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Triplet and Higher-Order Births: What Is the Optimal Delivery Route?

M. Thiery, G. Kermans, R. Derom
Department of Obstetrics, University Hospital, Gent, Belgium

Abstract. Data concerning 16 triplet and higher-order deliveries (resulting in a total of 56 infants) are reviewed. The vaginal delivery rate was 81%. Maternal morbidity was more serious after abdominal delivery. Prematurity (< 36 weeks gestation) rate amounted to 68% . Overall perinatal and neonatal mortalities for infants born after 28 weeks gestation and weighing at least 1000 g were 7% and 3%, respectively. We doubt that neonatal outcome could have been markedly improved by performing more cesareans. The importance of antenatal care is stressed.

Key words: Triplets, Delivery, Birthweight, Neonatal mortality

INTRODUCTION

Although the optimal delivery route for triplet and higher order fetuses is still a moot question, many obstetricians (often influenced in their decision by their respective neonatologists) currently resort to elective cesarean section (CS) in an attempt to overcome the possible adversities of low birthweight and abnormal lie and, in a growing number of Western countries, to obviate liability as well [4,6,7,11,16,19,23]. Thus, in Belgium, the national CS rate for triplet and higher order deliveries was 56% (52 out of 93 deliveries) for 1981-83 [Buekens, pers. comm., 1986]. The policy in our department is to attempt vaginal delivery in both triplet and higher order gestations, except when obstetrical contraindications are present. To check the correctness of our viewpoint this retrospective analysis was performed.

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MATERIALS

Between October 1975, and May 1986, 16 triplet and higher order deliveries occurred at our department whereby a total of 56 infants were born. Birth was defined as the delivery, by either route, of a fetus weighing 500 g or more. According to this definition our series includes 10 sets of triplets, 5 sets of quadruplets, and 1 set of sextuplets.

Most of the women (12/16) were nulliparous, which is logical for, with few exceptions, ovulation had been induced because of an infertility problem (Table 1). Mean

Table 1 - Patients' characteristics, fetal presentation, and mode of delivery

Case no.	Ov. ind.	Parity	Duration of gestation (weeks)	Zygosity	Presenting part						Mode of delivery					
					1	2	3	4	5	6	1	2	3	4	5	6
1	yes	0	36	2	C	B	T				VE	PE	V			
2	yes	0	36	3	C	B	C				VE	AE	VE			
3	no	2	37	2	C	C	C				S	VE	VE			
4	yes	0	37	3	C	B	B				VE	AE	AE			
5	yes	0	27	3	C	C	B				S	S	S			
6	yes	0	35	2	C	B	B				S	TE	S			
7	yes	0	35	3	C	B	B				VE	TE	TE			
8	yes	2	30	2	C	C	C				VE	VE	S			
9	yes	1	33	3	C	B	C				cesarean section					
10	yes	0	33	?	C	C	B				VE	S	AE			
11	yes	0	36	4	B	B	B	C			S	S	TE	AE		
12	yes	0	33	4	C	C	B	B			VE	VE	VE	S		
13	yes	0	31	4	T	C	B	C			cesarean section					
14	yes	0	27	3?	C	C	B	C			VE	VE	TE	VE		
15	yes	2	25	4	C	B	B	C			S	TE	TE	VE		
16	yes	0	33	?	T	C	B	?	C	B	cesarean section					

Key: C = cephalic; B = breech; T = transverse lie; S = spontaneous delivery (Bracht in breech delivery); VE = vacuum extraction; PE = partial breech extraction; TE = total breech extraction; AE = assisted breech delivery (Lövset, Mauriceau); V = version-extraction; Ov. ind. = ovulation induction

(+SD) duration of gestation at parturition amounted to 32.7 weeks (ranges 25 to 37 weeks) and the prematurity (< 36 weeks) rate was 68%. All the patients were hospitalized (bedrest) during various periods of time, usually from the moment (cervical) signs of preterm labor were suspected/diagnosed, and most of the women underwent tocolysis (Table 2). Structure of fetal membranes and genetic markers, including placental DNA [8], were used for zygosity determination [9].

RESULTS

Antenal Maternal Morbidity

Two complications dominated: iron deficiency anemia (12/16), notwithstanding the fact

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Table 2 – Bedrest and tocolysis (weeks of gestation)

Case no.	Duration of bedrest	Tocolysis: type and duration				
		Oral ritodrine	I.V. ritodrine	Indomethacin (oral/rectal)	$MgSO_4$	Aminophylline (I.V.)
1	30 to 36	32–36				
2	25 to 36			25–36		
3	25 to 36		33–36			
4	30 to 36					
6	24 to 35	20*–24		20*–34		
7	32 to 35			32–35		
9	29 to 33	16–29*	29–33	29–33	32–33	
10	24 to 33		28–32	29–32	31	
11	23 to 35	23–27	27–35	28–32		
12	24 to 33		27–32	24–32		28–32
13	25 to 31		30–31	25–30	30–31	
14	26 to 27		26–27	26–27		
15	20 to 25					
16	28 to 33					

Note: Cases 5 and 8 (see also Table 7) are deleted because at arrival in our clinic these patients were considered to be beyond treatment.
* Treatment initiated before transfer to our department.

all the patients were given supplementary iron, and toxemia of pregnancy (4/16). Anemia was more frequent in higher order gestations (6/6) compared with triplet (6/10) gestations. Almost silent spontaneous perforation of the cecum occurred in one woman during intensive tocolytic therapy with intravenous ritodrine and rectal indomethacin.

Delivery Route

A remarkable finding is that in 13 out of the 16 cases (81%) the first fetus presented by the head, malpositions being restricted to transverse lie in two cases and breech presentation in one case (Table 1). According to our policy, the two cases of transverse lie underwent elective cesarean section, the single secundary abdominal delivery (case 9) being indicated by fetal bradycardia. In this case, at laparotomy, distress appeared to be the consequence of maternal peritonitis following spontaneous rupture of the cecum. After colonic repair, this patient recovered. Thus, the CS rate in the entire series amounts to 19%. The mode of birth of the fetuses delivered per vaginam is given in Table 1.

Maternal Outcome

Puerperal morbidity after vaginal delivery was limited to hypotonic uterine hemorrhage (easily controlled with oxytocic compounds) in 4 of the 13 (30%) patients. Two of the three patients sectioned had serious postoperative complications: transfusion hepatitis (case 9) and Mendelson's syndrome and sepsis (case 13).

Neonatal Outcome

Twenty of the 56 infants were female, a male/female ratio of 1.33. Birthweights ranged

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from 570 to 3000 g. Details on short- and long-term neonatal outcomes are given in Tables 3 and 4.

Table 3 – Outcome of neonates and children

Case no.	Birth order	Sex	Weight	Apgar (1/5/10)	pH_a	Short-term	Long-term	Duration follow-up (months)
1	1	F	2430	8/10	7.32	good	good	
	2	F	2510	4/7	7.33	good	good	131
	3	F	2210	2/7	7.28	good	good	
2	1	M	2550	6/9	7.30	good	good	
	2	F	2290	5/8	7.16	good	good	81
	3	F	2580	7/9	7.19	good	good	
3	1	M	2400	9/9	7.35	good	good	
	2	M	3000	7/9	7.29	good	good	36
	3	M	2320	9/9	7.23	good	good	
4	1	M	2110	8/9	7.31	good	good	
	2	F	2110	5/9	7.39	good	good	33
	3	M	1740	7/10	7.27	good	good	
5	1	F	920	2/2/8	-	good	good	
	2	M	770	5/9	-	sepsis	†	25
	3	M	930	3/4/9	-	persisting ductus art., perforation intestines, sepsis	good	
6	1	F	1960	5/6	7.28	good	good	
	2	F	2080	5/9	7.20	good	good	27
	3	M	1760	5/9	7.26	good	good	
7	1	M	2000	7/9	-	good	good	
	2	M	1630	1/3/8	-	good	good	23
	3	M	2060	7/9	7.17	good	good	
8	1	F	1040	7/9	7.29	persisting ductus art., RDS, meningitis	good	
	2	F	1000	5/8	7.29	hyperbilirubinemia	good	17
	3	F	1430	5/9	7.32	RDS, meningitis, persisting ductus art.,	good	
9	1	M	1800	1/7	7.24	sepsis	†	
	2	M	2100	1/4	-	renal insufficiency	good	15
	3	F	1810	1/2	-	renal insufficiency, sepsis, leptomeningeal hematoma	good	
10	1	F	1440	6/9	-	hyperbilirubinemia	good	
	2	M	1300	mors in utero	-			5
	3	F	1410	2/9	-	hyperbilirubinemia	good	
11	1	M	2080	6/9	7.29	good	good	
	2	F	2100	7/9	7.23	good	good	115
	3	F	1680	1/2	6.74	good	good	
	4	M	1950	7/9	6.98	good	good	

(Contd.)

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Table 3 - *Continued*

Case no.	Birth order	Sex	Weight	Apgar (1/5/10)	pH_a	Short-term	Long-term	Duration follow-up (months)
12	1	M	1430	5/8	7.0	good	good	
	2	M	1130	2/3	7.21	good	viral encephalitis (mentally retarded)	47
	3	M	1210	4/7	7.00	good	good	
	4	M	870	mors in utero				
13	1	M	1780	8/9	7.32	hyperbilirubinemia, RDS, sepsis	good	
	2	M	1690	-	7.30	RDS, sepsis, hyperbilirubinemia	good	23
	3	F	1240	-	7.29	good	good	
	4	M	1440	-	7.29	good	good	
14	1	F	970	1/7	-	sepsis	†	
	2	F	930	-	-	RDS	†	
	3	M	930	5/8	7.15	RDS	†	
	4	F	910	5/8	7.07	RDS	good	25
15	1	M	750	1/2	-	†		
	2	M	820	1/2	-	†		
	3	M	800	5/5	-	†		–
	4	F	780	0/1	-	†		
16	1	M	1690	8/9	7.17	strabisme	good	
	2	M	1670	5/8	7.08	strabisme, tracheo-eosophageal fistula	good	55
	3	F	870	5/8	-	sepsis	good	
	4	F	570	mors in utero	-			
	5	M	1980	6/9	-	good	good	
	6	M	1510	7/9	-	good	good	

Table 4 – Neonatal deaths

Case no.	Birth order	Time of death	Cause of death
9	1	34 hr	sepsis
14	1	5 hr	sepsis
	2	15 hr	RDS
	3	48 hr	RDS
15	1	30 min	immaturity
	2	1 hr	immaturity
	3	15 hr	immaturity
	4	14 hr	immaturity

Note: Case no. 5, second-born triplet, succumbed on day 30 of sepsis and was therefore not withheld in our mortality rates.

Overall perinatal and neonatal (first 7 days of life) *mortality rates* were 20% (11/56 cases) and 15% (8/53 cases), respectively. For vaginal deliveries the *perinatal* mortality rate (mean gestational age: 32.8 weeks) was 21% (9/43) against 15% (2/13) for CS deliveries (mean gestational age: 32.3 weeks), and this difference is not statistically significant ($P <$

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0.05). The *neonatal* mortality in vaginal deliveries was 7/41 (17%) as compared with 1/12 (8%) in CS deliveries ($P < 0.05$). The above mortality rates were corrected for gestational age at birth (> 28 weeks) and for birthweight (> 1000 g). Corrected overall perinatal and neonatal mortality was 3/42 (7%) and 1/40 (3%), respectively. Corrected perinatal mortality for vaginal deliveries was 2/31 (6%) as compared with 1/11 (9%) in CS deliveries. Corrected neonatal mortality in vaginal deliveries was nil as compared with 1/11 (9%) in CS deliveries.

Status at birth. Twelve out of 53 (23%) fetuses born alive had a low (< 7) Apgar score at 5 minutes. For patients for whom results were available, the mean (+SD) umbilical-artery pH was 7.22+0.13, and 6 infants were markedly acidotic (< 7.10) at birth. As a rule, clinical and biochemical conditions at birth were more favorable in the first-born infants.

Short-term outcome. The short-term outcomes were favorable in 30 of the 53 liveborn infants (57%). The following complications were registered (number refer to diagnoses, not to neonates, because some infants had more than one item): infection, 10 cases (8 of sepsis, of which 3 were lethal, and 2 of meningitis); RDS, 7 cases (of which 2 were lethal); 5 cases of hyperbilirubinemia, 3 of persistent ductus arteriosus, 2 of renal insufficiency, 1 of leptomeningeal hemorrhage, and 1 of spontaneous perforation of intestines. Congenital anomalies were restricted to the sextuplet set of which two infants had strabismus and one was afflicted by a tracheo-esophageal fistula which was corrected surgically at the age of 3 weeks.

Long-term outcome was favorable in all surviving children, except in one that had suffered from viral encephalitis at the age of 3 months.

DISCUSSION

It is obvious that abdominal delivery carries more risks for the mother compared with vaginal delivery. More important, however, is whether perinatal outcome is significantly improved by a more liberal use of CS.

In a first attempt to answer this question we compared our data with those in the literature. These data (Tables 5A and 5B) show that there is no consistent relationship between CS rate and mortality rate; this is even more clear for the corrected figures which clinically is the most important subgroup (Table 5B). If for each published series we compare the mortality rates of CS and vaginal delivery groups, abdominally-born infants tend to have a better outcome, except in our own material. For this discrepancy no explanation can be offered, but selection of patients for either route of birth probably plays a role here. The same conclusion holds for literature data concerning the higher order births (Table 6).

Another approach to answer the above question was to analyse our individual case report and such analysis obviously produced a negative answer (Table 7). It is clear, however, that earlier transfer of cases 5 and 14 might have given us a better chance to delay labor, thus possibly improving neonatal outcome.

Case no. 8 was sent to our hospital at 30 weeks of gestation in a desperate state (essential hypertension, anasarca, weight gain 33 kg) and labor had to be induced without delay; here also better antenatal care might have had a positive effect on the neonatal

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Table 5A – Literature data

Reference	Prematurity rate (<36 weeks)	CS rate (%)	Perinatal mortality			Neonatal mortality		
			Overall	CS	Vaginal	Overall	CS	Vaginal
Pheiffer and Golan 1979	92[a]	2	19	100	18	18	100	16
Michlewitz et al 1981	66	7	13	0	14	9	0	10
Daw 1978	57	14	31	0	36	22	0	22
Itzkowitc 1979	66	15	23	0	27	19	0	23
Own series	68	19	20	15	21	15	8	17
Holcberg et al 1982	74	32	31	3	44	24	0	36
Loucopulos and Jewelewicz 1982		42	15	5	10	8[c]	5[c]	10[c]
Ron-El et al 1981	72[b]	44	18	6	12	8	3	11
Deale and Cronje 1984	?	14	?	?	?	?	10	16

[a] Prematurity = birthweight < 2500 g.
[b] Prematurity = < 37 weeks gestation.
[c] Neonatal death in pregnancies > 28 wks.

Table 5B – Literature data

Reference	Correction criteria applied	Perinatal mortality			Neonatal mortality		
		Overall	CS	Vaginal	Overall	CS	Vaginal
Pheiffer and Golan 1979	>1000 g	13					
Michlewitz et al 1981	>28 wks	7			5		
Own series	>1000 g and >28 wks	7	9	6	3	9	0
Loucopulos and Jewelewicz 1982	>28 wks	8			8	5	10
Ron–El et al 1981	>28 wks and >1000 g	14			8		

outcome. All this shows that the question asked in the title of this paper is in fact a secondary one because probably the most important single factor which influences neonatal outcome of triplets and higher order births is their degree of maturity. Taking this factor into account, Ron-El [21] found that "perinatal mortality according to the gestational group was similar regardless of the mode of delivery".

These considerations highlight the importance of proper perinatal care in preventing very preterm birth in triplet and higher order gestations. The efficacy of the methods proposed is equivocal. However, although this series is much too small to draw conclusions on the value of bedrest/uterolysis, we nevertheless wish to mention that in 8 out of the 10 triplet births (cases 1-4, 6, 7, 9, 10) and in 5 out of the 6 higher-order births (cases 11-13, 15, 16) thus treated, the duration of gestation was extended by 3 to 12 (mean 7.7 weeks) and by 5 to 13 weeks (mean 7.6 weeks), respectively.

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Table 6 – Literature data on higher order births. Duration of pregnancy > 20 weeks, birthweight > 500 g

Reference	No. of infants	No. of stillbirths	No. of neonatal death (7 days)
CS deliveries			
Fullerton et al 1965	4	0	0
Salisbury et al 1977	4	0	3
	4	0	1
Shennan et al 1979	4	0	0
Riley 1979	4	0	0
Neri et al 1981	5	0	0
Botha et al 1981	5	0	0
Muechler and Haung 1983	5	0	0
Schenker et al 1981	51	1	4
Total	86	1	8
Perinatal mortality = 10%; neonatal mortality = 9%			
Vaginal deliveries			
Dafoe 1934	5	0	0
Berbos et al 1964	5	0	0
Keast and Cooper 1967	5	0	0
McFee et al 1974	4	0	1
	4	0	0
Bieniarz et al 1978	4	0	0
	4	0	3
Schenker et al 1981	23	0	5
Total	54	0	9
Perinatal mortality = 17%; neonatal mortality = 17%			

CONCLUSIONS

Only a multicenter prospective randomized trial could eventually answer the question of the optimal delivery route for triplets and higher-order births. Whatever the route of delivery, only proper antenatal supervision and improved prevention of preterm birth may decrease neonatal mortality rates. We suggest that (in the absence of obstetrical contraindications) vaginal delivery is indicated for triplet and higher-order births, not in the least to improve maternal outcome.

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Table 7 – Could abdominal delivery have improved perinatal outcome?

Patient no.	Antenatal care	Start of labor	Improvement possible?
1	bedrest + oral ritodrine	PROM (36 wks)	No
2	bedrest + oral indomethacin	PROM (36 wks)	No
3	bedrest + I.V. ritodrine	elective induction of labor with PGE_2 (37 wks)	No
4	bedrest	spontaneous labor (37 wks)	No
5	transfer for threatened preterm labor at 27 weeks gestation: stitch torn through cervix → removal of stitch + I.V. ritodrine	in labor at wk 28 notwithstanding tocolysis	No
6	bedrest + oral indomethacin	spontaneous labor (35 wks)	No
7	bedrest + rectal indomethacin	spontaneous labor (35 wks)	No
8	transfer for essential hypertension (+anasarca and 33 kg weight gain) at 30 wks	induction (PGE_2) for medical reasons at 30 weeks	No
10	bedrest + I.V. ritodrine + rectal indomethacin	spontaneous labor (33 wks)	No
11	bedrest + I.V. ritodrine + oral indomethacin	tocolyisis stopped at 35 wks, spontaneous labor at 36 wks	No
12	bedrest + I.V. ritodrine + oral indomethacin	induction for medical reasons (toxemia of pregnancy) at 33 wks	No
14	cerclage at 15 wks. Transfer at 26 wks for preterm labor. Bedrest + I.V. ritodrine + oral indomethacin	Notwithstanding tocolysis, spontaneous labor at 27 wks	No
15	bedrest	spontaneous labor at 25 wks	No

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Correspondence: Dr. Michael Thiery, Department of Obstetrics, University Hospital, De Pintelaan 185, B-9000 Gent, Belgium.

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