Study of Possible Predisposing Factors that May Result in Congenital Abnormalities among Newborn Infants a Hospital-based Study

Munaf Authman Hreeth[1], Ahmed Nadher Kareem[2], Sabah Noori Rashid[2]

[1]Pediatrics Specialist M.B.Ch.B, FIBMS Pediatrics , Speciality of General Pediatrics and Neonatalogy Iraqi board and Subspecialty of Hematology in Pediatrics Iraqi Board / Pediatric Central Teaching Hospital/ Al-karch Health Directorate/ Ministry of Health and Environment; [2]P ediatrics Specialist MB.Ch.B. ,D.C.H.,C.A.B.P Consultant Pediatrician, Speciality of General Pediatrics and Neonatology Iraqi Board and Subspecialty of Hematology in Pediatrics Iraqi board / Pediatric central teaching hospital / Al-karch Health Directorate/ Ministry of Health and Environment / Baghdad / Iraq

Abstract

The term congenital abnormalities signifies that there has been disruption in the normal process of organogenesis occurring before birth. The earlier the insult, the more gross the abnormality.

This study aimed to study some predisposing factors that may result in congenital abnormalities among newborn infants in neonatal care unit (NCU) of Al-Kadhymia teaching hospital-Baghdad/Iraq. This prospective study was carried out during the period from 1st February to 1st August 2011. A total of 2700 neonates were admitted to NCU, and (100) newborn infants were proven to have congenital abnormalities by physical examination alone in the nursery care unit.

The results showed that of the total (100) affected neonates, 63 (63%) were full term as compared to only 37 (37%) preterm baby (<37 weeks gestation) with a significant difference (P <0.05). Of the total 2700 neonates, 1440 (53%) were females and the remining 1260 (47%) were males.

Out of the (100) neonates who were proven to have congenital anomalies, 55 (55%) were males and 45 (45%) females. The percentage of newborns with congenital abnormalities was 3.7% with respect to total number of newborns (2700); 2.1% were males and 1.6% were females.

Our results showed that (55%) had neurological abnormalities followed by (12%) cleft lip and palate then (11%) chromosomal abnormalities (most of them Down syndrome and only 3 cases had Edward syndrome and 1 case had Patau syndrome). In this study, it was shown that the highest incidence of congenital abnormalities (55) occurred between (20-30) years.

It can be concluded that most the affected newborns were full terms, with a slight male predominance. Incidence of neurological abnormalities was higher than other types of congenital abnormalities, the highest incidence of congenital abnormalities occurred between 20-30 years, and in multigravida mothers, and most of parents were reported to be consanguineous or relatives.

Key words: *Congenital abnormalities, newborn infants, predisposing factors.*

Introduction

There are two types of congenital abnormalities, the major congenital anomaly, which is a structural abnormality present at birth, and has a significant effect on function or social acceptability, e.g. cleft lip, while the minor congenital anomaly is a structural abnormality present at birth, which has minimal effect on clinical functions, but may have a cosmetic impact, e.g. pre auricular pit [1].

Congenital malformations or birth defects are common among all races, cultures and socioeconomic strata. Birth defects can be isolated abnormalities or part of a syndrome and continue to be an important cause of neonatal and infant morbidity. Based on a World Health organization (WHO) report, about 3 million fetuses and infants are born each year with major congenital malformations; congenital malformations accounted for an estimated 495,000 deaths worldwide in 2005 [2].

Regarding etiology, congenital abnormalities can be the result of monogenic, chromosomal, maternal infections, maternal illness, twinning, environmental agents, medications, nutritional and unknown etiologies [3].

Congenital anomalies can be classified either based on timing of insult, underlying histological changes, or based on its medical and social consequences.

Congenital anomalies based on insult can be placed into following three categories: malformation, disruption and deformation. Classification based on underlying histological changes includes: aplasia, hypoplasia, hyperplasia and dysplasia [4].

Regarding management of congenital abnormalities, newborns with one or more malformations should receive ongoing care and may require multidisciplinary care and case management. Some clinical problems or physical findings may evolve over time and become more apparent with age [5,6].

Patients and Methods

This prospective study was carried out in Al-Kadhymia teaching hospital (Neonatal care unit) during the period from 1st February to 1st August 2011.

A total of 2700 neonates were admitted to NCU. One hundred newborn infants were proven to have congenital abnormalities by physical examination alone in the nursery care unit. The questionnaire for neonatal evaluation included: gestational age, sex, body weight and type of congenital anomaly. A detailed maternal history including age, parity, antenatal care, any history of abortion, previous baby with congenital abnormality, still births, medical illness, or drug intake during pregnancy were also obtained.

Moreover, the residency of the family and consanguinity between father and mother were recorded.

Statistical Analysis

The Statistics Package for Social Science (SPSS) version 17 was used for data analysis. The results are expressed in form of numbers, percentages and Chi-square Pearson correlation which was statistically significant at P.value less than 0.05 and statistically not significant at P.value more than 0.05.

Results

Of the total (100) affected neonates, 63 (63%) were full term when compared with 37 (37%) preterm babies (<37 weeks gestation), as shown in table (1), with significant difference (P <0.05).

Table (1) Gestational age of newborn babies

Gestational age	Number	(%)
Preterm babies	37	37%
Full term babies	63	63%
Total	100	100%

Table (2) showed that out of the (100) neonates who were proven to be have congenital anomalies, 55 (55%) were males and 45 (45%) were females, with no significant difference (P>0.05). The male to female ratio was 1.3:1.

Table (2): Gender distribution of neonates with congenital abnormalities

Gender	Number	(%)
Males	55	55%
Females	45	45%
Total	100	100%

Results showed that 55% were diagnosed to have neurological abnormalities followed by (12%) cleft lip and palate then (11%) chromosomal abnormalities (most of them were Down syndrome and only 3 cases were Edward syndrome, while 1 case Patau syndrome) as shown in table (3), with significant differences (P <0.05).

Table (3): Distribution of newborns according to the type of congenital anomalies

Types of anomalies	(%)
Neurological (mainly neural tube defects)	55
Cleft lip & palate	12
Chromosomal	11
Cardiovascular system (C.V. S)	6
Musculoskeletal system	5
Alimentary system	5
Genitourinary system (GUS)	5
Respiratory system	1

Results in table (4) showed the highest incidence (55%) of congenital abnormalities occurred within the age group (20-30) years, and (38%) within the age group (30-40) years, while (5%) occurred within (> 40) years and only (2%) within <20 years. The table demonstrated that the occurrence of congenital abnormalities in multigravida mothers was the highest (81%) when compared with primigravida mothers (19%). Out of 100 cases, (34%) had regular antenatal care and folic acid supplement during pregnancy, while (20%) were with maternal illness during pregnancy, which included (11% D.M), (8%) with hypertension and (1%) with epilepsy. Table (4) also showed that (13%) had a history of congenital abnormalities in their families, which was mainly neurological (10%), cleft lip and palate (2%) and (1%) chromosomal disorder (Down syndrome). Out of

100 cases, (56%) were living in urban areas and (44%) in rural areas, In regard to consanguinity between father and mother, (70%) were reported to be consanguineous, and only (30%) were negative (strange). Finally, (6%) of mothers were reported to be giving birth to a baby with congenital abnormalities and (2%) with stillbirth.

Table (4): Relationship between congenital abnormalities and predisposing factors

Factor	No.	%
Age of mothers		
<20 years	2	2%
20-30 years	55	55%
30-40 years	38	38%
>40 years	5	5%
Residency		
Urban	55	55%
Rural	45	45%
Parity of mother		
Multigravida	81	81%
Primigravida	19	19%
Antenatal history		
Had regular care & folate supplement during pregnancy	34	34%
Maternal illness	20	20%
Family history		
Family history of congenital abnormalities	13	13%
History of previous birth with congenital abnormality	6	6%
Still birth	2	2%
Consanguinity		
consanguineous parents (relatives)	70	70%
Strange	30	30%

Discussion

Our results indicate the prevalence of congenital malformation disorders at Al-Kadhymia teaching hospital in NCU was 3.7 % (100/2700), where males were higher than females, and male to female ratio was 1.3/1 . This finding is in agreement with the Iranian study [7].

In a recent study done in Iran in June 2008, there was 2.9% of live births have major congenital abnormalities [7], while another study in Kuwait documented 1.25% of children with congenital abnormalities [8]. Considerable variation in frequency in different populations has been reported, from as low as 1.07% in Japan [9] to as high as 4.3% in Taiwan [10]. This wide variability could be due to the difference in population's genetics.

Also, in this study, out of 100 newborn infants with congenital abnormalities, (63%) were full term with body weight (2.5-3.5 Kg), and only (37%) preterm babies with body weight (1–2.5 Kg), whereas a slight increment in incidence had been found in preterm and small for gestational age infants in a studies done in U.K [11], and India [12]. Such results could be attributed to the absence of facilities regarding antenatal diagnosis of such anomalies in our country leading to delivery of a full term babies with such anomalies.

Moreover, this study showed that the commonest anomalies were neurological (55%), followed by cleft lip and/or palate (12%), then chromosomal abnormalities (11%); among the neurological anomalies, the neural tube defects was the commonest one.

Different observations were recorded in other studies. A study in India [13,14] revealed an increase in frequency of musculoskeletal anomalies (30%), neurological (20.5%), then cleft lip and palate (18.5%) ; Other studies in Iran and Tunis [15,16] showed higher incidence of cleft lip and palate, while a study in Saudi Arabia [17] reported that the major anomalies are genitourinary (25%), cardiovascular (15%) then neurological (10%).

This partly implies a poor compliance of pregnant women regarding the intake of folic acid, in addition to poor antenatal care in regard to screening for such anomalies.

The neurological anomalies in this study were 55%, while in Wales (1%) [18], and in Germany (2%) [19] ; this could be related to inadequate education of our people in regard to supplementation of folic acid during pregnancy and poor antenatal care, while in Wales and Germany, there are facilities for prenatal diagnosis and interruption of affected pregnancy.

The chromosomal abnormalities in this study was 11% which is similar to the study of United Kingdom, but higher than a study in in Norway 0.1% [20].

The chromosomal abnormalities in this study was 11% which is similar to the study of United Kingdom [11], whereas 0.1% in Norway [20].

On the other hand, this study showed that the percentage of occurrence of congenital abnormalities was (70%) among newborns delivered to consanguineous parents, which is similar to the figure in India and Iran and Saudi Arabia studies [15,17,21]. Despite the high prevalence of consanguineous marriages, the overall incidence of congenital abnormalities was not higher than developed countries [22].

The percentage of congenital abnormalities was very high among mothers aged (20- 30) years (55%). A study done in England concluded that the increasing age of the mother may increase the risk of congenital abnormalities especially chromosomal defects [23], which may be attributed to the fact that this age is a common age of child bearing and higher fertility rate that is why most congenital abnormalities can be diagnosed in this age group.

Also, this study revealed that the residency of the families was from urban areas (56%) and this could be related to physical and environmental exposures (hot climate, air pollution, chemicals like lead exposure [24] and ionizing radiation [25,26]. In addition to the proximity of Al-Kadhymia teaching hospital to these areas, more anomalies can be diagnosed and documented. This result was in disagreement with a study done in India by Datta V Chaturvedi [14] who revealed higher incidence

of congenital malformations (57%) among people living in rural areas.

With respect to parity of mothers, this study revealed that most anomalies occur in multigravida mother (81%). Similar observations were recorded in other studies [27,28], which could be related to presence of a history of previous abortion, still births or delivery of affected baby with major anomaly, making such mothers attend hospital for their delivery of subsequent babies, whereas the least occurrence of anomalies in primigravida mother (19%). Chaturvedi et al [21] recorded increase in frequency of congenital anomalies in primi mothers .

Our study showed that there is significant family history of congenital abnormalities, as there were thirteen (13%) cases reported to have such a history which could be explained by the fact that most anomalies would be the result of genetic inheritance or mutation of certain gene in the family. This had been approved by a study done in Tokyo by Otake etal., [27] who revealed high frequency of congenital anomalies (10%) out of 1000 families with history of congenital anomalies).

Finally, this study showed that the diseases during pregnancy with drugs taken during such period were relatively insignificant regarding the occurrence of congenital abnormalities in newborns, as only (20%) mothers who had taken drugs during pregnancy. This could be due to that either most pregnant ladies in our society have no regular antenatal care follow up so most diseases passed undiagnosed, or the pregnant women who had medical disease during their pregnancy are well controlled by medication that had no impact on the growing fetus. Other studies done in Pakistan by Mishra and Baweja [29] and Garner [30] revealed increased incidence of congenital abnormalities with maternal illness.

Ethical Clearance: Hospital and patient approvals were taken

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Conflict of Interest: None

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