



## **Perinatal Deaths in Twin Pregnancy: A 22-Year Review**

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**Abstract.** Changes in the management of 1120 twin pregnancies delivered in Tampere University Central Hospital during the years 1964-1985 were studied, together with changes in the pattern of perinatal deaths. Perinatal mortality decreased from 7.4% in 1964-68 to 3.5% in 1981-85. There were no significant changes in stillbirths. The decrease of perinatal mortality resulted from a reduction in early neonatal deaths, mainly those due to respiratory distress syndrome. Changes in obstetric management include earlier diagnosis by ultrasound, intrapartum monitoring, and an increase in cesarean section rate from 4% to 32%. There is still a need for a reduction in the number of very early preterm births, and for more effective intrauterine supervision of twin pregnancies.

**Key words:** Perinatal mortality, Twin pregnancy, Birth weight, Gestational age

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### **INTRODUCTION**

In Finland perinatal mortality (PNM) has decreased from 24.8 in 1964 to 7.3 per 1000 in 1982 [21]. However, the twin pregnancy, with its major problems of preterm delivery and intrauterine growth retardation (IUGR), continues to be a significant problem with PNM markedly higher than in singleton pregnancy [15,16]. Much has been written about how to prevent preterm labour. All reports agree that early diagnosis is most important [9,16], but not all recommend routine bed rest, cerclage or prophylactic tocolytic therapy to postpone the day of delivery [5,9,16,22]. There are difficulties involved in the intrauterine supervision of twins. Here hormonal detriments are not useful, since they provide information about both twins simultaneously and indiscriminately [7]. Ultrasonography and monitoring of fetal heart rates are the most reliable methods of supervision [6,14,17]. Several studies have shown advantages for cesarean section (CS) in reducing birth asphyxia

and PNM in very premature twins and in twins presenting as breech [1,11]. Others have cast doubt on the value of CS in improving the outcome [2]. This study considers the various changes made in the management of twin pregnancies, together with their outcome in terms of PNM and the causes of death, when such mortality did occur, over a period of 22 years.

## MATERIALS AND METHODS

A total of 1130 pregnancies delivered during the years 1964-1985 in Tampere University Central Hospital involving two fetuses, each with a birth weight of 500 g or more, were included in the study. Ten cases were omitted because of missing information. The incidence of twins in the 91,887 pregnancies delivered in the hospital was 1.2%. The population of the hospital ward area is about 400,000. Our hospital is the only one in the town with maternity services and it also serves as a reference centre for high-risk pregnancies from 6 other towns and 27 rural communes.

All the available obstetric and neonatal hospital records, as well as the pathological records in all cases where autopsies were held on lost infants, were reviewed, coded and entered into the computer. Changes in management and outcome were studied over four periods: 1964-68, when there were 283 twin deliveries; 1969-74 with 292; 1975-80 with 329, and 1981-85 with 216. The significance of the differences was tested by the chi-square test.

The supervision of pregnancy and labour improved markedly over these years. Amnioscopy and fetal scalp pH measurements have been made since 1967, urine estriol from 1968, radioimmunoassays of estriol and human placental lactogen from 1977, ultrasound examinations from 1972. The first cardiocography was obtained in 1972. The CS rate in all deliveries increased from 6% in 1964 to 10% in 1985. The PNM declined from 21.9% to 8.7%, respectively. Gestational age was calculated as the number of completed weeks.

A stillbirth was defined as a newborn, weighing 500 g or more, that after delivery showed no evidence of life. An early neonatal death was a death within 7 days. The PNM included all stillbirths and early neonatal deaths.

## RESULTS

As shown in Table 1, increasing use of ultrasound has allowed an earlier diagnosis of twins. Cerclage of the uterine cervix, seldom performed during the first five years under study, became more popular in 1970. It was performed in 12% of twin pregnancies during the period 1975 to 1980, but during the last years under study the rate again decreased to 6%. Elective hospitalization for bed rest, usually prescribed after the 31st week, also increased during the 1970s when half of the mothers were hospitalized for more than three weeks. After 1982 this routine hospitalization was abandoned and mothers were admitted for bed rest only if there appeared complications. The percentage thus decreased to 30%. Delivery by CS occurred in 4% of twins delivered in 1964-1968 and thereafter increased progressively to 32% in 1981-1985. The higher CS rate was primarily for malpresentation.

Table 1 - Changes in the management and outcome of twin pregnancy during four different periods of time

	1964-68	1969-74	1975-80	1981-85	P
Diagnosis					
< 20 wk (%)	0.3	0.7	48	64	< 0.001
< 30 wk (%)	15	31	76	93	< 0.001
Hospital rest					
> 20 day (%)	16	30	50	30	< 0.001
Cerclage (%)	1	5	12	6	< 0.001
Preterm delivery (%)	49	47	45	44	NS
Delivery					
< 32 wk (%)	15	13	9.1	9.7	< 0.05
C/S rate (%)	4	9	23	32	< 0.001
Low birth weight (%)	40	42	38	40	NS
Very low birth weight (%)	7	7	5	7	NS

Table 1 also shows that there were no significant changes in the frequency of preterm deliveries (those delivered before 37 completed weeks), whereas the number of those delivered before 33 completed weeks almost significantly decreased ( $P < 0.05$ ). The percentage of low-birth weights (less than 2500 g) and very low birth weights (less than 1500 g) remained the same over the period, at 40% and 7% respectively.

The PNM of twins decreased from 7.4% to 3.5%. As shown in Fig. 1 the difference

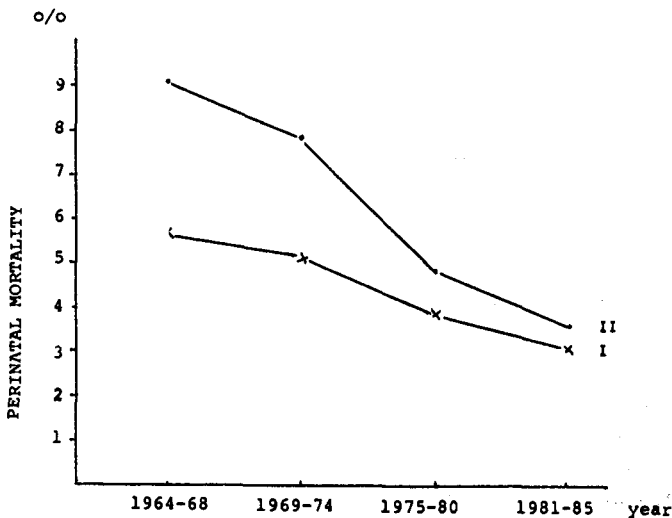


Fig. 1 - Trend in perinatal mortality of twin I and twin II during four different periods of time.

in the mortality expectation of the first and second twin (that of the second originally being nearly twice as high), has almost vanished. Fig. 2 and 3 show that the improved result was primarily due to a decrease in the early neonatal mortality of the second twin.



Fig. 2 - Trend in fetal mortality of twin I and twin II during four different periods of time.

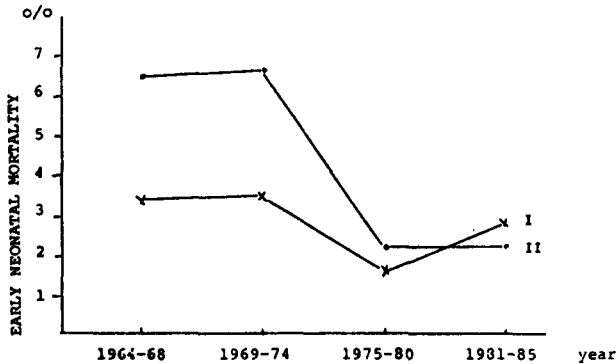


Fig. 3 - Trend in early neonatal mortality of twin I and twin II during four different periods of time.

Table 2 shows the causes of stillbirth over the four different periods of time dealt with by the study. Those attributable to the mother – diabetes mellitus, preeclampsia, hepatogestosis, maternal isoimmunisation – were few. None was recorded during the last of the four periods. In most cases the cause was found in the afterbirth. Velamentous insertion of the cord and abruption of the placenta accounted for more than half of these causes, the others being feto-fetal transfusion, compression of the cord and placental infarction. The most common single cause of stillbirths was malformation, accounting for 18% of the causes. In 10 cases the cause of death remained unexplained, although for reasons that remain obscure, anoxia was reported in 7 of these cases. Three of the cases of death from unexplained causes occurred during the first two periods under study, in the years 1964-74. In 2 of those cases the weight at birth was more than 1500 g. The remain-

Table 2 - Causes of stillbirth in twins during four different periods of time

Cause	1964-68	1969-74	1975-80	1981-85
Maternal disease	4	3	1	
Fetal malformation	4	1	1	2
Fetal infection	2			
Placental reasons	4	3	8	2
Hypoxia for unexplained reasons	1	1	5	
Unexplained reason		1	2	
Total	15	9	17	4

ing cases – in 6 of which the birthweight was more than 1500 g – occurred during the last two periods, from 1975 to 1985.

The causes of early neonatal death are listed in Table 3. Extreme prematurity, involving infants born with a birth weight of less than 1000 g, accounted for 23% of the mortality with no improvement taking place over the years. The most common cause of early neonatal death was respiratory distress syndrome (RDS), which accounted for 44% of the losses. Altogether, 8 first- and 28 second-born twins were lost. During the first five years, 1.8% of the first-, and 5% of the second-liveborn twins were lost because of RDS; but during the last five years the figure was 0.5% for both twins. Malformations accounted for 6% of the early neonatal mortality and thus for 10% of the total PNM. Birth trauma, a tentorial tear, was stated as the cause of death in one first-born twin delivered vaginally in breech presentation. Asphyxia neonatorum accounted for 10% of the losses, none however of these were delivered during the last five years. All of these infants had been delivered vaginally. The deliveries were complicated, in the case of the first twin, with tight loops of the cord; in the case of second twin, twice with velamentous

Table 3 - Causes of early neonatal death in twins I and II during four different periods of time

Cause	1964-68		1969-74		1975-80		1981-85	
	I	II	I	II	I	II	I	II
Extreme prematurity	1	1	3	4	3	2	3	1
Respiratory distress syndrome	5	14	2	10		3	1	1
Pulmonary hemorrhage		2	1		1			
Neonatal asphyxia	2	1		2		2		
Birth trauma			1					
Infection			2	2	1			3
Malformation	1		1	1			2	
Total	9	18	19	10	5	7	6	5

insertion of the cord, twice with prolapse of the cord, and once with difficulties during assisted breech delivery. Infection accounted for 10% of the early neonatal loss; 3 first-born and second-born twins were lost.

## DISCUSSION

The results of the study show that the mortality of twins has declined in line with the decline found in all pregnancies delivered in our hospital and overall in Finland. There are many factors that contribute to the overall improved survival and the importance of a single factor on the obstetrical results is very difficult to estimate. One of the most important might be better standards of living: nutrition, the general state of health and the general level of education, have all improved. Further, mean maternal age has increased, with fewer very young mothers, and high parity has decreased [20]. Pregnancies are obviously better planned. At the same time, the development of maternity welfare centres with their well-educated personal, good cooperation with hospitals and ability to arrange for the centralisation of risk pregnancies also contributes to the better outcome. Other important factors are the developments which have taken place in obstetric practice and newborn care.

Almost no change was found in the fetal mortality of twins; and the main factor accounting for the decrease was the decline in early neonatal mortality and especially in mortality due to RDS, that is to say, prematurity, as other researchers have also reported [2,16]. Neonatal survival has remarkably improved due to advances in the care of respiratory and circulatory problems of premature infants; but some improvement was also found in the prolongation of pregnancy, as seen in the reduction of the number of twins delivered before the 33rd week of gestation.

We agree with other reports [9,16] that early diagnosis is most important. It seems that knowing that a twin pregnancy is likely, with its risk of premature delivery and IUGR, makes it easier to take appropriate action and diminishes the risk. When the policy of hospitalizing mothers for bed rest at the 32nd week was abandoned there was no worsening, but rather an improvement in the prolongation of pregnancy. Thus we could not see any adverse effect of giving up elective routine hospitalization or suturing of the cervix. Both methods have also been found to be ineffective in control studies [5,22]. An important consideration here is that, when hospitalization was the policy, this began after the 31st week; but by this time most premature infants (and it is these who run the greatest risk of not surviving) have already been delivered. In twin pregnancy, lung maturation is known to begin earlier as compared to singleton pregnancy [13]. In many cases the weeks of danger, during which the infant, if delivered, was likely to develop RDS, were already over when rest was initiated. If bed rests is to be effective it should be initiated earlier, around the 25th week, as other researchers have also concluded [10].

The observation that the incidence of fetal mortality has changed only slightly agrees with other reports [2]. The most important thing is to detect IUGR, which often affects only one fetus and carries an elevated risk. The measurement of biparietal diameters alone is not sensitive enough to detect these high-risk pregnancies [6]. There are promising reports about umbilical blood flow measurements in twin pregnancies [8]. The method allows identification of faulty fetoplacental circulation, in most cases connected

with IUGR. Thus fetuses at risk for IUGR can be identified, and more effective surveillance focused on one twin with biophysical profile and cardiotocographic monitoring [14,17].

The increased risk of the second twin of not surviving vanished during the years under study; and this resulted mainly from the reduction in neonatal deaths due to RDS. RDS is not only common in twins but is more severe in second-born ones [4,12]. One factor may be the degree of depression at birth. Quirk et al [18] have demonstrated that avoidance of a stressful labour, coupled with a-traumatic delivery, is as effective as glucocorticoids in reducing the incidence of RDS. Kelly et al [12] have shown that asphyxia as measured by cord blood pH, is not related to the development of RDS, but that other factors, such as increased physical manipulation during delivery, may be responsible for both the increased depression of the second twin at birth and the frequent development of RDS.

According to Apgar scores, vaginally delivered second twins are twice as frequently depressed than first twins, while after CS no difference is found and vaginal delivery by breech increases the risk of depression for both twins [15]. Thus, although the role of asphyxia in the etiology of RDS is obscure, we feel that the more liberal use of CS in premature and breech twins contributes to the improved outcome. On the other hand, the skillful conduct of vaginal delivery helps to prevent complications and traumatic delivery. The reliable monitoring now available helps to single out those cases where very active intervention is needed. Undue hast in the delivery of the second twin may only lead to cord prolapse and traumatic delivery. An interdelivery interval has been reported not to have any adverse effect on the PNM of the second twin now that electronic monitoring is in common use [19].

The PNM of our twins was found to decrease continuously with advancing gestational age. Prolongation of gestation over 39 weeks is, however, considered to increase the risk of IUGR and PNM [3]. Although we did not report any deaths in pregnancies delivered after the 39th week, we feel that induction of labour is indicated in these cases.

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