

# Does a Caesarean Section Alter Neonatal Outcome in Low Birth Weight Babies ?

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**Summary :** The aim of the current study is to analyse the effect of mode of delivery on the neonatal outcome in low birth weight babies. All the babies who were born at the K.E.M. Hospital in the year 1996. With a weight less than 2 kg. were studied with respect to mode of delivery i.e. Caesarean Section or vaginal delivery and this was correlated with the neonatal mortality and morbidity. The average Caesarean Section rate was 15%. The Chi<sup>2</sup> test of significance were applied to the results. The study showed that when delivery of LBW infant was inevitable a Caesarean Section significantly decreased neonatal morbidity in babies with a birth weight 1000 - 1500gms. and, babies with a breech presentation with birth weight 1500 - 2000 gms.

## Introduction

The optimal method of delivery for the low birth weight infant has been strongly debated during the past ten years. And even today, it has not been conclusively proved that a Caesarean Section optimizes the neonatal outcome in a low birth weight baby.

Low birth weight (L.B.W). neonates are those with a birth weight less than or equal to 2500 gms. Very low birth weight (V.L.B.W.) neonates are those with a birth weight less than or equal to 1500 gms. Low birth weight neonates may be either appropriate for gestational age i. e. AGA (preterm) or small for gestational age i.e. SGA (growth retarded).

## AIM

The aim of the current study is to analyse the effect of mode of delivery i.e. caesarean Section v/s vaginal delivery on the neonatal mortality and morbidity in low birth weight babies.

## Material and Methods

All the babies who were born at the K.E.M. Hospital, in the year 1996 with a weight less than or equal to 2000

gms were studied with respect to their mode of delivery i.e. vaginal v/s abdominal.

Patients who came with absent foetal heart sounds or who developed intrapartum foetal distress (late decelerations and/or thick meconium stained liquor) were excluded from the analysis comparing neonatal mortality and morbidity with the mode of delivery. Thus the effect of mode of delivery on the neonatal outcome was studied on those patients who had no intrapartum foetal distress. The parameters that were studied from the point of view of morbidity included intracranial haemorrhage, respiratory distress syndrome, meconium aspiration syndrome, polycythemia, hyperbilirubinemia, hypoglycemia and septicemia. The Chi-square test of significance was applied to the results and significant results were those with  $X^2 > 3.84$  i.e.  $p < 0.05$ .

## Observations

Table I depicts the birth weight distribution and mode of delivery.

Out of the 725 babies weighing less than 2000 gms., Caesarean Section was performed in 106 cases i.e. 15%.

Table II depicts the correlation of mode of delivery, survival & normalcy (i.e. no morbidity) in neonates in differ-

ent weight groups.

**Table 1**

**Birth Weight and Mode of Delivery**

Birth Weight (Grams)	Number	Vaginal Delivery		Caesarean Section	
		Number	%	Number	%
<1000	76	69	90.8	7	9.2
1000-1500	185	154	83.2	31	16.3
1500-2000	464	396	85.3	68	14.7
Total	725	619	85.4	106	14.6

Of the 31 babies with birth weight less than 750 gms., 28 delivered vaginally and 3 babies were delivered by Caesarean section. \* caesarean section was done for maternal eclampsia not responding to induction. None of the neonates weighing less than 750 gms. survived.

**Table II**

**Birth Weight, Mode of Delivery, Survival Correlate.**

Weight (Grams)	Vaginal Delivery				Caesarean Section			
	Total	Alive	%	%	Total	Alive	%	%
<750	28	0	0	-	3	0	0	-
750-1000	23	13	56.50	0	4	3	75	0
1000-1500	129	101	78.30	14.80*	24	20	83.30	50*
1500-2000	390	371	95.10	60.10	55	53	96.30	67.90*

\*P<0.05=Significant

(Normal indicates those babies who had no neonatal complications considered in the study.)

Of the 45 babies weighing between 750 gms. to 1000 gms., 18 were excluded from the study because their heart sounds were absent on admission. 23 patients had a vaginal live birth, of which 13 (54.5%) went home and 10 of the live born babies died. 4 babies were delivered by a caesarean section of which 3 (75%) went home and 1 baby died. Here the three caesarean sections in which the neonates survived were performed for a maternal indication namely eclampsia not responding to induction. The fourth caesarean section was done in a case of premature rupture of membranes with chorioamnionitis with

failed induction. The baby died of septicaemia. This difference in mortality was not statistically significant (p>0.05).

Of the 185 babies with a birth weight between 1000 gms. to 1500 gms., 153 babies satisfied the inclusion criteria. 129 babies delivered vaginally of which 101 (75.9%) went home, 20 were neonatal deaths and 8 were fresh still births. 15 (14.8%) of the 101 babies who went home had no neonatal morbidity. 24 babies delivered by a Caesarean section of which 20(83.3%) went home alive and 4 were neonatal deaths. 10 (50%) of the 20 babies had no neonatal complications. Though the difference in mortality was not significant, the babies had a significantly reduced morbidity following a Caesarean Section (p < 0.05).

Of the 464 babies weighing between 1500 gms. to 2000 gms., 445 babies satisfied the inclusion criteria. 390 babies delivered vaginally of which 371 (95.1%) went home. 13 were neonatal deaths and 6 were fresh still births. 222 (60.1%) of the 371 babies who went home had no neonatal complications. 55 babies were delivered by a Caesarean Section of which 53 (96.3%) were alive and I was a neonatal death. There was I fresh still birth, which was a case of severe I.U.G.R. with anaemia with a non-reactive non-stress test. 36 (67.9%) of the 53 babies who went home had no neonatal complications. These slight differences were not statistically significant.

Table III depicts the comparison between preterm babies and growth retarded babies, with respect to mode of delivery, survival & normalcy (i.e. no neonatal complications), in the different weight groups.

In the preterm AGA babies less than 1000 gms, 1 of the 4 (25%) babies delivered by Caesarean section survived as compared to 8 out of 43 (18.6%) babies who survived following a vaginal delivery.

In the weight group 1000 gms. to 1500 gms., the percentage of babies who had no neonatal complications was



**Table III**  
**Preterm V/S IUGR**  
**Birth Weight, Mode of Delivery, Survival Correlate**

Weight (Grams)	Mode of DEL.	Preterm					AGA					Fullterm					SGA	
		Total	Alive	%	Normal	%	Total	Alive	%	Normal	%	Total	Alive	%	Normal	%		
<1000	Vaginal	43	8	18.6	-	-	8	5	62.5	-	-	-	-	-	-	-	-	
	LACS	4	1	25	-	-	3	2	66.7	-	-	-	-	-	-	-		
1000 to 1500	Vaginal	61	42	69	716.7*	38	30	79	4	13.3*	30	29	97	5	17*			
1500 to 2000	LSCS	4	3	75	133.3*	10	7	70	4	57.1*	10	10	100	5	50*			
	Vaginal	100	90	90	21	23.3	96	91	95	58	63.7	194	190	98	114	60		
	LSCS	8	7	87.5	4	57.1	9	9	100	6	66.7	38	37	97	12	32		

\*P < 0.05 = Significant

significantly more following a Caesarean Section, irrespective of whether the baby was preterm or growth retarded.

**Table IV**  
**Birth Weight, Mode of Delivery, Survival Correlate**  
**L.B.W. Breech Deliveries**

Weight (Grams)	Vaginal Delivery				Caesarean Section			
	Total	Alive	Normal	% Survival	Total	Alive	Normal	% Survival
<1000	15	1	-	6.67	-	-	-	-
1000-1500	11	6	-	54.54	1	1	-	100
1500-2000	21	19	5*	90.48	11	11	6**	100

\* % Normal = 26.32%  
\*\* % Normal = 54.54%  
(Normal = no morbidity)

Table IV depicts the outcome of low birth weight breech deliveries. There were 32 breech deliveries weighing between 1500 gms. to 2000 gms. of the 21 vaginal breech deliveries, 19 (90.5%) were alive, of which 5 (26.3%) had no neonatal complications. Of the 11 babies delivered abdominally all 11 (100%) survived and 6 (54.5%) had no neonatal problems. The difference in morbidity was significant (p < 0.05).

Table V depicts the correlation of the various neonatal complications with the mode of delivery, in different weight groups.

**Table V**  
**Birth Weight, Mode of Delivery and Morbidity Correlate**

Morbidity	<1000GMS		1000-1500GMS		1500-2000GMS	
	% Vaginal Delivery	% LSCS	% Vaginal Delivery	% LSCS	% Vaginal Delivery	% LSCS
Intracranial Haemorrhage	17.18	14.30	19.36	12.70	2.60	4.40
Respiratory Distress Syndrome	18.75	28.60	17.90	19.35	6.60	13.20
Meconium Aspiration Syndrome	-	-	2.98	-	2.40	4.40
Miscellaneous Normal	64.07	57.10	48.57	29.18	27.66	25.06
	-	-	11.19	38.77	60.74	52.94

Miscellaneous included Hyperbilirubinemia, Polycythemia, Septicaemia and Hypoglycemia.

The incidence of intracranial haemorrhage was significantly more following a vaginal delivery in babies with a birth weight less than 1500 gms. On the other hand, in babies weighing between 1500 gms. to 2000 gms., the route of delivery did not significantly change the incidence of intracranial haemorrhage. The incidence of Respiratory Distress Syndrome was significantly more following Caesarean delivery in all the weight groups.

## Discussion

Our study confirms the improvement in neonatal outcome following Caesarean section in low birth weight babies, delivered in a tertiary care centre, with good Neonatal Intensive Care Facilities. In our study, the neonatal survival in babies with a birth weight 750 gms. to 1000 gms. was improved following a caesarean section (though this was not statistically significant). In the weight group 1000 gms to 1500 gms. there was a marginal improvement in neonatal survival following an abdominal delivery, but there was a significant decline in neonatal morbidity following an abdominal delivery as compared to a vaginal delivery. The improvement in neonatal morbidity was seen in babies who were preterm as well as those were growth retarded.

Fairweather et al (1983) of the University College Hospital of London were the strongest advocates of Caesarean section for very low birth weight babies. According to them the mortality rate was halved at each weight group (less than 1500 gms). if the neonate was delivered by Caesarean section. Stewart et al (1977) showed that when delivery of a VLBW infant is inevitable, the prognosis for survival is improved by a Caesarean section. Boyes et al (1979) have proposed that a Caesarean section with careful attention to technique, can be an appropriate mode of delivery, for VLBW infants. Worthington et al (1983) showed that the survival was statistically significant following a Caesarean section only in 500-750 gms weight group. The current study showed that in the group 1000 - 1500 gms, survival was better following a vaginal delivery. On the other hand, studies by Olshan et al (1989) showed that Caesarean section produced no major decrease in neonatal mortality in VLBW infants.

In the current study, in babies with birth weight 1500 gms, to 2000 gms, there was a marginal decline in neonatal morbidity and mortality following Caesarean section. But in this group the outcome of babies with a breech presentation delivered abdominally was significantly better than those delivered vaginally.

In the study conducted by Main et al (1983), on the low birth weight breech babies, the mortality rate in those delivered by a Caesarean section was 29% which was significantly lower than the 58% mortality seen in those babies that were born vaginally. According to Duenholter et al (1979) vaginal delivery was more hazardous for LBW breech foetus than an abdominal delivery. Lysons et al (1978) observed that birth asphyxia, birth trauma and intracranial haemorrhage, was more common in LBW infants with a breech presentation born vaginally, than those delivered by a Caesarean. A study by Effer et al (1983) on the mode of delivery in VLBW breech babies, showed a non-significant improvement following Caesarean section. Lysons et al (1978) recommended Caesarean section for LBW foetus presenting as footling breech. But for complete & frank breech, they reserved Caesarean section for associated indications such as an abnormal pelvis, failure to progress and hyperextension of the foetal head. Kauppila et al (1981) showed that a Caesarean section did not improve prognosis of breech weighing above 1500 gms. But in breech babies with weight less than 1500 gms., incidence of intracranial haemorrhage was more following a vaginal delivery.

As regards neonatal morbidity, the current study shows that in vertex as well as non-vertex babies, the incidence of intracranial haemorrhage was more following a vaginal delivery, in very low birth weight neonates. Kosmetatos et al (1980) suggested that Caesarean delivered very low birth weight infant have a significantly reduced incidence of intracranial haemorrhage.

This was immediately followed by two studies by Dykes (1982), (Atlanta), and Levene et al (1982) (London). These studies found no such difference. Bejar et al (1981) using cranial ultrasound in the first 24 hours of life, concluded that it was not the route of delivery, but the presence of labour that was critical in development of intracranial haemorrhage. Tejani et al (1984) proved that if preterm delivery was indicated before labour is started (e.g. for maternal indications), neonatal outcome is better following a Caesarean section.

## Conclusions

Thus from our study, we can conclude that, when delivery of a LBW infant is inevitable, a Caesarean section :-

1. Does not significantly increase neonatal survival in birth weight less than 1500 gms.
2. Significantly decreases neonatal morbidity in birth weight 1000 - 1500 gms.
3. Significantly decreases neonatal morbidity in breech presentation with birth weight 1500 - 2000 gms., though it has no effect on the survival.
4. Significantly decreases incidence of intracranial haemorrhage in birth weight less than 1500 gms. in vertex as well as breech babies.

In the current study, the Caesarean section in the VLBW group were done primarily for maternal indications and thus strictly speaking, the two groups of babies were not matched. The babies who were delivered by a Caesarean section were at a higher risk for morbidity and mortality as compared to those babies delivered vaginally. In spite of this, the neonatal morbidity was significantly lower in babies delivered by a Caesarean section (in birth weight 1000 to 1500 grams.)

Whereas LBW non-vertex infants do better after a Caesarean birth, whether a Caesarean section should be routinely performed for all LBW vertex infants, definitely deserves further evaluation.

On the other hand, certain clinical conditions such as maternal medical indications or premature rupture of membranes, requiring delivery in the face of a long closed cervix, should tilt the management away from a long and potentially morbid induction of labour, towards an elective Caesarean birth. However, the decision of the route of delivery in LBW neonates would also depend upon the level of Neonatal Intensive Care available at a given centre.

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