Audit of congenital anomalies in neonates born at tertiary health care centre – a cross sectional study

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Abstract

Introduction: Incidence of congenital anomalies differs from country to country and from region to region within same country. The factors associated with the congenital anomalies vary from place to place. The outcome of congenital anomalies depends upon type and number of anomalies. **Aims and objectives:** to study the various types of congenital anomalies, its outcome and associated factors. **Materials and method:** All the live born and still born babies born in the GMC Latur were observed meticulously to diagnose congenital anomalies. Birth weight, gestational age at the time of delivery and sex of the neonates was recorded on a prestructured proforma. Also the type (major and minor) and number of congenital anomalies per case were recorded. System wise classification was also done. The outcome of the in neonates in the form of death, referred and discharged was noted. **Results:** incidence of congenital anomalies was found to be 43.03 per 1000.Prematurity (12.28%) and low birth weight (2.96%) was found to be associated with increased risk of congenital anomalies. Males (4.87%) are found to be more affected than females (3.73%). The most common system involved was Central nervous system (32.35%). Mortality was seen in 22.86% cases whereas 35.69% cases were discharged. **Conclusion:** Incidence of congenital anomalies was 43.03 per 1000 births. It was seen most commonly in low birth weight, preterm and male neonates. The most common system involved was Central nervous system (14.96 per 1000). Major anomalies (63.88%) contributed in a greater extent to the total incidence.
Key Word: congenital anomalies, neonatal.

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INTRODUCTION

The problem of congenital malformations has puzzled and troubled man from the earliest time. Either due to superstitions or practical difficulties of affected survivor and guilt feeling of the parents, lately the medical aspects of possible preventions. The congenital defects have challenged the imagination of man and skeleton of malformed infants have found as far back a stone age.[1] Epidemiological survey of congenital malformations in various part of the world and among different ethnic groups with widely varying marital habits, socioeconomic status and environment not only help in understanding the frequency of malformations in specific areas but also contribute to the general knowledge about predisposing factors and different patterns of congenital malformations or these could be vary over time. The worldwide incidence of congenital disorder is estimated at 3-7%, but actual numbers vary widely between countries. Congenital anomalies account for 8 to 10% 8-12 of perinatal deaths and 13-16% of neonatal deaths in India.[2,3] Incidence of congenital anomalies differs from country to country and from region to region within same country. This could be due to different environmental factors and also due to

variability in the nature of study, in the selection of population samples and inclusion and exclusion of certain defects.[4] The valid determination of incidence requires the collection of data not only on live-born neonates, but also on still births and on spontaneous and induced abortions. The frequency of malformations is higher in later groups and their exclusion therefore lead to an artefactually low estimated prevalence of malformations (selection bias).[5] Also the factors associated with the congenital anomalies varies from place to place. The outcome of congenital anomalies depends upon type and number of anomalies. Thus the present study was undertaken to study the various factors associated with congenital and its outcome.

AIMS AND OBJECTIVES

To study the various types of congenital anomalies, its outcome and associated factors.

METHODOLOGY

Study Design: The present observational study was conducted to study the association of various antenatal factors with congenital anomalies.

The study was conducted at government medical college and hospital, Latur during the year 2011 to 2013. Following inclusion and exclusion criteria was used to select the study subjects.

Inclusion criteria
- All the Live born/ still born babies born in the GMC Latur.

Exclusion criteria
- All babies born outside and referred to NICU of medical college.

- Abortions (Gestational age <28wks)

All babies were examined within 24hrs of birth and followed up for 72hrs. Data collection was done on a prestructuredproforma. Information was collected from mother about the age, gravida and parity. History of chronic illness, drug ingestion, exposure to x-ray, history of congenital malformations in other offspring, parental consanguinity, nutritional status of mother, history of smoking, tobacco chewing and alcohol consumption, paternal and maternal occupation were obtained. Examination of babies was performed in good light with complete exposure from top to bottom and sex of baby was noted. General and systematic examination of babies was conducted in detail to diagnose the congenital anomaly. Investigation like X-ray, ECGs, biochemical tests, CT, MRI was performed to confirm the diagnosis where ever required. The cases of congenital anomalies were compared with various demographic characters of the newborn.

Table 1: Incidence of congenital anomalies

Congenital anomalies	Total births		Incidence /1000
	No.	%	
Present	443	4.30	
Absent	9851	95.69	43.03
Total	10294	100	

It was observed that there were total 10294 deliveries were conducted in the institute during the study duration. Out of that 9861 (95.69%) were live births and 433 (4.31%) still births. The total number of newborns with congenital anomalies was 443 (4.3%). Thus the incidence of congenital anomalies was 43.03 per 1000.

Table 2: Association of various variables with congenital anomalies

Variable		Congenital anomalies		Significance
		Present	Absent	
Birth Weight (grams)	<1000	29 (21.64%)	105 (78.36%)	x^2=507.13, df= 4, p<0.001 (significant)
	1001-1500	64 (15.53%)	348 (84.47%)	
	1501-2000	98 (12.53%)	684 (87.47%)	
	2001-2500	138 (7.05%)	1817 (92.94%)	
	>2501	115 (1.64%)	6883 (98.36%)	
Gestational age	Preterm	182 (12.28%)	1300 (87.72%)	x^2=267.54, df= 1, p<0.001 (significant)
	Full Term	261 (2.96%)	8551 (97.04%)	
Sex of baby	Male	252 (4.87%)	5179 (95.66%)	x^2=7.34, df= 1, p<0.05 (significant)
	Female	191 (3.73%)	5115 (96.27%)	

It was observed that as the birth weight decreases percentage of congenital anomalies was increasing. Maximumnumber of congenital anomalies (21.64%) was seen in birth weight less than 1000gm. The incidence of congenital anomalies was also studied in relation with gestational age at the time of delivery. It was observed that preterm labour was common in preterm babies (12.28%) as compared to term babies (2.96%). It was seen that congenitalanomalies were common in male babies (4.87%) as compared to female babies (3.73%).

Table 3: Distribution of congenital anomalies according to type and number of anomalies per case

Congenital anomalies		No. of cases	Percentage
Type	Major	283	63.88
	Minor	160	36.11
Number of anomalies per case	Single	361	81.49
	Multiple	82	18.51

It was observed that 63.88% congenital anomalies were of major type and 36.11% were of minor type. It was seen that in 81.49% babies single congenital anomalies were diagnosed whereas in 18.51% babies multiple congenital anomalies were diagnosed.

Table 4: Distribution of various congenital anomalies of the subjects

System	No. of Anomalies	%	Incidence /1000
Central nervous system	154	32.35	14.96
Skeletal	107	22.47	10.39
Gastro intestinal system	55	11.55	5.34
Genitourinary	49	10.29	4.76
Cardiovascular System	39	8.19	3.78
Haematology	21	4.4	2.04
Cleft lip palate	19	4.0	1.84
Cutaneous and other	10	2.1	0.97
Syndromes	15	3.15	1.45
Ambiguous Genitalia	6	1.26	0.58
Respiratory system	1	0.2	0.09
Total	**476**	**100**	

When system wise analysis of congenital anomalies was done it was observed that central nervous system (14.96%) anomalies were most common followed by skeletal system (10.39%). very few anomalies of respiratory system (0.09%) were diagnosed.

Table 5: Outcome of cases with congenital anomalies

Outcome		No. of cases	Percentage
Still birth		45	10.14%
Live birth	Death	91	22.86%
	Referred	142	35.69%
	Discharge	165	41.46%
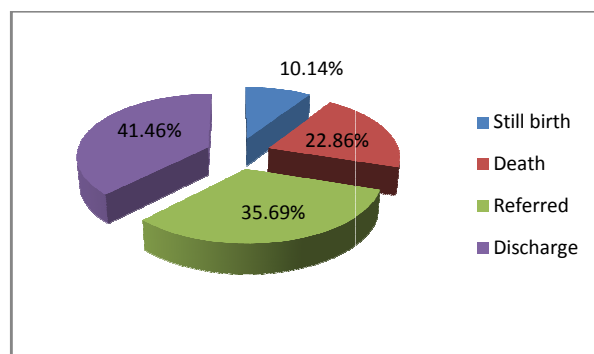
Graph 1: Outcome of cases with congenital anomalies

It was seen that out of 443 cases with congenital anomalies detected, 91 (22.86%) cases didn't survive, 142 (35.69%) cases referred to different surgical units for correction of anomalies, and 165 (41.46%) cases were discharged.

DISCUSSION

In the present study it was observed that there were total 10294 births in the hospital during the study period. Out them total 443 births were with congenital anomalies.Thus the incidence of congenital anomalies in the present study was 43.03 per 1000 births i.e. 4.3%. Similar finding were reported by VermaM et al[6] (3.6%), Bhat V et al[7](3.7%) and Singh M et al[8] (5.5%). The incidence reported by Mital VK et al[9] (2.24%), Dutta H K et al[10] (0.08%) and Swain et al[11] (1.2%) was much lower than the present study. Out of total 443 neonates with congenital anomalies, 29 (21.64%) neonates had birth weight less than 1000 grams, 64 (15.53%) neonates had birth weight between 1000-1500 grams, 98 (12.53%) neonates had birth weight between 1501-2000 grams, 138 (7%) neonates had birth weight between 2001-2500 grams and 115 (1.64%) neonates had birth weight more than 2501 grams. Thus, out of total 443 cases 264 cases were low birth weight (<2500 grams) with incidence of (99.8/1000) as compared to weight >2500 with incidence of 16.4/1000, which is statistically significant (p< 0.0001). Similar incidences was also reported by VermaM et al[6] (14.7%) and Bhat V et al[7] (22.2%). Chaturvedi P et al[12] reported higher incidence of CAs in low birth weight babies (57%). In our study out of total preterm deliveries 12.28% babies were born with congenital anomalies whereas out of total full term deliveries only 2.96% babies were born with congenital anomalies. Thus, Incidence of congenital anomalies was more in preterm as compared to full term and the difference was also statistically significant (p< 0.0001). Congenital anomalies and syndromes are associated with premature labour. In fact, many of these fetuses are spontaneously aborted very early in pregnancy. Of those

who are carried beyond the first half of pregnancy more than half are delivered preterm and they may have restricted intrauterine growth. Some anomalies and syndromes are associated with both preterm delivery and intrauterine growth restriction. It was seen that congenital anomalies were common in male babies (4.87%) as compared to female babies (3.73%).Anomalies were significantly more in males as compared to females. Our findings are similar to studies of Mital VK *et al*[9], Bhat V *et al*[7], Padma S *et al*[13], and Dutta H K *et al*[10] which also showed male preponderance in congenital anomalous neonates. These findings were statistically significant. However, gender of neonates did not affect the prevalence of congenital anomalies and both genders were equally distributed in other studies of Verma M *et al*[6], Grover N *et al*[15], Datta V *et al*[16]. However according to Parmar A *et al*[17] females were more affected than males. The variability in results of different studies could not explain but the significance of sex predominance can be substantiated by the fact that when there is a dominance of one sex for a particular malformation, this information can predict the likelihood of the malformations in a patient and influence of diagnostic approach. Out of total 443 congenital anomalous neonates 283 (63.88%) neonates had major anomalies as compared to 160 (36.11%) neonates with minor anomalies. This is in conformity with studies conducted by Verma M *et al*[6] (79.9% of major anomalies), Bhat V *et al*[7] (72%), Chaturvedi P *et al*[12] (75.6%) and Dutta H K *et al*[10] (82.4%). Thus it is seen that major anomalies contribute to a major extent to the total anomalies. This further implies that they would be a major cause of morbidity and mortality in the future. In the study 361 (81.49%) neonates had single anomalies whereas 82 (18.51%) neonates had multiple system involvement which is similar to study of Swain S *et al*. However Parmar A *et al*[17] have documented a very high incidence of multiple system involvement (46%). It was observed that central nervous system anomalies were the commonest congenital anomalies, which contribute to incidence of 14.96/1000. Our findings are consistent with study of Mital VK *et al*[9] which also showed CNS as the commonest anomaly with incidence of 6.74/1000, Verma M *et al*[6] with incidence of 20.6/1000, Gupta S *et al*[14] with incidence of 6.4/1000.It was followed by skeletal anomalies with 10.39 /1000 incidence, gastrointestinal system with incidence of 5.34/1000, genitourinary system with incidence of 4.76/1000, cardiovascular system with incidence of 3.78/1000, haematology with 2.04/1000 incidence, cleft lip palate with 1.84/1000 incidence, cutaneous involvement and syndrome with 0.97 and 1.45 per 1000 birth respectively, ambiguineous genitalia with 0.58/1000 incidence and the least of the system involved

was the respiratory system with incidence of 0.09/ 1000. While studding the outcome of cases with congenital anomalies within 72 hrs of delivery it was observed that out of 443 cases, 91 (22.86%) cases didn't survive, 142 (35.69%) cases referred to different surgical units for correction of anomalies, and 165 (41.46%) cases were discharged. 165 newborns (41.46%) with most of them having minor anomalies were discharge without any complications. Perinatal mortality could not be calculated in our study because it requires 7 days follow up period and our observation period was limited to 72 hrs after birth.

CONCLUSION

Thus in the end we could conclude that incidence of congenital anomalies in the present study was 43.03 per 1000 births. And it was seen most commonly in low birth weight, preterm and male neonates. The most common system involved was Central nervous system (14.96 per 1000). Major anomalies (63.88%) contributed in a greater extent to the total incidence.

REFERENCES

1. Dasen V. Dwarfs in Ancient Egypt and Greece. *The Classical Review (New Series)* Oxford: Clarendon Press 1995; pp116-117
2. Chaturvedi P, Benerjee KS. Spectrum of congenital malformations in the newborn from rural Maharashtra. *Indian J Pediatr* 1989; 56:501-507.
3. Agarwal SS, Singh U, Singh PS at al. Prevalence and spectrum of congenital malformations in a prospective study at a teaching hospital. *Indian J Med Res* 1991; 94:413-419.
4. Mosayebi Z, Movahedian AH. Pattern of congenital malformations in consanguineous versus non consanguineous marriages in Kashan, islamic Republic of Iran. *East Mediterr Health J.* 2007;13(4):868-75.
5. Kurinczuk JJ, Hollowell J, Boyd AP, Oakley L, Brocklehurst P, Gray R. *The contribution of congenital anomalies to infant mortality.* Inequalities in infant mortality project briefing paper 4. Oxford: National Perinatal Epidemiology Unit, 2010
6. Mital VK, Grewal RS. Congenital Anomalies In Neonates *Indian J. Pediat.* 1969; 36:356.
7. Verma M, Chhatwai J, Singh D. Congenital Malformations-A Retrospective Study of 10,000 Cases. *Indian J Pediatr*1991; 58 : 245-252.
8. Karbasi SA, Golestan M, Fallah R, Mirnaser F, Barkhordari K, Bafghee MS. Prevalence of Congenital Malformations in Yazd (Iran) *ActaMedicaIranica*2009;47(2)
9. Introduction. In :Kennith Lyon jones. Smith's Recognisable patterns Of Human malformation. 4th (edn) Philadelphia: Saunders,pp1-9
10. Grover N. Congenital malformations in Shimla. *Indian journal of pediatrics*, 2000; 67(4) : 249

11. Dutta H K, Bhattacharyya N C, Sarma J N, Kusre G. Congenital malformations in Assam. *J Indian AssocPediatrSurg*2010; 15(2).
12. Bhat V, Babu L. Congenital Malformations at Birth - A Prospective Study from South India. *Indian J Pediatr* 1998; 65 : 873-881
13. Parmar A, Rathod SP, Patel SV, Patel SM. A Study of Congenital Anomalies In Newborn. *NJIRM*. 2010; 1(1): 13-17.
14. Padma S, Ramakrishna D, Jijiya P, ramana PV. Pattern of distribution of congenital anomalies in stillborn: a hospital based prospective study. *International journal of pharma and bio sciences* 2011;2(2).
15. Tootoonchi P. Easily Identifiable Congenital Anomalies: Prevalence And Risk Factors. *Acta Medica Iranica* 2003;41(1)
16. Chaturvedi P, Banerjee KS. Spectrum of Congenital Malformations in the Newborns from Rural Maharashtra. *Indian J Pediatr* 1989; 56 : 501-507