Volume : 5 | Issue : 10 | October 2016 • ISSN No 2277 - 8179 | IF : 3.508 | IC Value : 69.48

Original Research Paper

A Study on Anencephaly- Correlation With Maternal Parameters

ANATOMY

KEYWORDS : Neural tube defects (NTDs), Anencephaly

Dr. G.V.Siva Prasad — Associate Professor, Department of Anatomy, NRI Institute of Medical Sciences, Sangivalasa

*** Dr. Teki Surekha** — Assistant Professor, Depatment of Anatomy, GITAM Institute of Medical Sciences and Research, Visakhapatnam * corresponding author

ABSTRACT

Introduction: *Anencephaly is a neural tube defect (NTD) caused by a failure of closure in the cranial neuropore between the third and fourth week of gestation (23rd and 26th embryonic day),resulting in the absence of a major portion of the brain, skull,and scalp.*

Materials and methods:The present study has been conducted on 14 cases of anencephaly obtained from the Department of OBG over a period of three years.

Aims and objectives: *To study the correlation of maternal factors on the incidence of anencephaly.*

Results: Discussed in the Paper

Conclusion: *Better knowledge of unexpected fetal loss is the promise for better parental counselling and for prevention of recurrences. Understanding and identifying the risk factors associated with anencephaly in our population, allows approaches to avoid them and thereby lower the incidence of anencephaly in our population.*

INTRODUCTION:

Anencephaly is a neural tube defect (NTD) caused by a failure of closure in the cranial neuropore between the third and fourth week of gestation (23rd and 26th embryonic day),resulting in the absence of amajor portion of the brain, skull,and scalp [1]. The brain lacks part or the entire cerebrum, and the remaining brain tissue is often exposed to injury from amniotic fluid. The precise etiology of anencephaly and other NTDs is unknown; however, socioeconomic status, environmental conditions, and the genetics of both population and familial ancestry are indicated [2–4]. The prenatal detection of anencephaly through the antenatal ultrasound is virtually 100% [5].After the periconceptional folic acid supplementation, the prevalence of anencephaly-affected pregnancies declined worldwide, but no significant change in prevalence was observed in the subsequent years [6, 7]. Its actual prevalence is estimated in 1/1000 pregnancies [8].

Anencephalic newborns are not competent with life so, it is classified as a lethal neural tube defect. Although stillbirth is a common outcome of fetal anencephaly, some affected fetuses are born alive with a rudimentary brain. Lacking a functioning cerebrum, they are incapable of consciousness and of experiencing pain, although the brain stem may support reflex actions such as breathing, and occasionally responses to sound or touch [8]. Some rudimentary brain development is usually present in a small proportion of neonates surviving for a few days.

In the present study we are trying to find out the relationship between maternal parameters and incidence of anencephaly.

MATERIALS AND METHODS:

The present study has been conducted on 14 cases of anencephaly obtained from the Department of OBG, Victoria General Hospital, Visakhapatnam from January 2012 to February 2015 for a period of three years. The maternal parameters like age of the mother, parity, ,intake of folic acid during first trimester and socio-economical status were collected from the records available in the Department of OBG and by enquiring the mother.

RESULTS:

Out of 2752 live births 14 anencephalic fetuses were observed (0.5%)

Of the 14 anencephalic fetuses 13 were cases of anencephaly and one was a case of spina-bifida.

About 80% of the mothers were less than 25 years of age.

57% of mothers were primigravida and the remaining are multigravida.

85.7% of mothers belong to a low socio-economic status.

Only 30% of the mothers have received folic acid supplementation from the govt. hospital in the first trimester.



IMAGE 1: Showing anencephalic fetus



IMAGE 2: Showing anencephalic fetus with Spina-Bifida

Volume : 5 | Issue : 10 | October 2016 • ISSN No 2277 - 8179 | IF : 3.508 | IC Value : 69.48



IMAGE 3: Showing anencephalic fetus

DISCUSSION:

The prevalence of anencephaly shows great variation . It is 12 per 10,000 in Iran, 10.4 per 10,000 in china, 0.01 to 7.42 per 10,000 in Rijeka Crotia, 1.49/1000 in Santos Dumout, [9] 0.5 to 0.6 per 1000 live births in Singapore[10] and 0.5 to 6.5 per 1000 live births in India[11,12,13,14,15] In the present study it is about 0.5% which is correlating with the previous studies.

Mean age of the mother observed in this study is 23 years (ranged from 19-28 years) and our findings are consistent with published literature. [16] In the present study the incidence is more in mothers less than 23 years of age.In contrast, Edward [17] observed prevalence of anencephaly more in women aged above 35 years.

In the present study the incidence was more in Primigravida mother(57%) which is consistent with previous studies [12]

NTDs are considered to be polygenic, multifactorial condition wherein many genes, nutrients, environmental factors including infections, drugs and maternal disease like diabetes individually or in combination play a role. [19] The maternal risk factors that are associated with anencephaly are illiteracy, increasing gravidity, history of previous miscarriages, positive history of birth defects, high or low age of mothers during pregnancy, increased stress, women employed in industry or agriculture, low socio-economic status and maternal antipyretic consumption. In the present study more than 85.7% of the mothers belong to a low socio-economic status.

The major thrust of primary prevention of NTDs has been on nutritional supplementation with folic acid apart from controlling the maternal diseases like diabetes and avoiding medications. Role of 0.4 mg of periconceptional folic acid leading to reduction in NTDs was demonstrated by MRC[20] and also by Kulkarni *et al*. in India.[21].

In the present study only 30% of the mothers have received folic acid supplementation during their first trimester suggesting a positive correlation between folic acid supplementation and anencephaly. [21]

CONCLUSION:

Better knowledge of unexpected fetal loss is the promise for better parental counselling and for prevention of recurrences. Understanding and identifying the risk factors associated with anencephaly in our population, allows approaches to avoid them and thereby lower the incidence of anencephaly in our population. Prenatal screening in a tertiary care hospital is of utmost importance to rule out NTDs. 1st trimester antenatal check up of mothers should be made mandatory. To prevent NTD, dietary supplements should be provided to low socioeconomic pregnant females. Periconceptional and 1st trimester folic acid supplementation is of prime importance.[18].

REFERENCES :

[1] J. C. Dudar, "Qualitative and quantitative diagnosis of lethal cranial neural tube defects from the fetal and neonatal human skeleton, with a case study involving taphonomically altered remains," *Journal of Forensic Sciences*, vol. 55, no. 4, pp. 877–883, 2010.

[2] D. N. Dickel and G. H. Doran, "Severe neural tube defect syndrome from the early archaic of Florida," *American Journal of Physical Anthropology*, vol. 80, no. 3, pp. 325–334, 1989.

[3] L. E. Sever, "Looking for causes of neural tube defects: where does the environment fit in?" *Environmental Health Perspectives*, vol. 103, supplement 6, pp. 165–171, 1995.

[4] R. Gorgal, C. Ramalho, O. Brand˜ao, A. Matias, and N. Montenegro,"Revisiting acrania: same phenotype, different aetiologies," *Fetal Diagnosis and Therapy*, vol. 29, pp. 166–170, 2011.

[5] S. P. Johnson, N. J. Sebire, R. J. M. Snijders, S. Tunkel, and K. H. Nicolaides, "Ultrasound screening for anencephaly at 10–14 weeks of gestation," *Ultrasound in Obstetrics and Gynecology*, vol. 9, no. 1, pp. 14–16, 1997.

[6] T. J. Mathews, M. A. Honein, and J. D. Erickson, "Spina bifida and anencephaly prevalence—United States, 1991–2001," *MMWR—Recommendations and Reports*, vol. 51, no. 13, pp. 9–11, 2002.

[7] L. E. Mitchell, "Epidemiology of neural tube defects," *American Journal of Medical Genetics*, vol. 135, no. 1, pp. 88–94, 2005.

[8] R. J. Cook, J. N. Erdman, M. Hevia, and B. M. Dickens, "Prenatal management of anencephaly," *International Journal of Gynecology and Obstetrics*, vol. 102, no. 3, pp. 304–308, 2008.

[9]Golalipour MJ, Najafi L, Keshtkar AA. Prevalence of Anencephaly in Gorgan, northern Iran. Arch Iran Med 2010;13:34-7.

[10] Tan KB, Tan SH, Tan KH, Yeo GS. Anencephaly in Singapore: a ten-year series 1993 - 2002. Singapore Med J 2007;48:12-5.

[11]Bhat BV, Babu L. Congenital malformations at birth- A prospective study from south India. Indian J Pediatr 1998;65:873-81.

[12]Mahadevan B, Bhat BV. Neural tube defects in Pondicherry. Indian J Pediatr 2005; 72:557-9.

[13]Agarwal SS, Singh U, Singh PS, Singh SS, Das V, Sharma A, *et al*. Prevalence and spectrum of congenital malformation in a prospective study at a teaching hospital. Indian J Med Res 1991;94:413-9.

[14]Sood M, Agarwal N, Verma S, Bhargava SK. Neural tubal defects in an East Delhi hospital. Indian J Pediatr 1991;58:363-5.

[15]Kulkarni ML, Mathew MA, Ramachandran B. High incidence of Neural tube defects in south India. Lancet 1987;8544:1260.

[16]Vare AM, Bansal PC. Anencephaly. An Anatomical study of 41 anencephalies. Indian J Pediatr 1971;38:301- 305.

[17]Edward JH. Congenital malformations of the central nervous system in Scotland. Br J Prev Soc Med 1958;12:115-30.

[18] SINGH J etal. Incidence of Anencephaly in a tertiary care hospital in North West India International Journal of Scientific and Research Publications, Volume 5, Issue 9, September 2015

[19] Coffey VP, Jessop WJ. A study of 137 cases of anencephaly. Br J Prev Soc Med 1957;11:174-80.

[20] MRC Vitamin Study Research Group. Prevention of neural tube defects: Results of the Medical Research Council Vitamin Study. Lancet 1991;338:131-7.

[21] Kulkarni ML, Jose S. Folic acid prevents neural tube defects in high prevalence area. Indian Pediatr 1997;34:561-2.