

Antenatal Diagnosis of Anencephaly to Determine the Prevalence and its Correlation with Folic Acid Deficiency by Using Peripheral Blood Picture in District Poonch, Azad Kashmir

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ABSTRACT

Aim: The study was carried to determine the prevalence of anencephaly in antenatal patients and its correlation with folic acid deficiency at Sheikh Khalifa Bin Zayad Hospital Rawalakot, District Poonch Azad Kashmir.

Study Design: Prospective and descriptive analysis.

Place & duration of study: Department of Radiology and Department of Gynecology and obstetrics Sheikh Khalifa Bin Zayad Hospital Rawalakot, District Poonch, Azad Kashmir from January 2013 to February 2015.

Methods: All the patients reporting in Radiology department for antenatal ultrasonographic examination. Blood sample for the cell morphology of all the patients with anomalous fetuses (SUBJECTS) as well as normal fetuses (Control). was taken on the same day. Peripheral blood picture showing hyper segmented neutrophils is suggestive of Folic acid deficiency.

Results: Out of a total 8960 pregnancies, 1.02% (92) were diagnosed as having anencephalic fetuses on ultrasonography which was confirmed at termination of pregnancy. Most of the patients (85%) were having hyper segmented neutrophils which suggest folic acid deficiency. Women with normal pregnancies do have hyper segmented neutrophils but only in 7%.

Conclusion: Anencephaly is a common congenital anomaly in district Poonch of Azad Kashmir, having strong association with folic acid deficiency. Its Prevalence can be decreased by antenatal folic acid supplementation. Ultrasonography is a reliable modality with 100% accuracy for prenatal diagnosis of anencephaly.

Keywords: Anencephaly, Folic acid, Prevalence, Antenatal diagnosis, Azad Kashmir

INTRODUCTION

Anencephaly is a congenital anomaly that refers to the incomplete development of the brain, skull, and scalp and is part of birth defects called neural tube defects (NTD)¹. The structure which will become the neural tube is supposed to fold and to close together (to form a tube) during the third and fourth weeks of pregnancy. Brain and spinal cord of the embryo develop from this neural tube². Neural tube defects result when the neural tube does not close as expected. Anencephaly occurs when the end of the neural tube that would have developed into the brain does not close properly, resulting in the failure of the development of main parts of brain, skull and scalp. Other defects, like spina bifida, form when the neural tube does not close properly in other part of the neural tube³.

Fetuses with anencephaly are born without the front part of the brain, (forebrain) and coordinating

part of the brain (cerebral hemispheres and cerebellum). Most of the infants with anencephaly do not survive more than a few days or weeks⁴. Acrania has been the other term used synonymously with anencephaly but it is not popular as it mixes up two altogether different anomalies. Pregnancies affected by anencephaly show high levels of alpha fetoprotein in tests carried on the mother's blood or on amniotic fluid. Neural tube defects are commonly associated with polyhydramnios⁵.

Antenatal anencephaly can be diagnosed on different imaging modalities. Ultrasonography is reliable, easily accessible, and economical and radiation free modality. Anencephaly is characterized by the absence of the skull and parts of the brain (cerebral hemispheres and cerebellum). Abnormalities of facial features secondary to the absent skull are common and vary depending on the development of each fetus. Anencephaly usually occurs without other birth defects. Many fetuses with anencephaly are stillborn or are spontaneously aborted. More females are born with anencephaly than males⁶.

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In January 1998, the United States Food and Drug Administration mandated that folic acid be added to all enriched cereal grain products. After this mandate, anencephaly affects about 1 in per 5,000 to 10,000 births in the U.S. Internationally the number of births affected varies and is greatly influenced by the use of folic acid supplementation or food fortification, prenatal diagnosis, and pregnancy termination⁷.

The United States Public Health Service advises women of childbearing age to take 0.4mg of folic acid daily, either through supplements or fortified foods, even if those women do not think they are likely to become pregnant. This is recommended because the neural tube forms early, often before women realize they are pregnant⁸. Women are urged not to take more than 1.0 mg of folic acid daily unless advised by a physician because high doses of folic acid may mask the diagnosis of severe B12 deficiency (pernicious anemia)⁹. Women who have had a previous pregnancy affected by a neural tube defect are advised to consume 4mg of folic acid beginning 30 days before conception through the first trimester under the care of their physician. Infants with anencephaly usually do not survive more than a few days or weeks. The role of healthcare providers is to provide a supportive environment that will enable the family to accept the diagnosis and make preparations for their loss¹⁰. Anencephaly is quite a common anomaly encountered as singly or in association with other anomalies during routine antenatal ultrasonographic examination at Sheikh Khalifa Bin Zayad Hospital Rawalakot, District Poonch Azad Kashmir. This is 300 bedded hospital and is the main hospital for healthcare especially obstetric and radiologic services for the population of about 7 million. No study has yet been carried to determine the prevalence of these neural tube defects in this region. So we wanted to see the prevalence of anencephaly and its association with folic acid deficiency in our antenatal patients.

PATIENTS AND METHOD

This prospective study was done at radiology department of Sheikh Khalifa Bin Zayad Hospital Rawalakot, district Poonch Azad Kashmir for a period of two year from January 2013 to February 2015. During this period, 8960 antenatal ultrasound for fetal wellbeing were performed and were included in study. Those women who were carrying an anencephalic fetus were taken as SUBJECT and women who were carrying normal fetus were taken as CONTROL. Proper history was taken from each subject and control and was recorded on a proforma. Intake of folic acid and any other medication was specifically asked. Previous history of any NTD was

also asked. Blood samples were taken at the time of presentation for peripheral blood picture after the consent of the patient. Data of all the patients reporting for antenatal checkup and having ultrasonographic examination was collected for determining the prevalence. The patients who did not opt for termination of pregnancy or left their follow up visits to our departments were excluded from the study. Patients not getting registered or not agreed for peripheral blood pictures were not included in the study. Data analysis was done using SPSS computer software version 22.

RESULTS

Table 1: General demographic data

Total antenatal patients examined	9600
Patients fulfilling the study criteria	8960
Sonographic diagnosis of Anencephaly	92

Table II: general statistics (n= 8960)

	Subjects (n=92)	Control (n=8868)
Age	26-48 years (median 40.23 years)	24-49 years (median 32.44 years)
Peripheral blood pictures	92	8868
Gestational age of diagnosis	15-31 weeks (mean 20.5 weeks)	-

Table III: Ultrasonographic examinations and laboratory findings in subjects (n=92)

Polyhydramnios	42
Anencephaly (n=92)	
Spina bifida	9
Omphalocele	7
Cleft lip/palate	5
Club foot	3
Short bones	2
Peripheral blood picture	
Hypersegmented neutrophils	86
Hypochromic Macrocytic anaemia	76

DISCUSSION

The rate of Anencephaly is higher in underdeveloped countries due to poor diet, lack of awareness and environmental factors. The rate of anencephaly is higher in Iranian population as compared to European population. It has been calculated that in Iranian population 13.1 in 10000 had Anencephaly whose mother age >35 years and consanguineous marriages contribute 36% to Anencephaly¹¹. The anencephaly occurs in up to 0.83% cases in Armenia, western Azerbaijan¹² while the Indian population has 31.6 anencephaly in 10000

pregnancies¹³. In Hazara division of Pakistan, the prevalence of anencephaly was 98 (98/10000)¹⁴ while in Swat region of Pakistan, the frequency of Anencephaly was reported 1.13% (113/10000)¹⁵. The present study reported 1.02% (102/10000) case of Anencephaly in district Poonch Rawalakot, Azad Kashmir. The prevalence of Anencephaly in this region is very high from other areas of the world and is in line with Hazara and Swat districts of Pakistan. It has been hypothesized by Khattak et al¹⁶ that women belonging to poor socioeconomic status have more chances of having anencephalic fetus while food supplements during pregnancy are helpful in prevention of Anencephaly.

CONCLUSION

Anencephaly is a common congenital anomaly in district Poonch of Azad Kashmir. It has a strong correlation with folic acid deficiency. Its Prevalence can be decreased by antenatal folic acid supplementation. Ultrasonography is a reliable modality with 100% accuracy for prenatal diagnosis of anencephaly.

Limitations of study: Some of the fetuses with anencephaly are spontaneously aborted and the patients do not report to our hospital which cannot be included in the study.

Patients delivered in private clinics or referred to other hospitals of Azad Kashmir or Pakistan are also missing in the data.

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