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Research Article

Incidence and distribution of congenital malformations in newborns: a hospital based study

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ABSTRACT

Background: It is considered that the congenital disorders are not a public health problem among the developing countries, however, over the recent years, they are actually experiencing a transition in the epidemiology like significant reduction in infant mortality rates, decline in infections and malnutrition and also a relative rise in morbidity as well as mortality due to the congenital malformations. Present study describes the incidence and distribution of congenital malformations in newborns during the study period at Government Medical College and Hospital, Aurangabad, Maharashtra, India.
Methods: This study was a hospital based cross sectional study. Seven thousand and twelve (7012) babies born over a period extending from 1st March 1994 to 31st April 1995 at Government Medical College and Hospital, Aurangabad, Maharashtra were studied for congenital malformations diagnosed clinically within 3 days of life. Both major and minor malformations were recorded. Minor variations such as capillary haemangioma, mongolian spots, superficial sacral dimples, small umbilical hernias, saddle nose, mild bowing of tibia and hydrocele of the testis were not considered as malformation.
Results: Out of 7012 subjects, 66 newborns (0.94%) were found to be affected with congenital malformations. There was no statistically significant difference between the incidence of congenital malformations in males and females with a male: female ratio of 0.97:1. Central nervous system malformations were the most common and found in 51.66% cases. There was statistically significant higher rate of congenital malformations among stillborn babies (8.54%) as compared to live born babies (0.62%) with a p value less than 0.05. Out of 66 newborns with congenital malformations, 19 newborns had other birth defects apart from the congenital malformation.
Conclusions: Congenital malformations were noted in 0.94% of the newborns at the tertiary care hospital and central nervous system malformations were the most common.

Keywords: Congenital malformations, Stillborn, Central nervous system malformations

INTRODUCTION

Congenital malformations indicate the defects in morphogenesis during early life of the foetus. Congenital malformation is "a permanent change produced by an intrinsic abnormality of development in a body structure during prenatal life". As per the 1972, World Health Organization (WHO) document, it is recommended that the term congenital malformations should be used only for the structural defects at birth.[1-3] It is considered that the congenital disorders are not a public health problem among the developing countries, however, over the recent years, they are actually experiencing a transition in the epidemiology like significant reduction in infant

mortality rates, decline in infections and malnutrition and also a relative rise in morbidity as well as mortality due to the congenital malformations.[3-7] Present study describes the incidence and distribution of congenital malformations in newborns during the study period at Government Medical College and Hospital, Aurangabad, Maharashtra, India.

METHODS

This study was a hospital-based cross-sectional study. Seven thousand and twelve (7012) babies born over a period extending from 1st March 1994 to 31st April 1995 at Government Medical College and Hospital, Aurangabad, Maharashtra, India were studied for congenital malformations diagnosed clinically within 3 days of life. During this period, there were 281 stillbirths and 6731 live births. Both major and minor malformations were recorded. Minor variations such as capillary haemangioma, mongolian spots, superficial sacral dimples, small umbilical hernias, saddle nose, mild bowing of tibia and hydrocele of the testis were not considered as malformation. [8, 9] Study was restricted to 3 days of life only as a large majority of our newborns were discharged from the hospital at the end of 3 days and follow up was not possible in all cases. Autopsies were performed on stillbirths and on those who succumbed, whenever consent for the same could be obtained. During the clinical examination of the newborn, particular attention was paid to the presence of breathlessness, cyanosis, feeding difficulties, persistent vomiting and failure to pass the meconium, distension of abdomen, presence of cardiac murmurs and anthropometric measurements of the infants, as the pointer to the possibility of a congenital malformation. Radiology, ultrasonography and other relevant investigations were performed whenever possible.

RESULTS

Table 1: Sex incidence of congenital malformations.

Sex	No. of newborns	Newborns with malformation	Incidence (%)	Incidence per 1000
Male	3870	33	0.9	9
Female	3340	31	0.93	9.3
Ambiguous	2	2	-	-

Table 1-5 describes the study results. Out of 7012 subjects, 66 newborns (0.94%) were found to be affected with congenital malformations. There was no statistically significant difference between the incidence of congenital malformations in males and females with a male:female ratio of 0.97:1. Central nervous system malformations were the most common and found in 51.66% cases. There was statistically significant higher rate of congenital malformations among stillborn babies (8.54%) as compared to live born babies (0.62%) with a p-value less than 0.05. Out of 66 newborns with congenital malformations, 19 newborns had other birth defects apart from the congenital malformation.

Table 2: System wise distribution of malformations.

System involved	Number of cases	Percentage of total malformations
Central nervous system	46	51.1
Musculoskeletal system	20	22.2
Gastrointestinal system	15	16.7
Genitourinary system	04	04.4
Cardiovascular System	02	02.2
Respiratory System	03	03.3
Total	90	100

Table 3: Distribution of malformations.

Congenital malformation	Number of cases	Incidence per 1000
Central nervous system		
Hydrocephalus	19	2.7
Anencephaly	10	1.4
Meningomyelocele	14	2
Encephalocele	02	0.29
Spina bifida (Open)	01	0.15
Musculoskeletal		
Talipesequinovarus	10	1.43
Polydactytly	03	0.43
Syndactyly	01	0.15
Achondroplasia	01	0.15
Arthrogryphosis multiplex congenita	01	0.15
Hemivertrebrae	01	0.15
Klippel feil syndrome with Sprengel's deformity	01	0.15
Hypoplastic forearm	01	0.15
Hypoplastic left leg	01	0.15
Gastrointestinal/oropharyngeal		
Cleft lip with/without cleft palate	05	0.71
Oesophageal atresia with to fistula	03	0.43
Omphalocele	03	0.43
Diaphragmatic hernia	02	0.29
Imperforate anus	02	0.29
Genitourinary		
Ambiguous genitalia	02	0.29
Rectovaginal fistula	01	0.15
Cardiovascular		
VSD	01	0.15
Dextrocardia	01	0.15
Respiratory		
Tracheo-oesphageal fistula	03	0.43
Total	**89**	----

Table 4: Incidence of congenital malformations in live born and stillborn babies.

	No. of newborns	Newborns with malformation	Incidence (%)	Incidence per 1000
Live born	6731	42	0.62	6.2
Stillborn	281	24	8.54	85.4
Total	7012	66	0.94	9.4

Table 5: Cases with congenital malformation and other birth defects.

Malformation	Other birth defects	Numbers of cases
Hydrocephalus	Meningomyelocele club foot	5
Diaphragmatic hernia	Hypoplastic left lung	2
Oesophageal atresia	Tracheo-oesphageal fistula	3
Hydrocephalus	Meningomyelocele	1
Anencephaly	Cleft lip with syndactyly with omphalocele	1
Imperforate anus	Rectovaginal fistula	1
VSD	Polydactyly	1
Hypoplastic right forearm	Low set ears	1
Hydrocephalus	Diaphragmatic hernia	1
Meningomyelocele	Club foot, ambiguous genitalia	1
Hypoplastic mandible	High arched palate, glossoptosis	1
Total	---	19

DISCUSSION

Out of 7012 subjects, 66 newborns (0.94%) i.e. 9.4/1000 total births were found to be affected with congenital malformations. There is a wide variation in reported rates of congenital malformations. It may be due to factors like inclusion or exclusion of minor malformations, inclusion or exclusion of stillbirths, the period of follow up after birth and geographic and ethnic population studied. Khanna et al reported 13.76/1000 total births congenital malformation rate which is in line with our results.[10] Study of 421781 pregnancies in 24 centers in 16 countries under the WHO reported incidence of congenital malformations to be 12.7/1000 total births.

The incidence was found to vary from as low as 3.1/1000 total births in Calcutta to as high as 22.5/1000 total births in Johannesburg.[11] In our study, central nervous system malformations were the most common and found in 51.66% affected cases. Khanna et al also reported that infants with central nervous system anomalies formed the major group with an incidence of 40.54 per cent among the affected infants.[10] Similarly, Verma M et al also reported that predominant system involved was CNS in their retrospective study of 10, 000 congenital malformation cases.[12] However, Mathur BC et al reported that predominant system involved was musculoskeletal system in their study of 1060 cases.[13] The incidence of CNS malformations was 6.6/1000 total births in our study. Similarly, Kalra et al reported incidence of CNS malformations as 6.6/1000 total births while Khanna et al reported incidence of CNS malformations as 5.6/1000 total births.[14,10] Saifullah et al reported a high rate of incidence of CNS malformations as 12/1000 total births.[15] The incidence of musculoskeletal malformations in our study was 2.8/1000 total births. Similar reports were given by Tibrewala et al and Kalra et al with incidence of musculoskeletal malformations in their studies as 3.6/1000 total births and 2.9/1000 total births respectively.[16,14] The incidence of gastrointestinal malformations in our study was 2.1/1000 total births. Khanna et al reported similar incidence of gastrointestinal malformations i.e. 2.5/1000 total births.[10]

In our study, there was no statistically significant difference between the incidence of congenital malformations in males and females with a male:female ratio of 0.97:1. Saifullah et al reported similar findings, however, Khanna et al reported a higher male dominance among the malformed infants.[10,15]

In our study, there was statistically significant higher rate of congenital malformations among stillborn babies (8.54%) as compared to live born babies (0.62%). Similar results were reported by Grover N. who found that incidence of congenital malformations was much higher in still born babies (15.1%) as compared to the live born babies (1.3%).[17]

CONCLUSION

Congenital malformations were noted in 0.94% of the newborns at the tertiary care hospital and central nervous system malformations were the most common.

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