

Variation of nuchal translucency with increasing crown rump length and gestational age in normal singleton pregnancies

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Abstract: This study was undertaken to estimate ultrasound measurement of nuchal translucency (NT) thickness in normal fetuses between 11 and 13.6 weeks of gestation. The aim of this study was to establish normative data of nuchal translucency distribution in singleton pregnancies. 600 fetuses with known normal outcome were included in this study. The distribution of median values of NT thickness with crown rump length (CRL) in 10 mm intervals and 95th percentile were calculated with linear regression method. False positive rates with increasing gestational age were studied. This study offers a normative data of fetal NT thickness in normal pregnancy, which can be used as a reference for screening chromosomal aberrations or other congenital abnormalities in the first trimester.

Keywords-anomalies, fetus, nuchal, screening, translucency.

I. Introduction

The association between fetal chromosomal abnormality and increased nuchal translucency during the first trimester of pregnancy is well established.^(1,2)

Nuchal translucency (NT) is usually done between 11-14 weeks of gestational age, mainly as a screening test for fetal Down's syndrome. It is done either alone or in combination with serum markers. Thickened nuchal translucency may also be associated with fetal structural defects, genetic syndromes and poor perinatal outcomes.⁽³⁻⁵⁾ There is a small but significant difference in NT thickness between fetuses of different ethnic origins⁽⁶⁾. It is therefore important to establish normative data for the distribution of NT thickness.

II. Aims:

To establish normative data for the distribution of nuchal translucency in normal fetuses between 11-14 weeks of gestation.

To see if there was a variation of NT with increasing crown rump length

III. Materials And Methods:

This study was conducted at a tertiary care institute. Study population included 600 singleton pregnancies with known normal neonatal outcome, who had NT measured between 11-14 weeks of gestation (CRL 40-80 mm). The ultrasound machine used was General Electric Voluson 730 Expert. Transducer used was curvilinear probe at a frequency 2-5 Mhz.

The exclusion criteria were:

1. Those cases with no obstetrical or neonatal records
2. Cases affected by chromosomal and major structural abnormalities
3. Cases which resulted in miscarriages and intrauterine fetal demise

The gestational age was calculated from the first day of last menstrual period and was confirmed by Crown Rump Length measurement. In cases where the estimated gestational age and menstrual age had discrepancy of more than 7 days, the ultrasound estimation was used.

In spite of poor repeatability of transabdominal scan (TAS) measurements as compared with transvaginal scan (TVS), we used TAS as patient acceptability was poor with TVS.

If it was impossible to obtain proper image of the fetal NT due to fetal position, we either waited for spontaneous fetal movement away from the amniotic membrane or the fetus was bounced off amnion by tapping the maternal abdomen.

All the cases were subdivided into five categories on the basis of CRL of fetuses with 10 mm intervals. To correct for gestational age, the median value for NT thickness in each CRL category was calculated. In order to establish normative data of NT thickness, the relationship between NT thickness and CRL was analysed with

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the linear regression method. According to the regression equation, the expected 5th , 50th and 95th percentile values of NT thickness were obtained for a given CRL.

IV. Results :

The mean maternal age in this study was 24 ± 2 yrs (range 19-32 yrs)

The mean NT thickness was 1.5 ± 0.5 mm

The mean CRL was 58 ± 9.07 mm

The median gestational age was 12.5 weeks

The regression equation relating median NT thickness to CRL was described as follows :

Expected NT thickness (mm) = 0.437 + 0.01969 * CRL (mm)

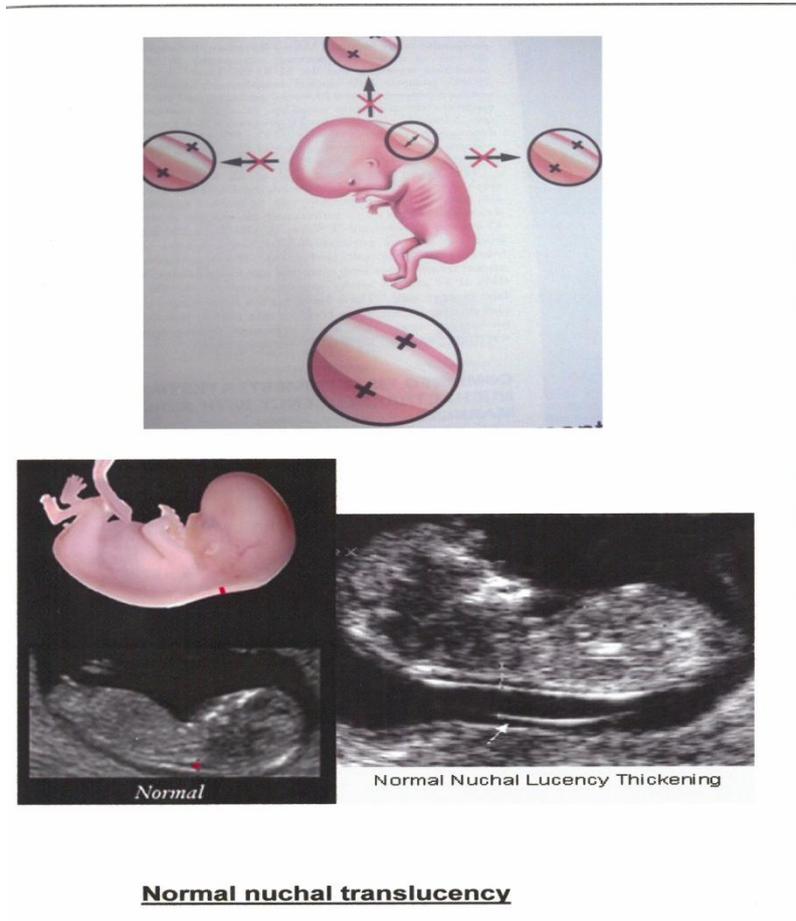


TABLE 1

The expected 5th, 50th& 95th percentile values of NT for various CRL values was as below:

CRL (mm)	Expected nuchal translucency		
	5 th percentile	50 th percentile	95 th percentile
40	0.3	1.2	2.1
45	0.4	1.3	2.2
50	0.5	1.4	2.3
55	0.6	1.5	2.4
60	0.7	1.6	2.5
65	0.8	1.7	2.6
70	0.9	1.8	2.7
75	0.9	1.9	2.8
80	1.0	2.0	2.9

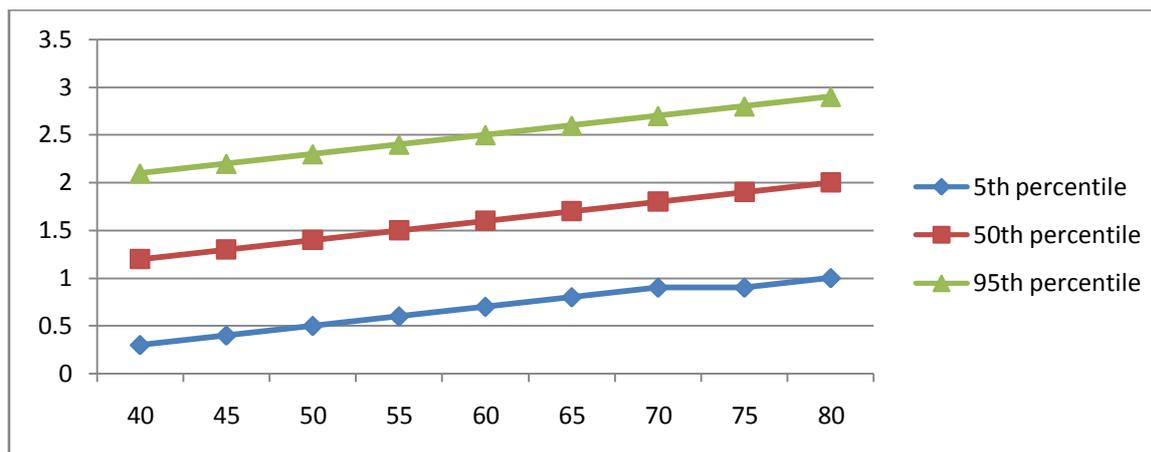


TABLE 2
Median NT thickness in relation to the CRL measurements in 10 mm interval

Nuchal translucency (mm)				
CRL (mm)	No of cases	% of total cases	Mean ± SD	Median
40-49	78	13	1.3 ± 0.4	1.2
50-59	213	35.5	1.5 ± 0.4	1.5
60-69	219	36.5	1.7 ± 0.5	1.8
70-79	90	15	1.8 ± 0.5	1.9
Total	600	100	1.5 ± 0.5	1.6

As the CRL increases from 40 to 79, the median NT thickness was found to increase from 1.2 mm to 1.9 mm

TABLE 3
Distribution of cases with NT thickness more than 2.5 mm according to their gestational age

Gestational age (weeks)	No of cases	% of total cases	NT > 2.5 mm	
			Number	% of cases
11 – 11.6	129	21.5	2	2.5
12 – 12.6	330	55.5	11	3.6
13 – 13.6	141	23.5	4	5.6
Total	600	100	17	2.8

In our study, 17 out of 600 (2.8%) cases were found to have increased nuchal translucency thickness

V. Conclusion

The results of this study demonstrate that fetal NT thickness increases with CRL and this is compatible with previous studies.^(4,7,8) Therefore, in screening chromosomal defects, the use for a fixed cut-off in NT thickness is inappropriate and each measurement should be examined according to the CRL.⁽⁹⁾

Multiple of median values to express the relationship between NT measurements and gestational age can be used⁽¹⁰⁾.

Therefore it is mandatory to establish a normative distribution of fetal NT measurements.

In our study the mean NT thickness in normal fetuses was 1.5 mm, as compared to a study in Taiwanese population, where the mean NT thickness was 1.7 mm⁽¹¹⁾.

We found that the incidence of NT thickness greater than or equal to 2.5 mm was 2.8% and this observation was in accordance with previous studies^(2,8). The incidence of NT thickness greater than or equal to 2.5 mm in normal fetuses was 2.5% at 11-11.6 weeks at gestation and increased to 5.6% at 13-13.6 weeks, in our study. Other studies have reported that the incidence of NT thickness greater than or equal to 2.5 mm in normal fetuses increased from 1.3% at CRL 30-39 mm to 13.2% at CRL 60-69 mm⁽⁸⁾.

The present study offers a normative data of fetal NT thickness, which can be used for screening chromosomal aberrations and congenital abnormalities in the first trimester.

As the false positive rate increases with increasing gestational age, NT measurements should be adjusted according to the gestational age for screening chromosomal abnormalities.

References

- [1]. Nicolaides KH, Brizot ML, Snijders RJ. Fetal nuchal translucency: Ultrasound sreening for fetal trisomy in the first trimester of pregnancy.Br J Obstet Gynaecol.1994;101:782-786
- [2]. Pandya PP, Snijders RJ, Johnson SP,DeLourdesBrizotM,NicolaidesKH.Screening for fetal trisomies by maternal age and fetal nuchal translucency thickness at 10 to 14 weeks of gestation.Br J Obstet Gynaecol.1995;102:957-962.
- [3]. Pandya PP, Kondylios A, Hilbert L, SnijdersRJ,NicolaidesKH.Chromosomal defects and outcome in 1015 fetuses with increased nuchal translucency. Ultrasound Obstet Gynecol. 1995;5: 15-19.
- [4]. Hyett J, PerduM,Sharland G, Snijders R, NicolaidesKH.Using fetal nuchal translucency to screen for major congenital cardiac defects at 10-14 weeks of gestation: Population based cohort study. Br Med J.1999;318:81-85
- [5]. Hafner E, SchuchterK,Liebert E, Phillip K.Results of routine fetal nuchal translucency measurement at weeks 10-13 in 4233 unselected pregnant women. Prenat Diagn.1998;18:29-34
- [6]. Thilaganathan B, Khare m, Williams B, Wathan NC. Influence of ethnic origin on nuchal translucency screening for Down's syndrome. Ultrasound Obstet Gynecol.2000;43:998-1001.
- [7]. SnijdersRJ,NobleP,Sebire N, Souka A., Nicolaides KH. UK muticentre project on assessment of risk of trisomy 21 by maternal age and fetal nuchal translucency thickness at 10-14 weeks of gestation.Lancet 1998; 352:343-346.
- [8]. Scott F, Boogert A, Sinosich M, Anderson J. Establishment and application of a normal range for nuchal translucency across the first trimester. Prenat Diagn.1996;16:629-634.
- [9]. Taipale P, Hiilesmaa V, Salonen R, Ylostao P. Increasd nuchal translucency as a marker for fetal chromosomal defects. N Enl J Med. 1997;337:1654-1658.
- [10]. Schuchter K, Wald N, Hackshaw AK, Hafner E, Leibhart E. The distreibution of nuchal translucency at 10-13 weeks of pregnancy.Prenat Diagn.1998;18:281-286.
- [11]. Jou HJ, Wu SC, Li TC, Hsu HC, Tzeng CY, Hseich FJ. Relationship between fetal nuchal translucency and crown rump length in an Asian population. Ultrasound Obstet Gynecol. 2001;17:111-114.