Can Ventriculomegaly in CNS anomaly be compared to Axis deviation in cardiac anomaly?
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Objective
The purpose of this retrospective study was to examine the association of ventriculomegaly in CNS anomaly and to study the sensitivity, specificity, positive and negative predictive value of ventriculomegaly in predicting CNS anomaly. We have also tried to compare predictive value of ventriculomegaly in predicting CNS anomaly to Cardiac axis deviation in predicting cardiac anomaly.

Methods
This is a retrospective study of all cases of CNS anomalies presenting in a tertiary Fetal medicine centre between 1st January 2015 to 31st December 2019 (5 Years). Inclusion Criteria: All cases of CNS anomalies with or without Ventriculomegaly with Gestational age (GA) more than 14 weeks. Exclusion Criteria: All cases of Open neural tube defects were excluded from the study. Cases were reviewed for GA at presentation, size of both Lateral Ventricles, other CNS findings and extra CNS structural anomalies. Detailed ultrasound examination with fetal echocardiography and fetal neuro-sonogram (TAS or preferably TVS whenever the presentation was cephalic) was done to exclude other structural abnormalities associated with ventriculomegaly. Invasive testing whenever done either Antenatal or postnatal/Postabortal was reviewed. Ventricle size upto 7.0 mm was considered normal, size from 7.1 to 10.0 mm was considered as prominent ventricle, 10.1 to 14.9 mm was considered as mild ventriculomegaly and ≥ 15 mm was considered as severe ventriculomegaly. The cases were classified in 4 groups as follows: Group I: Isolated Ventriculomegaly: Cases with no other CNS or extra-CNS findings other than Ventriculomegaly were included in this group, Group II: Ventriculomegaly with CNS Anomalies only, Group III: ventriculomegaly with extra-CNS Anomalies only, and Group IV: ventriculomegaly with CNS + extra-CNS Anomalies.

Results
Total of 165 cases fulfilled the inclusion and exclusion criteria were included in the study. Few patients had more than 1 CNS anomaly, whereas some had isolated Ventriculomegaly. In Total there were 206 CNS Anomalies detected in 165 pts. There were 57 cases of CNS anomaly with normal sized ventricles, 41 cases with Prominent ventricles, 58 cases with ventriculomegaly and 9 cases where ventricular size was not measurable. There were 15 cases of isolated Ventriculomegaly and 7 cases of isolated prominent Lateral Ventricles with the absence of any CNS Anomaly. The most common CNS Anomaly detected was Agenesis of Corpus Callosum (ACC) and Partial Agenesis of Corpus Callosum (PACC), with 28 cases each. Majority of the cases of PACC (82.2%) had normal sized ventricles at the time of diagnosis. Out of 62 cases of Posterior fossa anomalies, only 14 cases(22%) had Ventriculomegaly. Whereas 67.8% cases of ACC and 68.7% cases of Lobar Holoprosencephaly had associated Ventriculomegaly at the time of diagnosis. Among the cases of Intracranial cysts, 40.9% cases had ventriculomegaly. Our data shows that although ventriculomegaly is a strong marker for suspecting intracranial structural abnormality, anomalies of Posterior Fossa, PACC, and intracranial cysts may be present with normal sized ventricles. 34.5 % of CNS anomaly had normal ventricles, and only 35.2% cases had Ventriculomegaly.

Conclusion
In cardiac evaluation, an Abnormal cardiac axis is the first and strong indicator of cardiac anomaly ( after excluding the extra cardiac causes of axis deviation ). The positive predictive value of abnormal axis in cardiac anomaly is very high. Whereas the Positive Predictive Value and Negative Predictive Value of Ventriculomegaly in predicting CNS Anomalies was 74.14% and 41.84% respectively in our study. The sensitivity and specificity of Ventriculomegaly in detecting CNS Anomalies was 43% and 73.21% only. From our study, we can conclude that ventriculomegaly does not predict the presence of structural CNS abnormality and a normal size ventricle rules does not rule out the presence of structural CNS anomaly. Ventriculomegaly is not a strong marker in CNS anomaly like cardiac axis deviation in cardiac anomaly. A Detailed and thorough evaluation of fetal brain is necessary even in the presence of normal size Lateral Ventricles so as to avoid missing out any CNS anomaly.