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Congenital anomalies attending at fetomaternal wing of bangabandhu sheikh mujib medical university, Dhaka, Bangladesh

Abstract

Background: Congenital anomaly is one of the most common causes of perinatal death throughout the world. Consanguinity, nutritional deficiency, infection during pregnancy, malaria etc. are most prevalent in Bangladesh. The study was aimed to explore the prevalence and types of congenital malformations along with their immediate outcome.

Materials and methods: This observational study was conducted among all the admitted high risk pregnancies who were admitted with prenatally diagnosed congenital anomalies from January, 2015 to December, 2015. During this tenure 705 high risk patients were admitted among which 125 patients had prenatally diagnosed congenital anomalous fetus and included for the study to explore the prevalence and types of congenital malformations and their immediate outcome. For the study purpose, congenital anomalies were broadly classified into major and minor groups. Major anomalies were considered when the defects seemed to cause stillbirth or neonatal death or needed medical termination for lethal anomalies (anencephaly, multiple congenital anomalies) or severeanomalies that without medical intervention would cause handicap or death. Mild anomalies/defects were considered which might require medical intervention but compatible with life.

Results: The mean of gestational age at the time of delivery was 31.77± 6.23(SD) wks. 125 (17.7%) women had congenital anomaly of their baby. Among these anomalies central nervous system anomalies was the most frequent (34.4%), followed by renal anomalies (22.4%) and others in order of frequency were gastro–intestinal, skeletal, non–immune hydrops, cardiac anomalies. The major anomalies were 81.6% and multiple congenital anomalies were in 28.8%. Among the congenital anomalous fetus, perinatal death was 43.2% and appeared to be the most common cause of death in new borne babies.

Conclusion: In this study, Central nervous system (CNS) anomalies were found the commonest congenital anomalies and pointing to the risk of burden of these anomalies on the future handicapping condition and have their impact on social and economical consequences. So, emphasis is needed on prenatal diagnosis of congenital anomalies by routine scanning for anomalies by standard ultrasonograph, so that opportunity of secondary prevention can be considered in fatal cases and appropriate treatment can be ensured immediately after birth. Emphasis should also need in the use of fetal echocardiograph for prenatal detection of cardiac anomalies.

Keywords: Congenital anomaly, routine scan for anomalies, ultrasonography, fetal echocardiograph

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Tabassum Parveen,[1] Md. Golam Hafiz,[2] Shohela Akther,[3] Tajmira Sultana,[4] Nahreen Akther,[5] Firoza Begum,[5] Hasna Hena Parveen[6]

[1]Associate Professor, Department of Obstetrics and Gynecology, Bangabandhu Sheikh Mujib Medical University, Bangladesh
[2]Associate Professor, Department of Pediatric Hematology and Oncology, Bangabandhu Sheikh Mujib Medical University, Bangladesh
[3]Associate Professor, Department of Pediatrics, Bangabandhu Sheikh Mujib Medical University, Bangladesh
[4]Resident, Department of Obstetrics and Gynecology, Bangabandhu Sheikh Mujib Medical University, Bangladesh
[5]Professor, Department of Obstetrics and Gynecology, Bangabandhu Sheikh Mujib Medical University, Bangladesh
[6]Medical Officer, Feto□maternal Medicine Wing, Department of Obstetrics and Gynecology, Bangabandhu Sheikh Mujib Medical University, Bangladesh

Correspondence: Md. Golam Hafiz, Associate Professor, Department of Pediatric Hematology and Oncology, Bangabandhu Sheikh Mujib Medical University, Bangladesh, Email golamhafiz59@yahoo.com

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Abbreviations: CA, Congenital Anomaly; BSMMU, Bangabandhu Sheikh Mujib Medical University; WHO, World Health Organization. EUROCAT, European Surveillance Team of Congenital Anomalies

Introduction

Congenital anomaly (CA) can be defined as any abnormality present at birth, particularly a structural one which may be inherited genetically, acquired during the period of gestation or inflicted during parturition.[1] It covers a wide spectrum of structural dismorphism ranging from relatively minor problem with no serious medical or cosmetic consequence to major anomalies with exceptionally poor prognostic outcome, long–term disability creating significant impacts on individuals, families, health care systems and societies. According to the report of World Health Organization (WHO), CA estimated to be affected 1 in 33 infants resulting in approximately 3.2 million birth defect related disabilities and it is reported that 2,70,000 newborns death occur during the first 28 days of life every year.2 European Surveillance team of Congenital Anomalies (EUROCAT) is the network of population based registers of CA in Europe covering 1.5 million annual births in 22 countries. EUROCAT recorded a total prevalence of major CA of 23.9 per 1,000 births for 2003–2007.[3]

It is a common view that congenital disorders are not a public health issue in developing countries as infections and malnutrition are the major contributing factor for neonatal morbidities and mortality. Contrary to this misconception, a number of developing countries are in fact experiencing an epidemiological transition in morbidity and mortality due to non communicable diseases, including CA as infant mortality rates due to infections and malnutrition have been reduced significantly.[4]

Penchaszadeh showed the prevalence of recognizable malformations among newborns is between 2–3% in developing countries which is very similar to that found in the industrialized

world.[4] WHO reported the prevalence of birth defect in the South East Asian region ranges between 54.1 to 64.3 per 1000 live birth and in Bangladesh it is about 58.6 per thousand live births.[5] In Bangladesh newborn deaths under 5 years of age has increased from 39% in 1989–93 to 60% in the year 2011[[5] Following sepsis (23%), asphyxia (21%) and prematurity/LBW (11%), birth defects appeared to be responsible for most of these newborn deaths.[5]

However, the exact number of newborn deaths attributable to birth defect is yet unknown. Some of the known risk factors of birth defect (consanguinity, poverty, infection during pregnancy, malaria, etc) are highly prevalent in Bangladesh. Here, we have tried to explore the prevalence and types of congenital malformations, their immediate outcome and to share our observations in a tertiary level hospital in the feto–maternal medicine wing of Bangabandhu Sheikh Mujib Medical University (BSMMU), Bangladesh where such types of patients are referred from all corners of the country.

Materials and methods

This observational study was carried out in collaboration with the Fetomaternal Medicine Wing of the Department of Obstetrics and Gynecology, Department of Pediatrics and Department of Pediatric Hematology and Oncology, BSMMU from January, 2015 to December, 2015 on 705 patients those who are of high risk attended at the department for follow–up with the aim to calculate the prevalence of CA among the admitted patients with high risk group, to find out the percentage of different types of CA, to categorize them according to lethality and to identify their immediate outcome. CA was broadly classified into major and minor anomalies. Major anomalies included the defects that cause stillbirth or neonatal death or needs medical termination for lethal anomalies e.g. anencephaly, multiple CAs or the severeform of defects which without medical intervention cause handicap or death (moderate to severe hydronephrosis, ventriculomegaly, rectal atresia etc). The milddefects were considered which may require medical intervention but life expectancy was good (isolated fetal hydrocele, polydactyl, mild hydronephrosis). The babies which included in this study were followed up till discharge from the hospital.

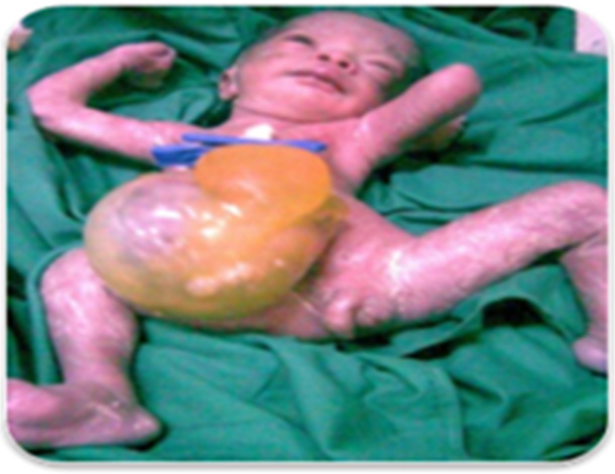
Collected raw data were organized into a statistical format and appropriate statistical analyses were done using statistical package for social science (SPSS), a software version 21.0 All continuous data were expressed as mean ± SD and the categorical data of the test in percentage (%). Paired‘t’ test had done to compare within the parameters to observe the statistical significance. p value of less than 0.05 and confidence interval 95% were taken as the minimum level of significance.

Results and observations

Out of 705 high risk patients attended, 125 (17.7%) women had congenital anomaly of their baby. Among these anomalies central nervous system (CNS) anomalies was the most frequent (34.4%) (Photograph 1a & b), followed by renal anomalies (22.4%) and others in order of frequency were gastro–intestinal (Photograph 2a&b), skeletal, non–immune hydrops fetalies (Photograph 3), cleft lip and palate (Photograph 4), cardiac anomalies (Figure 1).

Among the CNS anomalies ventriculomegaly was in top of the list, sharing 82.2% followed by anencephaly which contributed about 13.3% and Dandy–Walker malformation which was 4.4%. Hydronephrosis, Polycystic and dysplastic kidneys were the predominating renal anomalies. Gastro–intestinal anomalies along with anterior abdominal wall defects were duodenal atresia, rectal atresia, omphalocele and gastroschisis. Among the CAs major anomalies were 81.6% and the rest were minor (18.4%). Multiple congenital anomalies were noted in 28.8% cases which were mostly fatal and the rest 71.2% was isolated. Regarding gestational age, 32% were delivered at term, 15% at 34–37 weeks, 12% at 32–34 weeks and 16% at 28–32 weeks. About 25% patients needed medical termination before 28 weeks. The mean of gestational age at delivery was 31.77± 6.23(SD) wks (Figure 2). Birth weights of these babies are presented in (Figure 3).

Photograph 1a, b Showing meningomyelocele of the new born baby.



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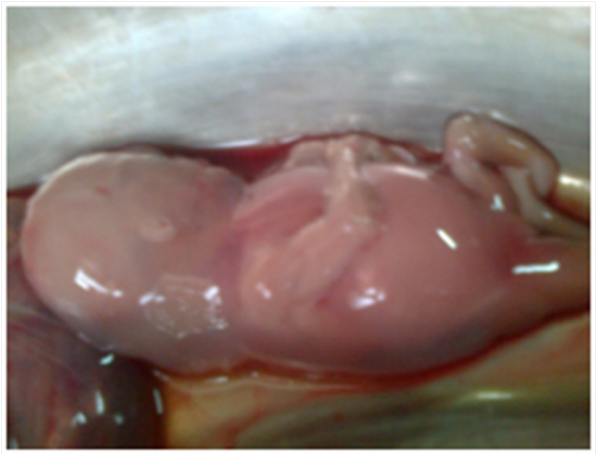
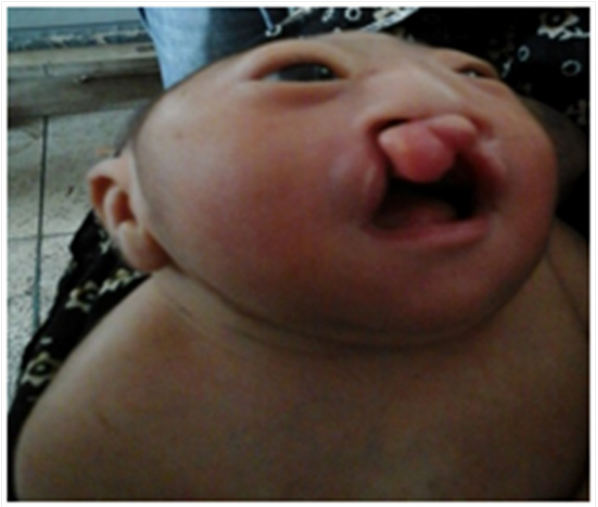
Photograph 2a, b Showing gastrointestinal anomaly of the new born baby.



Photograph 3 Showing non–immune hydrops fetalies of the new born baby.



Photograph 4 Showing cleft lip and palate of the new born baby.

Among the congenital anomalous fetus, 19% presented with intrauterine death (IUD), still birth was found in 25% cases which were actually the candidates of medical termination for lethal anomalies. After delivery of baby NICU admission needed in 38% cases for active support and treatment i.e. medical or surgical intervention (Figure 4).

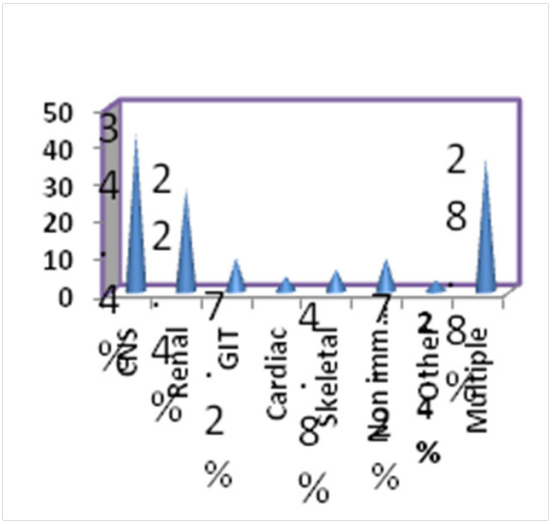


Figure 1 Showing cogenital anomalies based on organ involvement.

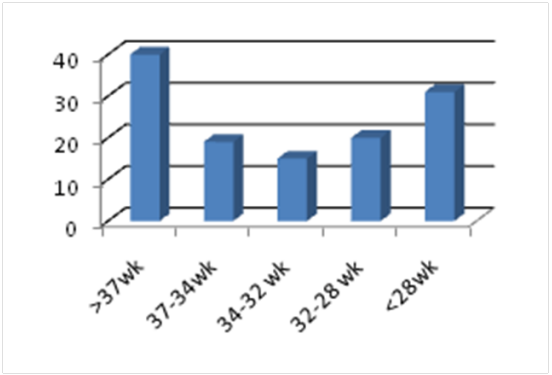


Figure 2 Gestational age at birth.

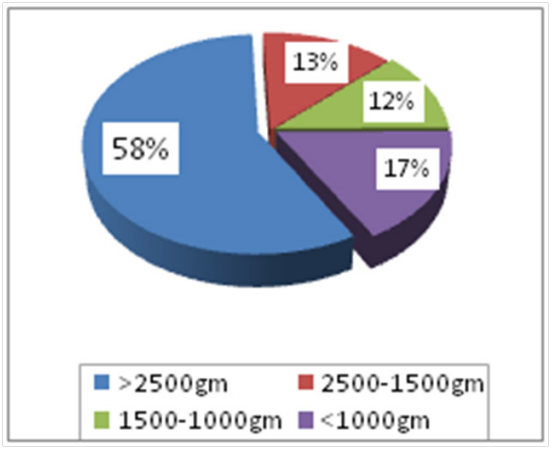


Figure 3 Birth weight of the anomalous baby.

Among the neonates who were admitted in NICU, 12% died in the first week of life, 21% recovered from illness and discharged with advice but 5% babies did not continue the treatment and subsequently left hospital with medical advice. Total perinatal death was found 54(43.2%). During the whole period of time total perinatal death in fetomaternal medicine wing was 87, mostly due to CAs which constitutes 62% of the total perinatal death. Because of minor anomalies no medical or surgical intervention was needed in 18% babies. It is observed that about 39% of the babies were discharged in apparently healthy condition.

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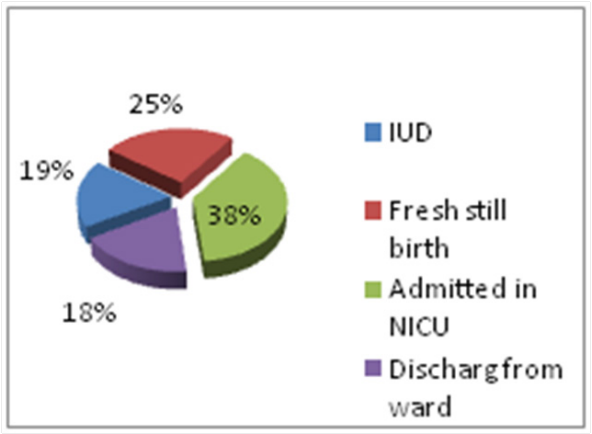

Figure 4 Immediate fetal outcome.

Discussion

There are wide variations in the frequency of CAs in different geographical community. Devdas.[6]] reported on 64,587 sample by compiling data from 12 hospitals covering whole geographical area of India, reported the incidence of CAs 7.7/1000 live births , in our observation it is 17.7%. EUROCAT representing the European data showed a total prevalence of major congenital anomalies 23.9/1,000 births for 2003–2007.[3] We found among the total high risk pregnancy admission, 17.7% was due to CAs. The inhomogeneous characteristics of the samples of different geographical communities, quality of record keeping are among the factors that may operate for these wide variations in incidences. The high incidence of anomalies in our study may be due to the referral of such patients to this wing from all corners of the country. This was supported in a cross–sectional study among the high risk pregnant women at a Fetomaternal medicine centre of Brazil from March 2002 to March 2006 where frequency of anomalies was 56.2%, which was quite high.[7] We had found CNS, renal, GIT abnormality was most commonly affected by anomalies in order of frequency. CNS anomalies was reported as the most common type of CAs in many national and international studies.[6,8,9,10]], which is consistent with our findings. Devdas.6] reported that out of 12 participating hospitals, CNS malformation including neural tube defects topped the list in 10 hospitals. One possible explanation for the apparent higher percentage of these types of defects may be due to obvious anatomical changes, CNS anomalies are rarely missed on ultrasonogram even in less expert hands. However, congenital heart disease (CHD) were the most common non chromosomal subgroup (6.5/1,000 births) found in the report of EUROCAT.[3]], followed by limb defects (3.8 per1, 000), anomalies of urinary system (3.1per1,000) and nervous system defects (2.3 per 1,000).[11]] has shown that prenatal detection rates vary by anomaly. We had observed prenatal detection rate for NTD was 95% whereas for cardiac anomalies it was 35%.[12]], prevalence of cardiac anomalies were low; only 3.2% which is not also consistent with the present study. It is probably due to low detection rate of this anomaly in antenatal period in our set up. The diagnosis of the abnormalities in the present study was mostly based on ultrasonogram. Fetal echocardiograph was done only when cardiac anomalies were suspected by ultasonogram or mothers had CHD. In Bangladesh, the scope of fetal echocardiograph is still limited due to lack of expertise in this field and presently this option is not generally utilized as a routine anomaly screening test. In this study multiple congenital anomalies (MCA) was noted in 28.8% cases. In EUROCAT study total prevalence of MCA cases was 15.8/10,000 births and fetal deaths and termination of pregnancy were significantly more frequent in MCA cases.[11] We found the termination of pregnancy for fatal CAs following prenatal diagnosis was in 25% cases which are almost comparable to the EUROCAT data where 17.6% were the candidates for TOPFA.[11] Prenatal diagnosis followed by medical termination is currently the mainstay of secondary prevention of congenital anomalies. In a report.[13]] it has been shown that increased prenatal diagnosis and subsequent pregnancy termination contributed a major role in reducing overall national birth prevalence rate of congenital anomalies in Canada between 1998 and 2013. Samadirad et al..[14]] has shown that one in almost three prenatally diagnosed pregnancies with birth defects was legally terminated in Iran before 20 weeks of gestation. However the social and legal acceptability of this form of secondary prevention is not without questions. In the present study though 56% of the CAs babies were live births but finally 39% babies were discharged in apparently good condition after getting medical treatment or surgical correction. In contrast EUROCAT recorded live births 80% and among them only 2.5% died in the first week of life.[11] Considering poor outcome or economic constraints of long term treatment a number of parents are reluctant to continue the treatment of their anomalous babies. In the present study LAMA was noted 5% among the admitted babies who needed long term medical treatment and/or required surgical correction. Lucy et.al.[15]] showed that socioeconomic variation causes inequalities in outcome of pregnancy and neonatal mortality associated with CA, the factor which may also operate in the present study. Two separate study.[16,17]] showed significant relationship between CAs and birth weight. Gulrukh in 2010.[17]] showed 43.5% of the pregnancies affected by CAs ended in a low birth weight infant i.e. ≤ 2.5kg. In the present study vast majorities (58%) were of low birth weight i.e. birth weight <2.5kg and 17% had weight< 1kg. It is reported that congenital malformations contribute highly to prenatal mortality and postnatal physical defects.[18–20]], which is consistent with our observation. WHO reported in 2004.[21]] where around 2, 60,000 neonatal deaths (about 7% of all neonatal deaths) were caused by CAs. Same report revealed that CAs appeared as the most prominent cause of death in settings where overall mortality rates are low (European Region, 25% of neonatal deaths were due to CAs). But we observed the perinatal death among CAs babies was 43.2% which was solely responsible for 62% of the total perinatal death among the admitted high risk patients during the study period. Another study by Chhabra et.al.[22]], were the trends of perinatal mortality (PM) at a rural institute due to major congenital malformations (MCM) was 8.3% of which 82.94% were stillbirths and 17.06% neonatal death. Jennifer et al..[23]] showed CAs to be the second commonest cause of infant deaths and leading cause of deaths in the post neonatal period which was 0.52 /1,000 live births which has similarities with our observation. Mathews et al..[24]] statistically proved the leading cause of infant death was due to congenital malformations, deformations and chromosomal abnormalities accounting for 20% of all infant deaths; whish is also consistent with our findings. The proportion of perinatal deaths due to congenital malformations has been increasing as a result of reduction of mortality due to other causes due to the improvement in perinatal and neonatal management and care. In the upcoming decades, throughout the globe this may appear as the leading cause of morbidity and mortality.

Conclusion

Congenital malformations of the fetus are a major contributing factor of perinatal death. CNS anomalies are highest pointing to the risk of burden on the future handicapping and have their impact on social and economical consequences. The emphasis should be given on prenatal diagnosis through routine anomalies scanning by ultra sonogram so that secondary prevention can be considered in

fatal cases immediately after birth. Though the incidence of cardiac anomalies appeared to be low but still it needs fetal echocardiography for prenatal detection of these anomalies.

Ethical consideration

The institutional ethical committee and reviewer board approved the protocol and signed informed consent was obtained from the patients/parents/guardians as appropriate.

Limitation of the study

The study was performed in different department of same institute; there may be some biasness during data collection or processing. So, giving a conclusive massage it demands further multicenter studies.

Authors' contributions

This work was carried out in collaboration between all authors. Author TP designed the study, wrote the protocol, interpreted data and final revision of the paper. Author MGH anchored field study. Author SA gathered initial data. Author TS performed preliminary data analysis. Author NA performed data entry. Author FB and author HHP managed literature search. All authors read and approved the manuscript.

Disclosure

The paper has been read and approved by all authors and has not been published totally or partially in any other journal and it will not be published in other periodicals.

Further suggestion

As congenital malformations of the fetus is a major contributing factor for perinatal death throughout the world. So, routine ultrasonograph and or echocardiograph should be advised remembering secondary prevention and management in fatal cases.

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Competing interests

The authors declare no conflicts of interest regarding publication of this paper.

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