



# **Perinatal Profile of Twin Pregnancies: A Retrospective Review of 11 Years (1969–1979) at Hôpital Notre-Dame, Montréal, Canada**

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Four hundred and thirty four twins occurring in 220 women were studied during a period of 11 years (1969–1979) at Notre-Dame Hospital.

Perinatal mortality (< 28 days) was compared before and after 1974, and the impact of ultrasound technique upon perinatal outcome was assessed during the second period (1974–1979). The main factor associated with perinatal mortality was low birth weight caused by either prematurity or intrauterine growth retardation.

While fetal mortality remained unchanged within the two study periods, neonatal mortality decreased from 68.2/1,000 to 28.9/1,000 mainly due to increased survival rate of twins below 1,500 g at birth.

With identical perinatal care during the same period, perinatal mortality and incidence of intra-uterine growth-retarded twins remained unchanged despite early diagnosis by ultrasound.

**Key words:** Twins, Perinatal mortality, Fetal mortality, Neonatal mortality, Prematurity, Intrauterine growth retardation, Respiratory distress syndrome, Ultrasound

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## **INTRODUCTION**

Twin pregnancies are associated with high rates of neonatal mortality, prematurity, and structural defects [2, 8]. Early diagnosis has been suggested as an important factor to improve outcome of these high-risk pregnancies [7]. Two hundred twenty twin pregnancies delivered in our institution from 1969 to 1979 were reviewed.

The purpose of this 11-year retrospective study was to look at the perinatal outcome during the entire period and to compare the outcome before and after 1974, the year of introduction of ultrasound technique and changes in perinatal care in our institution.

## MATERIALS AND METHODS

Medical records of 417 neonates were reviewed together with a set of conjoined twins (418 live births).

There were 16 fetal deaths; five embryonic losses were excluded from the study. Therefore, only 434 medical records were examined in order to assess the total perinatal mortality (up to 28 days), the neonatal mortality by weight, the incidence of respiratory distress syndrome, and the incidence of intrauterine growth retardation, together with the prevalence and type of congenital anomalies.

Respiratory distress syndrome (RDS) was diagnosed when two criteria were met (Table 1). Intrauterine growth retardation (IUGR) was defined by a birthweight less than 2 SD from the mean birth weight of singleton population in Montreal [11].

Congenital defects such as metatarsus varus, undescended testis, and hernia were excluded, but all congenital defects, including fetal deaths, were part of the analysis. There were 207 live births in the first study period (1969–1973) and 211 in the second (1974–1979).

Statistical analyses were made by chi-square method and Fisher's exact test [9].

## RESULTS

### Perinatal and Fetal Mortality

Perinatal deaths associated with congenital anomalies were excluded. All but one resulting from amniotic band disruption will be presented in Table 11.

There were 32 perinatal deaths, 20 during the first study period and 12 during the second (Table 2). The corrected fetal mortality was 30.1/1,000, 28.17/1,000 and 32.1/1,000 during 1969–1979, the first and the second study period, respectively. These differences were not significant.

Factors associated with fetal deaths were intrauterine growth retardation in seven out of 13 cases ( $\approx 54\%$ ), nuchal cord in one case, and possible intrapartum infection (funiculitis on one set of twins). In three cases, one set of twins born at 32 weeks of gestation, and a first-born twin delivered at 35 weeks, no associated factor was identified (Table 3).

TABLE 1. Criteria for Diagnosis of Respiratory Distress Syndrome\*

1. Clinical diagnosis by pediatrician
2. X-ray diagnosis
3. Autopsy diagnosis
4. Need for oxygen for more than 48 hours
5. Respiratory disease requiring at least one week hospitalization

\*At least two criteria needed.

TABLE 2. Perinatal Mortality\*

Period	No. of twins	Fetal deaths			Neonatal deaths			Perinatal deaths		
		(CM)	No.	Rate/1,000	(CM)	No.	Rate/1,000	(CM)	No.	Rate/1,000
1969–1973	213	(0)	6	28.17	(2)	14	68.2	(2)	20	94.7
1974–1979	221	(3)	7	32.1	(2)	5	23.9	(5)	12	55.5
1969–1979	434	(3)	13	30.1	(4)	19	44.8	(7)	32	75

\*Congenital malformations (CM) excluded.

TABLE 3. Factors Associated With Fetal Deaths (1969–1979)

Factor	No. of deaths
IUGR	7
Infection	2
Nuchal cord	1 (IUGR)
Mother's death	2 (1 IUGR)
Unknown	3

When studied over the entire period, infants of mothers who had ultrasound (US) performed during pregnancy had a lower perinatal mortality rate (42.8/1,000) than those infants whose mothers did not have ultrasound (90.5/1,000) ( $\chi^2 = 3.123$ ,  $0.05 < P < 0.1$ ;) as shown in Table 4. Only two mothers had ultrasound technique between 1969 and 1973. The same evaluation limited to the second study period did not reveal any difference in perinatal, fetal, and neonatal outcome between infants of mothers who had or did not have ultrasound performed (Table 5).

### Neonatal Mortality

There were 23 neonatal deaths (< 28 days) during the entire period. Neonatal mortality rate was 44.8/1,000, if we exclude four neonatal deaths associated with congenital malformations. During the first study period, neonatal mortality rate was 68.2/1,000 and during the second period, 23.9/1,000 ( $\chi^2 = 3.65$ ,  $0.05 < P < 0.1$ ; Table 2). The mortality rate of infants weighing between 1,001 and 1,500 g at birth dropped from 444/1,000 during the first study period to 55/1,000 during the second (Fig. 1:  $\chi^2 = 6.01$ ,  $P < 0.02$ ).

The main cause of death was prematurity (17/19). The mean gestational age was  $28.3 \pm 2.9$  weeks, and mean birth weight was  $1,167 \pm 375$  g. Factors associated were RDS (17/19), severe asphyxia (Apgar score less than 5 at one minute, 16/19), and intracranial hemorrhage in six cases (two of which occurred in term infants). About 63% of deaths occurred in the second twin, and abnormal presentation at delivery was reported in 58% of all neonatal deaths (Table 6). No statistically significant difference was observed between neonatal mortality rates when mothers had or did not have ultrasound between 1974 and 1979.

### Respiratory Distress Syndrome

Respiratory distress syndrome (RDS) was diagnosed in 46 cases. In the study first period, the incidence was 11.6%, whereas during the second it was 10.4% of all live births. Thirteen neonatal deaths were associated with RDS during the first and four during the second study (Table 7).

Use of  $\beta$ -methasone for twin pregnancies in premature labor began in 1977 according to the protocol of Liggins and Howie [3]. Of the nine women enrolled in this protocol, only five received a full course of  $\beta$ -methasone. No RDS was recorded in their ten subsequent neonates born before 34 weeks of gestation. During the same period, from 1977 to 1979, the incidence of RDS in infants born before 34 weeks of gestation whose mothers received no  $\beta$ -methasone or incomplete therapy was 75% ( $P = 0.0004$ , Fisher's exact probability, Table 8). Of interest, no twin died from RDS from 1977 to 1979.

TABLE 4. Impact of Ultrasound Technique (US) on Perinatal Mortality (1969–1979)

	No. of women	No. of twins	Fetal deaths			Neonatal deaths			Perinatal deaths		
			(CM)	No.	Rate/1,000	(CM)	No.	Rate/1,000	(CM)	No.	Rate/1,000
With US	73	145	(3)	4	28.1	(2)	2	14.7	(5)	6	42.8
Without US	147	289	(0)	9	31.1	(2)	17	61.1	(2)	26	90.5

TABLE 5. Impact of Ultrasound Technique (US) on Perinatal Mortality (1974–1979)

	No. of twins	Fetal deaths			Neonatal deaths			Perinatal deaths		
		(CM)	No.	Rate/1,000	(CM)	No.	Rate/1,000	(CM)	No.	Rate/1,000
With US	137	(3)	4	29.8	(1)	3	23.2	(4)	7	52.6
Without US	84	(0)	3	35.7	(1)	2	25	(1)	5	60.2

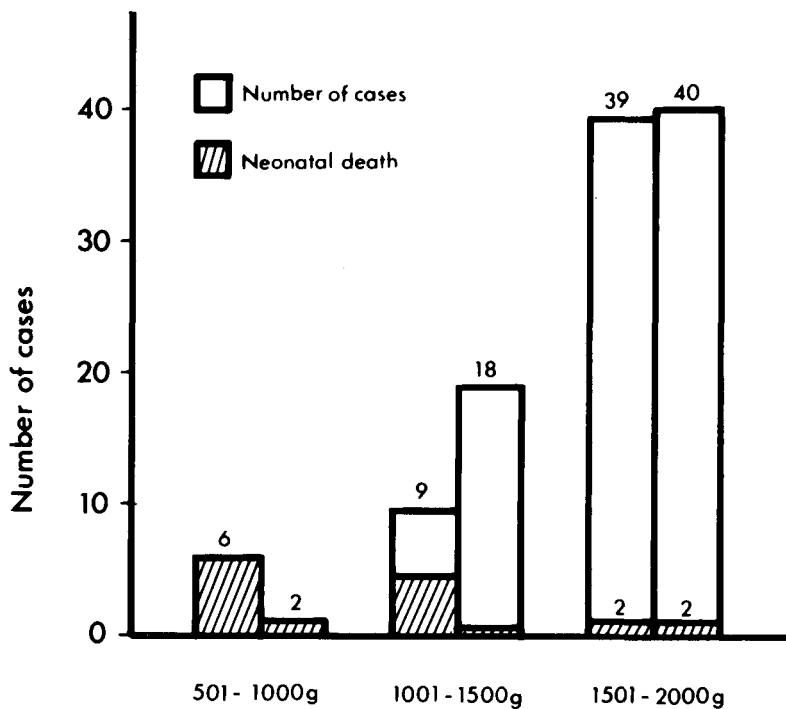


Fig. 1. Birth weight distribution and neonatal deaths in infants less than 2,000 g (1969–1979).

TABLE 6. Characteristics of Neonatal Deaths\*

Severe asphyxia	16
Intracranial hemorrhage	6
Second twin	12
Abnormal presentation	11
RDS	17

\*Nineteen deaths.

TABLE 7. Deaths From RDS

Period	No. of live twins	No. of RDS	$\bar{x}$ Birth weight (g) $\pm$ 1 SD	Deaths from RDS
1969-1973	207	24	1730 $\pm$ 664	13
1974-1979	211	22	1650 $\pm$ 463	4

TABLE 8. RDS Deaths With and Without  $\beta$ -Methasone

	Women	Fetuses	RDS	Deaths
With $\beta$ -methasone	5	10	0	1 (CM)
Without $\beta$ -methasone or incomplete prevention	6	12	9	0

### Intrauterine Growth Retardation

The prevalence of IUGR declined from 25.8% before 1974 to 15.7% thereafter ( $\chi^2 = 6.70$ ,  $P < 0.01$ ). Perinatal deaths associated with IUGR dropped from 127/1,000 to 57.1/1,000 (Table 9).

During the entire period, mothers who had ultrasound examinations performed had fewer infants with IUGR (14.4%) than mothers who did not (23.9%) ( $\chi^2 = 5.32$ ,  $P < 0.005$ ; Table 10). The same difference was not found when this was studied only during the second period (Table 10).

### Congenital Malformations

The prevalence of major congenital malformations was 23/1,000 (10/34) between 1969 and 1979, excluding five early embryonic losses (Table 11). The prevalence rate in the first study period was 18.7/1,000 (4/213) and 27.1/1,000 (6/221) during the second. Various anomalies were encountered but defects of the central nervous system accounted for 60% of all problems (Table 11).

The perinatal mortality rate due to congenital malformations was 13.8/1,000, four times higher than the rate in our singleton population (unpublished data). In all but one case, only one twin was affected.

TABLE 9. IUGR and Associated Perinatal Deaths

	1969–1973		1974–1979	
	No.	Rate	No.	Rate
Population	213		219	
IUGR	55	25.8%	35	15.8%
Fetal deaths	5		2	
Neonatal deaths	2		0	
Perinatal deaths	7	127/1,000	2	57/1,000

TABLE 10. Impact of Ultrasound (US) Technique on Incidence of IUGR

Period	US	No. US
1969–1979		
Population	146	289
IUGR	21 (14.4%)	69 (23.9%)
$(\chi^2 = 5.32, P < 0.05)$		
1974–1979		
Population	142	84
IUGR	20 (14%)	15 (17.6%)
(NS)		

TABLE 11. Congenital Malformations (1969–1979)

Embryonic losses	No.	Type of malformations	No.
Abortion (20 wks)	1	Conjoined twins	1 <sup>a</sup>
Papyraceus twins	3	Craniosynostosis	2
Amorphous twin (acardiac)	1	Hydrocephaly	2 <sup>a</sup>
		Anencephaly	2 <sup>a</sup>
		Hypoplastic right heart	1 <sup>a</sup>
		Hypospadias	2

<sup>a</sup>Lethal.

## DISCUSSION

Congenital abnormalities accounted for 18% of all deaths. Neural tube defects, mainly anencephaly and hydrocephaly, were preeminent in this small group, a fact reported by others [4].

The largest single factor associated with perinatal deaths was low birth weight: 54% of fetal deaths occurred in growth-retarded fetuses and 68% of neonatal deaths occurred in premature infants born before 32 weeks of gestation.

When both study periods were compared, a decrease in neonatal mortality was observed after 1974 despite an identical average length of pregnancy and the same incidence of RDS. Meanwhile, however, survival rates for infants weighing between 1,001 and 1,500 g at birth had increased significantly. Recent improvements in neonatal care for the very low birth weight infants are an important factor in the decrease in twin mortality as has been the case for singleton mortality during the same period [10].

Use of  $\beta$ -methasone has decreased the incidence of RDS from 1977 to 1979. However, the impact of this preventive measure on the outcome of premature twins cannot be seen from this study due to our small number of cases.

Improvement in antenatal care, as reflected by the increase in antenatal hospitalizations during the second period, may have contributed to better monitoring of fetal well-being and possibly enhanced fetal growth [1].

The impact of ultrasound technique on perinatal outcome is difficult to assess because major improvements in perinatal care have occurred in the same time that this technique was introduced. The fact that ultrasound technique over the same period did not promote any change in the prevalence of IUGR, as well as perinatal mortality, suggests that the recognition of multiple gestation during pregnancy does not influence its immediate outcome.

Specific perinatal interventions for twin pregnancies, such as preventive hospitalizations, use of tocolytic agents, and increased use of cesarean section for delivery of preterm twins, are measures that need to be evaluated in the prospect of reducing twin mortality to the level of singleton mortality [5, 6].

## CONCLUSION

Improvements in perinatal care since 1974 have decreased neonatal mortality in twins.

Use of ultrasound to diagnose multiple gestation had no effect on perinatal mortality; its routine use needs to be assessed further.

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