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Range of congenital heart diseases in nicu-an analysis

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Abstract:

Objective: Although there are plethora of clinical studies relating to birth prevalence of Congenital Heart Diseases an attempt is madeto depict the pattern of congenital heart diseases with associated maternal and neonatal risk factors and their burden in NICU of Tertiary care hospital in Eastern India.

Methodology: To depict the pattern of congenital heart diseases with associated maternal and neonatal risk factors and their burden in a Tertiary care hospital NICU. For this purpose the required cross sectional data has been gathered from NICU of tertiary care hospital,of Eastern India,Odisha,between May 2018-April 2020.Study population include newborns admitted in NICU during the study period. 2D ECHO was done in those newborns who had respiratory distress, tachycardia,murmur on clinical examination,wide pulse pressure, cyanosis, syndromicbabies.Cases which were diagnosed to have Congenital heart defect with the help of 2D ECHO remained comprised in the research. The parameters that were considered in the study include: Range of Congenital Heart Diseases in NICU, Clinical profile and presentation(tachypnea,tachycardia, murmur on examination, cyanosis,wide pulse pressure) Maternal risk factors(Maternal age,Hypothyroidism, GDM,Bad obstetric history) and Fetal risk factors(prematurity,low birth weight,gender,other associated abonormalities) were studied.

Results: Total number of NICU admission during study period were 1720,of which 66 were diagnosed to have congenital heart diseases by 2D ECHO. It was found in the study that Acyanotic Congenital Heart Disease was more prevalent than Cyanotic Congenital Heart Disease. and TAPVC was most common acyanotic heart diseases.It has also been noted that number of male babies affected were more than females(M:F=2.6:1), Birth weight less than 2500gm was observed in most of the cases.Number of term and preterm cases were nearly equal.Most common clinical presentation was respiratory distress,followed by tachycardia.Mean Maternal age at conception obtained in the study was 24.05years.6 of the cases had history of Maternal Hypothyroidism, 6 were IDM(5 GDM,1 Type 2 DM), 4 had bad obstetric history. 1 had Cleft Lip and Cleft Palate,2 were Syndromicbabies(Downs),2 had TEF,GI 4 cases were associated with GI Anomalies and 2 with Renal anomalies.

Conclusion:Encountering Congenital heart disease in NICU is not uncommon, hence all newborns admitted in NICU should undergo screening 2D ECHO,which might aid in early diagnosis and formulate necessary management,thus improving the outcome.Awareness about Fetal Echocardiography should be created in our country and should be employed in high risk maternal cases,so that complex congenital heart diseases can be diagnosed

antenatally which will aid in planning delivery in a setup which has interventional facilities,thus improving the outcome and survival of the newborn

1. INTRODUCTION:

Congenital heart diseases are the frequently encountered congenital disorder,which account 28 percent of all birth defects.The birth occurrence of Congenital heart diseases is described to be 8-12 per 1000 animate births.Critical congenital heart diseases are the conditions which require intervention within 28days of life the form of either surgery or catheter intervention [1].The presentation of specific heart defect depends on the transitional circulation in the newborn[1].Investigation modalities such as Pulse oximetry, 2D ECHO help in CHD identification[1]. There are several studies that have assessed the f pulse oximetryusefulness in identifying critical congenital heart diseases in newborn period ,which have concluded that pulse oximetry screening is highly effective in detecting Critical congenital heart diseases in newborns with hypoxemia but not without hypoxemia[2]. 2D ECHO on the other hand helps in early diagnosis of congenital heart defects including critical congenital defects.Early diagnosis of congenital heart diseases can lead to optimal management of the condition and thus improving the neonatal outcome.Data of congenital heart diseases in neonates in developing countries is lacking. Analyzing the incidence and spectrum of congenital heart diseases and their pattern of presentation, risk factor association can aid in early diagnosis diseases in neonates in developing countries is the major limitation. Against this back drop an attempt is made in this paper to analyze the incidence and spectrum of congenital heart diseases, pattern of presentation, risk factor association with newborns admitted in NICU with Congenital Heart Disease[4][5].

2. OBJECTIVE –

Although there are plethora of clinical studies relating to birth prevalence of Congenital Heart Diseases an attempt is madeto depict the pattern of congenital heart diseases with associated maternal and neonatal risk factors and their burden in NICU of Tertiary care hospital in Eastern India[6].

3.METHODOLOGY-

To depict the pattern of congenital heart diseases with associated maternal and neonatal risk factors and their burden in a Tertiary care hospital NICU. For this purpose the required cross sectional data has been gathered from NICU of tertiary care hospital,of Eastern India,Odisha,between May 2018-April 2020.Study population include newborns admitted in NICU during the study period[7].2D ECHO was done in those newborns who had respiratory distress, tachycardia,murmur on clinical examination,wide pulse pressure, cyanosis, syndromicbabies.Cases which were diagnosed to have Congenital heart defect with the help of 2D ECHO remained encompassed in the training[8].The parameters that remained considered in the research include: Range of Congenital Heart Diseases in NICU, Clinical profile and presentation(tachypnea,tachycardia, murmur on examination, cyanosis,wide pulse pressure) Maternal risk factors(Maternal age,Hypothyroidism, GDM,Bad obstetric history) and Fetal risk factors(prematurity,low birth weight,gender,other associated abonormalities) were studied[9][10].

4.RESULTS-

Total number of NICU admission during study period were 1720,of which 66 were diagnosed to have congenital heart diseases by 2D ECHO. It has been observed in the study

that heart diseases (AcyanoticCongenital) were much more common when compared to Cyanotic Congenital Heart diseases[Fig 2.] .PDA was the most common acyanotic heart disease and TAPVC was most common acyanotic heart diseases[Fig 3].It has also been noted that number of male babies affected were more than females(M:F=2.6:1), Birth weight less than 2500gm was observed in most of the cases.Number of term and preterm cases were nearly equal[Table2].Most common clinical presentation was respiratory distress,followed by tachycardia[Figure 4].Mean Maternal age at conception obtained in the study was 24.05years.6 of the cases had history of Maternal Hypothyroidism, 6 were IDM(5 GDM,1 Type 2 DM), 4 had bad obstetric history[Table 1]. 1 had Cleft Lip and Cleft Palate,2 were Syndromicbabies(Downs),2 had TEF,GI 4 cases were associated with GI Anomalies and 2 with Renal anomalies[Table 3].

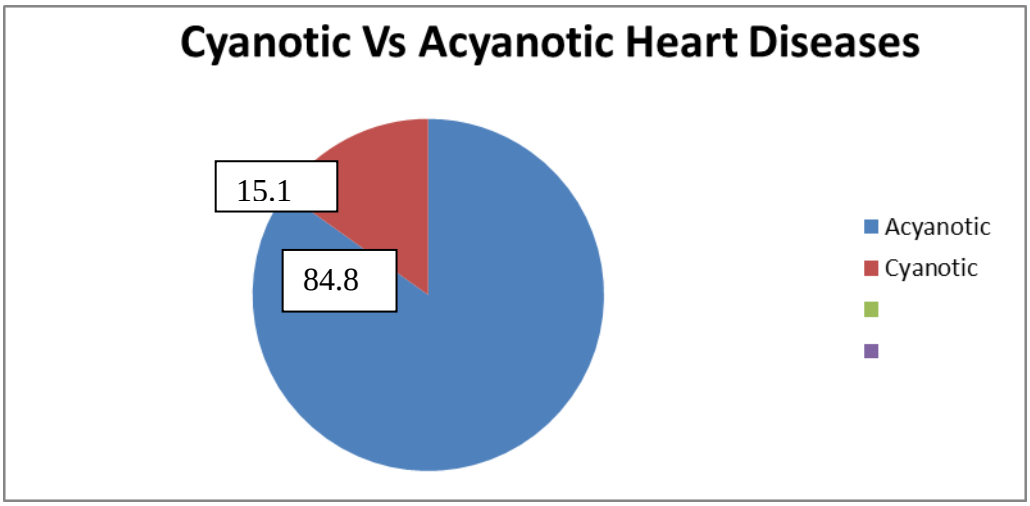

Fig 2-Acyanotic VS Cyanotic Congenital Heart Diseases-This figure shows that Acyanotic CHD contribute 84.8% and Cyanotic CHD contribute 15.1% to the total number of CHD.

Maternal Risk Factors	Number	Percentage(%)
Mean Maternal Age	24.05years	
Hypothyroidism	06	9%
GDM	05	7.5%
Bad Obstetric History	04	6%
Others-Type2 DM	01	1.5%

Table 1-Maternal Risk Factors-Mean maternal age at conception was 24.05years, 9% of the cases had h/o maternal hypothyroidism,7.5% had GDM,1.5% had type 2 DM and 6% had bad obstetric history

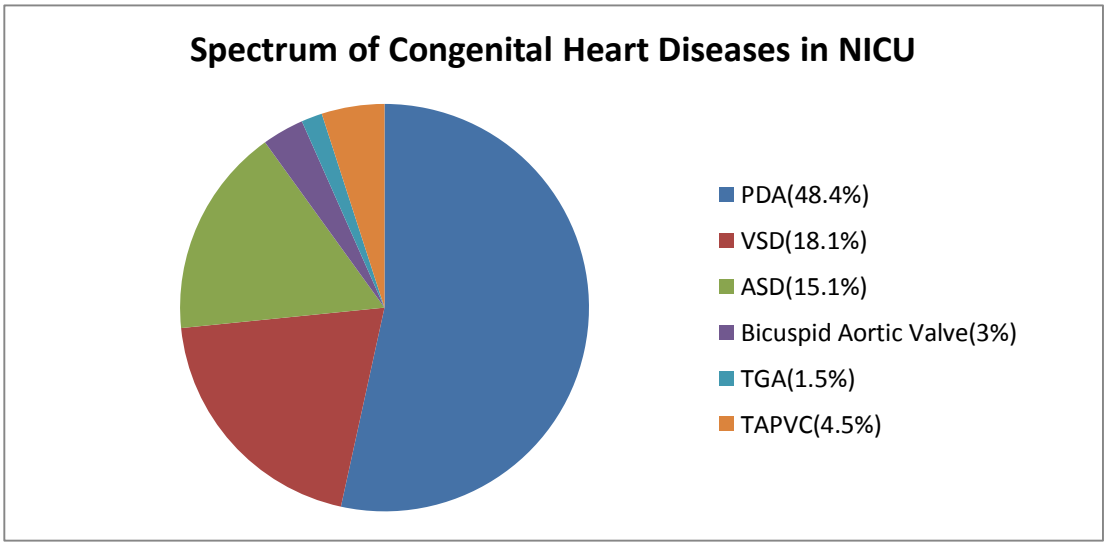

Fig 3-Spectrum of Congenital Heart Diseases in NICU-Figure depicting that the most common CHD encountered was PDA(48.4%) followed by VSD(18.1%),ASD(15.1%),Bicuspid Aortic Valve(3%),TAPVC(4.5%),TGA(1.5%)

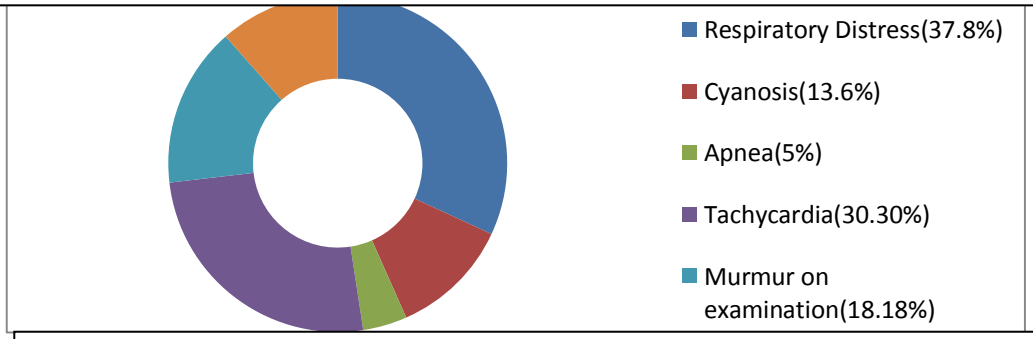

Fig 4-Clinical presentation-Most common clinical presentation was respiratory distress(37.8%) followed by Tachycardia(30.30%),Cyanosis(13.6%), apnea(5%)

Table2- Maternal risk factors observed

Gender:	Number	Percentage(%)
Male		
Female		
Gestational Age:		
Term	48	72.7%
Preterm	18	27.27%
Mean Gestational age		
Birth weight:		
1.Normal(>2500g)	35	53.03%
2.LBW(<2500g)	31	46.09%
3.VLBW(<1500g)	34.4weeks	
4.ELBW(<1000g)		
Mean birth weight-		

	16	24.2%
	38	57.57%
	04	6%
	08	12.12%
	2055.67gm	

Table 2-Depicting the clinical profile of the CHD cases: Males are more commonly affected thanfemales(72.7%),53.03%ere term, 46.09% were preterm, mean gestational age is 34.4weeks, 75% of the cases had birth weight less than 2500gm(57.5% less than 2500gm,6% were VLBW,12.12 were ELBW),mean birth weight obtained was 2055.67gm

Cleft Lip and Cleft Palate	Number(Percentage%)	
TracheoOesophageal Fistula	11.5%	
GI Anomalies	2	3.03%
Renal Anomalies	4	6.06%
Syndromic babies(Downs)	2	3.03%
	2	3.03%

Table 3-Associated anomalies observed in Newborn with CHD:1 had Cleft Lip and Cleft Palate, 2 were Syndromicbabies(Downs),2 had TEF,GI 4 cases were associated with GI Anomalies and 2 with Renal anomalies.

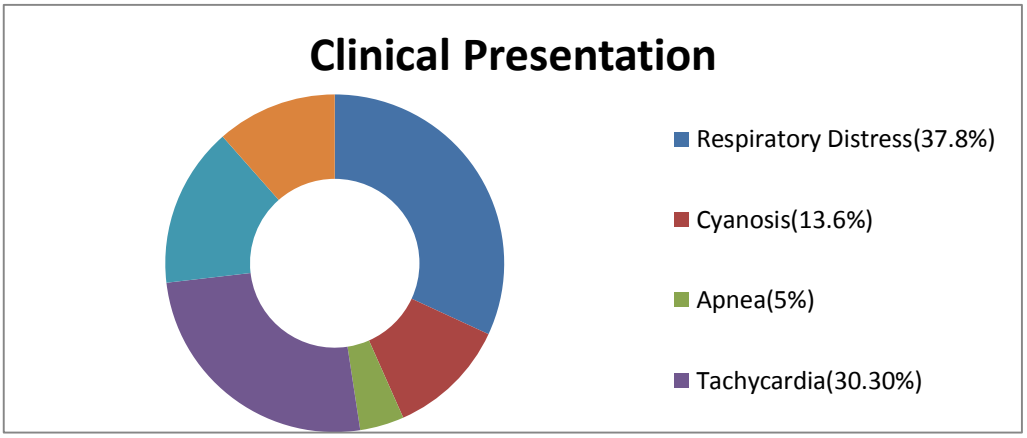

Fig 4-Clinical presentation-Most common clinical presentation was respiratory distress(37.8%) followed by Tachycardia(30.30%),Cyanosis(13.6%), apnea(5%)

5.DISCUSSION:

Taking congenital heart disease of birth prevalence as 9 / 1000, It has been calculated the number of newborns here in India with congenital heart disease are approx 200,000 per year[1]. Amongst which about 1/5th are having serious defect, demanding an intervention within the

first year[1].Shadd AbqariShaad Abqari, AkashGupta,etal have quoted in their study in NICU that Acyanotic heart defects were 290 (72.50%)cyanotic heart defects was 110 (27.50%).VSD being the most common acyanotic CHD and TOF was the most common cyanotic CHD. Amber Bashir Mir et al have noticed in their study that(72.2%) had acyanotic CHD(27.7%) had cyanotic CHD (CCHD),most common CHD was ventricular septal defects and TGA was the most common cyanotic CHD, however it has been noticed in our study that PDA was the maximum shared acyanoticcongenital heart disease in our setup[11].This could be attributed to more number of preterm admissions to NICU.The most common cyanotic congenital heart diseases observed in our NICU was TAPVC.Prematurity has been predicted as risk factor for CHD in several studies.In a study by Laas E et al,amongst the newborns with CHD, 13.5% were preterm against our study in which number of term and preterm cases were nearly equal[Table2.]Few studies have also noted that newborns with congenital heart defects are more likely to be born with low birth weights .Birth weight less than 2500gm was observed inmajority of the cases[12]**.** It has been postulated in several studies that Maternal age at the time of conception is associated with cardiac anomaliesagainst our observation in which most of the cases were not associated with advanced maternal age. Maternal hypothyroidism has also been implicated as a risk factor associated with growth of Inherited heart defect. In a research conducted by Grattan MJ et al ,concluded that Mothers with a background of hypothyroidism were far more violent than females without a history of hypothyroidism to have children with CHD.In our study 6 cases had history of Maternal Hypothyroidism.History of Maternal Diabetes(5 GDM,1 Type 2DM) was observed in 6 cases.Several studies have concluded that congenital anomalies occur more commonly in infants born to diabetic mothers, and cardiac defects predominate.Respiratory distress was the most common clinical presentation, similar finding was noted in several other studies[13]. Associated anomalies such as Tracheoesophagealfistule, Cleft lip and cleft palate,Renal anomalies were noted in few cases, hence emphasizing the fact that a baby with any organ anomaly should always be evaluated for other associated anomalies.Number of male cases were more than that of female cases, similar to other studies.It is important to consider our social beliefs,society and customs,that male babies are brought to the medical attention by the families unlike female babies,hencemale:female ratio might not be the true pictue existing in the society.

6.CONCLUSION-

Encountering Congenital heart disease in NICU is not uncommon, hence all newborns admitted in NICU should undergo screening 2D ECHO,which might aid in early diagnosis and formulate necessary management,thus improving the outcome. Fetal Echocardiography is a commonly employed tool in developed countries for antenatal diagnosis of congenital heart diseases in high risk cases.Awareness about Fetal Echocardiography should be created in our country and should be employed in high risk maternal cases,so that complex congenital heart diseases can be diagnosed antenatally which will aid in planning delivery in a setup which has interventional facilities,thus improving the outcome and survival of the newborn.

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