FOETAL GROWTH IN THE MIDTRIMESTER

by

ROHIT V. BHATT,* M.D., D.C.H.,

NISHA D. PATHAK,** M.D., D.G.O.

and

LALJI N. CHAUHAN,** M.D., D.G.O.

The intrauterine growth of the foetus is the subject of deep study in recent years. Streeter, Scammon and Calkins, Hamilton *et al*, Arey and Thomson are some of the workers who have studied foetal growth. However, in most studies foetuses of spontaneous abortion cases were studied and therefore do not reflect the normal growth pattern in the foetus. What is needed are the foetuses from healthy and well nourished mothers in the course of perfectly normal pregnancies. This was not possible till recently because it was illegal to terminate normal pregnancies. Moreover, the foetal growth may be affected by other factors such as race, community, maternal nutrition, etc. Hytten and Leitch (1964) have commented on differences of growth pattern ir different races. Therefore we cannot have universal criteria for foetal growth. It is necessary to establish norms of foetal growth for different races and communi ties. It is not possible to construct growth curves of the foetus till the date of the last menstrual period is accurately known. With liberalization of abortion laws in many countries, it is possible to collect large number of foetuses in the second trimester. These foetuses are from normal pregnancies and would therefore represent normal foetal growth. There is very scant literature on this subject. There is no published work from India on this subject because the abortion law is only recently modified. The present study was undertaken to accurately measure the foetal growth and establish norms for this part of the country.

*Professor and Head.

**Research Assistants, Department of Obstetrics & Gynaecology, Medical College, Baroda, India.

Accepted for Publication on 4-5-1976.

Material and Methods

Accurate records of 1000 cases of induced abortion in the second trimester at Shree Sayaji General Hospital, Baroda were maintained. Perfectly healthy pregnant women without any associated systemic disease and who were sure of the date of the last menstrual period were taken in this study. Many of the patients could not tell the date of last menstrual period by English calender. They could give the date according to Hindu calender. We had to convert the dates of Hindu calender to the dates of English calender. This was not difficult because calenders with Hindu dates and English dates side by side are available. The fundal height of the uterus was recorded after the patient had evacuated the bladder. The weight of the placenta was recorded after washing with water and clearing as much blood

as possible. The crown-heel height of the foetus and the weight of the foetus were recorded. The standard weighing machine based on lever principle was used. The machine was sensitive upto 500 mg weight. The sex of the foetus was noted. All measurements were taken independently by two of us (NDP and LMC).

Analysis

The foetal height at various periods of gestation is analysed in Table I. The Hess rule does not appear to be very applicable in our cases. The foetal height is more than expected by Hess rule upto 17 weeks. Eighteen weeks onwards the height curve is slower than expected. Moreover, there are variations in height at each week of gestation. The variations in height become narrow as the pregnancy. advances. Similarly, there are marked variations in foetal weight at each week of gestation (Table II). At 14 weeks the weight ranges from 20 to 140 grams. We have compared the height and weight of our foetuses with the height and weight chart supplied by Mead Johnson company's gestation calculator (Table III). The foetal weight is more in our series upto 19 weeks. After 20 weeks, the foetal weight in our series is lower than the weights recorded in the Mead Johnson charts. Similarly the foetal height is more in our series till 17 weeks of gestation and after 18 weeks, our foetuses are shorter as compared to the heights mentioned in the charts. It is likely that the weight and height of the foetuses in Mead Johnson charts are calculated from spontaneous abortion cases and hence are pathological foetuses. We do not know the reason for smaller weights and height after 18 weeks of gestation. It is probable that maternal

TABLE I
Foetal Height and Gestation

Gestation (weeks)	Average height (cms)	Range
14	13	8-21
15	18	13-26
16	18	12-25
17	20	12-26
18	20	12-28
19	22.5	12-30
20	22.5	13-31
21	25	23-27
22	25	24-28
23	26	25-31
24	26	25-31

TABLE II
Foetal Weight and Gestation

Gestation (weeks)	Average weight (grams)	Range
14	65	20-140
15	90	40-170
16	130	40-200
17	170	60-224
18	190	90-272
19	245	115-316
20	260	150-405
21	272	150-440
22	310	180-485
23	340	180-520
24	405	280-580

TABLE III
Foetal Height and Weight Compared with Mead Johnson Gestation Calculator

	Our series		Mead Johnson figures	
Gestation (weeks)	Height (cms)	Weight (grams)	Height (cms)	Weight (grams)
14	13	65	12.5	45
15	18	90	12.5	70
16	18	130	16	100
17	20	170	16	140
18	20	190	20.5	190
19	22.5	245	20.5	240
20	22.5	260	25	300
21	25	272	25	360
22	25	310	27.5	430
23	26	340	27.5	501
24	26	405	30	600

nutrition decides the height and weight after 18 weeks and the maternal nutrition has no significant effect on foetal growth in the early weeks of gestation till 18 weeks. The placental weight and placental weight/foetal weight ratio is compared in Table IV. The placenta weighs more than the foetus till 15 weeks of gestation. Later the foetal weight increases faster than the placental weight. The ratio of male foetus to female foetus declines with the duration. This is in confirmation with the biological laws. At the time of conception there are 137 males to 100 females. At birth there are 111 males to 100 females. Therefore, it is expected that at all gestations there would be more male foetuses (Table VII).

TABLE IV
Comparison of Placental and Foetal Weight

Gestation (weeks)	Placental weight	Foetal weight	Placental wt./Foetal wt. Ratio
14	85	65	1.30
15	105	90	1.16
16	112	130	0.86
17	124	170	0.72
18	130	190	0.68
19	156	245	0.63
20	165	260	0.63
21	170	272	0.62
22	190	310	0.61
23	210	340	0.61
24	240	405	0.59

TABLE VII
Male to Female Ratio

Duration gestation	Male/Female ratio
14	75:25
15	69:31
16	65:35
17	66:34
18	62:38
19	61:39
20	62:38
20+	61:39
	66:34

We feel that foetal growth curve should be studied at many centres where second trimester terminations are performed in greater number. This would give an opportunity to compare the growth curve of the foetus in intrauterine life and would help in establishing norms

TABLE V
Comparison of Foetal Height

Gestation (weeks)	Foetal height (cms.)				
	Arey	Scammon	Dietrich	Mead Johnson	Bhatt
16	15.7	15.5	18	16	18
25	23.9	22.7	25	30	26 (24 weeks)

TABLE VI
Comparison of Foetal Weight

Gestation (weeks)	Foetal weight (grams)				
	Arey	Scammon	Streeter	Mead Johnson	Bhatt
16	105	86.8	108	100	130
25	310	260.9	316	700	405 (24 weeks)