Cyclopia

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ABSTRACT

True cyclopia is a rare anomaly in which the organogenetic development of the 2 separate eyes is suppressed. We report a fetus with an association of cyclopia with other anomalies. The possible mechanism of the histogenesis is discussed, together with a review of the relevant literature.

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Cyclopia is an unusual anomaly in which the anterior brain and the midline mesodermal structures develop anomalously. The orbital region is grossly deformed, resulting in the formation of a central cavity 'pseudo-orbit', with absence of nasal cavity and presence of a rudimentary proboscis above the pseudo-orbit. If 2 globes are found in a different degree of fusion in the pseudo-orbit, the condition is called synophthalmos. A much more rare anomaly is true cyclopia, wherein only one eye is present.[1,2] Underlying brain malformation is usually alobar holoprosencephaly with microcephaly. Associated structural anomalies include absence of some of the facial bones and absence of the hypophysis with associated endocrine abnormalities. Polydactyly and syndactyly are frequently present.[3]

Case Report. This infant was born to a 23-year-old gravida 3 para 2 woman and her 25-year-old husband. The marriage was not consanguineous. The first 2 children were normal. All investigations of the mother were normal. At 3rd trimester of pregnancy, ultrasound investigation confirmed the suspected polyhydramnios and at the same time documented marked hydrocephaly and holoprosencephaly of the fetus (**Figure 1**). Amniocentesis was performed, and 500 ml of amniotic fluid was withdrawn to reduce the polyhydramnios. The fetus was delivered at 33 weeks spontaneously. After delivery, the cyclopic infant showed severe apnea and bradycardia, the child died after 5 minutes. His length was 40 cm, weight was 1400 gm and head circumference was 30 cm. There was a midline frontal proboscis, single midline orbit with single eye of fused eyes, a chin-like structure at the lower part of the face (**Figure 2**). In addition to anal atresia and hypoplastic male genitalia, there was meningomyelocele. Other anomalies included short right femur and tibia, right clubfoot and bilateral pes equino varus (**Figure 3**). At autopsy, there was cyclopia and a proboscis like mass above the eye. The proboscis measuring 15 mm length and 10 mm diameter with a single blind end orifice was attached to the superior aspect of the orbit. The nose was absent. There was a single median ventricular cavity and alobar holoprosencephaly, but no olfactory apparatus no optic chiasma, and no optic tracts or pituitary gland. Only a median connection was seen between a single optic foramen and the eyeball, which was presumed to be the sheats of the optic nerve. The other viscera were macroscopically normal. Microscopically, there was no pathologic finding. The placenta and umbilical cord were macroscopically and histologically normal. Chromosomal studies taken from the chordocentesis showed a normal karyotype (46-XY).

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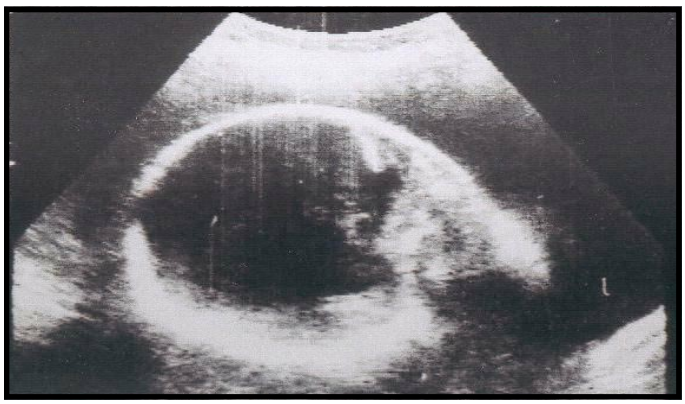

Figure 1 - Sonographic picture of the skull of the 33-week-old fetus.

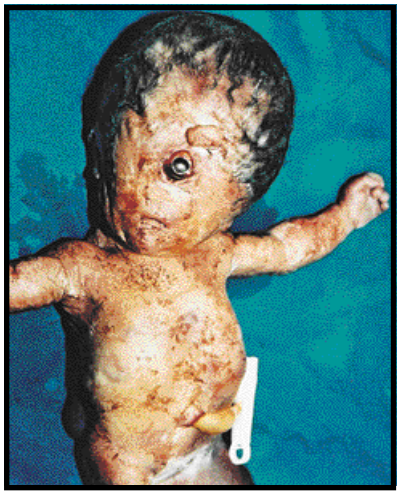

Figure 2 - Cyclopic fetus with midline frontal proboscis above the eyeball.

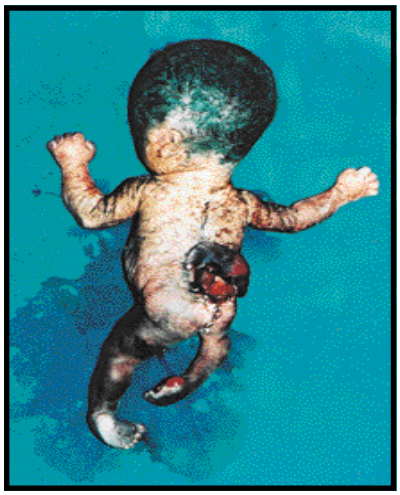

Figure 3 - Fetus showing meningomyelocele, short right femur and tibia, right clubfoot and bilateral pes equino varus.

Discussion. Cyclopia is a rare deformity. It is considered to result from the fusion of 2 optic grooves, due to defective development of the ventral diencephalon (holoprosencephaly). Cyclopia is commonly divided into true cyclopia and synophthalmia. True cyclopia is very rare, and the 2 eyes are completely fused.[1,2] Synophthalmia is more commonly seen and is characterized by fusion of 2 eyes by varying degrees.[4] We evaluated our case as true cyclopia. Defective genetic and environmental factors have been associated with cyclopia.[1,5,6] Agents that have been shown to induce cyclopia in animals include magnesium salt, alcohol, lithium chloride, retinol, and radiation.[4,7] In human beings, environmental factors associated with this deformity include ionizing radiation, contraceptives, viremia, salicylate, rubella vaccine, antibiotics, and aminopyrine.[4,8] It was reported that administration of high doses of salicylates might produce a variety of anomalies in pregnant rats, particularly of the nervous system, including craniorachischisis. All reports in man remain short of convincing in the absence of prospective studies.[9] Benawra et al[10] presented a case of cyclopia with multiple other anomalies born to a mother who took 3 to 4.5 gm of aspirin daily during the first trimester. Genetic errors with chromosomal abnormalities such as trisomy-D, monosomy-G mosaicism, translocation affecting chromosome 3 and group C chromosome, and chromosome 10 short arm deletions have also been recorded in cyclopia.[1,11] Taysi and Tinaztepe[12] suggested a classification of 2 main etiological groups. In the first group, there were only cephalic malformations and the karyotype was normal. In the 2nd group there were cephalic as well as extracephalic malformations with anomalous karyotype, mostly trisomy-D. We detected that the case had cephalic malformation including a single median ventricular cavity and holoprosencephaly (alobar), and that there was no olfactory apparatus, no optic chiasma, and no optic tracts or pituitary gland. In addition, in our case, the extracephalic defects anal atresia, hypoplastic male genitalia, meningomyelocele, short right femur and tibia, right clubfoot and bilateral pes equino varus were detected. However, the karyotype was normal.

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