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Original Research Article

Neonatal outcome of babies born with congenital anomalies after pediatric surgery

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ABSTRACT

Background: Congenital anomalies are the major cause of adverse neonatal outcome and mortality. Some congenital anomalies are correctable and there is immense role of pediatric surgery in treatment of these anomalies. The aim of this study was to determine the pattern of congenital anomalies and to evaluate clinical outcome of babies after surgical intervention.
Methods: This hospital-based cross-sectional study was carried out in the Obstetrics and Gynecology department during the period of 1 year. All the delivered babies in this hospital during this period were examined by obstetricians and pediatricians for the presence of various congenital anomalies. Babies with correctable anomalies were operated by the Pediatric Surgery Department and outcome of babies at the time of discharge was included. Data were entered into a case record form and then in the excel sheet and were analyzed statistically.
Results: During the study period, 1670 babies were delivered in our institution; of which, 32 babies had congenital malformations, giving the prevalence of 1.91%. The system involved predominantly was the gastrointestinal (GI) system (80%). Pregnancy with congenital malformation were associated with malpresentation, anemia and polyhydramnios. Overall, most babies operated for pediatric surgery had good outcome.
Conclusions: Pre pregnancy high-dose folic acid supplementation, regular antenatal visits, and prenatal diagnosis are recommended for prevention, early detection and management of congenital anomalies. There is great importance of Level II and NT NB Scan. Pediatric surgery is a boon in babies with correctable anomalies.

Keywords: Congenital anomalies, Neonatal mortality, Pediatric surgery, Prevalence, Risk factors, Stillbirths

INTRODUCTION

Congenital anomaly is a defect in the morphogenesis of an organ which results from defective embryogenesis.[1-3] The global estimated prevalence of Congenital anomalies is between 1% and 3% and varies widely among countries.[2,5,6] Congenital anomalies affect 1 in every 33 newborns.[4] Birth prevalence of congenital anomalies is affected due to social, racial, economical, and ecological influences. The cause of congenital anomalies is considered multifactorial, which accounts for two-thirds of all defects.[1,5] Risk factors attributed to their development include metabolic factors, such as hypothyroidism, uncontrolled diabetes, and maternal obesity.[3,5] Maternal exposures to certain drugs (trimethoprim, phenytoin, phenobarbitone and carbamazepine), infections (TORCHs-toxoplasmosis, others (syphilis, hepatitis B), rubella, cytomegalovirus (CMV) and herpes simplex) and radiation have been implicated.[1,8] Maternal age (>35 years), family history , high birth order (>4 births) and consanguineous marriage have been reported as significant risk factors .[3,9] So, it is important to identify prevalence of

various anomalies in the society and the risk factors for them to decrease the incidence of various congenital anomalies. Pre conception supplementation with folic acid at 400 mcg/day up to the 12th week of gestational age has shown to reduce their rate.[8] They contribute a significant proportion of infant mortality globally.[4,10] It is estimated to account for one-third of infant mortality, 8-15% of perinatal deaths and 13-16% of neonatal deaths.[2,3,9] They are responsible for significant increase in number of complications and morbidity causing social and economic burden on families. The role of antenatal counseling is to provide information to prospective parents regarding the fetal outcome, possible interventions, appropriate settings, time and route of delivery, and expected postnatal outcomes. Surgical intervention in these children is potentially life-saving. Significant advances in surgical management have resulted in treatment success in up to 90% of cases. Surgery is a cost-effective way to prevent the premature mortality and lifelong disability from congenital anomalies.[7,11] There are poor diagnostic capabilities in most health facilities, lack of awareness on management of congenital anomalies and absence of surveillance.[12] Improving the accessibility and quality of pediatric surgical care has the potential to reduce childhood mortality and lifelong disability.

Table 1: Pattern and clinical profile of congenital malformations.

Malformations and number of cases in study	Maternal clinical profile	Imaging findings	Neonatal clinical profile	Surgery done
Exomphalos (3)	Anemia hypothyroidism	Intra-abdominal contents covered by amniotic membranes herniating through base of umbilcal cord	Swelling over abdomen	Repair of exomphalos with umbilicoplasty
Congenital diaphragmatic hernia (3)	Anemia polyhydramnios	Mediastinal and cardiac shift	Respiratory distress cyanosis	Diaphragmatic hernia repair
Esophageal atresia with TEF (13)	Polyhydramnios pre eclamspsia		Excessive oral secretions respiratory distress	Postero lateral thoracotomy with esophageal repair
Duodenal atresia (2)	Polyhydramnios	Double bubble sign in USG	Vomiting upper abdominal swelling	Exploratory laparotomy and duodeno duodenostomy
Saccrococcgyeal teratoma (1)	Polyhydramnios breech presentation	Cystic/solid pre-sacral soft tissue mass	Large boggy mass (10X9X11 cm) involving sacral and coccyx region	Tumor excision with coccyx corpectomy
Hydrocephalous (1)	Preterm labor	Enlarged ventricles with parenchymal thinning	Macrocephaly	Medium pressure ventriculo peritoneal shunting
Gastroschisis (3)	Pre-eclampsia	Numerous extra abdominal cystic masses	Exteriorized small and large bowel from abdominal wall	Primary repair where bowel is placed inside and abdominal opening is closed.
Hypospadias (1)	Anemia	‘‘Blunt tip’’ appearance of penis	The opening of the urethra is not located at the tip of the penis	Meatotomy
Posterior urethral valve (3)	Rh negative pregnancy hypothyroidism	Keyhole sign	urinary tract obstruction	Cystoscopic fulguration of PUV/ vesicotomy
Polydactyly (1)	GDM	Extra digit with bone earliest detected by 10th week gestation.	Extra fingers	Excision of bilateral accessory digits
Imperforate anus (1)	Rh negative pregnancy hypothyroidism	“Line” Sign	Abdominal distension constipation vomiting	Colostomy

METHODS

This hospital-based cross-sectional study was carried out in the Obstetrics and Gynecology department of Shri Guru Ram Rai Institute of Medical & Health Sciences and Shri Mahant Indiresh Hospital during the period of October 2022 to October 2023. All the babies delivered in this hospital during this period were included. Some women came with Ultrasound diagnosis of congenital anomalies in third trimester. Some patients had no prior ultrasound diagnosis and only after birth congenital anomalies were detected. The newborn babies were examined by obstetricians and paediatricians for the presence of various congenital anomalies and detailed history was taken from mothers for socio demographic variables. Diagnosis of congenital anomalies was done on the basis of clinical evaluation of newborn babies and other appropriate investigations such as radiography, ultrasonography, etc. For every case, a detailed antenatal and maternal history such as age, parity, history of consanguinity, including the familial and gestational factors, was obtained by interviewing the parents. Antenatal ultrasonography findings were also noted. Babies with correctable anomalies were operated by the Pediatric Surgery Department. Intra op findings were noted and outcome of babies at the time of discharge was included. Data were entered into a case record form and then in the Excel sheet and were analyzed statistically.

RESULTS

During the study period, 1670 babies were delivered in our institution; of which, 32 babies had congenital malformations, giving the prevalence of 1.91%. The system involved predominantly was the gastrointestinal (GI) system (80%). The most common anomaly being esophageal atresia with tracheo esophageal fistula (Table 1).

Figure 1: Baby with omphalocoele.

As far as the parity of the mothers is concerned, 13 mothers were primiparas and rest 19 mothers were multiparas (Table 2).

Figure 2: Gastroschisis.

Figure 3: Saccro coccygeal teratoma.

Table 2: Maternal socio demographic characters.

Parameter	Character	No. of cases
Maternal age (in years)	<20	02
	20-30	20
	>30	10
Education	< Secondary level	12
	>secondary level	20
Area	Rural	20
	Urban	12
Parity	Primigravida	13
	Multipara	19
Consanguinity	Present	3
	Absent	29
Type of pregnancy	Singleton	29
	Twin	3
Gestational age at the time of delivery	Preterm	10
	Term	17
	Post term	5

More than half of the mothers who gave birth to anomalous babies were aged between 20 years and 30 years. In the present study, there were three consanguineous couples (9.3%). Low birth weight was found to be associated with higher risk of congenital anomalies. The occurrence of congenital anomalies was about 31.25% in case of babies delivered with low birth weight (Table 3). The congenital

anomalies affected significantly higher proportion of male babies (60%) than females (Table 3).

Table 3: Characteristics of neonates.

Characteristic		No. of cases
Low birth weight	Present	10
	Absent	22
Malpresentation	Cephalic	26
	Breech	6
Mode of delivery	Caesarean section	12
	Vaginal delivery	16
	Instrumental delivery	4
Baby gender	Boy	21
	Girl	14
Asphyxia in newborn at birth	Yes	8
	No	24
Ultrasound diagnosis	Present	20
	Absent	12

Pregnancy with congenital malformation were associated with malpresentation, anemia and polyhydramnios (Table 4). There were only 3 mortalities, 2 of which occurred in babies with tarcheo oesphageal fistula and one with gastroschisis. Thereby reflecting successful role of pediatric surgery.

Table 4: Medical disorders in mothers during index pregnancy.

Medical disorder	Cases
Anemia	20
Oligohydramnios	6
Polyhydramnios	3
Hypertension	1
Pre-eclampsia	3
Gestational diabetes mellitus	2
Pregestational diabetes	1
Hypothyroid	13
Rh negative pregnancy	6

DISCUSSION

Congenital anomalies are structural or functional abnormalities including metabolic disorders which are present at birth.[13] The WHO reports 3-7% of newborns every year with major congenital anomalies worldwide.[14] The pattern and prevalence of various congenital anomalies shows a correlation between various known and unknown genetic and environmental factors including sociocultural, racial, and ethnic variables. Male babies were more commonly associated with congenital anomalies than females in the present study. There is association between low birth weight with increased risk of congenital malformations. Bai et al showed a higher incidence of malformation in the babies born to mothers aged over 35 years.[15] Regarding the relationship between maternal age and babies born with congenital malformations, our study found that the majority of malformed babies were born to mothers aged 20-30 years. Consanguineous marriages play a major role in the occurrence of congenital malformations.[17] Studies by Prajapati et al showed a significantly higher incidence of anomalies in preterm babies than term babies.[18] Studies by Mashuda et al showed that CNS malformations were most commonly involved and had 29.8% and 16.6% of CNS malformations in their respective studies.[14,19] However, the study by Vinitha et al observed genitourinary system to be most commonly involved with 28.5% occurence.[20] In our study, gastro intestinal tract was the most affected system. Savaskar et al observed that congenital anomalies were more in multigravida than in primigravidae.[16] Our result is consistent with this finding, which indicates a positive correlation between the birth order and the incidence of congenital anomalies. Delayed presentation to medical facilities is a common occurrence in poor resource countries. This late presentation for surgical management of anomalies places a significant burden on disability adjusted life years.[21] Early presentation and adequate intervention significantly improve the outcome of congenital anomalies though it increases healthcare costs.[22,23] Good quality NT NB Scan and level II anomaly scan is crucial in the diagnosis of congenital malformations. As we observed in present study, most of the patients came without NT NB scan or level II anomaly scan. Some patients had USG diagnosis of congenital anomaly in third trimester scan. This emphasizes importance of good quality level II and NT NB scan. If early diagnosis of congenital anomaly is made, then there is opportunity to offer medical termination of pregnancy to women to avoid social and economic burden. It indicates that health education, antenatal care, prenatal tests, and strong preventive measures are needed to decrease their incidence. Pediatric surgery plays a key role in the management of correctable congenital anomalies. Increasing awareness about maternal care during pregnancy needs to be highlighted to decrease the incidence of congenital anomalies.

This study has some limitations. Cytogenetic analysis and autopsies for stillbirths were not performed, because they are expensive and have limited availability. It is therefore likely that the study missed some congenital anomalies that do not present early in life, such as heart defects, pyloric stenosis, and anomalies of the urinary system, which could also explain the low level of defects found compared with other studies. Furthermore, this was a hospital-based study and may not be generalizable to the general population.

CONCLUSION

This study highlights the prevalence of gastro intestinal anomalies in this region. Congenital anomalies were more likely to be associated with maternal age (between 20 years and 30 years). There is incidence of low birth weight babies born with congenital anomalies. The congenital

anomalies affected higher proportion of male babies than females. Pre pregnancy high-dose folic acid supplementation, regular antenatal visits as per WHO schedule, and prenatal diagnosis are recommended for prevention and early detection and appropriate management of congenital anomalies.

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REFERENCES

1. Dursun A, Zenciroglu A, Hakan N, Karadag N, Karagol BS, Aydin B, et al. Distribution of congenital anomalies in a neonatal intensive care unit in Turkey. J Matern Fetal Neonatal Med. 2014;27(10):1069-74.
2. Taksande A, Vilhekar K, Chaturvedi P, Jain M. Congenital malformations at birth in Central India: A rural medical college hospital based data. Ind J Hum Genet. 2010;16(3):159-63.
3. Pandala P, Kotha R, Singh H, Nirmala C. Pattern of congenital anomalies in neonates at tertiary care centre in Hyderabad, India: a hospital based prospective observational study. Int J Contemp Pediatr. 2019;6:63-7.
4. Bakalli I, Kola E, Lluka R, Celaj E, Sala D, Gjeta I, et al. Surgical congenital anomalies in Albania: incidence, prenatal diagnosis and outcome. World J Pedia Surg. 2019;2(1):e000012.
5. Ara A, Kumar D, Dewan D, Digra NC. Incidence of congenital anomalies in a rural population of Jammu -A prospective study. Ind J Publ Heal. 2018;62(3):188-92.
6. Oluwafemi RO, Abiodun MT. Incidence, spectrum and outcome of congenital anomalies seen in a neonatal intensive care unit in Southern Nigeria. Niger Postgrad Med J. 2019;26(4):239-43.
7. Sitkin NA, Ozgediz D, Donkor P, Farmer DL. Congenital anomalies in low- and middle-income countries: the unborn child of global surgery. World J Surg. 2015;39(1):36-40.
8. Verity C, Firth H, ffrench-Constant C. Congenital abnormalities of the central nervous system. J Neurol Neuros Psych. 2003;74(Suppl 1):i3-8.
9. Naseha A, Iqbal Y. Incidence of congenital anomalies in tertiary health care centre. J. Evolution Med. Dent. Sci. 2016;5(67):4826-33.
10. Bakare TI, Sowande OA, Adejuyigbe OO, Chinda JY, Usang UE. Epidemiology of external birth defects in neonates in Southwestern Nigeria. Afr J Paediatr Surg. 2009;6(1):28-30.
11. Wright NJ Global PaedSurg Research Collaboration Management and outcomes of gastrointestinal congenital anomalies in low, middle and high income countries: protocol for a multicentre, international, prospective cohort study. BMJ Open. 2019;9:e030452.
12. Kishimba RS, Mpembeni R, Mghamba JM, Goodman D, Valencia D. Birth prevalence of selected external structural birth defects at four hospitals in Dar es Salaam, Tanzania, 2011-2012. J Glob Health. 2015;5(2):020411.
13. Park K. Preventive medicine in Obstetrics, Pediatrics and Geriatrics. In: Park's Textbook of Preventive and Social Medicine. 23rd ed. Banarsidas Bhanot Publishers; 2015:577.
14. Mashuda F, Zuechner A, Chalya PL, Kidenya BR, Manyama M. Pattern and factors associated with congenital anomalies among young infants admitted at Bugando medical centre, Mwanza, Tanzania. BMC Res Notes. 2014;7:195.
15. Suguna Bai NS, Mascarene M, Syamalan K, Nair PM. An etiological study of congenital malformation in the newborn. Ind Pediatr. 1982;19(12):1003-7.
16. Savaskar SV, Mundada SK, Pathan AS, Gajbhiye SF. Study of various antenatal factors associated with congenital anomalies born at tertiary health centre. Int J Rece Tren Sci Technol. 2014;12(1):82.
17. Millman GC. Fanaroff and Martin's neonatal-perinatal medicine diseases of the fetus and infant, 8th ed, Vols I and II. Arch Dis Child Fetal Neonatal Ed. 2006;91(6):F468.
18. Prajapati VJ, Kacha AR, Kakkad KM, Damor PB, Nandaniya AM. Study of congenital malformation in neonates born at tertiary care hospital. Natl J Community Med. 2015;6(1):30-4.
19. Francine R, Pascale S, Aline H. Congenital anomalies: prevalence and risk factors. Mortality. 2014;1(2):58-63.
20. Wills V, Jacob A, Sreedevi NS. Congenital anomalies: The spectrum of distribution and associated maternal risk factors in a tertiary teaching hospital. Int J Reprod Contracept Obstet Gynecol. 2017;6(4):1555-60.
21. Wu VK, Poenaru D, Poley MJ. Burden of surgical congenital anomalies in Kenya: a population-based study. J Trop Pediatr. 2013;59(3):195-202.
22. Ekenze SO, Ikechukwu RN, Oparaocha DC. Surgically correctable congenital anomalies: prospective analysis of management problems and outcome in a developing country. J Trop Pediatr. 2006;52(2):126-31.
23. Gasparella P, Singer G, Kienesberger B, Arneitz C, Fülöp G, Castellani C, Till H, Schalamon J. The financial burden of surgery for congenital malformations-the austrian perspective. Int J Environ Res Public Health. 2021;18(21):11166.

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