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CT Imaging of the Brain Lateral Ventricular Papillomas

Brodawczaki spłotów naczyńiówkowych komór bocznych mózgu w obrazowaniu TK

Choroid plexus papillomas constitute 3—5% of all the brain tumors occurring in children (4). In 70—89% they are diagnosed in the first decade of life (4, 6), usually in the brain lateral ventricles (79%), 43% of the cases described in literature involving only one ventricle (4). According to the above facts they result either in unilateral or bilateral communicating hydrocephalus (8, 10).

MATERIAL AND RESULTS

The material under discussion comprises 5 cases of brain lateral ventricular choroid papillomas verified after surgical removal of neoplastic tissue. The patients representing both sexes were treated at the Neurosurgical Department of the University Hospital in Tripoli (head R. Krajewski M. D.). They were up to 1 year of age. CT imaging was performed by one of the authors.

In all the children there was found increasing hydrocephalus with rapid growth of head circumference. In two of them head circumference increased by about 2—2.5 cm a week, revealing itself 3—10 months after birth. There occurred clinical symptoms of WCS. They were indications for CT imaging and subsequent preoperative implantation of an aliculoventricular valve in two children.

Scans showed in 2 cases a uniform, in 2 others lobar, isodensic intraventricular mass in the choroid plexus region (Fig. 1a). After giving the contrast medium there occurred in 4 cases a uniform, clear intensification of intraventricular mass (Fig. 1b). In the fifth case on the scan there was only visible a symmetrical, bilateral hydrocephalus of the lateral and third ventricles of the brain (Fig. 2a). Only after the intravenous administration of the contrast medium did the tumor mass get contrasted showing a differentiated, lobulated structure (Fig. 2b).

In 3 children there were observed CT features of active, communicating hydrocephalus manifesting itself by subependymal accumulation of the fluid

around the frontal horns of the lateral ventricles, butterfly-shaped (Fig. 1b). Angiography of cervical arteries was performed in 2 cases revealing tumor overcoloring and widening of the anterior choroidal artery.

DISCUSSION

Excessive production of the cerebrospinal fluid resulting from the presence of choroid plexus papillomas leads to the occurrence of bilateral hydrocephalic widening of the brain fluid system of the communicating type (1). This hydrocephalus is thought to occur in 88% cases of all tumors of choroid plexus in children (6), which corresponds with our findings. Periodic intraventricular bleeding from the tumor, debilitating fluid absorption, can also cause hydrocephalus. Segmental periventricular widening can have porencephalic nature caused by a local increase of pressure of overabundant fluid. Asymmetric hydrocephalus is caused by tumors arising near the interventricular foramen. The lateral ventricle on the side of the tumor is usually bigger, and the tumor containing the segment of the ventricle is the most widened part (4).

CT is one of the techniques considerably contributing to determining indications for fluid drainage and to further assessment of the course of hydrocephalus by means of serial control tests. This technique is also helpful in the differential diagnosis of papillomas with other intraventricular masses of this region. Contrast CT scans, revealing a tumor, can bring correction to the diagnosis of congenital communicating hydrocephalus, which is not unfrequently of unknown etiology and nature.

Generally, intraventricular lesions are satisfactorily outlined on CT as well as MRI scans. Choroid plexus papillomas are easily diagnosed on angiograms, computed tomograms and on brain scans. The ipsilateral lateral ventricle, as a rule, is more dilated than the opposite non-tumor-containing side. An intraventricular tumor may not be initially considered as the cause of bilaterally enlarged lateral ventricles in cases when bilateral, rarely, choroid plexus papillomas occur.

Papillomas show a typical choroidal location tending to plexus. A characteristic, intensive contrast intensification reflects contrast absorption of choroidal origin (3, 5). The hydrocephalus syndrome and WCS symptoms are typical of papillomas (4). Intraventricular mass, sometimes hyperdense on scan images, has a smooth surface, well confined or irregular nodular outlines, frequently lobular, wart-like, leaf-like structure (3, 8). A sporadically visible hypodense zone can correspond to the central necrosis. In small tumors diagnosis is hindered by hypertrophies of choroid plexus villi forming abundant plexus shadows. This usually occurs in children under 2 years of age, in whom prominent choroid plexi are age characteristics (2, 7).

The presence of extensive, macular or dotted, fragmented calcifications localized in the triangles of the lateral ventricles, or having the character of calcareous casts of this region, can be very helpful in diagnosing a tumor of the plexus. In Rovit's (4) material the calcifications in 4.1% cases were big enough to let diagnose papilloma of the plexus. Calcification of the plexus in the first decade of life is exceptional, this occurring unilaterally and extensive constitutes a pertinent diagnostic element. Some authors believed that choroid plexus papillomas are almost never calcified. Zatz (9) described three children with calcification of the choroid plexus in central neurofibromatosis. Necropsy in one case showed the calcification to be due to an intraventricular meningioma. In our series of cases we did not observe any calcification.

Big tumors must be differentiated from other intraventricular masses of the choroid glomus region. Malignant changes constitute in children 20% of choroid plexus tumors (6). Primary choroid plexus carcinoma in the lateral ventricles are rare. They form intraventricular mass also with considerable contrast intensification. They can contain fields with small density corresponding to the central necrosis, old bleedings, zones of ependymal oedema or tumor invasions to adjacent brain tissue. There also occurs big hydrocephalus. Medulloblastoma tend to spread throughout the subarachnoid space giving retrograde metastatic implantation in the lateral ventricle. Intraventricular meningioma on scan pictures forms a uniform, well confined mass, lobular isodense or hypodense, most commonly in the atrium of the lateral ventricle. Contrast intensification is considerable, homogeneous. Widening of the ventricles is small, reactive brain oedema usually absent (5).

Ependymomas in children occur mainly in the fourth ventricle, whereas in adults they are less frequently found in the lateral ventricles. On scan pictures they form iso- or slightly hyperdense mass. In 50% cases they show homogeneous structure, in the other half of cases they show hypodense fields with cysts and dot-like calcifications. Contrast intensification is moderate, less intense.

The most frequent intraventricular cystic lesions are colloid or neuroepithelial cysts. Colloid cysts arise the anterior third ventricle and are relatively small in childhood but later in life may obstruct interventricular foramen and extend through the foramen of Monro into the lateral ventricular cavity.

Inflammatory cysts, secondary to cystocercosis, may also be intraventricular in location. In such cases other findings, such as calcifications elsewhere in the brain, help to establish proper diagnosis. In newborns intracerebral hematoma may simulate an intracerebral tumor. In contrast to choroid plexus papillomas, other tumors are more likely to displace than to overgrow the plexi.

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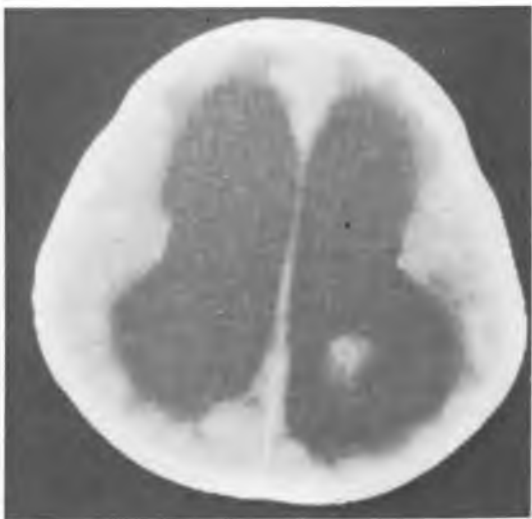
EXPLANATIONS TO FIGURES

Fig. 1. Patient (male) I. B. age 4/12; a — a scan picture — considerable, bilateral hydrocephalus with visible hyperdense mass in an anatomical projection of the choroid plexus of the left cerebral ventricle, b — a contrast scan picture — intensive, homogeneous mass in the region of the occipital triangle and its left horn. Communicating hydrocephalus with characteristics of subependymal transudation round the frontal horns.

Fig. 2. Patient (female) M. B. age 8/12; a — scan picture — considerable hydrocephalus, the tumor mass invisible, b — a contrast scan picture shows intensive saturation of the tumor with an irregular outline and partly lobular structure in the right ventricular triangle, at the site of choroid plexus location.

STRESZCZENIE

Na podstawie badania 5 przypadków brodawczaków spłotów naczyniówkowych komór bocznych mózgu i dostępnych danych z piśmiennictwa oceniono możliwości rozpoznawania tych guzów techniką TK u dzieci poniżej pierwszego roku życia. Analizowano następstwa rozpoznanych brodawczaków spłotów naczyniówkowych, zwłaszcza nadmiernego wytwarzania płynu mózgowo-rdzeniowego prowadzącego do obustronnego lub jednostronnego wodogłowiowego poszerzenia przestrzeni płynowych mózgu typu komunikującego. U 3 pacjentów obserwowano obustronne aktywne wodogłowie komunikujące, ujawniające się w postaci podwyższiółkowego nagromadzenia płynu wokół rogów czołowych komór bocznych mózgu, przypominające kształt skrzydeł motyla.



a

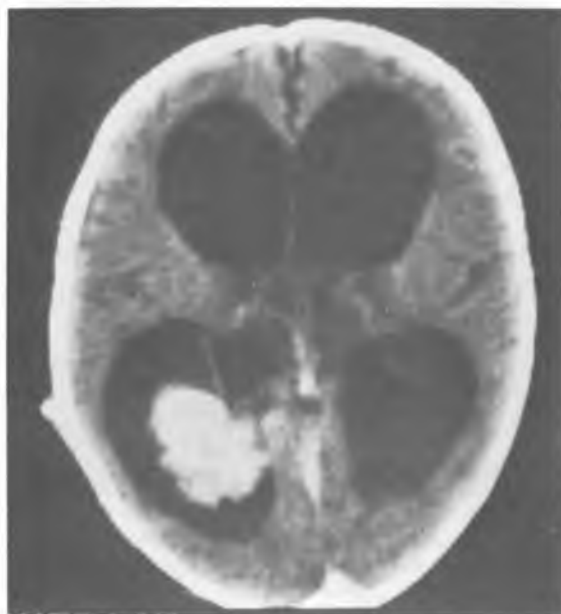


b

Fig. 1



a



b

Fig. 2