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FETAL BIOMETRY IN KOREAN FETUS

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Abstract: The purpose of the study was to create a fetal biometry standard from data on ultrasound-dated in Korean people. A total of 142 singleton gestations with ultrasonographic fetal biometry from 14 to 38 weeks made up the study population. BPD, HC, AC and FL were measured every second weeks. To assess sonographic accuracy, we measured wooden sticks in 0°, 10° and 70° in artificial box. BPD, HC, AC and FL were measured. Mean values of each percentiles(5, 25, 50, 75, 95) are displayed. The resulting values were plotted graphically. Inter-degree differences were not significant and 0.2±0.1, 0.3±0.2, 0.2±0.1, respectively(0°VS10°, 0°VS70° and 10°VS70°) We validated the accuracy and reliability of sonographic measurements according to fetal positions.

Keywords: Biometry, Ultrasonography, Fetus.

1. INTRODUCTION

Assessing fetal size, age and growth is probably the most common task in antenatal care, and care should be taken to minimize adverse effects such as misclassifying normal pregnancies to growth restriction or missing the growth restriction. Also, gestational age assessment has long been a quintessential application of ultrasonography to the practice of obstetrics. Numerous equations have been generated that describe the relationship between fetal biometric parameters and gestational age[1]. Biparietal diameter (BPD), head circumference (HC), abdominal circumference (AC) and femur length (FL) is used to assess gestational age (GA), evaluate fetal growth and estimate fetal weight[2,3]. Fetal biometry has been shown to be affected by ethnic status, even when allowing for environmental and socio-economic factors[4-6]. We need to create a fetal standard equation from data on ultrasound-dated in Korean people. Intrauterine fetal positions are numerous and for example, fetal femur lengths could be measured differently. So, we made artificial situations that we measured wooden stick in different degree positions.

2. METHODS

1. Gestational age was based on last menstrual period LMP

Inclusion criteria − singleton pregnancy with a cycle length of 26-30 days and confirmed by ultrasound before 12 weeks gestational age(GA).

Exclusion criteria − Multifetal pregnancy, complicated pregnancy, in case of a discrepancy of more than 7 days between the GA based on LMP

BPD − An accurate BPD can be obtained through any place of section that intersects the third ventricle and thalami. The first criterion endures that the plane of section is taken at the proper craniocaudal plane. The second criterion ensures that the transducer is oriented perpendicular to the central axis of the head.

HC − The cursors are positioned at the outer edge of the near calvarial wall in the BPD plane. Most modern equipment then will allow a computer-generated ellipse to be fit to the calvarial margins.

AC − At the position where the transverse diameter of the liver is the greatest. This can be determined sonographically as the position where the right and left portal veins are continuous with one another.

FL − The essentially "one-dimensional" nature of the measurement. The tranducer need only be aligned to the long axis of the bone to obtain a proper plane of section.

2. Measurement of different degree wooden sticks.

We made a box that contain three different degree wooden sticks (10cm long) and filled with saline and covered by plastic wrap. Three sticks were attached to bottom of the box (20cm depth).

We measured the length of the wooden sticks for 10 times and calculated inter-degree differences. (Fig. 1)

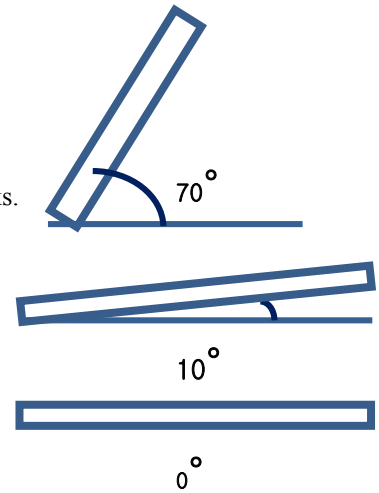

Figure 1. Wooden sticks.

3. RESULTS

A total of 142 singleton gestations with ultrasonographic fetal biometry from 14 to 38 weeks made up the study population. BPD, HC, AC and FL were measured every second weeks.

1. BPD

BPD mean values and median values according to each gestational week were showed in Table 1 and Figure 2.

2. HC

HC mean values and median values according to each gestational week were showed in Table 2 and Figure 3.

3. AC

AC mean values and median values according to each gestational week were showed in Table 3 and Figure 4.

4. FL

FL mean values and median values according to each gestational week were showed in Table 4 and Figure 5.

GP	Percentiles(cm)						
	5	25	50	75	95	Mean	Med
14	3.00	3.00	3.00	3.10	3.10	3.03	3.00
16	3.30	3.30	3.40	3.70	3.70	3.47	3.40
18	4.20	4.23	4.30	4.38	4.40	4.30	4.30
20	4.70	4.75	4.90	5.10	5.10	5.62	5.50
22	5.40	5.45	5.50	5.85	5.90	5.62	5.50
24	5.60	5.70	5.90	6.00	6.10	5.85	5.90
26	6.40	6.40	6.50	6.70	6.70	6.53	6.50
28	6.90	7.05	7.35	7.48	7.60	7.29	7.35
30	7.10	7.48	7.60	7.80	8.00	7.61	7.60
32	8.40	8.45	8.60	8.75	8.80	8.60	8.60
34	8.50	8.50	8.60	9.18	9.20	8.80	8.60
36	8.70	8.80	8.90	9.05	9.40	8.90	8.90
38	9.10	9.28	9.35	9.60	9.70	9.40	9.35

Table 1. BPD mean values and median values according to each gestational week

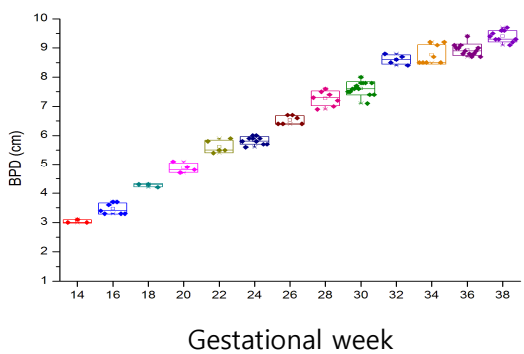

Figure 2. BPD according to gestational week. ◆ – each data, □ – mean values, upper margin and lower margin – SD values, X - 5‰ and 95‰

GP	Percentiles(cm)						
	5	25	50	75	95	Mean	Media n
14	10.70	10.70	11.00	11.60	11.60	11.10	11.00
16	12.10	12.10	13.10	13.43	13.50	12.88	13.10
18	15.60	15.50	15.60	16.10	16.10	15.73	15.60
20	17.10	17.15	17.40	17.95	18.10	17.50	17.40
22	19.40	19.65	20.70	21.45	21.90	20.58	20.70
24	21.20	21.88	22.10	22.25	22.70	22.05	22.10
26	23.80	24.10	24.55	24.98	25.20	24.55	24.55
28	26.10	26.10	26.70	27.70	28.00	26.88	26.70
30	26.90	27.10	28.15	28.53	29.40	28.00	28.15
32	30.00	30.20	30.50	31.05	31.30	30.60	30.50
34	30.70	30.93	31.30	32.63	33.00	31.59	31.30
36	30.20	30.80	31.30	33.20	33.40	31.82	31.30
38	31.60	32.63	33.35	34.10	34.20	33.24	33.35

Table 2. HC mean values and median values according to each gestational week

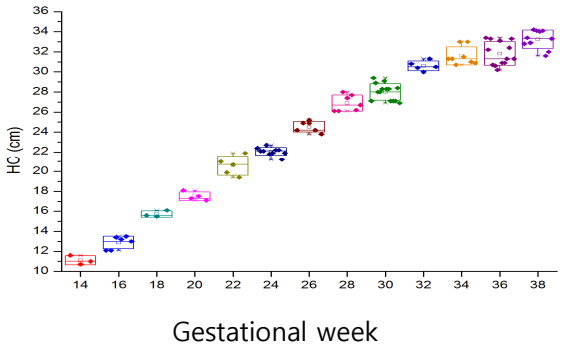

Figure 3. HC according to gestational week. ◆ – each data, □ – mean values, upper margin and lower margin – SD values, X - 5‰ and 95‰

GP	Percentiles(cm)						
	5	25	50	75	95	Mean	Median
14	8.40	8.43	8.55	8.68	8.70	8.55	8.55
16	9.70	10.08	10.45	11.03	11.00	10.48	10.45
18	12.60	12.60	13.00	13.20	13.20	12.93	13.00
20	15.20	15.25	15.3	17.00	18.00	15.96	15.30
22	17.30	17.55	18.1	18.85	18.90	18.18	18.10
24	18.60	19.00	19.70	21.10	21.40	19.92	19.70
26	20.40	20.55	21.10	21.25	21.40	20.97	21.1
28	22.00	22.88	24.50	24.70	26.80	24.19	24.50
30	24.40	25.00	26.50	27.33	28.40	26.25	26.50
32	27.40	27.45	27.70	29.35	29.60	28.26	27.70
34	28.40	28.40	28.70	29.20	29.20	28.77	27.70
36	27.70	30.30	30.75	31.68	32.90	30.93	30.75
38	30.7	31.65	31.80	33.45	34.8	32.37	31.80

Table 3. AC mean values and median values according to each gestational week

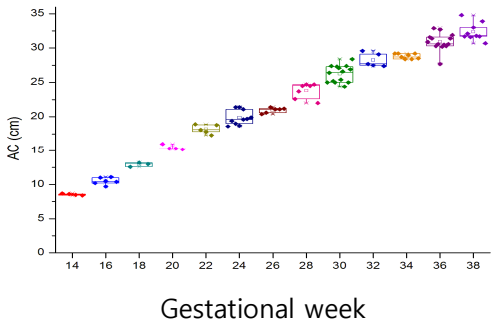

Figure 4. AC according to gestational week. ◆ – each data, □ – mean values, upper margin and lower margin – SD values, X - 5‰ and 95‰

GP	Percentiles(cm)						
	5	25	50	75	95	Mean	Median
14	1.40	1.43	1.55	1.75	1.80	1.58	1.55
16	1.70	1.80	2.10	2.20	2.20	2.00	2.10
18	2.70	2.70	2.70	2.80	2.0	2.73	2.70
20	2.90	3.00	3.10	3.45	3.70	3.20	3.10
22	3.70	3.75	3.90	4.25	4.30	3.98	3.90
24	3.80	4.20	4.40	4.40	4.70	4.32	4.40
26	4.60	4.60	4.70	4.75	4.90	4.70	4.70
28	5.20	5.30	5.45	5.60	5.90	5.48	5.45
30	5.50	5.50	5.80	5.93	6.20	5.80	5.80
32	6.00	6.00	6.00	6.40	6.50	6.16	6.00
34	6.10	6.33	6.40	6.80	6.90	6.49	6.40
36	6.50	6.68	6.70	6.80	7.20	6.74	6.70
38	7.00	7.10	7.10	7.50	7.70	7.27	7.10

Table 4. FL mean values and median values according to each gestational week

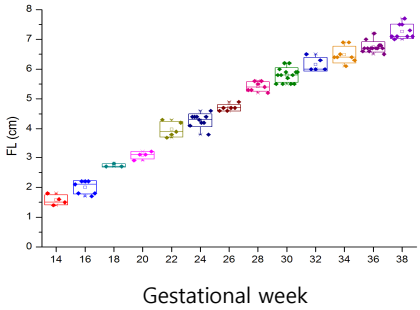

Figure 5. FL according to gestational week. ◆ – each data, □ – mean values, upper margin and lower margin – SD values, X - 5‰ and 95‰

4. CONCLUSTION

In the present study, we showed accuracy of sonographic instruments and presented Korean fetal biometry. We believe that our standard, being derived from singleton pregnant women, is a reference for fetal growth. Further research should focus on twin and triplet pregnancies.

5. REFERENCES

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