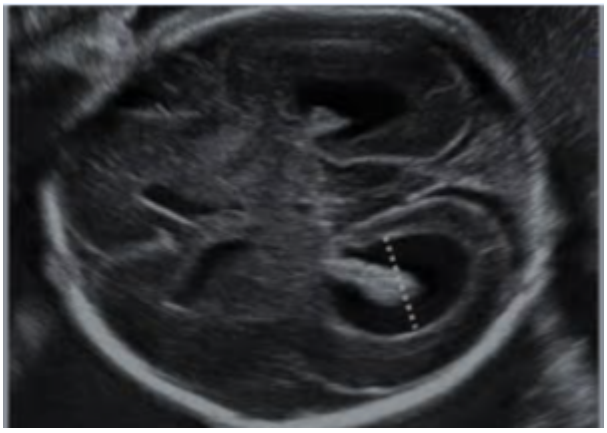
Isolated mild fetal ventriculomegaly

Mild isolated fetal ventriculomegaly (iFVM) is the most common abnormality of the fetal central nervous system.



Fetal mild VM is commonly defined as a ventricular atrial width of 10.0-15.0 mm, and it is considered isolated if there are no associated ultrasound abnormalities. There is no good evidence to suggest that the width of the ventricular atria contributes to the risk of neurodevelopmental outcomes in fetuses with mild VM. The most important prognostic factors are the association with other abnormalities that escape early detection and the progression of ventricular dilatation, which are reported to occur in about 13% and 16% of cases, respectively. Most infants with a prenatal diagnosis of isolated mild VM have normal neurological development at least in infancy. The rate of abnormal or delayed neurodevelopment in infancy is about 11%, and it is unclear whether this is higher than in the general population. Furthermore, the number of infants that develop a real handicap is unknown. There are limitations to existing studies of mild VM. Although they address many of the relevant questions regarding the prognosis and management of fetal isolated mild VM, there is a lack of good-quality postnatal follow-up studies. The resulting uncertainties make antenatal counseling for this abnormality difficult [1].

Pathophysiology

Despite its high prevalence, the pathophysiology of iFVM during fetal brain development and the neurobiological substrate beyond ventricular enlargement remain unexplored. Vasung et al. aimed to establish the relationships between the structural development of transient fetal brain zones/compartments and increased cerebrospinal fluid volume. For this purpose, they used in vivo structural T2-weighted magnetic resonance imaging of 89 fetuses (48 controls and 41 cases with iFVM). Our results indicate abnormal development of transient zones/compartments belonging to both hemispheres (i.e. on the side with and also on the contralateral side without a dilated ventricle) in fetuses with iFVM. Specifically, compared to controls, we observed enlargement of proliferative zones and overgrowth of the cortical plate in iFVM with associated reduction of volumes of central structures, subplate, and fetal white matter. These results indicate that enlarged lateral ventricles might be linked to the development of transient fetal zones and that global brain development should be taken into consideration when evaluating iFVM [2].

Diagnosis

It is usually diagnosed at a routine fetal anomaly scan at 18-22 weeks gestation [3].

Management

Management of the condition and counseling of parents is difficult, as the cause, absolute risk, and degree of resulting handicap cannot be determined with confidence [4].

A prospective observational study of patients referred with fetal ventriculomegaly from January 2011 to July 2020. Data were obtained from the hospital medical database and analyzed to determine the rate of isolated ventriculomegaly, associated structural abnormalities, chromosomal/genetic abnormalities, and survival rates. Data were stratified into three groups; mild(Vp=10-12mm), moderate(Vp=13-15 mm) and severe(Vp >15mm) ventriculomegaly.

There were 213 fetuses included for analysis. Of these 42.7% had mild ventriculomegaly, 44.6% severe and 12.7% had moderate ventriculomegaly. Initial ultrasound assessment reported isolated ventriculomegaly in 45.5% of fetuses, with additional structural abnormalities in 54.5%. The rate of chromosomal/genetic abnormalities was high,16.4%. After all investigations, the true rate of isolated VM was 36.1%. The overall survival was 85.6%. Survival was higher for those with isolated VM across all groups(P<0.05).

Fetal ventriculomegaly is a complex condition and patients should undergo genetic counseling that even with apparently isolated VM, there remains the possibility of additional genetic and/or structural problems being diagnosed in up to 10% of fetuses [5].

Retrospective cohort study

A retrospective cohort study of women diagnosed with isolated ventriculomegaly via fetal ultrasound at a tertiary referral center between 2011 and 2019. Patients were excluded if other structural anomalies were identified on ultrasound.

A total of 49 patients were included in the study, 19 in the resolved ventriculomegaly group and 30 in the persistent ventriculomegaly group. Women in the resolved ventriculomegaly group were more likely to be diagnosed earlier (24 vs. 28 weeks, p = 0.007). Additionally, they were more likely to have mild ventriculomegaly (63 vs. 84%, p = 0.15), and less likely to have structural neurological abnormalities diagnosed on postnatal imaging (5 vs. 17%, p = 0.384), although these were not statistically significant. Aneuploidy risk for resolved compared with persistent ventriculomegaly was similar (5 vs. 7%, p = 0.999).

This study suggests that resolution of isolated ventriculomegaly in utero may not eliminate the risk of genetic or chromosomal abnormalities in this population and may warrant inclusion as part of the counseling of these at-risk patients. Larger prospective studies are needed to confirm these findings [6].

1)
Melchiorre K, Bhide A, Gika AD, Pilu G, Papageorghiou AT. Counseling in isolated mild fetal ventriculomegaly. Ultrasound Obstet Gynecol. 2009 Aug;34(2):212-24. doi: 10.1002/uog.7307. Erratum in: Ultrasound Obstet Gynecol. 2010 May;35(5):626. PMID: 19644944.
2)
Vasung L, Rollins CK, Zhang J, Velasco-Annis C, Yang E, Lin I, Sutin J, Warfield SK, Soul J, Estroff J, Connolly S, Barnewolt C, Gholipour A, Feldman HA, Grant PE. Abnormal development of transient fetal

zones in Isolated mild fetal ventriculomegaly. Cereb Cortex. 2022 Mar 29:bhac125. doi: 10.1093/cercor/bhac125. Epub ahead of print. PMID: 35349640.
[3] [4]
,
Wyldes M, Watkinson M. Isolated mild fetal ventriculomegaly. Arch Dis Child Fetal Neonatal Ed. 2004 Jan;89(1):F9-13. doi: 10.1136/fn.89.1.f9. PMID: 14711845; PMCID: PMC1721643.
[5]
Ryan GA, Start AO, Cathcart B, Hughes H, Denona B, Higgins S, Corcoran S, Walsh J, Carroll S, Mahony R, Crimmins D, Caird J, Robinson I, Colleran G, McParland P, McAuliffe FM. Prenatal Findings and Associated Survival Rates in Fetal Ventriculomegaly: A Prospective Observational Study. Int J Gynaecol Obstet. 2022 Apr 3. doi: 10.1002/ijgo.14206. Epub ahead of print. PMID: 35373343.
[6]
Ma'ayeh M, Ward CL, Chitwood A, Gee SE, Schneider P, Rood KM. Outcomes of Isolated Fetal Ventriculomegaly That Resolve In Utero. Am J Perinatol. 2021 Jan;38(2):111-114. doi: 10.1055/s-0040-1715086. Epub 2020 Aug 9. PMID: 32772358.