Pregnancy Wastage Due to Fetal Congenital Malformations

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ABSTRACT

OBJECTIVES: To study the pattern of various congenital anomalies in rural Haryana.

STUDY DESIGN: This was a retrospective study conducted over 1 and ½ years (from January 2015 to June 2016) in a tertiary care center in Haryana, India.

RESULTS: Out of 11,178 births, 227 babies had gross congenital malformations 2.03%. In literature, the most common birth defect reported in western countries is cardiovascular anomalies while in India and eastern countries, it’s the neural tube defect. In our study also, neural tube defects were the most common congenital anomalies accounting for 64.31% of total anomalies. They were more common in unbooked patients (70%) and the rural population. So, the main cause appears to be a lack of awareness and illiteracy.

CONCLUSION: There is a need for increased awareness and folic acid supplementation routinely in the periconceptional period to decrease the incidence of congenital anomalies.

Keywords: Congenital malformations, Folic acid, Pregnancy wastage

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Introduction

A congenital malformation is defined as any irreversible abnormality in the physical or anatomical or functional form existing in a child before birth. They are of two types-major and minor. Major anomalies are those which create a significant medical problem or require specific management. Minor anomalies are relatively minor physical abnormalities. These anomalies represent a global burden and are a public health challenge. The common causes are genetic i.e., chromosomal anomalies, environmental such as chemical and radiation exposure and teratogenic drugs, dietary deficiencies, and medical disorders like diabetes and hypothyroidism. Congenital malformations are common in India, as it is a developing country. Seventy percent of the Indian population lives in rural India. Due to lower literacy and lack of education, people do not take adequate antenatal care which significantly contributes to congenital anomalies. They go to the hospital only for delivery and forego first-trimester antenatal visits, hence there is no folic acid intake leading to anomalies. Again, the villages are agriculture-based so pesticides play an important role in causing the anomalies. 2-3% of newborns have recognized structural defects (1). Annually 3.3 million deaths are associated with birth defects, mainly major anomalies (2). An estimated 30,300 newborns die within 4 weeks of birth every year worldwide due to congenital anomalies (3). Interestingly prevalence and the pattern of congenital anomalies vary over time and geographical location and hence we decided to do study in our hospital.

Material and Method

It is a retrospective study conducted in the Obstetrics and Gynecology Department of BPSGMC(W), Khapur Kalan, Sonepat, over a period of one and a half year from 1st January 2015 to 30th June 2016, which is a tertiary care center in rural Haryana, enrolling all babies having congenital anomalies irrespective of gestational age that comprised 11,178 deliveries. Maternal age, gestational age, birth order, maternal illness, drug or radiation exposure, medical history, family history, consanguinity and associated obstetric complications, antenatal radiological findings if available were included in the study. After birth baby sex, weight, and clinical details were recorded by a skilled pediatrician. If needed ultrasonography was done after birth to confirm internal anomalies. High-risk neonates were kept under observation. The outcome of babies...
was recorded during the hospital stay. No fetal autopsy was done. Data were analyzed with SPSS software.

It is a retrospective data analysis. This study was conducted in accordance with the Declaration of Helsinki. There is a provision of informed written consent in our medical records regarding utilization of data for academic purpose and therefore we took it for analysis after ethical clearance from our institutional ethical committee vides letter no. BPS-GMCW/RC 487/IEC/19 dated 13.11.19.

**Results**

The total number of births in 1 and ½ year were 11,178. The total number of gross congenital malformation (GCMF) babies in this period were 227 and the incidence of GCMF babies in this period was 2.03%. The most common anomalies were CNS anomalies i.e., 64.31% followed by GIT as shown in table I. The malformations were more common in unbooked patients, from a rural background, and of lower literacy levels as depicted in table II. Female fetuses and babies had more (53.7%) anomalies than their male counterpart as shown in table III. It also depicts that out of 227 deliveries 150 fetuses were dead and 77 were alive. The pattern of GCMF according to sex distribution is demonstrated in table IV. Table V tells about the possible etiologies of GCMF in our study.

**Table I: Distribution of malformations according to the organ system involved**

| Organ-specific gross congenital malformation          | number | % of total malformations | No. of incompatible fetuses with life or stillborn fetuses |
|-------------------------------------------------------|--------|--------------------------|----------------------------------------------------------|
| Central nervous system                                 | 146    | 64.31                    | 113 (77.9%)                                              |
| Gastrointestinal tract                                | 33     | 14.53                    | 13 (39.39%)                                              |
| Genitourinary system                                  | 18     | 7.92                     | 12 (66.66%)                                              |
| Musculoskeletal system                                | 10     | 4.40                     | 00 (00%)                                                |
| Cardiovascular system                                 | 05     | 2.20                     | 02 (40%)                                                |
| Respiratory system                                    | 04     | 1.76                     | 02 (50%)                                                |
| Special sensory as cleft lip and palate or anotia     | 04     | 1.76                     | 01 (25%)                                                |
| Multiple sequences (syndromes)                        | 07     | 3.08                     | 07 (100%)                                                |

**Table II: Maternal demographic profile of gross congenital malformation babies**

| Status of ANC visits | Booked | Unbooked |
|----------------------|--------|----------|
|                      | 30%    | 70%      |
| Residence            |        |          |
| Urban                |        | 36%      |
| Rural                |        | 64%      |
| Education status     |        |          |
| Illiterate           |        | 39%      |
| 5-12th               |        | 49%      |
| >= graduate          |        | 12%      |
| Age (years)          |        |          |
| 19 y or less         |        | 3.08%    |
| 20-29 y              |        | 68.28%   |
| 30 y or more         |        | 28.63%   |
| Trimester            |        |          |
| 1st                  |        | 8%       |
| 2nd                  |        | 33%      |
| 3rd                  |        | 59%      |

**Table III: Features of gross congenital malformation babies**

| Sex of gross congenital malformation babies | No. | %    |
|--------------------------------------------|-----|------|
| Male                                       | 104 | 45.8%|
| Female                                     | 122 | 53.7%|
| Ambiguous                                  | 01  | 0.44%|

Incidence of gross congenital malformation in singleton and twin pregnancy

|                |        |
|----------------|--------|
| Singleton      | 2.01%  |
| Twin           | 5.5%   |

Survival outcome

|                |        |
|----------------|--------|
| Exitus         | 150    |
| Alive          | 77     |

|                |        |
|----------------|--------|
| Exitus         | 66.07% |
| Alive          | 33.92% |
Discussion

In the present study, the incidence of congenital anomalies is 2.03%. In India incidence is more in the northern region as Punjab, Haryana, Rajasthan, Bihar (4). The incidence of congenital anomalies in India and eastern countries is quite variable ranging from 0.43% to 7% (5-8). While in western countries it is 2.4% and 2.9/1000 live births (9,10).

The incidence is more common in unbooked patients (70%). It is like other studies by Sachdeva et al (5) where it was found to be 2.07% (unbooked) than 1.01% (booked). Unbooked patients are usually illiterate and of the low-income group and therefore unaware of the importance of antenatal care and folic acid. More than 50% of mothers of GCMF babies belonged to the rural background and have poor literacy and awareness and are mostly unbooked with no folic acid supplementation, indicating the underlying preventable cause of malformations especially neural tube defects (NTD). Malformations are more in multipara patients (65.35%) as compared to primipara patients (34.65%), this too is in concordance with the study by Hussain et al (8) where the incidence was 60.17% in multipara and 39.82% in primipara. This indicates that the incidence of congenital anomalies increases with birth order.

Congenital anomalies were more common in female babies in our study (1.17%) as compared to male babies (1%). This is comparable to a study done by Sachdeva et al i.e. female babies (2.14%) account more than male babies (1.24%). In contrast, malformations were found to be more common in male fetuses (0.60%) than female fetuses (0.25%) in a study by Gaur et al which is in concordance with the study done by Yorulmaz et al (11) male babies (52.2%) outnumbered the female babies (47.8%) (7,11). However, in our study, the overall incidence of malformation was high in female fetuses (54%). The incidence of the genitourinary tract and cardiovascular defect was significantly higher in males whereas the incidence of NTD was higher in female fetuses but in other malformations, there was no significant difference.

In literature, most common birth defect reported in western countries is cardiovascular anomalies, corresponding to a study by Beksac MS in Ankara (10) but in India and eastern countries, most common congenital anomalies reported are neural tube defects. Twenty-nine percent of all neonatal deaths from congenital abnormalities are attributed to neural tube defects in South East Asia (12). Congenital malformations affect 2.5% of infants at birth and are responsible for about 15% perinatal mortality in India.

The fetal central nervous system (CNS) develops during the first trimester. NTD and CNS anomalies are the most common malformations of all congenital anomalies (13-18). Neural tube defects were found to be the most common congenital anomalies in this study too, accounting for 64% of total anomalies. Out of which hydrocephalus (Figure 1) and anencephaly were the commonest. It is comparable to a study by Yorulmaz et al in which hydrocephalus is most common (75.3%) NTD (11). CNS anomalies top the list as depicted in the studies by Sachdeva et al (59.57%) (5), Gaur et al (41.09%) (7), Hussain et al (20.35%) (5,7,8). NTD accounted for 52.3% of CNS anomalies and 16.5% of all anomalies in a study by Siddesh et al (19).

### Table IV: Pattern of gross congenital malformation babies according to sex

| Organ-specific gross congenital malformation          | Male | Female |
|------------------------------------------------------|------|--------|
| Central nervous system                               | 59   | 87     |
| Gastrointestinal tract                               | 17   | 16     |
| Genitourinary                                        | 14   | 4      |
| Musculoskeletal system                               | 6    | 4      |
| Cardiovascular system                                | 4    | 1      |
| Respiratory system                                   | 1    | 3      |
| Special sensory as cleft lips and palate or anotia   | 2    | 2      |
| Multiple sequences (syndromes)                       | 5    | 2      |

### Table V: Possible etiology of gross congenital malformation in our study

1. Chromosomal anomalies
2. Environmental toxins as pesticides
3. Low socioeconomic status, overcrowding
4. Lack of education and awareness, antenatal patients not seeking clinics
5. Lack of nutrients as folic acid
In our study, 94.2% of the patients were delivered vaginally and only 5.7% underwent cesarean section. It contrasts with the study done by Sachdeva et al (5) in which cesarean rate (4.36%) was more than vaginal deliveries (0.62%). Most of the malformed babies were born in the third trimester.

Unfortunately, 18% of congenital anomalies remain undiagnosed until birth, while 81.5% anomalies were diagnosed antenatally by ultrasonography (79%), fetal echo (1.7%), and MRI (0.8%).

Overall, babies with congenital anomaly had high perinatal mortality of 66%. Multiple sequences of syndromes had the highest perinatal mortality rate of 100% followed by NTD which carries a 78% perinatal mortality rate. Best perinatal outcomes were with musculoskeletal defects.

The most common obstetric complication associated with congenital anomalies was polyhydramnios (14%) followed by malpresentation in 9%. Maternal diabetes was present in 2% cases, which is again a preventable cause of the birth defects. In mothers with diabetes, most common birth defect reported in the literature is cardiovascular system (CVS) defects, but in this study most common anomaly even in diabetic mothers was found to be NTD i.e., anencephaly. Oligohydramnios was present in 12 patients (5%), postdated pregnancy in 5 (2%), Rh isomunination in 4 (1.7%), multifetal pregnancy in 4 (1.7%) and maternal epilepsy in 1 (0.4%) patient.

In conclusion, there is a need for increasing awareness about early detection of anomalies in the first-trimester scan and folic acid supplementation routinely in all females peri-conceptionally especially in the first three months of conception. A routine anomaly scan should be done at 18-20 weeks. Fetal echocardiography should be done at 22 weeks in all high-risk females e.g., those having diabetes or congenital heart disease or a family history of congenital heart disease. There is a need to take steps to optimize the health of pregnant women, for example, controlling the blood sugar of diabetic women well before conception and switch over to safer medication.

Wherever possible, a fetal autopsy should be done in all abortions, IUFD, and congenitally malformed babies incompatible to life. Before doing a cesarean section preferably malformations should be ruled out by sonography. One should be more vigilant if a cesarean section is being done for malpresentation or twin or associated with polyhydramnios or oligohydramnios. By proper antenatal care, we can decrease the incidence of congenital anomalies.

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