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Does birthweight affect the mode of delivery?

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Abstract

Objective(s): To investigate whether the mode of delivery effects the birthweight. *Study design*: In this retrospective study, 3092 singleton live births following uncomplicated pregnancies were analyzed. Birthweights were expressed as multiples of the median (MoM) for the relevant gestational week. The birthweight of children born vaginally was compared with those born by cesarean section. *Results*: The birthweight of children born vaginally was lower than that of those born by cesarean section. However, this difference was not observed at all gestational ages. Increasing cesarean rates and birthweights throughout years were observed, and the women, who delivered by cesarean section, were older than those, who delivered vaginally. *Conclusion(s)*: It appears that mode of delivery has negligible effect on birthweight.

Keywords: Birthweight; Cesarean section; Vaginal delivery

1. Introduction

The birthweight has an important impact on neonatal morbidity and mortality. Many factors, such as smoking, maternal size, nutrition and age, maternal complications during pregnancy and delivery, maternal socioeconomic and educational status, multiple pregnancy and placental abnormalities, may effect birthweight. Recently, Chard [1] suggested that the birthweight of children born by cesarean section was lower than that of those born vaginally and, in addition, hypothesized that the baby might gain weight during labor. In an attempt to demonstrate whether the mode of delivery effects the birthweight, we analyzed our obstetric data, retrospectively.

2. Materials and methods

In the present study, we analyzed the results of 3092 singleton live births in our university between January 1992 and December 2001. Only elective cesarean and spontaneous vaginal deliveries between the 36th and 41st weeks of pregnancy were included in the present study. Pregnancies, which were complicated by hypertensive diseases of pregnancy, oligohydramnios, intrauterine growth retardation, diabetes, placenta previa and placental abruption were excluded from the study.

The median for birthweight was determined for each gestational week, and birthweights were expressed as multiples of the median (MoM) for the relevant gestational week. Comparisons between groups were made by using Student's t- and χ^2-tests, where appropriate. Values are expressed as 'mean ± S.D.', and $P < 0.05$ was considered statistically significant.

3. Results

Mothers who delivered by vaginal delivery were significantly younger than those, who delivered by cesarean section (Table 1; $P < 0.001$). Male-to-female ratio and the distribution of women with different parities were comparable between groups (Table 1; $P > 0.05$).

Birthweights of infants, who were born between 1992 and 1996 were less than those who were born in the latter 5 years of our study period (Table 2; $P < 0.03$). Mean ± S.D. birthweights were 1.001 ± 0.12 MoM and 1.010 ± 0.11 MoM for the former and latter 5 years of the study period, respectively. The cesarean rate increased constantly from 12.8% in 1992 to 49.2% in 2001 (Table 2; $P < 0.001$).

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Table 1
Age, birthweight, sex and parity distribution in relation to mode of delivery

	CS ($n = 938$)	SVD ($n = 2154$)	P	Cesarean rate (%)
Age	30.3 ± 4.83	27.57 ± 4.61	<0.001	
Birthweight				
MoM	1.019 ± 0.120 ($n = 938$)	0.998 ± 0.113 ($n = 2154$)	<0.001	
36 GW (g)	2936 ± 384 ($n = 18$)	2839 ± 324 ($n = 47$)	0.31	27.7
37 GW (g)	3222 ± 393 ($n = 51$)	3082 ± 343 ($n = 130$)	0.02	28.2
38 GW (g)	3373 ± 384 ($n = 358$)	3260 ± 391 ($n = 346$)	<0.001	50.9
39 GW (g)	3371 ± 397 ($n = 355$)	3356 ± 371 ($n = 603$)	0.54	37.1
40 GW (g)	3559 ± 443 ($n = 100$)	3449 ± 386 ($n = 699$)	0.009	12.5
41 GW (g)	3603 ± 446 ($n = 56$)	3512 ± 396 ($n = 329$)	0.12	14.5
Total (g)	3389 ± 413 ($n = 938$)	3367 ± 404 ($n = 2154$)	0.16	30.3
Male (n)/female (n)	480/458	1039/1115	0.14	
Rates of women with different parities (%)				
0	54.1	52.5		
1	34.9	36.3		
2	8.7	9.3		
3	1.4	1.5		
4	0.7	0.3		
5	0.2	0.1		
6	0	0.1	0.40	

CS: cesarean section; SVD: spontaneous vaginal delivery; GW: gestational week.

Table 2
Cesarean rates and birthweights in years from 1992 to 2001

Years	Cesarean rate (%)	Birthweight (MoM)[a]
1992	12.8	1.005 ± 0.11
1993	11.5	0.999 ± 0.12
1994	23.5	0.999 ± 0.12
1995	22.1	0.999 ± 0.12
1996	29.4	1.002 ± 0.11
1997	40.0	1.016 ± 0.09
1998	33.5	1.015 ± 0.12
1999	45.6	1.013 ± 0.12
2000	47.5	1.005 ± 0.11
2001	49.2	1.009 ± 0.11
Total	30.3	1.008 ± 0.12

[a] Mean ± S.D.

Birthweights of live born infants for each week are shown in Table 1. Infants, who were delivered by cesarean section in gestational weeks of 37, 38, and 40, were significantly heavier than those, who were delivered by spontaneous vaginal delivery (Table 1; $P < 0.05$). Birthweights were comparable between these two modes of deliveries in the 36th, 39th and 41st gestational weeks (Table 1; $P > 0.05$). When all deliveries were analyzed, the birthweight of children born vaginally was lower than that of those born by cesarean section (Table 1; $P < 0.001$).

4. Discussion

The present study shows that there is a difference in birthweights between babies born vaginally and those born by cesarean section; those born vaginally were lighter. However, previous reports have suggested that babies delivered by cesarean section had significantly lower birthweights than those delivered by vaginal delivery [1,2]. Yudkin et al. [3] have suggested that the mode of delivery may effect the birthweight. However, they have compared babies born after induction of labor or by cesarean section with those born after spontaneous labor, and reported heavier babies in the latter group [3]. Lucas et al. [2] and Chard [1] have analyzed preterm deliveries. Lucas et al. [2] have studied deliveries between the 25th and 31st weeks of gestation. The difference in birthweights between the two modes of deliveries was not significant for all gestational weeks, but in only 5 of the 7 weeks of gestational ages [2]. In the present study, we also observed that the difference was not significant for all gestational ages. Chard has not analyzed the consistency of his results at different gestational ages. Our results, which contradict Chard's observation, and the lack of difference in birthweight at all gestational ages may indicate the presence of other factors to explain the difference in birthweight between these two modes of deliveries.

Secular trends toward increasing birthweight have been reported previously [4]. We also observed that there is a secular increase in birthweight, and a simultaneous increase in the cesarean rate in our institution. These may explain the higher birthweight of babies, who were born by cesarean delivery than those, who were born vaginally. In addition, mothers, who delivered by cesarean section were older than those, who delivered vaginally. Older age may be associated with a higher rate of elective cesarean deliveries, which may

have an impact on the difference in birthweight between the two modes of deliveries.

In conclusion, the difference in birthweight between babies, who were delivered by elective cesarean section and by spontaneous vaginal delivery, may be differently pronounced in different populations and institutions. This may be attributed to a combination of several factors, which should be investigated. It appears that the mode of delivery per se, has a negligible effect on birthweight.

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Erratum

Erratum to "Does birthweight affect the mode of delivery?" [European Journal of Obstetrics & Gynecology and Reproductive Biology 109 (2003) 138–140]☆

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The Publisher regrets that in the above article, the title of the paper was incorrectly changed without the authors consent. The correct title as been published below:

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The Publisher would like to sincerely apologize for any inconvenience caused.

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