

Neural tube malformations diagnosed at prenatal ultrasound in abidjan

Abstract

Objective: To describe the morphological abnormalities of the neural tube discovered at ultrasound in Abidjan.

Patients and methods: A retrospective multicenter study carried out over a 6 year period in Côte d'Ivoire (January 2009 to December 2015). All obstetric ultrasound reports were re-read. Cases of neural tube defects have been recurrent; Then their types, seating, associated signs and socio-demographic and epidemiological characteristics were described.

Results: 6714 obstetric ultrasound scans of the first, second and third trimesters were reviewed. 104 cases of fetal malformation (1.55%) were identified. 64.42% of the malformations (67/104) concerned the neural tube. The major morphological abnormality was lethal in 37 cases (55.22%) and minor, non-lethal in 30 cases (44.78%). The major morphological abnormalities were all anencephaly. Minor morphological abnormalities included 10 cases of myelomeningocele, 7 cases of lumbosacral spinabifida and 13 cases of hydrocephalus. Hydramnios were associated in 59 cases (88.06%).

Discussion: The rate of malformation of the neural tube would be high in our context for 3 reasons:

- i. The high prevalence of infectious diseases such as rubella and toxoplasmosis which have a high tropism for the neural tube.¹
- ii. Poverty with a lack of folic acid supplementation necessary for the good development of the neural tube.
- iii. A frequent association with a hydramnios (59 cases or 88.06%), a sign of specificity and high sensitivity (99.5% and 87.3% respectively) for the detection of fetal malformations in particular of the neural tube.²

Conclusion: Malformations of neural tube are not seldom and when they occur, they are serious. The most frequent is anencephaly. They are the easiest morphological abnormalities to detect during the prenatal period because they are often associated with an hydramnios, which is a sign of high sensitivity alert for antenatal diagnosis concerning fetal malformation.

Keywords: fetal ultrasound, safety, availability, accessibility, anencephalic

Volume 4 Issue 3 - 2017

Anhum Konan,¹ Olivier Tra bi,¹ Idrissa Garba,¹ Bherat Kouadio,² Alionou Schécheou,¹ Abdoulaye Touré,¹ Ali Coulibaly,¹ N'goran Kouamé,¹ Anne-marie N'goan-Domoua¹

¹Department of Radiology, Yopougon University hospital, Côte d'Ivoire

²Department of Pediatrics, Yopougon University hospital, Côte d'Ivoire

Correspondence: Anhum Konan, Department of Radiology, Yopougon University hospital, Abidjan, Côte d'Ivoire, Email anhum_konan@yahoo.fr

Received: October 18, 2017 | **Published:** November 02, 2017

Introduction

Antenatal screening of fetal morphological abnormality is a major obstetric issue.^{1,2} Fetal ultrasound, due to its safety, availability, accessibility and low cost, is the imaging technique of choice in our context. We report the results of ultrasound screening of neural tube morphological abnormalities.

Materials and methods

We have conducted a retrospective study, but also a multicenter and descriptive study over a period of 6 years, from January 2009 to December 2015. This study was carried out in the university-affiliated hospital of Yopougon and in medical clinics whose names are as follows: Nanglé medical clinic and Sainte Bernadée medical clinic. All the obstetrical ultrasound reports of the first trimester, the second trimester and the third trimester were re-read. The different cases of neural tube malformations have been identified in an inventory and their different types, their different locations, their associated signs

and their socio-demographic characteristics have been described. The different reports missing only one of the parameters studied were not included in the study. The postnatal fate of any pregnancy was obtained in the birth registry of the various delivery rooms and in the Neurosurgery and Pediatric Surgery departments of the hospitals concerned.

Results

During the study period, 6714 obstetrical ultrasound scans of the first, second and third trimesters were performed. The average age of patients was 23.6 years with some extremes to 17 years and to 44 years. Women aged between 20-25 years old represented the largest population with 45.3%. 104 cases of fetal malformation (1.55%) were identified including 67 neural tube malformations (64.42%). Ultrasound scans detecting neural tube malformations were performed concerning 6 cases (8.95%) in the first trimester, concerning 33 cases (49.25%) in the second trimester and concerning 28 cases (41.80%) in the third trimester. There were 37 cases (55.22%) of major morphological

abnormalities and 30 cases (44.78%) of minor abnormalities. They were associated with other malformations in 16.22% of cases.

Anencephalies (Figure 1) represent the major morphological abnormalities. The minor morphological abnormalities were hydrocephalus, myelomeningocele and spinabifida (Figure 2).

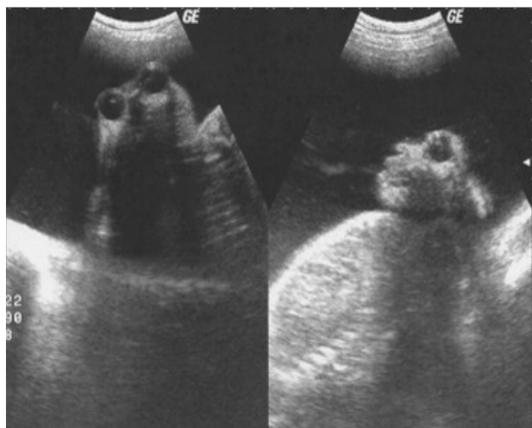


Figure 1 18weeks anencephalic fetus.
Left, frontal oblique section, right, sagittal section.

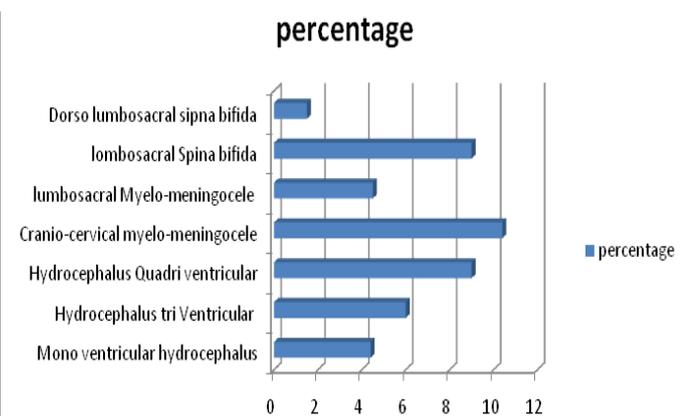


Figure 2 distribution of minor malformations of the neural tube.

The malformations of the neural tube were associated with a hydramnios in 59 cases (88.06%). In all the different cases, there was no recorded of medical termination of pregnancy. And we record in the population of anencephaly, 31 cases (83.77%) of fetal death in utero, 6 cases (16.22%) of vaginal birth delivery of anencephalic infants. All the cases of minor fetal morphological abnormalities were confirmed in the post natal observations. The newborns were taken care of in the departments of Pediatric Surgery and Neurosurgery.

Discussion

Obstetrical ultrasound in search of fetal morphological abnormality does not escape the traditional limitations of ultrasound, namely the dependent operator character and the difficulties related to the morphotype of the patients. Therefore, some malformations may go unnoticed. Indeed, according to Lawrence³ 2-3% of newborns are born with a detectable malformation on ultrasound and according to Dashe⁴ about 11% of malformations are not detected on antenatal ultrasound. These factors may account for the low prevalence observed in fetal malformations in our series (1.55%), which rate is consistent with

that observed in the local and also international literature, about 1.98 to 2.9%.³⁻⁶ The best rates of detection reported are in the central nervous system with 37 to 77%.^{4,5,7} Our series included 64.42% of malformations localized in the neural tube. This rate of malformation of the neural tube is high in our context for 3 reasons:

- The high prevalence of infectious diseases such as rubella and toxoplasmosis which have a high tropism for the neural tube.⁸
- Poverty which occasions a precocious absence of folic acid supplementation necessary for the good development of the neural tube.
- A frequent association with a hydramnios (59 cases meaning 88.06%), indicating a specificity and a high sensitivity (99.5% and 87.3% respectively) for the detection of fetal malformations of the neural tube in particular.^{4,9} Indeed, the excess of amniotic fluid would draw the attention of practitioners and would encourage them to systematically seek a malformative etiology.

The western series report an advanced age of pregnant women (35 years of age and older), probably a risk factor for the occurrence of genetic abnormalities which constitute the etiologies found.¹⁰ In our context, the young age of the patients concerned (23.6 years in average) could be related to the high prevalence of infectious diseases with neurological tropism and to the precocious absence of folic acid supplementation necessary for the good development of the neural tube.

The majority of the malformations were discovered in the ultrasounds made in the second and third trimester (91.05%), whereas we have a good detectability of those malformations in the ultrasound of the first trimester by the vaginal route which was evaluated between 32% and 60% according to Karim JN et al.¹¹ Indeed, in our context, the endovaginal ultrasonography was less available and often unaccepted for cultural and customary reasons. Also, poverty and ignorance about the interests of ultrasound monitoring of pregnancies, combined with the late appearance of clinical signs such as an excessive uterine height, would explain this late detection.

The neural malformations detected were, in descending order of frequency, anencephaly (55.22%), hydrocephalus (19.40%), myelomeningocele (14.93%) and spinabifidas (10.45%). For Molina,⁵ hydrocephalus was the most detected entity. These abnormalities were classified in terms of major malformations, lethal in 37 cases (55.22%) and minor, viable in 30 cases (44.78%). Major morphological abnormalities, in all the cases, were represented by anencephaly. In this group, fetal death in Utero was observed in 48.65% of the cases. The others are either lost to follow-up (35.13%) or died immediately after birth (16.22%).

As for minor malformations, all the cases were confirmed in post natal observation, meaning a 100% agreement between the antenatal and postnatal diagnoses. The newborns were taken care of in the departments of Pediatric Surgery and Neurosurgery. We did not find any therapeutic termination of pregnancy, contrarily to the study of Suzumori¹² in which more than 93% of pregnancies with fetal malformations were stopped. This raises in our context the difficulty of the psycho-affective management of pregnant women in whom, we discover a fetal malformation in an advanced stage of pregnancy.

Conclusion

Malformations of neural tube are not seldom and when they

occur, they are serious. The most frequent is anencephaly. They are the easiest morphological abnormalities to detect during the prenatal period because they are often associated with a hydramnios, which is a sign of high sensitivity alert for antenatal diagnosis concerning fetal malformation.

Acknowledgements

None.

Conflict of interest

Author declares that there is no conflict of interest.

References

1. Broussin B, Sarramon MF. La clarté nucale. Technique de mesure et signification. *J Radiol*. 2002;83:1891–1898.
2. Vendittelli F, Janky E. Suivi clinique et paraclinique d'une grossesse normale. *J Gynecol Obstet Biol Reprod*. 2001;30(1):51–58.
3. Lawrence MJ, Ford WD, Furness ME, et al. Congenital duodenal obstruction: early antenatal ultrasound diagnosis. *Pediatr Surg Int*. 2000;16(5–6):342–345.
4. Dashe JS, McIntire DD, Ramus RM, et al. Hydramnios: anomaly prevalence and sonographic detection. *Obstet Gynecol*. 2002;100(1):134–139.
5. Molina-Giraldo S, Alfonso-Ospina L, Parra-Meza C, et al. Prevalence in birth defects diagnosed by ultrasound: three years experience in university maternal fetal medicine unit. *Ginecol Obstet Mex*. 2015 ;83(11):680–689.
6. Wellfens Karine, Bokossa-Mambo. *Diagnostic antenatal des malformations foetales par l'échographie*. Universite Felix Houphouet-Boigny, Côte d'Ivoire. 2002.
7. Dhingani DD, Boruah DK, Dutta HK, et al. Ultrasonography and magnetic resonance imaging evaluation of pediatric spinal anomalies. *J Pediatr Neurosci*. 2016;11(3):206–212.
8. Faye-Kette. Seroepidemiology of rubella among 461 pregnant women in Abidjan. *Bull Soc Pathol Exot*. 1993;86(3):185–187.
9. Kouame Ngoran, Anhum Konan. Polyhydramnios: A warning sign in the prenatal ultrasound diagnosis of foetal malformation? *Diagn Interv Imaging*. 2013;94(4):433–437.
10. Dashe JS. Aneuploidy Screening in Pregnancy. *Obstet Gynecol*. 2016;128(1):181–194.
11. Karim JN, Roberts NW, Salomon LJ, Papageorghiou AT. Systematic review of first trimester ultrasound screening in detecting fetal structural anomalies and factors affecting screening performance. *Ultrasound Obstet Gynecol*. 50(4):429–441.
12. Suzumori N, Kumagai K, Goto S, et al. Parental decisions following prenatal diagnosis of chromosomal abnormalities: implications for genetic counseling practice in Japan. *J Genet Couns*. 2015;24(1):117–121.