

Case Report

Cyclopia syndrome in a 34-week fetus

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ABSTRACT

Cyclopia is a rare genetic birth defect with an incidence of approximately 1 in 13,000 to 20,000 newborns. This condition is marked by the failure of the eye orbits to properly divide, resulting in a single eye field or closely positioned eye fields. Additional features include a missing or dysfunctional nose and malformed ears. Most embryos with this condition are aborted, stillborn, or die shortly after birth. This case report discusses the 34-week pregnancy of a 36-year-old woman referred to Arifin Achmad Hospital. Ultrasound revealed midline fusion of the foetal head and thalamus, leading to an elective caesarean section. The newborn, a girl weighing 1800 g with an APGAR score of 3/4, had a single eye, no nose, and was polydactyly, and she died one day later due to respiratory failure. Holoprosencephaly, a related brain defect, results in severe craniofacial abnormalities and is categorised into lobar, semi-lobar, and lobar subtypes. Mutations in the SHH and PAX6 genes are linked to these conditions. Early diagnosis via ultrasonography and proper management are crucial to preventing harm. However, in developing countries, many cases remain undiagnosed due to the lack of regular prenatal care. Palliative care is essential for newborns with this lethal malformation, focusing on pain relief and family support.

Keywords: Cyclopia syndrome, Holoprosencephaly, Proboscis

INTRODUCTION

Cyclopia is a rare genetic birth defect, with an incidence rate of about 1 in 13,000 to 20,000 newborns. In this disorder, the eye orbits fail to divide properly into two cavities, resulting in either a single eye field or two eye fields positioned very close together. This condition affects both animals and humans.¹ Those with cyclopia typically have a missing or dysfunctional nose accompanied by a long snout, and their outer ears are often curved, broken, or crumpled inward. Additionally, a 3 to 5 cm polyp is usually present in the middle of the forebrain. Most embryos affected by this syndrome are either aborted, stillborn, or die shortly after birth.²

CASE REPORT

A 36-year-old multiparous woman with a 34-week pregnancy came to Arifin Achmad Hospital on a referral

from an obstetrician. When she arrived, the patient had no complaints. Then an ultrasound examination was performed, and abnormalities were found in the foetal head, namely the structure of the midline of the foetal head and the thalamus that were fused. Polyhydramnios was found. Due to the large size of the foetal head, an elective caesarean section was decided.

During pregnancy, the patient admitted that she had never been sick and regularly took vitamins given by the midwife. The patient only had an ultrasound examination once during pregnancy, and there was no history of congenital defects in her family. Then a caesarean section was performed, and a baby girl was born with a birth weight of 1800 g and an APGAR score of 3/4. After birth, the baby appeared to have only one eye, no nose, have a proboscis, and was polydactyly. The baby was treated in the perinatal unit, but due to respiratory failure, the baby died one day later. The patient's baby is planned to undergo

a karyotype examination, but the sample has not been taken.

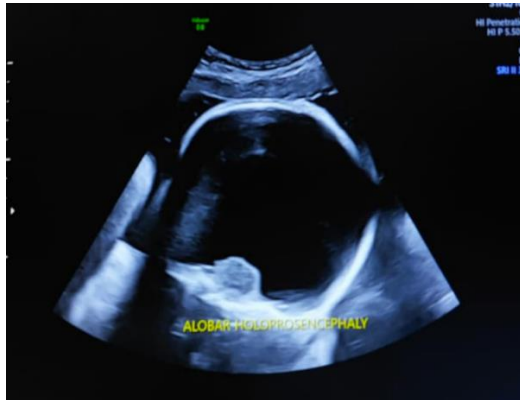


Figure 1: Ultrasound finding absence of midline structures.



Figure 2: The baby's face has only one eye, has a proboscis, and does not have a nose.



Figure 3: Hands with polydactyly.



Figure 4: Foot with polydactyly.

DISCUSSION

Holoprosencephaly is a common brain defect that frequently results in facial anomalies such as close ocular orbits, microcephaly, a cleft lip, and a cleft palate. This disorder is caused by the incomplete development and division of the prosencephalon (foetal forebrain) into the left and right hemispheres, leading to a single-lobed brain structure and severe craniofacial defects. Most cases are so severe that neonates die before birth.³ Holoprosencephaly is categorised into three subtypes: alobar, semi-lobar, and lobar. In alobar holoprosencephaly, the brain is not divided, resulting in severe facial defects. In the semi-lobar subtype, the brain's hemispheres are partially divided, causing a moderate form of the disorder. The lobar subtype features two separated hemispheres with minor structural defects. In milder forms of holoprosencephaly, craniofacial defects include microcephaly, orbital hypotelorism, a flat nasal bridge, and abnormal anterior teeth. Among these, cleft lip is the mildest facial abnormality, while the most severe is cyclopia. Cyclopia is a hereditary condition characterised by a single eye field and an incomplete nose above the eye. Parents of neonates with cyclopia should inform their first-degree relatives about the increased risk of cyclopia or other forms of holoprosencephaly.⁴ This case report discusses a 37-week and 5-day-old female foetus born to a 44 year old mother. The newborn had no nose and exhibited micrognathia but did not have a cleft lip or palate. The skin was cyanotic, and a chest X-ray revealed a completely collapsed right lung, necessitating immediate chest tube placement. Continuous ventilation was provided until the newborn's death. Brain MRI indicated characteristics of lobar holoprosencephaly, including a poorly formed corpus callosum and an azygous anterior cerebral artery. Since there is no cure for this condition, legal abortion may be considered to prevent further harm to the newborn and the mother. Identifying potential risk factors and informing parents is essential.⁵ Pregnant women should avoid ingesting certain plants that can increase the risk of cyclones. The Sonic Hedgehog (SHH) gene, located on the long arm of chromosome 7 (7q35.1 band), regulates protein synthesis in the nervous system, shaping the brain, hands, and nose. The paired box 6 (PAX6) gene regulates eye development. Mutations in these genes are linked to

cyclopia, disrupting their normal functions. SHH promotes the expression of other genes, including PAX6 and PAX2. Cyclopia can be diagnosed using ultrasonography during the third and fourth weeks of pregnancy. If abnormalities are detected, foetal magnetic resonance imaging (MRI) may be recommended. If not diagnosed prenatally, cyclopia can be identified through a medical examination at birth. The exact causes of cyclopia are unknown, but several risk factors are identified, including genetic factors, multiple pregnancies, female sex, previous miscarriages, gestational diabetes, infections, UV light exposure, smoking, alcohol use, certain medications, and cyclopamine.⁶ Another risk factor is *Veratrum californicum*, found in corn lily or false hellebore, which can cause cyclopia when ingested during pregnancy. Cyclopia often leads to stillbirth as the brain and other organs do not develop properly. Most studies show that neonates with cyclopia rarely survive more than 10-12 hours, though our case survived 13 hours, the longest reported survival time for a newborn with cyclopia. Newborns with this lethal congenital malformation, even if they survive briefly, are severely impaired. Palliative care, focusing on relieving pain and providing family support, is essential. Prenatal palliative care emphasises planning for the loss of the infant and providing non-directive counselling to help parents make informed decisions.⁷

CONCLUSION

Early diagnosis of cyclopia during pregnancy through methods like ultrasonography and appropriate management of this condition is crucial to prevent further harm to both the newborn and the mother. Unfortunately, in developing countries, where pregnant women often lack regular prenatal care, many cases go undiagnosed.

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