CROSS-SECTIONAL STUDY OF NEED OF TARGETED USG AND ITS BENEFITS IN DECREASING FOETAL AND MATERNAL MORBIDITY AND MORTALITY BY OBSTETRIC DECISION MAKING IN A LOW RESOURCE SETTING

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ABSTRACT

BACKGROUND
Congenital anomalies are responsible for a remarkable proportion of mortality and morbidity in newborns. This paper was focused on incidence of structural congenital malformations detectable at birth among 6380 deliveries. This study was conducted to evaluate the need for targeted USG and its benefits in decreasing foetal and maternal morbidity and mortality by obstetric decision making in a low resource setting by assessing structural congenital anomalies and to predict the variables which coexist in the incidence of congenital anomalies so that we can reduce the related perinatal morbidity and mortality.

MATERIALS AND METHODS
This is a cross-sectional study carried out in the Dept. of OB-GYN at Mahatma Gandhi Memorial Government Hospital attached to KAPV Government Medical College, Trichy during 10 months period from April 2016 to January 2017. A total of 6380 deliveries over 10 months, from April 2016 to January 2017, were studied for gross congenital malformations at birth as well as diagnosed antenatally by USG. All congenital anomaly cases detected at delivery were included in the study and also data from the birth register, and available medical & USG records during antenatal period were studied.

RESULTS
We diagnosed 104 cases of foetal anomalies. The antenatal prevalence of congenital anomalies was 1.63%. Out Of 6380 deliveries, 104 cases were identified with a primary diagnosis of congenital anomalies giving a prevalence rate of 1.63%. Anomalies of the cardiovascular system were the most common defects; accounting for 40.38% of birth defects followed by CNS anomalies of 25.0% & GIT anomalies of 18.27%. The surgery rate for delivery for anomaly group 19-22 weeks cases was 11.77%, which is very low when compared to 23-40 weeks anomaly group cases, where the surgery rate was 42.53%. Perinatal morbidity rate is 105.77% and mortality rate is 894.23% in anomaly group which is higher than the normal foetus group where morbidity rate is only 1.59% and mortality rate is 3.60%.

CONCLUSION
The targeted USG and followup, decision making by specialists is important in reducing foetal and also maternal morbidity and mortality. Prevalence of congenital anomaly was 1.63% and anomalies of the cardiovascular system were the most common observed in our study. Majority cases were not associated with any risk factor. However, GDM is the most commonly associated one. Others are polyhydramnios and IUGR. Routine targeted USG by radiologist at 18-22 weeks is an important measure for early detection of malformation. This helps in primary prevention of disability and reduces perinatal morbidity and mortality. This prenatal diagnosis helps in reducing surgery rate and reduces maternal morbidity and mortality.

KEYWORDS
Congenital Anomaly, Targeted USG.


BACKGROUND
Every year, about 7.9 million infants (6% of worldwide births) are born with serious birth defects. With the causes of over 50% of birth defects unknown, how do we diagnose and prevent them?

CONCLUSION
Congenital anomalies are a global health problem. Every year an estimated 7.9 million children are born with a serious birth defect, 3.3 million children [Under five years] die from birth defects, and 3.2 million who survive may develop a disability later in the life.1-2 They are the leading causes of prenatal mortality and childhood morbidity and disability in many countries.

Aims and Objectives
To evaluate the need for targeted USG at 18-22 weeks and followup and its benefits in decreasing foetal and maternal morbidity and mortality by obstetric decision making in a low resource setting [by assessing structural congenital anomalies that are diagnosed prenatally & postnatally and by predicting the variables which coexist in the incidence of congenital anomalies].
MATERIALS AND METHODS

The diagnosis of congenital abnormality was based on clinical evaluation and ultrasound examination (as documented by doctors in the patients’ folders). Patient’s history, including antenatal history, history of exposure to teratogens and family history of consanguinity were obtained from these folders. Further information obtained include maternal age, gestational age and type of congenital abnormality.

Inclusion Criteria

For inclusion in the study, a live birth must have been born from April 2016 to January 2017. Total prevalence was calculated by dividing the numerator (registered cases of congenital anomalies) by the relevant denominator (total live births) for the same period of time. Cases included are:
1. All deliveries which occurred at MGMGH, Trichy.
2. From review of all the records of babies born in MGMGH, Trichy admitted in the Newborn Intensive Care Unit, Mahatma Gandhi Memorial Hospital with the diagnosis of congenital abnormality.

A child with more than one anomaly was counted once only based on the primary diagnosis. We calculated 95% confidence interval (CI) for each prevalence rate.

For purposes of this study, congenital abnormalities are defined as obvious abnormality of structure or form which is present at birth or noticed within a few days after birth.4

Statistical Analysis: The study was analysed by the number and percentage for each variable mentioned in the tables.

RESULTS

We diagnosed 104 cases of foetal anomalies. The antenatal prevalence of congenital anomalies was 1.63%. Out of 6380 deliveries, 104 cases were identified with a primary diagnosis of congenital anomalies giving a prevalence rate of 1.63%. Anomalies of the cardiovascular system were the most common defects, accounting for 40.38% of birth defects followed by CNS anomalies of 25.0% & GIT anomalies of 18.27%.

The surgery rate for delivery for anomaly group 19-22 weeks cases was 11.77%, which is very low when compared to 23-40 weeks anomaly group cases, where the surgery rate was 42.53%. Perinatal morbidity rate is 105.77% and mortality rate is 894.23% in anomaly group which is higher than the normal foetus group where morbidity rate is only 1.59% and mortality rate is 3.60%.

In the anomaly group of 19-22 weeks, 88.23% of them were delivered vaginally and there is no foetal morbidity.

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Systems</th>
<th>19-22 wks.</th>
<th>23-40 wks.</th>
<th>No.</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>CVS</td>
<td>Hydrocephalus Anencephalus Encephalocoele</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
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<td></td>
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<tr>
<td>2.</td>
<td>CNS</td>
<td>Hydrocephalus Anencephalus Encephalocoele</td>
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<td></td>
<td></td>
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<tr>
<td>3.</td>
<td>GIT</td>
<td>CDH</td>
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<td></td>
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</tr>
<tr>
<td>4.</td>
<td>Renal</td>
<td>Post-urethral valve</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>5.</td>
<td>Others</td>
<td>Multiple anomalies</td>
<td></td>
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</tr>
</tbody>
</table>

Table 1. USG Diagnosis of Congenital Anomalies in Various Gest. Ages

Liquor Volume |
<table>
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<tbody>
<tr>
<td>Polyhydramnios (AFI&gt;8)</td>
</tr>
<tr>
<td>Oligohydramnios (AFI&lt;6)</td>
</tr>
<tr>
<td>Normal Liquor (AFI 6-8)</td>
</tr>
</tbody>
</table>

### Table 2. Distribution of Anomalous Cases According to Liquor Volume

As per Table 2 liquor volume has no significant correlation with the incidence of anomalies and 60.58% of anomalies were with normal amount of liquor.

Recommendations: 1. For polyhydramnios- karyotyping, biochemical testing, amnioreduction. 2. For oligohydramnios- counselling for prognosis, vesicoamniotic shunt in foetal obstructive uropathy, amnioinfusion. 3. For normal liquor- follow up USG.

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<table>
<thead>
<tr>
<th>Baby Weight</th>
<th>Type</th>
<th>System</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>CVS</td>
<td>CNS</td>
</tr>
<tr>
<td>Below 2.6 kg</td>
<td>ASD</td>
<td>Myelomeningocele Hydrocephalus Anencephalus</td>
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<tr>
<td></td>
<td>VSD</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>PDA</td>
<td>13</td>
</tr>
<tr>
<td></td>
<td>PS</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>SV</td>
<td>1</td>
</tr>
<tr>
<td>2.6 Kg &amp; Above</td>
<td>ASD</td>
<td>Microcephaly Spina Bifida Encephalocele</td>
</tr>
<tr>
<td></td>
<td>VSD</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>PDA</td>
<td>3</td>
</tr>
</tbody>
</table>

Table 3 shows congenital anomalies have no significant correlation with baby weight.

Recommendations: 1. For babies 2.5 kg & below- genetic karyotyping, followup USG, induction based on karyotyping, USG abnormality & gestational age. 2. For babies 2.6 kg & above- followup USG, induction based on liquor volume & gestational age.
By reducing the surgery rate.

Hence, control of metabolic diseases decreases the maternal morbidity and mortality.

The targeted USG examination (preconception counselling, control of metabolic state, targeted USG & detailed evaluation) reduces the surgery rate and the maternal morbidity.

For lethal anomalies- termination. For nonlethal anomalies- followup USG on care pathway & obstetric decision making. For all cases diagnosed- about chances of recurrences, preconception control of metabolic state and necessity for targeted USG examination.

Table 4 shows GDM alone is not a risk factor for anomalies.

Table 5 shows that in 19-22 weeks, vaginal delivery occurred in 88.23% and surgery rate is 11.77% and in 23-40 weeks it is 57.47% and 42.53% correspondingly. This decreases the maternal morbidity & mortality.

The targeted USG (18-22 weeks USG) significantly decreases the maternal morbidity and mortality by reducing the surgery rate.

Table 4. Distribution of Anomalous Cases in Accordance to GDM

Table 5. Mode of Delivery

Table 6. Perinatal Morbidity and Mortality
In the anomaly group, perinatal morbidity rate is 105.77%, perinatal mortality rate is 894.23%. In the normal foetus group, in the same period the perinatal morbidity rate is 36%, the perinatal mortality rate is 16%, these values clearly show the perinatal morbidity and mortality is higher in the anomalous group which can be reduced by targeted USG at 18-22 weeks and decision making which in this study is with nil morbidity.

DISCUSSION
Each year, 7.9 million children are born worldwide with congenital abnormalities, of which 3.3 million die. Survivors may be mentally and/or physically disabled. The prevalence of birth defects is comparable all over the world;
1. 1.3% in the United States.
2. 2.2% in India.
3. 2% to 3% in the United Kingdom.
4. 1.4% in Tamilnadu.
5. 1.63% in MGMGH, Trichy.

- The most prevalent conditions include congenital heart defects, orofacial clefts, Down syndrome, and neural tube defects.
- Age distribution of mothers in the study was 57 patients in 19-29 years, 30 patients in 30-39 years, and 17 patients above 39 years. Mothers were assessed for Hb% and the study shows 45 mothers with <4 g%, 35 mothers with 4-9 g% and 24 mothers with >9 g%.
- In this study, 36 babies were male, 68 were female, sex ratio was 1:1.9. Birth weight of babies- 62 babies with <2.5 kg, and 42 babies with weight between 2.6-4 kg.
- Surgery was done in the newborn period for 20 babies: surgery for duodenal atresia 4 cases, VP shunting 2 cases, CDH Correction 2 cases, cleft lip repair 5 cases, cleft palate repair 2 cases, surgery for posterior urethral valve 3 cases, surgery for ileal atresia 1 case. The perinatal morbidity rate is 105.77%. Mortality occurred in 15 lethal cases diagnosed at 19-22 weeks and 77 lethal cases diagnosed between 23-40 weeks and 1 case of cleft palate repair done in the postoperative period (total-93 cases) making perinatal mortality rate 894.23%. These show the higher perinatal morbidity and mortality than the general population.
- Delay of delivery could have been avoided by Targeted USG. In 19-22 weeks, vaginal delivery occurred in 88.23% and surgery rate is 11.77%. And in 23-40 weeks, it is 57.47% and 42.53% correspondingly. This shows the targeted USG (18-22 weeks USG) significantly decreases the maternal morbidity and mortality by reducing the surgery rate and also the perinatal morbidity and mortality.

CONCLUSION
The results of this study show that babies admitted to a Newborn Special Care Unit had congenital abnormalities and that the commonest forms seen were mainly CVS birth defects. Based on the study the incidence of CVS congenital anomalies was found to be more common. In order to diagnose early and to reduce the perinatal mortality, we need an 18-22 weeks antenatal targeted ultrasound with complete anatomical survey.

Antenatal ultrasound is a non-invasive highly sensitive, accurate and cost-effective imaging technique which gives good results in experienced hands. Meticulous screening for pregnant ladies by ultrasound, especially in 2nd trimester and followup of anomaly cases if required is recommended.

Public awareness about preventable risk factors like anaemia, GDM is to be created and early prenatal diagnosis and management of common anomalies is strongly recommended.

Followup USG after targeted USG, Doppler ultrasound examination, genetic karyotyping, counselling regarding the nature, prognosis, management options, recurrence rate, detailed evaluation with 3D, 4D ultrasound, MRI, counselling about termination of pregnancy, continuation of pregnancy and induction at optimum time and its benefits are to be done.

The following are the recommendations to reduce Foetal and Maternal morbidity and mortality
1. Need for targeted USG and the need for further study by foetal echo, Doppler, triple and quadruple test routinely, especially in high risk cases.
2. Need for one or more USG examinations, followup, need for high resolution USG, foetal echo, need for specialist care, (Radiologist, Obstetrician, Paediatrician, Paediatric surgeon, Neurosurgeon, Cardiologist, etc.) in decision making to reduce foetal and maternal morbidity and mortality.
3. Need for counselling regarding continuation of pregnancy (non-lethal) and termination of pregnancy (lethal).
4. The limitations are due to operator expertise, quality of instrument, amount of liquor, method of termination in public health setup.
REFERENCES


