Holoprosencephaly

Holoprosencephaly (HPE, once known as arhinencephaly) is a cephalic disorder in which the prosencephalon (the forebrain of the embryo) fails to develop into two hemispheres. Normally, the forebrain is formed and the face begins to develop in the fifth and sixth weeks of human pregnancy. The condition also occurs in other species.

Failure of the telencephalic vesicle to cleave into two cerebral hemispheres. The degree of cleavage failure ranges from the severe alobar (single ventricle, no interhemispheric fissure) to semi lobar and lobar (less severe malformations). The olfactory bulbs are usually small and the cingulate gyrus remains fused. Median faciocerebral dysplasia is common, and the degree of severity parallels the extent of the cleavage failure.

80% are associated with trisomy (primarily trisomy 13, and to a lesser extent trisomy 18). Survival beyond infancy is uncommon; most survivors are severely retarded, and a minority are able to function in society. Some develop shunt-dependent hydrocephalus. The risk of holoprosencephaly is increased in subsequent pregnancies of the same couple.

The condition can be mild or severe. According to the National Institute of Neurological Disorders and Stroke (NINDS), “in most cases of holoprosencephaly, the malformations are so severe that babies die before birth.”

When the embryo's forebrain does not divide to form bilateral cerebral hemispheres (the left and right halves of the brain), it causes defects in the development of the face and in brain structure and function.

In less severe cases, babies are born with normal or near-normal brain development and facial deformities that may affect the eyes, nose, and upper lip.

Facies

Type of face	Facial features	Cranium and brain findings
cyclopia	single eye or partially divided eye in single orbit; arhinia with proboscis	microcephaly; alobar holoprosencephaly
ethmocephaly	extreme orbital hypotelorism; separate orbits; arhinia with proboscis	microcephaly; alobar holoprosencephaly
cebocephaly	orbital hypotelorism; proboscis-like nose; no median cleft lip	microcephaly; usually has alobar holoprosencephaly
with median cleft lip	orbital hypotelorism; flat nose	microcephaly; sometimes has trigonocephaly; usually has alobar holoprosencephaly
with median philtrum-premaxilla anlage	orbital hypotelorism; bilateral lateral cleft lip with median process representing philtrum-premaxillary anlage; flat nose	microcephaly; sometimes has trigonocephaly; semilobar or lobar holoprosencephaly