

INCIDENCE OF CONGENITAL MALFORMATIONS IN NEWBORNS IN A TERTIARY CARE CENTRE.

Paediatric Surgery

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ABSTRACT

Introduction: The present study was carried out with aim to find out the spectrum of congenital malformations in new-borns, admitted in NICU of this institute and to determine the association of malformations in relation to various maternal risk factors and to know their outcome. **Methods:** All the live born new-borns delivered in this institute and admitted in NICU from 1st January 2021 to 31st October 2022 were included in present study. All new-borns were evaluated for any congenital malformations and detailed family history was taken. **Results:** During study period total live births were 6484 of which 80 were congenitally malformed, with total incidence of 1.23%. Most commonly involved was the gastrointestinal system accounting for 56.2% of all malformations. Preterm babies had higher incidence than term babies. **Conclusion-** The Present study depicts maternal risk factors associated with congenital malformations, which can be intervened at early stage with aim to decrease incidence of congenital malformation in community. Present study aids in determining service planning to deal with congenital malformations.

KEYWORDS

congenital malformation, Incidence, NICU, New-born.

INTRODUCTION-

In India congenital malformations have emerged as third commonest cause of perinatal mortality.^[1]

According to WHO, the "congenital malformations should be confined to structural defects present at birth"^[2]

With rapidly advancing knowledge in diagnosing and preventing infections and nutritional deficiencies coupled with increasing awareness amongst population, congenital anomalies are emerging as one of major worldwide problem. Early identification of burden of congenital malformation in community helps in strengthening of health services.

Congenital anomalies can be grouped into 3 groups based on cause

- Genetic
- Environmental
- Multifactorial

Congenital anomalies with multifactorial causation occur as a consequence of interactions between the environmental and genetic causes. Various environmental factors such as teratogens may cause various alterations during process of embryogenesis, including chromosomal breakage, gene mutation or enzyme inhibition and should be dealt with separately. Over the last decade the healthcare facilities have focused their resources in prevention of these congenital anomalies. In this context a detailed study of the relation of risk factors with respect to the corresponding anomalies and the strength of this association is an absolute necessity. Moreover, such studies will pave the way towards the development of infrastructure and reinforcement of manpower targeted towards reduction and prevention of these anomalies.

Patients and Methods-

This was a prospective observational study conducted at GSVM Medical College, Kanpur for a period of 22 months (from January, 2021 to October 2022). All the live births at our institute from January 2022 to October 2023 were considered. All newborns with congenital anomalies were included in the study.

For diagnosis of malformations, they were screened at various levels

1. Antenatal ultrasound was checked for any congenital anomaly, if present, was confirmed at the time of birth or later during NICU admission or follow up.

2. All the deliveries at our institute, were attended by pediatrics resident and the newborns were examined for anomalies & recorded in file if any
3. Inborn newborns admitted to NICU were examined and relevant investigations were done.

Still births were not included in the study as the cause could not be ascertained.

The details were recorded in excel sheets. Mother's details like age, gravida, history of previous abortions, intake of iron & folic acid, maternal diabetes, anemia, any harmful drug intake like antiepileptics were recorded. The newborn's gestational age, birth weight & sex was noted. The malformation in newborn was described in detail along with other associated anomalies & investigations done to diagnose or support it. Procedure performed if any was written and the final outcome was recorded in form of cured & discharged, partially treated, waiting for surgery, don't require surgery, referred or death. The cause of referral & death was also noted.

RESULTS-

During the study period, there were 6,484 live births in this institute. Eighty-six patients were found to have congenital anomalies of which eighty were admitted to NICU. Overall incidence of congenital malformations was 1.23%.

Gastrointestinal system was most commonly involved accounting for 56.2% of all malformations. Amongst these 40% of neonates had anorectal malformations. Subsequently central nervous system anomalies had second highest incidence (28.7%) followed by Respiratory system (7.5%), genitourinary system (5.0%), cardiovascular system (2.5%) and musculoskeletal system (2.5%). [table1]

Table 1.- Distribution according to organ system involved:

SYSTEM	Incidence of system involvement	Anomalies	Incidence of anomaly in involved system	Total Incidence
Gastrointestinal system	56.2%	Anorectal malformations	40.0 %	22.5 %
		Trachea-oesophageal fistula	17.7%	10 %

		Hirschsprung	4.4%	2.4 %
		Umbilical sinus	6.6%	3.75 %
		Omphalocele	8.8%	5 %
		Gastroschisis	4.4%	2.5 %
		Annular pancreas	2.2%	1.25 %
		Duodenal atresia	8.8%	3.75 %
		Down syndrome with duodenal atresia	6.6%	3.75 %
Central nervous system	28.7%	Meningomyelocele	70.0%	17.5%
		Congenital hydrocephalus	6.6%	7.5%
Cardiovascular system	2.5%	ASD	50.0%	1.25%
		VSD	50.0%	1.25%
Genitourinary	5.0%	Hypospadias	53.8%	8.75%
		Polycystic kidney disease	7.69%	1.25%
		Hydronephrosis	7.69%	1.25%
		Undescended testes	30.7%	5.0%
Musculoskeletal	2.5%	CTEV	66.6%	2.5%
		Polydactyly	33.3%	1.25%
Respiratory	7.5%	CDH	100%	7.5%

Maternal age and anaemia were the two most important risk factors that contributed to a majority of congenital anomalies (table 2)

Maternal Risk Factors In The Study Population-(Table 2)

Maternal risk factors	No of babies with anomalies	Percentage
Maternal age >30	50	62.5%
Maternal anaemia	56	70.0%
Maternal diabetes	36	45.0%
Absent maternal Iron and folic acid intake	36	45.0%
History of previous abortions	9	11.25%
Consanguinity	6	7.5%
Maternal Teratogenic drugs exposure	10	1.25%
Gravida		
Primi	5	6.25%
2	15	18.75%
3	29	36.25%
4	31	38.75%

Population of preterm babies with congenital malformations were 53.75% in present study, which illustrated that congenital anomalies predisposes to preterm deliveries.

Table 3: System wise distribution of maternal risk factors

	GIT	CVS	CNS	RESP	Musculoskeletal	Genitourinary
Maternal risk factor						
Maternal diabetes	31.2%	2.5%	26.2%	5.0%	2.5%	3.7%
Teratogenic drug exposure	11.2%	1.25%	26.2%	5.0%	2.5%	3.7%
Absent Iron and folic acid	23.7%	1.25%	23.7%	3.75%	2.5%	6.2%
Anemia	40.0%	0%	26.2%	1.25%	1.25%	7.5%

In our study population, 86.6% of the population which got operated belonged to gastrointestinal system, out of which 73.3% got discharged. Central nervous system (83.8%) was 2nd most common system in which anomalies were managed operatively. (shown in fig 1.)

DISCUSSION-

The incidence of congenital malformations in new-borns delivered and admitted in NICU of our institute was 1.23%. R. Sahadev Swain et al (may 12, 1994) reported an incidence of 1.62%^[3] another study by Rekha Thaddanee et al^[4] reported an incidence of 1.23%, which was similar to our study.

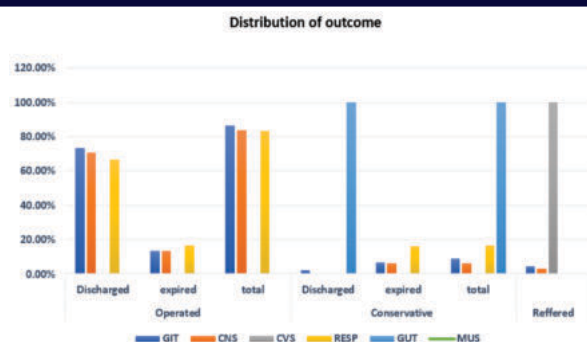


Fig 1.

In our study congenitally, malformed new-borns were more commonly seen in female population (58.75%) as compared to Basavanthappa. Et. al.^[2] in which males were slightly more commonly affected.

Amongst the study subjects, occurrence of congenital anomalies involving Gastrointestinal system (56.2%) were highest, followed by Central nervous system (28.7%), in consonance with observations of West -African journal of medicine^[5]. (table:1) R. Sahadev Swain et al^[3] reported maximum congenital anomalies belonging to the central nervous system group whereas Swapnil R Jain, et al^[6] reported cardiovascular anomalies to be commonest. Rizk Francine et al^[7] reported cardiovascular anomalies and limb anomalies as most commonly involved systems. Uchenna Ekwochi et al^[8] reported as musculoskeletal anomalies as the predominantly involved system.

Neural tube defects contributed to 17.5% of all congenital anomalies (table:1). High incidence of neural tube defects in our study could be due to lack of antenatal care and lack of supplementation of folic acid in diet^[11]. Among Genitourinary anomalies, hypospadias (table:1) was most commonly observed corresponding to the results seen in Ravi Bhatia et al^[9]

Association of maternal risk factors with congenital anomalies have been established from studies across the world. Rekha thaddanee et al^[4], West African journal of medicine^[5]. Rizk Francine et al^[7], Uchenna et al^[8] studied association of risk factors with congenital anomalies. In present study congenital malformations were more common in high gravida births and in mothers of neonates with an increased age at conception (table:4; fig.16) in contour with studies by swain et al^[3]. Rekha thaddanee et al^[4], Uchenna ekwochi et al^[8], sagunabai et al^[10]. On the contrary, studies conducted by Dutta et al^[11] Khanna et al^[12] and karla et al^[13] showed no significant association between congenital anomalies and maternal age.

Maternal anaemia was found to be an important risk factor in our study (table :2). Amongst the study population, neonates with gastrointestinal anomalies and nervous system anomalies had more common incidence of maternal anaemia in concordance with studies done by Rekha thaddanee et al^[4].

Patients factors like low birth weight were found to be an important risk factor in the occurrence of these anomalies (table 3) as they impede the growth of developing foetus. Studies done by Uchenna Ekwochi et al^[8], Mithlesh dewangan et al^[14]. Desai et al^[15], Taksande et al^[16], karla et al^[17], Saifullah et al^[18] also underlined low birth weight as a key factor accountable for these anomalies.

The highest death rate was found in neonates with multiple congenital anomalies as noticed by Ananya S.L et al^[19], which can be explained by the fact that multiple malformations prevent harmonious development of foetus leading to subsequent multi organ failure.

Consanguinity was not found to be an important risk factor in our study (fig .6) whereas it was found to be significant in certain studies by Rekha thaddanee et al^[4], Basavanthappa et al^[2], Mithlesh et al^[14], Agarwal et al^[20], Ravi Bhatia et al^[9].

In present study females with history of abortion was not a significant risk factor, in contrast to study done by saifullah et al^[18].

Polyhydramnios was present in majority of maternal population

presenting with congenital anomalies in their neonates. Anomalies involving the gastrointestinal tract and the nervous system were most commonly associated with polyhydramnios similar to Lalchan S et al^[21]. In oligohydramnios genitourinary anomalies had a more common occurrence.

Maternal diabetes mellitus and congenital malformations showed an obvious association, similar to studies by Ravi Bhatia et al^[9], chin-ping chen et al^[22].

Teratogenic drug exposure are not important risk factors in our study. History of exposure was present mainly in neonates with CNS anomalies in contrast to the findings of Roohi et al^[23], where strong association was present between two.

Majority of patients in our study required surgical management which is different from Yazhini et al^[24], in which maximum patients were managed conservatively.

CONCLUSION-

The present study concluded that congenital malformations in new born were associated with maternal risk factors like increased maternal age (more than 30yr), anaemia, absence of iron and folic acid intake, maternal diabetes, gravida more than four. New-born factors included low birth weight babies (birth weight <2.5) and female sex. Other factors associated were polyhydramnios, oligohydramnios, mode of delivery and gestational age. No significant association was present between congenital anomalies and consanguinity and history of previous abortions.

Early antenatal detection and genetic counselling can prevent many congenital anomalies. Regular antenatal check-up, iron and folic acid supplementation and avoidance of teratogenic drugs are key for prevention of congenital anomalies. By obtaining proper family history anomalies which are incompatible with life are diagnosed at early stage and can be subjected to abortions to prevent morbidity and mortality. Thorough clinical examination guides in identification of life-threatening congenital malformations at an early stage at which surgical correction of malformed babies offer best chance.

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