

Study of Foeto-Placental Ratio in Normal and Low Birth Weight Cases

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ABSTRACT

Birth weight is one of the simplest measurements that can be made with reasonable accuracy under different conditions. It is a reliable indicator of foetal well-being and maturity. In the present study, the average birth weight in Marathwada region, the incidence of low birth weight, the foeto-placental ratio in normal and in low birth weight cases was studied in 296 newborns and placentae. It was observed that the foeto-placental ratio in low birth weight cases is statistically significantly low (6.72) as compared with the normal (7.08). The significantly low foeto placental ratio in low birth weight cases indicates that though there is decrease in both birth weight and placental weight, the decrease in birth weight is more as compared with the decrease in placental weight.

Key words: Low birthweight; Foeto-placental ratio; Marathwada region.

INTRODUCTION

Birth weight is a reliable indicator of foetal well-being and maturity. It is also one of the simplest measurements that can be made with reasonable accuracy under different conditions[1]. Studies indicate that babies born with adequate birth weight have a relatively low mortality even in poor environmental conditions.

Birth weight depends upon numerous factors: genetic, maternal nutrition, height and age of mother, parity, duration of gestation,

birth spacing, sex of child, smoking in pregnancy, obstetrical history, placental weight, etc. Most of these factors are interrelated interact and it is difficult to point out any one main factor[2]. Some of the above mentioned factors also affect the placental weight. The placental weight in tern affects the birth weight.

So far, a number of studies have been conducted by different authors in different regions. Rath et al (2000)[3], Udana & Jain(2001)[4] and Rath & Jain (2001). They have studied the mean birth weight, the mean placental weight and the foeto placental ratio. It was observed that the mean birth weight, the mean placental weight and also the foeto placental ratio showed regional variations.

The present study was carried out to study the average birth weight, the incidence of low birth weight and the foeto-placental ratio in normal and in low birth weight cases in Marathwada region.

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MATERIAL & METHODS

The present study was undertaken at Swami Ramanand Teerth Rural Medical College and Hospital, Ambajogai. Being the Rural Medical College, study population was mainly from rural area. The data collected included the weights of 296 newborns and placentae, excluding the anemic, hypertensive, diabetic mothers and twins & stillbirths.

The chart was prepared containing a serial number, birth weight and placental weight. Serial number was given to each case. The birth weight was recorded as early as possible after delivery. The placentae were collected and the membranes were removed. The serial number was written and tagged to the placenta. The cord was cut leaving proximal 2 cm attached to the foetal surface. Then the placentae were dried between the blotting papers and weighed with a standard weighing machine. Cases with birth weight of 2500 gm or above were considered normal and below 2500 gm labeled as low birth weight.

The data obtained was tabulated and statistically analyzed separately for the normal and low birth weight cases.

RESULTS

Table I shows birth weights in normal and low birth weight cases.

Out of 296 total cases studied, 210 were having normal birth weight (mean 2775 gm) and 86 were of low birth weight (mean 2174 gm). The mean placental weight in all 296 cases studied was 2600.385gm.

It was observed that the mean placental weight in normal cases was 408 gm while the mean placental weight in low birth weight cases was 343 gm. The difference between the means was statistically highly significant.

The foeto-placental ratio in normal and low birth weight cases is shown in Table I. The foeto-placental ratio in normal cases was 7.08 while in low birth weight cases the foeto-placental ratio was 6.72. The value of $Z = 5.422$ at $p > 0.001$. Hence, the foeto-placental ratio in low birth weight cases was significantly low.

Table II shows the comparison of present and previous studies.

The mean birth weight observed by Rath, Garg & Sood[3] was 2718gm, Udania & Jain[4] observed 2640gm and Rath & Jain stated 2710gm, while in the present study it was 2600gm.

The mean placental weight observed by Rath, Garg & Sood[3] was 382gm, Udania & Jain[4] observed 495gm and Rath & Jain observed 438gm while in the present study it was 388gm.

The foeto-placental ratio observed by Rath, Garg & Sood³ was 7.11, Udania & Jain⁴ stated

Table I. Comparison of birth weight, placenta weight & foeto-placental ratio among normal & low birth weight cases

Parameter	Normal Birth Weight (n=210)	Low Birth Weight (n=86)	Z Value	P Value
Mean Birth Weight in kg	2775±251	2174±378	--	--
Mean Placental Weight in kg	408±83.75	343±86.63	6.058	<0.001
Mean Foeto- placental ratio	7.08±1.69	6.72±1.42	5.442	<0.001

Mean ±SD

Table II. Table showing comparison of present and previous studies

	Mean birth weight (gm)	Mean placental Weight (gm)	Mean foeto-placental ratio
Rath, Garg & Sood (2000)	2718	382	7.11
Udania & Jain (2001)	2640	495	5.33
Rath & Jain (2001)	2710	438	6.18
Present Study (2004)	2600	388	6.95

5.33 and Rath & Jain stated 6.18 while in the present study it was 6.95.

DISCUSSION AND CONCLUSION

The mean birth weight in a total of 296 babies studied was 2600 gm. Out of 296 babies, 86 had a birth weight below 2500 gm. Hence, the incidence of low birth weight in this region is 29.05%, which is slightly lower than the incidence of low birth weight in India, which is 30%.

The mean placental weight was 388 gm. The mean foeto-placental ratio was 6.95. The mean placental weight in low birth weight cases was low (343 gm) as compared with mean placental weight in normal (408 gm). The difference between the means was statistically highly significant ($z = 6.058$). Hence, the placental weight decreases significantly in low birth weight cases.

The mean foeto-placental ratio in normal was 7.08 while in low birth cases it was 6.72. The Z value is 5.422 at $p < 0.001$. Hence, the foeto-placental ratio in low birth weight cases is statistically significantly low.

The significantly low foeto-placental ratio in low birth weight cases indicates that, though there is decrease in both birth weight and placental weight, the decrease in birth weight

is more as compared with the decrease in placental weight. Hence, it can be concluded that some additional factors contribute to birth weight other than those contributing for the placental weight.

Also, the foeto-placental ratio, as observed in the present study and compared with the other workers, differs regionwise. The foeto-placental ratio, once determined in a region in normal cases cannot be applied as it is for the low birth weight cases because it is observed in the present study that the foetoplacental ratio decreases significantly in low birth weight cases. So, in low birth weight cases, the decrease in the placental weight is not in proportion with the decrease in the foetal weight but decrease in the foetal weight is significantly more than the decrease in the placental weight.

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