

## Original article

# Nuchal Translucency Thickness at 11-14 Weeks of Gestation in Cameroon

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## Abstract

### PURPOSE

To determine the prevalence of abnormal nuchal translucency at 11-14 weeks of pregnancy in a Cameroonian population and compare the values of the nuchal translucency thickness to international reference values

### METHODS

Descriptive cross-sectional study including 332 Cameroonian women who received obstetric ultrasound between 11 and 14 weeks in four hospitals in Cameroon, from 1st January to 31 December 2012. Measurement of nuchal translucency was performed according to the recommendations of the Fetal Medicine Foundation.

### RESULTS

340 fetuses were examined. The median nuchal thickness was 1.5 mm (range: 0 - 9.7 mm). Abnormal nuchal thickness ( $\geq 3$  mm) was 1.5% (5/340) and was significantly predominant in mothers aged over 36 years. In 8.8% (30/340) of cases, nuchal translucency was absent among which 46.7% (14/30) were examined before 13 weeks of gestation.

### CONCLUSION

The prevalence of abnormal nuchal translucency thickness is 1.5% in our setting and is significantly higher in mothers above 36 years. There seems to be an early 'filling' of nuchal translucency (before 13 weeks) in some Cameroonian fetus.

### KEYWORDS

Nuchal translucency. Ultrasonography. First trimester.

## Résumé :

### OBJECTIFS

Déterminer la prévalence des clartés nucales à 11-14 semaines de grossesse au Cameroun. Spécifiquement, comparer les valeurs normales et anormales aux normes internationales de référence.

### MÉTHODES

Etude descriptive transversale incluant 332 femmes camerounaises qui ont bénéficié d'une échographie obstétricale entre 11 et 14 SA dans quatre hôpitaux du Cameroun, du 1er janvier au 31 décembre 2012. Les mesures de la clarté nucale ont été effectuées selon les recommandations de la Fetal Medicine Foundation.

### RÉSULTATS

340 fœtus ont été examinés. La médiane des clartés nucales a été de 1,5mm (extrêmes: 0- 9,7 mm). Les clartés nucales anormales ( $\geq 3$  mm) ont représenté 1,5% (5/340) et ont été significativement prédominantes dans la tranche d'âge maternel de plus de 36ans. Dans 8,8% (30/340) des cas, la clarté nucale a été absente parmi lesquels 46,7% (14/30) avant 13 SA.

### CONCLUSION

La prévalence des clartés nucales anormales dans notre milieu (1,5%) est significativement plus élevée dans la tranche d'âge maternel de plus de 36 ans. Il existerait un effacement précoce de la clarté nucale (avant 13 SA) chez certains fœtus camerounais.

### MOTS CLÉS

Clarté nucale. Echographie. Premier trimestre.

## INTRODUCTION

Fetal medicine has developed considerably over the last 20 years [1]. First trimester ultrasonography, performed between 11 and 14 weeks of gestation, has become an essential step in the screening for aneuploidy and fetal malformations [1,2] by measuring the nuchal translucency (NT). Today, the screening of chromosomal abnormalities based on a combination of maternal age, fetal nuchal translucency thickness and maternal serum markers in the first [3, 4, 5] or second [6,7] trimesters represents the method of choice. The strategy proposed by Nicolaides et al. with one-stop clinic for assessment of risk (OSCAR) [4] confirmed its good results in many studies (BUN [5] SURUSS [6] and FASTER [7]). Its principle is now widely used in France in accordance with the latest recommendations of the High Authority of Health (HAH) [2, 8].

The first publication on nuchal translucency dates back to 1992. One of the teams that worked the most on this subject is that of Nicolaides [3]. Subsequently, several studies have been carried out in the world: Europe, America, Asia, North Africa (Tunisia), in West Africa (Côte d'Ivoire). The prevalence of nuchal translucency found varies between 0.6 and 7.8% [9, 10].

Differences in values of nuchal translucency from one center to another, between races or ethnic groups have been described for many years [11, 12]. Similarly, differences in median nuchal translucency were found between African-Caribbean populations, Asian and Americans [13]. These differences were small but significant [12]. However, to date, no study on the values of nuchal translucency has been carried out in sub-region of Central Africa in general and Cameroon in particular.

The purpose of this study was to determine the prevalence of abnormal nuchal thickness ( $\geq 3\text{mm}$ ) at 11-14 weeks of gestation in our setting.

## MATERIALS AND METHODS

This was a descriptive cross-sectional study carried out from 1st January to 31st December 2012 at the Radiology Services of the Yaoundé University Teaching Hospital, the Yaoundé General Hospital, the Yaoundé Central Hospital and the Douala General Hospital. Sampling was consecutive, including all Cameroonian women aged over 36 years with a crown-rump length (CRL) between 45 and 84 mm at first trimester ultrasound. Excluded from this study were cases of severe oligohydramnios, certain fetal diseases (cystic hygroma, anencephaly, acrania-anencephaly) and where it was impossible to obtain a sagittal section of the fetus.

The main variables studied were: the characteristics of the pregnant women (age, ethnic

origin and parity, history of aneuploidy or malformations, personal history of diabetes or smoking), the ultrasound data (evolution and site of pregnancy, number of embryos, biometric study, morphological examination, measurement of the CRL and the NT).

Measures of CRL and NT were carried out by two-dimensional transvaginal ultrasound (for the majority) or transabdominal (probes 7 MHz and 3.5-5 MHz respectively - General Electric Voluson 730 Expert Ultrasounds [GE Medical Systems Europe, A07945] - Siemens SonolineG60S GM-56400A00E Model 7474922 - Hitachi EUB-525CFM). To minimize potential bias due to incorrect NT measurement, all measurements were performed by three trained operators who had previously been recycled. The ultrasound systems were equipped with freeze function, Cine loop, zoom and electronic measurements Phillips sliders that operators could use freely. Gestational age was determined by ultrasound based on the CRL measured by the method of Robinson and Fleming [14].

Measurements of the thickness of the NT were conducted in accordance with the recommendations of the Fetal Medicine Foundation (FMF) [15,16] and a score greater than or equal to 4 Hermann (acceptable image) represented the goal for all measures [17]. All measurements were taken at an approximation of 0.1 mm. In short, a strict sagittal section of the embryo was sought to visualize the continuity of the skin at the neck. Zoom was performed on fetal cephalic pole and the upper chest. Cursors were placed on to it after checking the neutral position of the fetal head and whether or not it was near or away from the amnion [18, 19]. Only measurements for CRL between 45 and 84mm were used.

Several NT measurements (at least three) were performed and the highest value was used. In our study, intra-operator variability to measurement was 0.15 mm and 0.2 mm for inter-operator.

Statistical analysis of data was performed using the software EPI-info 3.3.2 2005 and Microsoft Excel 2007. Percentages were compared using the chi-square test. A p value less than 0.05 was considered statistically significant, and a value less than 0.01 was considered statistically highly significant.

## RESULTS

During the study period, we examined a total of 384 pregnant women, 8 twin pregnancies, amounting to 392 fetuses of which 52 (13.2%) examinations were excluded (due inadequate fetal position, severe oligohydramnios, score less than 4 Hermann). Statistical analysis focused on 332 pregnancies and 340 fetuses. One pregnancy by in vitro fertilization was recorded.

The median age of the pregnant woman was  $26 \pm 4.5$  years (range 12-43 years). 6% (19/332) were older than 36 years. 67.4% of patients (224/332) were multigravidae. The Bantu ethnic group was the majority (168/332 or 51%).

Morphological examination of embryos has detected one case of omphalocele.

The median CRL measured was  $58.5 \pm 9.8$  mm (range 45-84 mm). The median gestational ultrasound age was 12 SA 01 J (range 11 SA 01 J - 14 weeks). The median measure of NT was  $1.5 \pm 0.6$  mm (range 0-9.7 mm). We recorded: 98.5% (335/340) normal NT and 1.5% (5/340) abnormal NT (Table I).

TABLE I: CHARACTERISTICS OF THE MOTHER IN CASES OF NUCHAL LUCENCY

Value of CN(mm)	Mother' age (years)	Parity	Ethnic
3	30	Multigravida	Semi-Bantu
3.4	21	Primigravida	Bantu
3.6	34	Multigravida	Semi-Bantu
4	42	Multigravida	Semi-Bantu
9,7	37	Multigravida	Bantu

The two highest values of NT (4 mm and 9.7 mm) were found in patients aged over 36 years (Table I). The prevalence of abnormal nuchal translucency was 10.5% (2/19) in the range of maternal age over 36 years against 0.9% (3/321) in the age 36 and under. The difference was statistically significant ( $p = 0.017$ ). (Table II)

TABLE II: PREVALENCE OF ABNORMAL CN ACCORDING TO MATERNAL AGE

Maternal Age (years)	Number of topics	Abnormal CN	Prevalence (%)
$\leq 36$	321	3	0.9
$> 36$	19	2	10.5
Total	340	5	1.5

The prevalence of abnormal NT was 1.7% (4/232) in the group of multigravidae against 0.9% (1/108) in the primigravidae. The difference was not statistically significant ( $p = 0.50$ ). (Table I)

The prevalence of nuchal hyperlucency was 1.9% (3/160) in the Semi-Bantu ethnic group, against 1.1% (2/171) in the Bantu ethnicity. The difference was not statistically significant ( $p = 0.41$ ). (Table I)

We noted a lack of NT (CN zero thickness) in 8.8% of cases (30/340), amongst which; 10% (3/30) 11-12weeks of amenorrhea, 36.7% (11/30) 12-13 weeks of amenorrhea and 53.3% (16/30) after 13 weeks.

## DISCUSSION

In our study, intra-operator variability measurement is 0.15 mm and 0.2 mm for inter-

operator. Variability between French medians and those published by the FMF is less than 0.2 mm [20]. Pajkrt et al found an intra-operator of 0.54 mm and inter-operator of 0.62 mm [21] variability. This could be explained by the prior recycling of our operators and the priority use of the transvaginal route in our study. Several NT measurements (at least three) are performed and the highest value is used.

The median measure of NT in our series was 1.5 mm (range 0-9.7 mm). Solomon et al. in France had obtained the same median with extreme values of 0.4 and 7 mm [20]. Note, however, that they have excluded all pregnancies with chromosomal abnormality known or potential (died in utero, false early spontaneous abortion) from their study [20]. In the work of Chung et al. Korea, the median is higher than ours (1.6 mm), with a range of 0.5 to 5 mm. [11]

The prevalence of abnormal NT is 1.5% (5/340). This rate is higher than Fanny et al. Côte d'Ivoire (0.6%) with the same threshold of normality like ours (3 mm) [9]. Our percentage is lower than that found in other studies: Theodoropoulos et al. in Greece (2.9%) [22], Chelli et al. Tunisia (3%) [18], Zoppi et al. Italy (3%) [23], Chung et al. in Korea (4%) [11], Schuter et al. Germany (4%) [24], Snidjers, Nicolaides et al. England (5%) [15], Brizot et al. Brazil (5.8%) [25], Jemmali et al. in France (7.8%) [10]. These authors adopted different thresholds of significance from 3 mm (95% percentile with respect to the CRL or MOM 2.0 or 2.5 mm). This probably explains the underestimation of the prevalence of nuchal translucency in our study. Advanced maternal age in their series could also explain the high rates of abnormal NT they achieved. Indeed, the mean maternal age was 29 years, 32.7 years, 29.9 years and 31 years respectively in reported by Zoppi et al. (With 7.8% aged over 36 years) [23] of Chelli et al. (With 37% aged over 35 years) [18], Chung et al. [11] and Nicolaides et al. [15].

The two thickest NT in our series (4 mm and 9.7 mm) are found in elderly patients over 36 years. Abnormal NT are predominant in the range of maternal age over 36 years, with a statistically significant difference ( $p = 0.017$ ). This result concord with current data that defines advanced maternal age as a factor risk of fetal malformations [26, 27].

The prevalence of nuchal translucency is relatively higher in multigravidae and Semi-Bantu ethnicity. The difference is not statistically significant ( $p = 0.50$  and  $p = 0.41$  respectively). This could be due to the small sample size.

In our series, we note the absence of NT (NT zero thickness) in 8.8% of cases (30/340), including 10% (3/30) SA 11-12, 36.7% (11/30) 12-13 SA and 53.3% (16/30) after 13 weeks. Meanwhile, current literature suggests, all fetuses have a NT in the first trimester, and increases up to 13 weeks (LCC about 70 mm) and disappears thereafter (even if chromosomal abnormality) [1,28]. These zero values were not

recorded in other studies (Solomon et al in France, Chung et al. Korea, Chelli et al. Tunisia) who found the minimum values of 0.4 mm, 0.5 mm and 0.6 mm, respectively [11, 18, 20]. This result may suggest an early disappearance of the NT (before 13 weeks) in some Cameroonian fetus.

## CONCLUSION

The median nuchal translucency to 11-14 SA is 1.5 mm in our population. The prevalence of abnormal nuchal brightness ( $\geq 3$  mm) is 1.5% and is significantly higher in the range of maternal age over 36 years. There seems to be an early deletion of nuchal translucency (before 13 weeks) in some Cameroonian fetus.

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