Diagnosis of Intrauterine Neurological Anomalies by Ultrasound

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الخلاصة

اشتملت هذة الدراسة على ٤١ حالة من النساء الحوامل ذات تشوهات خلقية دماغية للجنين. اعمار الامهات الحوامل تتراوح بين ١٦-٤٣ سنة في فترات حمل مختلفة. وان القيمة الحسابية والانحراف القياسي سجلت في الحمل المفرد ٢٢.١٤+ ٨.٧١ وفي الحمل التوأم ٢٨+٩.٠٣ بدون اختلاف عندما يكون Pاكبر, حيث P= مستوى المعنوي . اخذت الحالات من مستشفى بغداد التعليمي للفترة من تشرين الاول ٢٠٠٧ ولغاية نيسان ٢٠٠٨ مستخدمين جهاز السونار نوع سمينس ذات مجس خطي بتردد (3.5 MHz). اخذين بنظر الاعتبار تناول بعض الامهات الحوامل للادوية ولهن في العائلة تشوهات دماغية أو الحامل لمتقدمة بالعمر أو الاصابة بالفايرس أو عوامل جينيةأو أوعوامل اخرى يزيد من خطورة الاصابة بالتشوهاة ومن هذة العوامل الداء السكري، نقص فيتامينات او الاصابة بالعوزالمناعي ،داء القطط ,الحصبة الالمانية او تعرضهن لجرعات شعاعية من الحروب التي مرت بها القطر.وكانت نتائج هذة الدراسة كالاتى: عديم الدماغ(anencephaly) وفتق الدماغ والسحايا (encephalomeningocele) هذه الحالتين اكثر ظهورا في الاعمار بين ١٦-١٩ سنة،استسقاء الراس hydrocephaly)اكثر ظهورا في الاعمار ١٦-٢٣ سنة، صغير الرأ س(microcephaly) اكثر ظهورا في الاعمار ٢٠-٢٧ سنة.هذا يبين ان عامل العمر المسجلة عند الاعما الصغيرة في حالات فتق الدماغ والسحايا ٢٤.٨٦+٧.٥٦وتتبع استسقاع الرأس ب٢٦+ ٨.٥٨ ايضا تتبع صغير الرأس وعديم الدماغ ب٢٨.٢+٨.٩٧ و٢٢.٨٦+ ٩.٤٧ بالتتابع والتي تتفق مع دراسات سابقة.

Abstract

This study included (41) cases of pregnant women with fetal neurological anomalies. The age of pregnant mothers varies from (16—43) year with different gestational age, mean value and stander deviation which was recorded in single 22.14+ 8.71 and in twin was 28+ 9.03 with anon significant difference at P> 0.05(P= level of significant). The cases were taken from Baghdad teaching hospital during the period from October 2007—2008 using Siemens Son line equipments Ultrasound with convex transducer of frequency sound wave (3.5) MHz's. The history of pregnant women regarding administration of any medications during gestation or she had a previous congenital abnormal baby, advanced pregnant age, viral causes, chromosomal factor(Genetic),other factors that increase the risk of malformations include diabeties,vitamins decencies' or the pregnant women infected by Aids, Toxoplasmosis or rubella and their exposure to radiation during previous wares. From this study it was shown that anencephaly and encephalomeningocele are prominent at period of (16-19) year old, hydrocephaly is observed at the period of (16-23) a microcephaly is observed at the period of age (20-27).This showed that age factor recorded elder age with encephalomeningocele factor with mean stander deviation 24.86+ 7.56 then followed with hydrocephaly with 26+ 8.58 then followed similarly with micocephaly and anencephaly with 28.22+ 8.97 and 22.86+ 9.47 respectively which is agree with previous study.

Introduction

Ultrasound had been used as useful diagnostics tool in obstetrics (1,2), is currently considered to be save ,non invasive ,accurate and cost-effective investigation both for pregnant women and her fetus age , size and growth (3,4). Ultrasound imaging is the most utilized diagnostic imaging modality to day(5), It possesses unique characteristics which are advantageous in compares to other competing modalities such as computed tomography (CT) and magnetic resonance imaging (MRI)(6). Ultrasound are use in

diagnosis of gestation and assessment of early pregnancy, threatened abortion, determination of gestational age and fetal size, placental localization, multiple pregnancies, hydramnios and oligohydramnios, fetal malformation usually be mad before (20) weeks (7,8,9,10). Advanced maternal age is strongly associated with chromosomal abnormalities ,screening for either high or low level of maternal serum alpha-fetoprotein [MS-AFP] can also help in identify that the fetus at risk for a neural tube defect (11). Vitamin deficiencies increase the risk of development neurological anomalies, in connection between folate level and neural tube defects, mother taking daily multivitamins supplement with folic acid showed a sharp decrease in the incidence of neural tube defects. This resulted in recommendation of adding supplements and folic acid-enriched food to the maternal diet at least one month before becoming pregnant, since neural tube development occurs within few weeks after fertilization (11,15). Other factors that increase the risk of malformations include diabetes and maternal family history of neural tube defects, so less than 10% of neural tube defects link to a family history (15).However, ultrasonography seen to be an accurate, is a form of non ionizing radiation, and non-invasive method for diagnosis of most of the neural abnormalities, like hydrocephaly, microcephaly and anencephaly (12). Normal cranial size commonly observed in fetus with hydrocephalus during the second and early third trimester and subnormal cranial size is commonly observed in association with the Arnold- Chari malformation before 24 weeks (13). Anencephaly, absence of the vault of the skull and brain and most common anomaly of the fetal central nervous system, can be recognized at 12 weeks of gestation, there will be hydramnios, the X- fetoprotein usually elevated in the amniotic fluid and maternal serum (14).The central nervous system (CNS) was one of the first systems evaluated with sonography, among congenital defects, neural tube defects are second in incidence following cardiac defects (15). It is also essential for diagnosis of other non-neural congenital anomalies like congenital cardiac defects (15).Microcephaly is usually secondary to abnormal brain development; a primary calvarias disorder that restricts normal brain growth (complete craniosynostosis) is very rare (14)... Hydrocephaly can be recognized at the18th weeks of gestation, there will be dilatation of the anterior and posterior horns of the ventricles, hydrocephalus due to Arnold-Chari malformation is associated with a lumbar myelomeningocele, frontal bossing gives the head a characteristic shape with X-fetoprotein is elevated in maternal serum. Microcephaly, an abnormally small head can be diagnosed when the biparietal diameter is more than three standard deviation below the normal, microcephaly do not diagnose unless there are other anomalies. Encephalomeningocele, this type of neural defect is characteristically contain fluid or brain tissue, Encephaloceles may be associated with infantile polycystic kidneys and polydactyl.(13,14).

Patient and Methods

The study include (41) pregnant women with fetal neurological anomalies, who were attending Baghdad teaching hospital over a period of 8 month from October 2007 to march 2008 over a period of 8 month, Their ages ranges from (16—43) years with highly coincidence in age groups between the tow type of pregnant(single and twin), since mean value and stander deviation which was recorded in single 22.14+ 8.71 and in twin was 28+ 9.03 with anon significant difference at $P>0.05$(P=level of significant) . Diagnosis done by Siemens Ultrasound machine with convex transducer of frequency sound waves of 3.5 MHZ. Contrast was not used In examining the abdomen, just put scanning gel on the skin of abdomen at the pelvic region and used convex array transducer. Also during the early pregnancy (first trimester) the bladder must be full, give more than 6-7 glasses of water and examine after one hour.

Results

The study was represented 34.14% anencephaly, 26.84% hydrocephaly, 17.07% encephalomeningocele and 21.45% microcephaly. This result of study can be mentioned or explained in our country are chemical material in bomb and most of women was exposed to radiation by radioactive material causes these anomaly in small age like in microcephaly, hydrocephaly and encephalomeningocele ,also regarding genetic, congenital infection such as Rubella , virus ,some drugs and vitamin deficiencies.

Table 1: Ages, type of gestation, patterned and number of neurological anomalies among 41 pregnant women.

ages	Type of pregnant		No. and % of Microcephaly	No. and % of Hydrocephaly	No. and % of Anencephaly	No. and % of Encephalomeningocele	Total %
	Single	Twin					
16-19	11	1	1 (11.11%)	4 (36.36%)	4 (28.51%)	3 (42.85%)	29.27
20-23	5	2	3 (33.33%)	2 (18.18%)	1 (7.140%)	1 (14.28%)	17.07
24-27	5	0	2 (22.22%)	1 (9.090%)	2 (14.28%)	0 (00.00%)	12.19
28-31	2	1	0 (00.00%)	0 (00.00%)	2 (14.28%)	1 (14.28%)	7.320
32-35	6	1	1 (11.11%)	3 (27.27%)	1 (7.140%)	2 (28.47%)	17.07
36-39	1	0	0 (00.00%)	0 (00.00%)	1 (7.140%)	0 (00.00%)	2.440
40-43	5	1	2 (22.22%)	1 (9.090%)	3 (21.42%)	0 (00.00%)	14.63

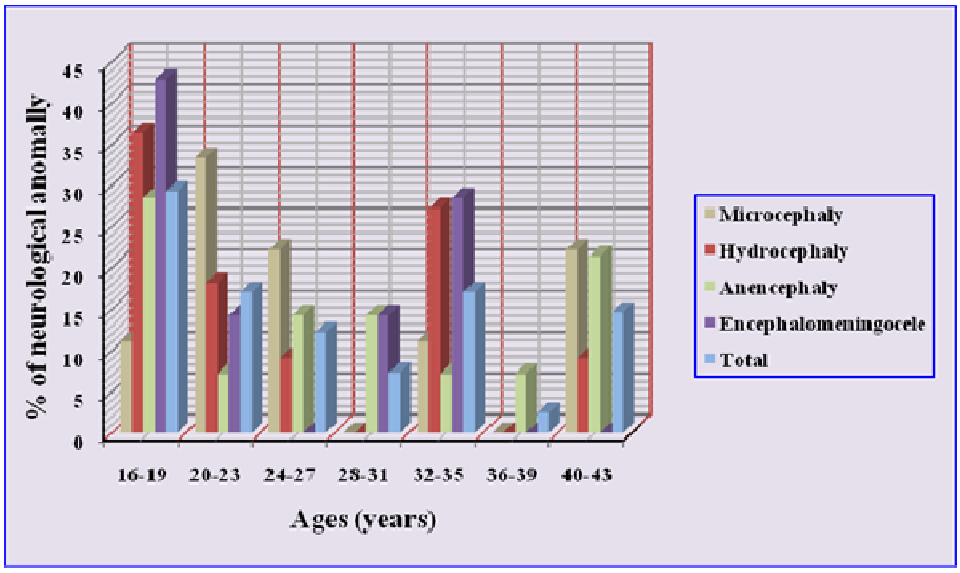

Figure A: percentage of different neurological **anomalies among differences ages groups.**

Discussion

The research sample showed that anencephaly, encephalomeningocele, hydrocephaly and microcephaly are the common anomalies elected in this study which have shown in table (1) and figure (A) respectively, this is in agreement with the result of the study which is done by Nyberg DA et al (Cerebral malformations in diagnostic ultrasound of fetal anomalies), 1990.and

In addition to that highly coincidence in age groups between the tow type of pregnant(single and twin) since mean value and stander deviation which was recorded in single 22.14+ 8.71 and in twin was 28+ 9.03 with anon significant difference at P>0.05(P=level of significant) . The result showed that age factor recorded elder age with encephalomeningocele factor with mean stander deviation 24.86+ 7.56 then followed with hydrocephaly with 26+ 8.58 then followed similarly with micocephaly and anencephaly with 28.22+ 8.97 and 22.86+ 9.47 respectively which is agree with previous study.

Recommendations and Conclusion

1. We recommend following the cases with neurological fetal anomalies until delivery.
2. Any pregnant women with family history of congenital anomalies should be subjected to a thorough ultrasound.
3. Recent studies have shown that the mother taking daily multivitamins supplement with folic acid(B9) to pregnant women may be significantly reduce in the incidence of neural tube defects ,therefore it is recommended that all women of child bearing consume 0.4mg of folic acid daily.
4. Ultrasound is safe, none ionizing, less expensive, an accurate and easy in use.
5. Ultrasound has no serious effect to the fetus and the maternal.
6. The neurological anomalies are observed more common in single fetus than in twin fetus.

If neurological anomalies are observed by ultrasound, other serological investigations are indicated the level of Maternal Serum Alpha fetoprotein (MS-AFP) (II).

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