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Prevalence Of Congenital Abnormalities On Routine Antenatal Ultrasonography During Second And Third Trimester Of Pregnancy: A Study In A District Hospital Of North East India

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Abstract
Background
Prevalence of congenital anomalies varies greatly from country to country. It is reported about 2.5% in India. In India, congenital anomalies are responsible for 15% of perinatal mortality and for 10% to 15% of neonatal deaths. The main aim of the study is to evaluate the prevalence of the congenital anomalies and malformation patterns in our hospital population.
Material & Method
This is a cross-sectional study carried out in the 'Radiology unit' of 'District Hospital, Gomati', Tripura. The study population includes about 910 antenatal mothers in the second and third trimester, who were referred to 'Radiology unit' from the outpatient and inpatient departments of 'Obstetrics and Gynaecology' of the same hospital between September 2017 to February 2018 were included in the study. Data of Antenatal ultrasounds was statistically analyzed on structured data collection form to determine the prevalence of congenital anomaly in 2nd & 3rd trimester.
Results:
Total 910 numbers of 2nd and 3rd trimester prenatal ultrasonography (USG) were done. Out of these 18 numbers of congenital anomalies were detected. The antenatal prevalence of congenital anomalies was 1.97%. The mean maternal age and mean gestational age at diagnosis was 22.9 years and 27.7 weeks respectively. Genitourinary system defect was the commonest (27.77%), of which maximum number had pyelactasis i.e. 3 (16.66%) cases.
Conclusion:
Ultrasonography is a cost-effective, non-invasive and sensitive tool in detecting the congenital anomalies antenatally in the hands of an experienced radiologist. Besides the first-trimester USG, the second trimester scan is mandatory in detecting anomaly in the growing foetus, as the majority of congenital anomalies are detected between 20 and 22 weeks of pregnancy.
Keywords: *Congenital anomaly, first & second trimester, ultrasonography*

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I. Introduction

A congenital anomaly is an abnormality of structure, function or body metabolism that is present at birth and results in physical or mental disability, or is fatal. Each year, eight million children are born worldwide with congenital abnormalities, of which 3.3 million die before the age of five; 3.2 million of the survivors may be mentally and/or physically disabled.[1]

Worldwide surveys have shown that birth prevalence of congenital anomalies varies greatly from country to country. It is reported about 3% in the United States, 2.5% in India and 2% to 3% in the United Kingdom. The prevalence is as low as 1.07% in Japan and as high as 4.3% in Taiwan.[2]

In India, congenital anomalies are responsible for 15% of perinatal mortality and for 10% to 15% of neonatal deaths.[3]

The factors such as racial, social, environmental, and economical factors are responsible for the type and prevalence of the anomalies in a different population.[4]

However, the underlying causes for most congenital anomalies remain obscure and multifactorial inheritance is believed to be the underlying aetiology of most of the common congenital anomalies.[1]

In India particularly in North-eastern region where the social support system is poor, bringing up a child with mental or physical handicap is a major burden for the parents and family. In cases where primary prevention

does not possible, prenatal diagnosis by ultrasound scan provides the next best alternative. In cases where a major structural defect is identified, termination of pregnancy can be offered. [2]

Although there are many investigations for detection of the anomalies, ultrasonography (USG) is the gold standard until now.[4] Therefore, routine anomaly USG is suggested between 20th and 22nd weeks of pregnancy as it can detect the majority of congenital anomalies.[5]

The main aim of the study is to evaluate the prevalence of the congenital anomalies and malformation patterns in our hospital population.

II. Material & Method

This is a cross-sectional study carried out in the 'Radiology unit' of 'District Hospital, Gomati', Tripura.

Pregnant women of 2nd and 3rd trimester, referred to 'Radiology unit' from the outpatient and inpatient departments of 'Obstetrics and Gynaecology' of the same hospital between September 2017 to February 2018 were included in the study.

The Radiologist performed all the transabdominal ultrasonography on a 'Siemens Acuson X 300' machine using 'CH 5-2' probe after taking consent from the patient. Form B consent is obtained routinely from all the antenatal mothers.

A questionnaire was used containing the following information e.g. women's age, parity, gravidity, date of last menstrual period, and also the result of this USG examination.

Data has been expressed in number and in frequency in terms of percentage. Statistical Package for the Social Sciences (SPSS) software programme (version 15) was used for data analysis.

III. Result

During the study period of September 2017 to February 2018, a total of 910 numbers of 2nd and 3rd trimesters antenatal USG were done.

18 numbers of congenital anomalies were detected among the pregnant women scanned.

So, the antenatal prevalence of congenital anomalies was 1.97%. The mean maternal age at the diagnosis was 22.9 years. Majority women were primi (55.05%) followed by multigravida (44.95%). 4 cases (22.22%) of anomalies were detected at 2nd trimester and 14 cases (77.78%) at 3rd trimester. The mean gestational age was 27.7 weeks. Maximum cases were literate (81%), only 19 % were not literate.

Out of the 18 congenital anomaly foetuses, genitourinary system defect was the commonest (5 cases), of which maximum number had Pyelactasis i.e. 3 cases. This is followed by central nervous system (4 cases) anomaly, Gastro-intestinal system (3 cases) anomaly, musculoskeletal system, in the form of skeletal dysplasia (2 cases) and cardiovascular system (1 case). Among the other anomalies, 1 case of cystic hygroma, 1 case of single umbilical artery & 1 case of hydrops fetalis were also seen. Table 1 shows all the anomalies involving various body system.

Table 1: Anomalies involving different body system (N=18).

	BODY SYSTEM	Total	%	ANOMALY	
1	CNS	4	22.22	Ventriculomegally	1
				Hydrocephalus	2
				Meningoencephalocele	1
2	CVS	1	5.55	Cardiomegaly	1
3	UROGENITAL	5	27.77	Pyelactasis	3
				PUJ obstruction	1
				Megacystis	1
4	MSK	2	11.11	Skeletal dysplasia	2
5	GIT	3	16.66	Omphalocele	2
				Congenital Diaphragmatic hernia (CDH)	1
6	OTHERS	3	16.66	Single umbilical artery	1
				Cystic hygroma	1
				Hydrops	1
		18			

Relevent Images Of This Study (Fig. 1 - 3)

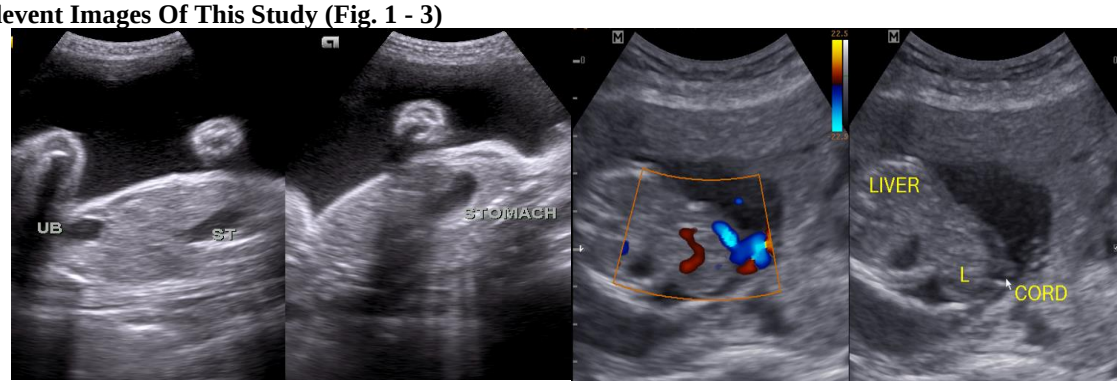

FIG. 1. A) CDH **1(B) Omphalocele**

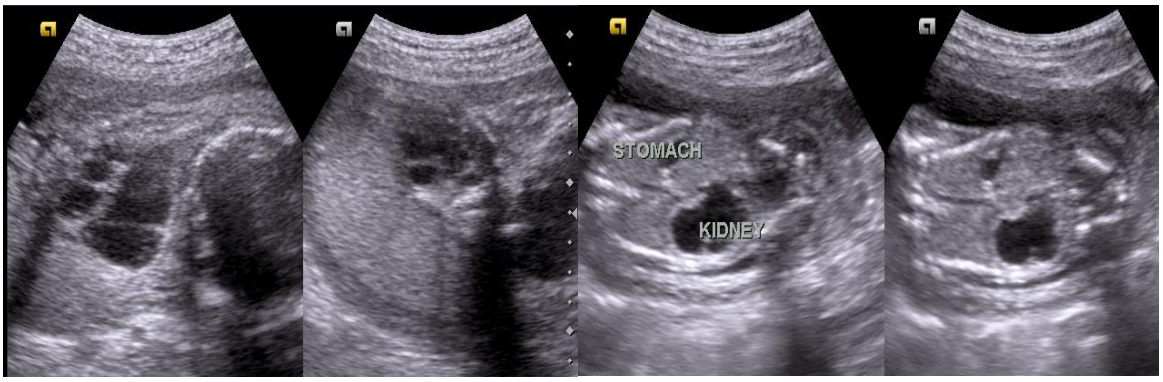

FIG.2 A) Cystic hygroma **2(B) Right PUJ obstruction**

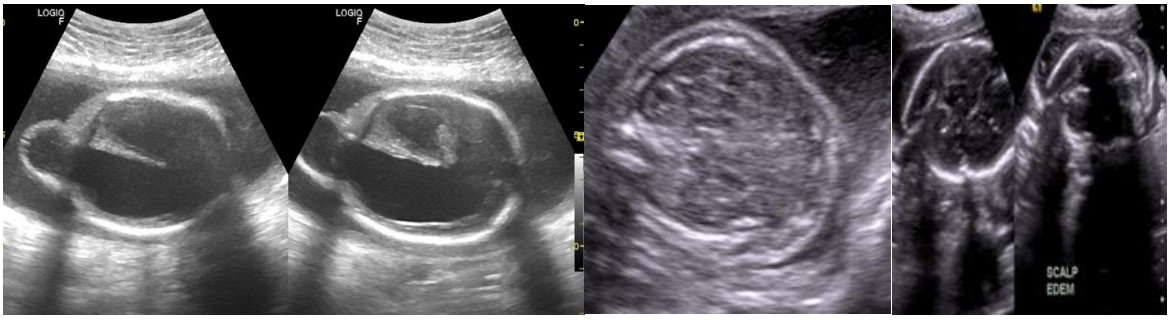

FIG.3 A) Meningoencephalocystocele **3 (B) Hydrops fetalis**

IV. Discussion

Antenatal USG, has made it possible to detect increased number of birth defects.

In this study, an attempt was made to diagnose the prevalence of anomalies in our hospital among those pregnant mother who attended for USG in 2nd and 3rd trimester.

The demographic features of this study are comparable to various other referred studies as shown in table-2.

Table. 2: Comparative demographic parameters of various referred study

Studies	Mean age	PARIETY (%)		GA		Mean GA (Wk)
		PRIMI	MULTI	2nd	3rd	
THIS STUDY	22.9	55.05	44.94	60.4	39.6	27.7
Mahela et al	25.5 Y	31.11	42.22	62.22	37.78	27
Shah et al	-	-	-	-	-	-
Singh et al	-	-	-	-	-	-
Aravazhi *et al*	28.5	50.8	40.46	62.29		24

The prevalence of congenital malformation in the present study was 1.97 %, which is very close to the observations of Aravazhi et al [4] (1.95 %).

Higher prevalence was observed in some other studies, ranging from 2.39 % to 2.97 %. [6, 7, 8]

In the study by Nakling et al [9], prevalence was 1.47%. In another study by Souka et al [10], it was 1.21%. Taboo et al [11] and Alakananda et al [12] also showed lower prevalence than the present study.

In present study, congenital malformations of the genitourinary system were the highest (27.77%). Almost Similar findings were observed by Aravazhi et al [4] (26.22%). Lower prevalence was observed by Alakananda et al [12] (6.25%) & Alia et al [8] (9.30%).

Anomaly of the central nervous system was 22.22 % in this study, which is comparable to study by Singh et al [13] (20.5 %). Higher prevalence was observed by Alakananda et al [12] (42.7%) & Alia et al [8] (54.65%).

Next in order is the malformations of gastrointestinal system (16.66 %), which is near to the finding of Singh et al [13] (18.5 %).

Musculoskeletal system malformation, in the form of skeletal dysplasia was seen in 11.11 % cases, which is higher than the prevalence of Mahela et al [2] (6.67%) & Aravazhi et al [4] (6.5%) but lower than the value of Singh et al [13] (30.6%).

Prevalence in respect of cardiovascular system is 5.5%, although slightly lower value was observed by Singh et al [13] (4%) & Shah et al [14] (2.27%) and higher by Aravazhi A et al [4] (10.6%).

Only one case (01) each of single umbilical artery, hydrops fetalis & Cystic hygroma was detected in this study (5.55% each). In the study by Aravazhi et al [4], prevalence of single umbilical artery & hydrops fetalis were 5.7% and 0.8 % respectively. Prevalence of cystic hygroma was 2.22 % in the similar study by Mahela et al [2] & 2.32% by Alia et al [8]

Variation in prevalence of congenital anomaly may be due to many causes like different geographical area, social factor, racial difference and study population. Observer variation and variation of equipment quality is also may be there. Therefore two studies generally can never be strictly comparable.

Although elder age group and higher parity are considered as risk factors for congenital anomaly, in our study the prevalence was more in primi gravida and younger age group, which may be due to earlier age of marriage in our scanning population. Table 3 showing Comparative chart of anomalies detected in various referred study.

Table 3 showing Comparative chart of anomalies detected in various referred study:

Studies	Prevalence	CNS	CVS	GIT	MSK	URO	Others		
							Hydrops	Cystic hygroma	Single umbilical artery
THIS STUDY	1.97%	22.22	5.55	16.66	11.11	27.77	5.55	5.55	5.55
Mahela et al	1.73 %	42.22	-	22.22	6.67	6.67		2.22	-
Shah et al	2.38%	10.42	2.27	2.49	2.95	0.91	0.91	-	-
Singh et al	1.5%	20.5	4	18.5	30.6	4.7	7.7	0.56	-
Aravazhi *et al*	1.95%	38.5	10.6	8.1	6.5	26.22	9.8	-	5.7
Alakananda et al	0.7%	42.7	-	-	-	6.25	-	-	-
Alia et al	2.97%	54.65	-	6.38	12.79	9.30	-	2.32	-

V. Conclusion

It was district hospital-based study in north east of India and does not represent the actual national prevalence. A multicentre study can more accurate in this regard. In this study prevalence of fetal congenital anomaly was found to be 1.97%. Genitourinary system anomaly was found to be the commonest form of anomaly in our study population.

Health education with creation of awareness regarding routine antenatal care and importance of anomaly scan on time can help in primary prevention of disability and reducing perinatal mortality and morbidity.

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