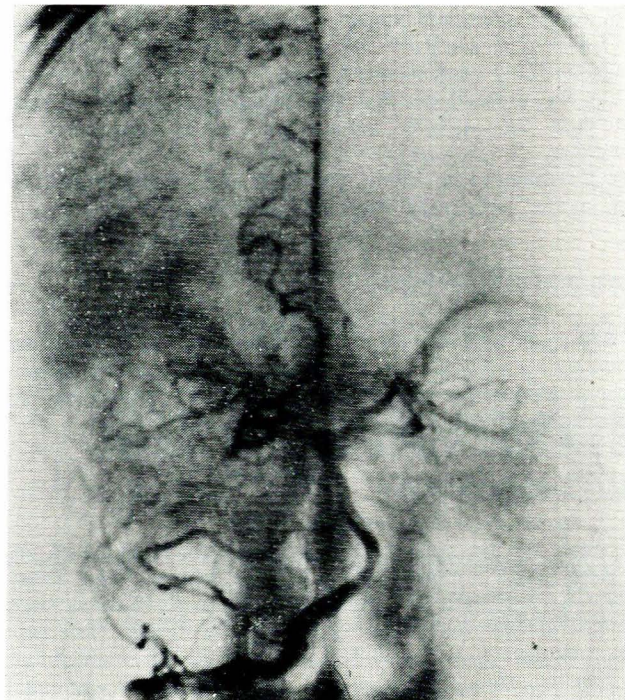
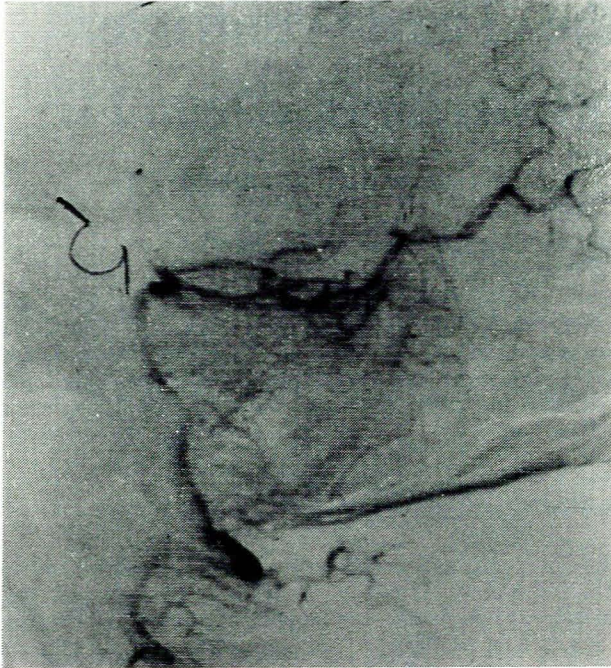


Fig. 1. Lateral (top) and anteroposterior (bottom) vertebral angiogram, arterial phase with subtraction, demonstrating posterior tilting of the superior portion of the basilar artery, downward and medial displacement of the proximal portions of the posterior cerebral arteries — features of hippocampal herniation.

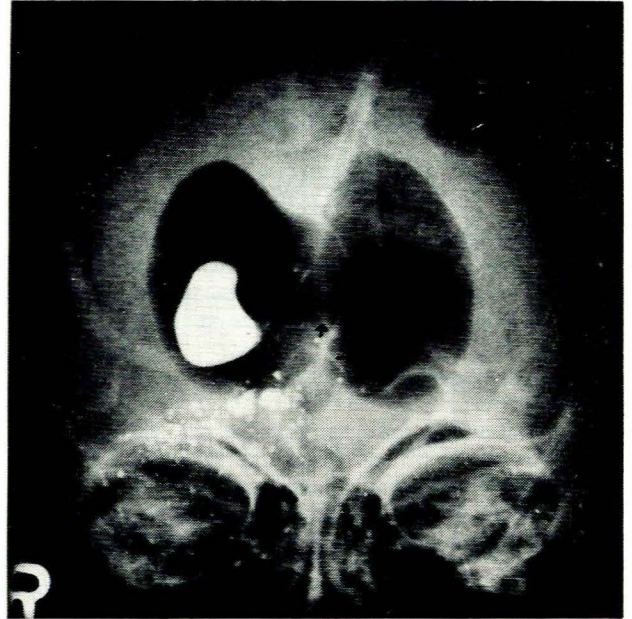


Fig. 2. Air and myodil ventriculogram, brow-up anteroposterior projection, demonstrating an obstructive hydrocephalus with the septum pellucidum displaced to the left. The colloid cyst (arrow) is seen projecting centrally upwards into the lateral ventricles, more towards the right side.

It was not possible to see rupture of the septum pellucidum on the air studies. When the cyst was large, its superior margin extended into the lateral ventricles in a typical fashion (Fig. 3).

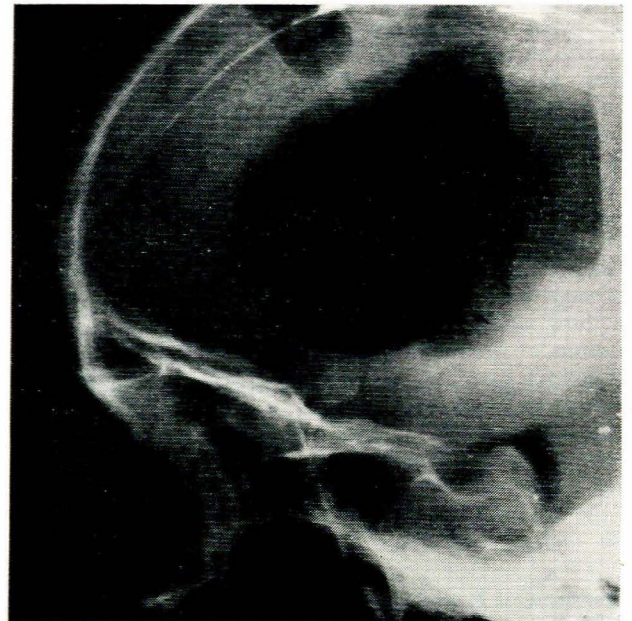


Fig. 3. Air ventriculogram, brow-up lateral projection, demonstrating the superior margin of the cyst (arrow) extending into the lateral ventricles.

A constant observation and feature which has not previously been described, was differential dilatation between the temporal horn and the rest of the lateral ventricle. The dilatation of all of the lateral ventricle, except for the temporal horn, was a striking appearance (Fig. 4). This was seen in 14 cases. We have no explanation for this anomaly, but have observed it in 2 other patients, one of whom had a brain stem abscess with an obstructive hydrocephalus, and the other an aqueduct stenosis.

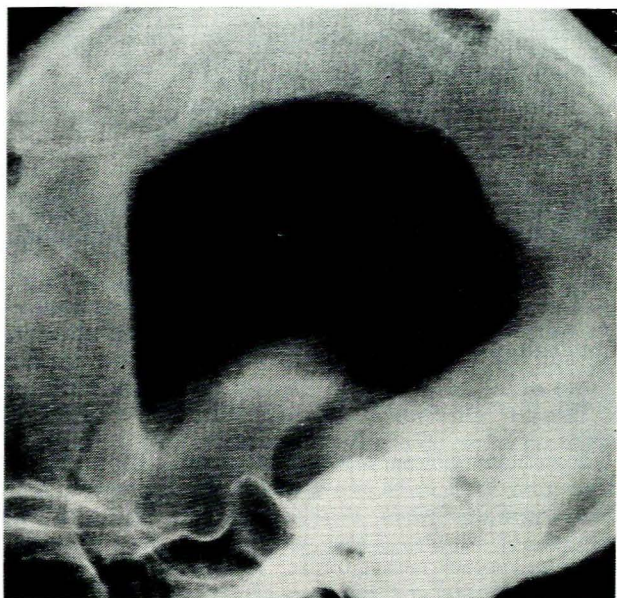


Fig. 4. Air ventriculogram, brow-down lateral projection, demonstrating a small temporal horn in the presence of marked dilatation of the lateral ventricle.

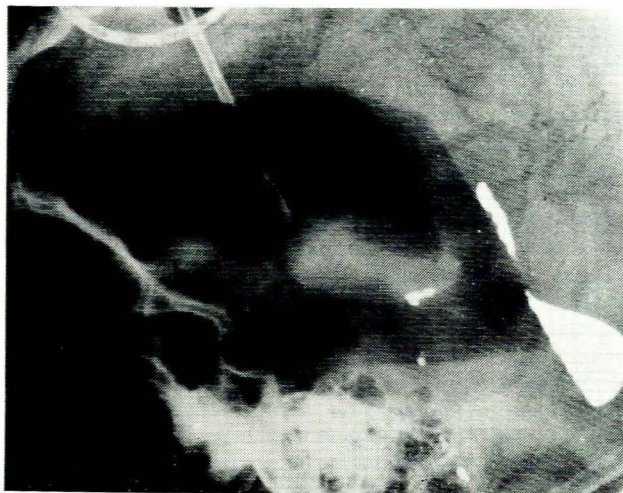


Fig. 5. Air ventriculogram, brow-up lateral projection, with extension of the head, demonstrating air present within the third ventricle defining the antero-inferior margin of the colloid cyst (arrow).

Attempted evaluation of the third ventricle by this procedure was disappointing, owing to the extent of the foramina of Monro obstruction, but when air did enter the third ventricle, the lower margin of the cyst could be demonstrated. This was seen in 5 patients and had a typical appearance (Fig. 5). It is stated that the cyst rarely exceeds 2 cm in size. However, in 2 of our patients the cyst was large, and occupied most of the anterior half of the third ventricle.

Air Encephalography

Two patients in this series were investigated because of the sudden onset of acute headaches on bending. In neither of them was there any evidence of raised intracranial pressure. They demonstrated cysts in the paraphysial region, producing a ball-valve affect in the foramina of Monro.

In the patients with obstructive hydrocephalus, when the ventricular catheters were in position and the air ventriculogram had demonstrated total occlusion of the foramina of Monro, air encephalography often provided additional information. By this procedure the third ventricle could be delineated and the margins of the cyst defined. Further, an evaluation of the posterior fossa contents was possible.

Myodil Ventriculography

This investigation was often carried out but added no further information to the air ventriculography, presumably because the myodil, being more viscous than air, would not pass through the narrowed foramina of Monro. However, it did define the superior margin of the cyst, which had a typical appearance, situated behind the foramina of Monro and projecting into, and often through them (Fig. 6). This investigation is therefore considered disappointing for evaluation of patency of the foramina of Monro, but did demonstrate typically the superior margin of the cyst extending through the foramina of Monro when this was present.

DISCUSSION

From our series we have concluded that in patients with obstructive hydrocephalus, air ventriculography, followed by lumbar air encephalography, are the most reliable diagnostic procedures for evaluating colloid cysts of the third ventricle. This is almost certainly due to the unique situation of the tumour. It is reported that unequal obstruction of the foramina of Monro can occur, with resultant differential dilatation of the lateral ventricles. We suggest that this is probably rare, since in none of our patients did this phenomenon occur. In all patients who demonstrated an obstructive hydrocephalus on ventriculography and in whom no air entered into the third ventricle, this condition was considered, and all attempts were made to confirm the diagnosis.

It should be stressed that sufficient air must be present within the ventricular system to extend behind the foramina

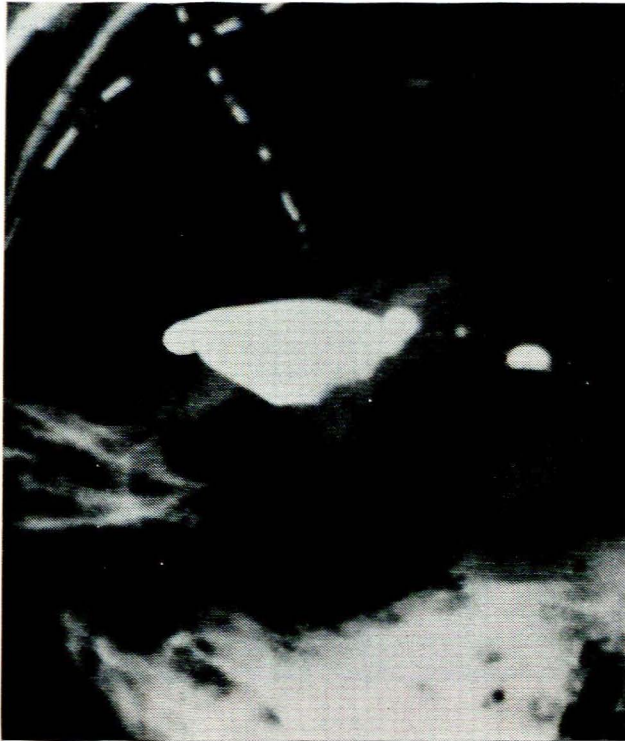


Fig. 6. Myodil ventriculogram, erect lateral projection, demonstrating the superior margin of the cyst extending through the foramina of Monro into the lateral ventricles.

of Monro in the brow-up position before these projections are performed. In the hanging-head lateral projection, with tomography, the anterior parts of the ventricular system will be seen, and if the foramina of Monro are patent the cyst will be outlined. This projection is also valuable in defining the suprasellar region, thus excluding pathology originating in this region and extending upwards. We consider this to be the most important projection in defining these masses. The half-axial brow-up projection, with anteroposterior tomography, is also recommended for evaluation of the width of the mass located in the foramina of Monro (Fig. 7).

The colloid cyst may be outlined in the initial erect lateral projection on lumbar air encephalography. This projection should be carefully scrutinised, since this may

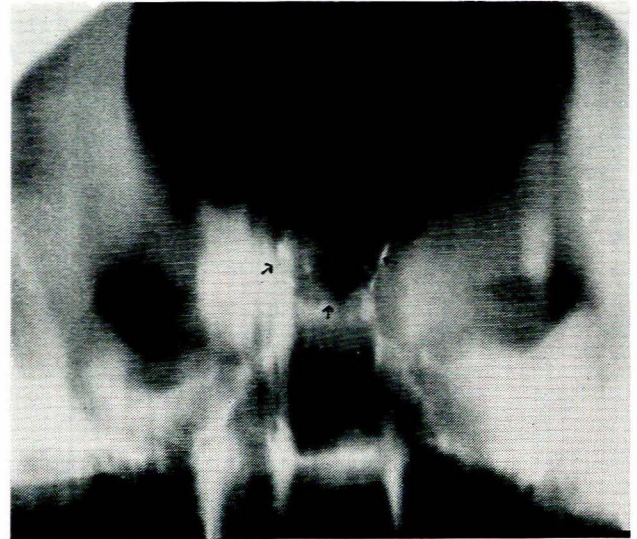


Fig. 7. Air ventriculogram, brow-up anteroposterior projection with tomography, demonstrating the circumference of the cyst (arrow) lying within the third ventricle and projecting into the lateral ventricles.

be the first indication that a mass is present in this region.

The radiographic appearances are typical, but other conditions may have to be considered in the differential diagnosis, especially when there is total occlusion of the foramina of Monro. These include craniopharyngiomas, tuberculum sellae meningiomas, suprasellar extensions of pituitary tumours and tumours of the basal ganglia and thalami. However, these conditions usually produce typical clinical presentations and some change on the plain films of the skull. This may be in the form of abnormal calcifications, hyperostosis of the tuberculum sellae or destruction of the pituitary fossa.

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