Holoprosencephaly: Apropos of 2 cases

Abstract

A rare brain malformation known as holoprosencephaly is caused by the forebrain's (prosencephalon) incomplete division during the third to fourth week of pregnancy. It frequently occurs in conjunction with expressive facial anomalies, most notably cleft lip and palate. Through two cases of alobar and semi lobar holoproencephaly, we try to focus on this malformation, thus defining the Three forms. These Three anatomical forms are distinguished according to the degree of individualization of the cerebral hemispheres: the alobar, semi-lobar and lobar form. The prognosis is reserved. Prenatal diagnosis can be made by fetal ultrasound.

Keywords : brain malformation, holoprosencephaly, Prenatal diagnosis, neurological manifestations

Introduction :

Holoprosencephaly (HPE) is a complex cerebral malformation resulting from a defect in the midline cleavage of the forebrain (into the right and left hemispheres) during early embryonic development. This malformation concerning the forebrain and the face is at the origin of neurological manifestations and dysmorphism of varying degrees. HPE is one of the midline brain abnormalities. They have been classified into alobar, semi-lobar, and lobar types.

Through two cases of alobar and semi lobar holoproencephaly, we try to focus on this malformation, thus defining the 3 forms.

Observation 1:

A newborn at H5 of life, female, third child of the siblings, from a 1st degree consanguineous marriage, poorly monitored pregnancy estimated at term. Admitted to the pediatric emergency room after birth for a vegetative state. Examination found an unresponsive newborn, non-gesticulating, eyes open, generalized hypotonia, absent archaic reflexes, with minimal audible whining. The trans-fontanellar ultrasound objectified a significant dilation of the lateral ventricles. The cerebral scanner performed without injection confirmed the encephalic malformation by highlighting a significant dilation of the lateral ventricles laminating the cortex on the right, with absence of visualization of the cerebral parenchyma at the bilateral frontal, parietal and left temporal level. It was a major cerebral malformation of the semi-lobar holoporencephaly type. The evolution was marked by a death of the newborn at H18 of life.

Observation 2:

It was a female newborn at D1 of life, resulting from a poorly followed pregnancy estimated at term with Greek fenu taken by the mother in the first trimester, delivery by cesarean. The newborn was admitted to the pediatric emergency department for neonatal respiratory distress. The clinical examination had objectified: severe respiratory distress; facial dysmorphism with a single nostril orifice; cleft palate and macrocrania. Cerebral CT showed alobar holoprosencephaly associated with midline facial malformations (choanal atresia and cleft palate).

The malformative assessment showed an inter-ventricular communication of 3 mm on the echocardiography and the chest CT angiography was normal. The evolution was marked by the death of the newborn at D9 of life.

Figure 1: Alobar holoprosencephaly

Discussion :

Holoprosencephaly (HPE) is a rare malformation, occurring during the second month of embryonic life. It is defined by a cleavage defect of the forebrain. This defect can be partial or complete, explaining the different clinical varieties. (1)

The prevalence of HPE is less than 1 per 10,000 live births and a total prevalence of approximately 1.2 per 10,000 births. Its incidence is underestimated due to the abortifacient nature of the malformation as well as minor forms that may go unnoticed. (2)

Several classifications have been proposed, but that of DEMYER and ZEMAN is the most commonly used, it distinguishes three types of increasing severity: alobar, semi-lobar and lobar holoprosencephaly. (1)

Alobar HPE is the most severe form, in which the telencephalon consists of a holosphere containing a single ventricular cavity closed in its posterior part by a thin wall which gives it a pseudo-cystic

appearance. The olfactory lobes are absent. The thalami, small and rudimentary, are fused in the midline. Microcephaly is constantly present.
The semi-lobar HPE is characterized by the appearance of a median furrow of variable length, marking a separation at the posterior part of the holosphere with an outline of two occipital lobes. The olfactory lobes are absent and microcephaly is usually present.
The lobar HPE is the minor form, having a median groove which, externally, appears to separate two hemispheres, showing individualized frontal, temporal and occipital lobes. (2)
There is a medium interhemispheric or syntelencephaly (less severe) subtype.
In most cases facial anomalies are observed such as: cyclopia, proboscis (with single nostril), cleft lip and/or palate, hypotelorism or single middle incisor. These latter abnormalities can occur without brain malformation and are called microforms.
A heart defect (80% of cases), and urogenital malformations, areas of occipital skin aplasia. (3)
The diagnosis of holoprosencephaly is primarily based on imaging. Antenatal and transfontanellar ultrasonography performed in toddlers can guide the diagnosis, which will be confirmed by CT scanning or magnetic resonance imaging. An angiographic study can also be contributory. (1.4)
Concerning the genetic diagnosis is done by study of the karyotype (biopsy of the chorionic villi), Approximately 25% to 50% of the cases of HPE are associated with a chromosomal anomaly. These abnormalities are non-specific and are either numerical or structural abnormalities. HPEs with a normal karyotype cannot be distinguished from those with an abnormal karyotype on the basis of craniofacial abnormality or HPE subtype; however, people with HPE as a result of a cytogenetic abnormality are more likely to have another malformation (4,5,6).

Holoprosencephaly is lethal in the most severe forms; more than 95% of affected fetuses die in utero. The evolution of HPE is marked by psychomotor retardation, spasticity, epilepsy, microcephaly, diabetes insipidus.
The prognosis depends on the severity of the HPE and the associated medical and neurological complications. The prognosis for severely affected children is very poor. Mildly affected children may have very few symptoms and live normally. (3)

Conclusion :

Holoprosencephaly is a rare brain malformation that results from incomplete division of the forebrain (prosencephalon) during the 3rd to 4th week of gestation. It is often associated with evocative facial anomalies, dominated by cleft lip and palate. Brain CT, or at best, MRI defines the anatomical subtype and identifies associated central nervous system abnormalities. Three anatomical forms are distinguished according to the degree of individualization of the cerebral hemispheres: the alobar, semi-lobar and lobar form. The prognosis is reserved. Prenatal diagnosis can be made by fetal ultrasound.

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