

ULTRASOUND CEPHALOMETRY IN INDIAN PREGNANT WOMEN

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SUMMARY

544 antenatal patients were subject to real time ultrasonography scanning in a cross sectional study to measure Biparietal diameter. 1076 readings of B.P.D. were analysed. The purpose of the study was to standardise the B.P.D. at different weeks of gestation at our centre. The mean B.P.D. were calculated along with two standard deviations and 5th & 95th percentile values for B.P.D. Our B.P.D. growth chart was compared with other standard B.P.D. growth charts. The mean B.P.D. growth rate was 2.75 mm/week from 20-30 weeks and 1.63 mm/week 30 weeks onwards. The B.P.D. values at our centre was less compared to other workers. It could be due to socio-economic and ethnic factors, in addition to lower mean birth weight of fetuses born to Indian women. Retrospectively after setting our own standard chart for B.P.D. growth gestational age could be predicted to within ± 9 days, from scattogram drawn between 20-30 weeks of gestation.

INTRODUCTION

Ultrasonography has become an essential tool for optimal management of every obstetric patient, as it provides more accurate information about growth and maturity of the foetus in utero. Out of various parameters available, Biparietal diameter (B.P.D.) and femoral length measurements provide most

accurate assessment of fetal maturity. At present there are more than 25 different B.P.D. charts available from workers all over the world. There are enough variations of B.P.D. measurement at the same period of gestation in these charts, for any one of these charts to be universally accepted for references. It is a well known fact that on an average, birth weight of fetuses born to Indian women is less at any period of gestation compared to fetuses born to women in most of the Western countries. The study was conducted to standardize B.P.D. meas-

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urements at each week of gestation at our centre, to minimize discrepancies between menstrual age (known or unknown and ultrasonographically determined maturity of the foetus when charts from foreign workers are referred to.

MATERIAL AND METHOD

In a cross sectional study 1076 B.P.D. measurements were made on 544 antenatal patients, between 20-40 weeks of gestation from 1.4. 1985 to 31.1. 1987. Though actually 720 patients were subjected to B.P.D. measurements antenatally, only 544 patients were considered for the study, as the rest did not fulfill the criteria laid down for the study. 68% of these patients were primigravidas and 32% were multigravidas. All had Hb of more than 10 gms percent and more suffered from medical, surgical or obstetric diseases.

The criteria :

1. Known exact date of last menstrual period, with previous regular cycles.
2. No medical or surgical disease in the patient.
3. No pregnancy complications.
4. Vertex presentation in absence of abnormalities of head size.

5. The patients delivered within \pm 2 weeks of E.D.D.
6. The patients delivered a normal healthy child weighing more than 2500 gms.

We used a real time grey scale aloka SSD-180 scanner with 3.5 Mz frequency transducer. The ultrasound tissue velocity used was 1540 meters per second.

The B.P.D. was measured by inbuilt electronic calipers at the level of two thalamic nuclei with slit like third ventricle in between it and when cavum septum pellucidum with midline reflexion of falx cerebri was seen. The B.P.D. was measured from outer to inner (leading edge to leading edge). Each patient underwent scanning at least once, while majority of patient were scanned twice or thrice, during different periods of gestations.

Adherence to the laid down criteria was necessary for construction of a meaningful percentile growth curve. Most of these patients belonged to low socio-economic or lower middle class group.

OBSERVATIONS

The mean B.P.D. values at each week of gestation from 20-40 weeks with 2 standard deviations and 5th and 95th percentile values of B.P.D. are shown in Table-I.

TABLE I

Gestation (Weeks)	No. of Readings	Mean B.P.D. (cm.)	2 S.D. (cm.)	5th Percentage	95th Percentage
20	34	4.50	0.26	4.28	4.72
21	33	4.81	0.28	4.66	4.97
22	32	5.08	0.29	4.84	5.32
23	36	5.39	0.26	5.15	5.65

Gestation (Weeks)	No. of Readings	Mean B.P.D. (cm.)	2 S.D. (cm.)	5th Percentage	95th Percentage
24	35	5.70	0.29	5.48	5.92
25	39	6.09	0.34	5.79	6.29
26	39	6.44	0.29	6.09	6.65
27	41	6.60	0.30	6.47	6.79
28	44	6.92	0.28	6.76	7.08
29	49	7.15	0.28	6.98	7.32
30	66	7.41	0.31	7.17	7.65
31	120	7.63	0.29	7.47	7.29
32	64	7.84	0.30	7.64	8.04
33	92	8.02	0.31	7.86	8.18
34	88	8.25	0.30	8.00	8.50
35	67	8.43	0.32	8.13	8.73
36	54	8.57	0.32	8.37	8.77
37	68	8.81	0.34	8.64	8.98
38	38	8.99	0.31	8.77	9.21
39	36	9.04	0.37	8.81	9.27
40	34	9.14	0.40	8.81	9.47

It shows a progressive increase in mean B.P.D., slightly more between 20-30 weeks compared to 31st weeks onwards. In last three weeks the mean B.P.D. rise was quite less. The standard deviations were less than 4.1 mm from 20-40 weeks gestation, and it did not increase with the duration of gestation as shown earlier. The growth rate from 20th to 30th week of gestation was 2.75 mm/week and 1.63 mm. thereafter.

Figure 1 shows mean B.P.D. with 2 S.D. at each week of gestation. It shows that the

rate of growth is rapid and relatively constant upto 30th week of gestation, but it gradually lessens after 30th week.

Table II shows comparative B.P.D. growth charts by different workers.

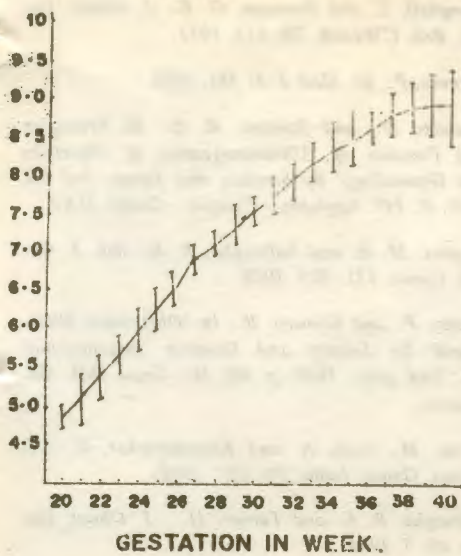
It can be seen that except for Sheppard and Filly, our B.P.D. growth values compared to other workers are quite less at a given gestational age. The scattargram between 20-30 weeks of gestation along with 5th and 95th percentile values for B.P.D. at each period of

TABLE II

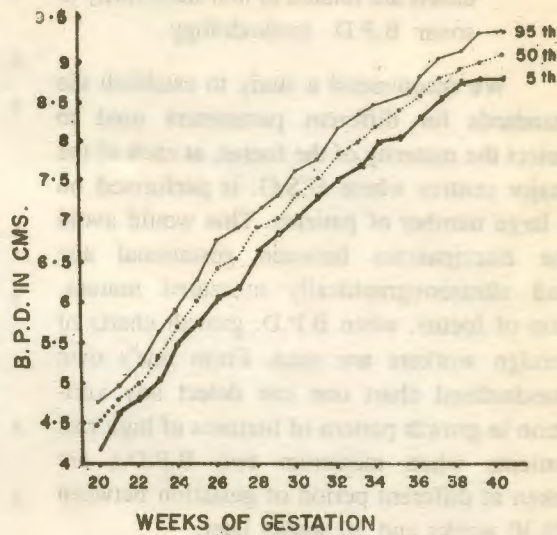
Cross Sectional Studies : Comparison of B.P.D. growth charts.

Weeks of Gestation	B.P.D. in CMs.					Our Series
	Sabbagha 1974	Campbell 1969	Shephard & Filly 1982	Jeanty & Romero 1984	Buckshee 1983	
20	4.8	4.8	4.6	4.9	5.12	4.50
21	5.1	5.1	4.9	5.3	5.38	4.81
22	5.4	5.4	5.2	5.6	5.57	5.10
23	5.8	5.9	5.5	5.9	5.8	5.39
24	6.1	6.2	5.7	6.2	6.0	5.70
25	6.4	6.5	6.0	6.5	6.32	6.09
26	6.7	6.7	6.3	6.7	6.74	6.44
27	7.0	7.0	6.5	7.0	6.93	6.60
28	7.2	7.3	6.8	7.2	7.10	6.92
29	7.5	7.5	7.1	7.5	7.43	7.15
30	7.8	7.8	7.3	7.7	7.69	7.41
31	8.0	8.0	7.6	7.9	7.95	7.63
32	8.2	8.2	7.8	8.1	8.20	7.84
33	8.5	8.5	8.0	8.3	8.38	8.02
34	8.7	8.6	8.3	8.5	8.5	8.25
35	8.8	8.8	8.5	8.6	8.74	8.43
36	9.0	9.0	8.8	8.8	8.92	8.57
37	9.2	9.1	9.0	8.9	9.01	8.81
38	9.3	9.3	9.2	9.1	9.12	8.99
39	9.4	9.4	9.5	9.2	9.19	9.04
40	9.5	9.4	9.7	9.3	9.30	9.14

FIGURE -- 1



B.P.D./GESTATIONAL AGE CHART



gestation between 20-30 weeks was charged. The linear regression was found to be good fit. In this series the 95 per cent confidence limits for the calculated duration of gestation were ± 9 days.

pattern in foetuses.

DISCUSSION

In the present series the B.P.D. was obtained at a plane described by Graham and Sanders (1985), as it may be easily and consistently obtained on repeat examination. Other authors like Raval et al (1982) and Filly (1982). Hughey and Sabbagha (1978) showed difference of 3-4 mm., in B.P.D.s measured by C-C measurement and C-I measurements. We have followed followed C-I measurements, as leading edge to leading edge reflects precise points for obtaining B.P.D.

Though the mean B.P.D. growth rate in our series compares well with most of the workers, the mean B.P.D. values at any gestational age was found to be less, despite strict adherence to criteria for selecting patients for study. Only Sheppard and Filly's (1982) data compare well with the Authors.

Prediction of gestation age could be made from out B.P.D. growth chart with accuracy of ± 9 days with 95% confidence limits between 20-30 weeks of gestation. Similar findings were shown by Campbell (1969), Flamme (1972), Sabbagha (1974) and Varma (1973). This helps predicting change in growth

The reasons for difference in B.P.D. growth charts used nowadays are postulated as follows :

1. Difference in socio-economic and ethnic background.
2. Engaging head particularly at or near term as in our study 68% of patients were primigravidas. Particularly in last 3-4 weeks, B.P.D. growth rate appears to be reduced due to this.
3. Lower mean birth weight of foetuses born to Indian women compared to European and American women.
4. As mentioned by Sabbagha (1976), these differences in B.P.D. growth

charts are related to non-uniformity in sonar B.P.D. methodology.

We recommend a study to establish the standards for different parameters used to detect the maturity of the foetus, at each of the major centres where U.S.G. is performed on a large number of patients. This would avoid the discrepancies between gestational age and ultrasonographically measured maturation of foetus, when B.P.D. growth charts of foreign workers are used. From one's own standardised chart one can detect any variation in growth pattern of foetuses of high risk patients when minimum two B.P.D.s are taken at different period of gestation between 20-30 weeks and 30 weeks later.

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