



Acta Genet Med Gemellol 34: 193-199 (1985)
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Paper presented at the
Third International Workshop on Multiple Pregnancies, Malmö, Sweden, 1984

An Assessment of Perinatal Mortality in Twin Pregnancies in Dundee

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Abstract. An analysis of all perinatal deaths occurring in twin pregnancies in Dundee women from 1956 to 1983 was performed. The uncorrected perinatal mortality rate fell from 116/1000 births in 1956-60 to 16/1000 births in 1981-83, this fall almost entirely taking place after 1975. Causes of death were identified using the Aberdeen Classification and a reduction in deaths in all cause groupings occurred. About half of the deaths were in the Premature, Cause Unknown group and a marked decrease in deaths in this group made the largest contribution to the improved perinatal mortality rate. This fall was partly due to a reduction in the incidence of extreme prematurity and low birth weight. Changes in obstetric management which may have influenced outcome included the introduction of routine early pregnancy ultrasound scanning, the use of tocolytic drugs, intrapartum fetal monitoring, epidural analgesia and an increase in Caesarean section rate from 2% in 1956-60 to 39% in 1981-83.

Key words: Twin perinatal mortality, Prematurity, Ultrasound scanning, Tocolytic drugs, Epidural analgesia, Intrapartum monitoring, Twin Caesarean section

INTRODUCTION

The perinatal mortality rate in twin pregnancies in the past has been markedly higher than in singleton pregnancies [8,11,14]. However, in recent years in Dundee we noted that a dramatic fall in twin perinatal deaths had occurred. In an attempt to identify contributory factors, a detailed study of all twin pregnancies in Dundee since 1956 was performed.

MATERIALS AND METHODS

A retrospective study of twin pregnancies in Dundee resident women between the years 1956 and 1983 was performed by extracting information from record cards containing the significant details of each twin pregnancy. All twin pregnancies resulting in the delivery of a live infant at any gestation, or stillborn infants at or beyond 28 weeks gestation, were included. The pregnancies were divided into five-year periods from 1956 to 1980 and the years 1981 to 1983 formed the final period under study. The Perinatal Mortality Rate was calculated from the number of stillbirths plus first-week deaths.

Causes of perinatal death were identified using the Aberdeen Classification [1]. Deaths in babies weighing less than 2500 g in which no complication of pregnancy other than the early onset of labour or low birthweight was identified, the Premature, Cause Unknown group, were divided into immature (normal weight for gestation) and growth retarded (below the 10th centile for singleton pregnancy on the charts of Gairdner and Pearson [2]). Deaths of babies weighing 2500 g and over in which no maternal complication was identified were classified as Mature, Cause Unknown. Trauma deaths included all cases of cord complications and traumatic delivery. Pregnancy associated hypertension was described as Toxaemia and other forms of hypertension were included in Maternal Disease.

RESULTS

The perinatal mortality rate in twin pregnancy in all periods was markedly higher than the total perinatal mortality rate (Table 1), but the twin rate decreased from around five times that of the singleton in the earlier years to twice the singleton rate in 1981-1983. No significant reduction in twin perinatal mortality rate occurred prior to 1976-1980, although a steady reduction in the total number of twin pregnancies was noted after 1965 (Table 2) in association with a fall in total birth rate.

Classification of deaths

The results obtained on grouping the perinatal deaths by the Aberdeen Classification [1] are shown in Table 3. The majority of deaths in the Fetal Deformity group were due to neural tube defects with cardiac and gastrointestinal abnormalities being responsible for the remaining deaths. When Fetal Deformity deaths are excluded from the total perinatal mortality rate it is noted that the marked fall in perinatal mortality in normal infants was achieved between 1971-75 and 1976-80, when the rate fell from 92/1000 to 25/1000 births.

The Premature, Cause Unknown group accounted for about half of all perinatal deaths until 1980, thereafter being the only cause of death. The marked reduction in the number of these deaths made the largest single contribution to the improvement in twin perinatal mortality. On subdividing this group (Table 3), it is seen that in the earlier years the majority of deaths occurred in normal weight for gestation infants.

Deaths due to antepartum haemorrhage and trauma made an important contribution to the total in the earlier years but were eliminated by 1976.

Distribution of Birthweight and Gestation

For each quinquennium the distribution of normal twin births by weight was calculated

Table 1. Total and Twin Perinatal Mortality Rates

Years	Perinatal deaths/1000 births	
	Total	Twin
1956-60	32	116
1961-65	27	124
1966-70	22	112
1971-75	19	101
1976-80	12	43
1981-83	8.6	16

Table 2. Number of Twin Births and Perinatal Deaths

Years	Total births	Perinatal deaths
1956-60	424	49
1961-65	436	54
1966-70	268	30
1971-75	218	22
1976-80	162	7
1981-83	124	2

Table 3. Causes of Perinatal Mortality in Twin Pregnancy (Rate per 1000 Births)

Cause	Years					
	1956-60	1961-65	1966-70	1971-75	1976-80	1981-83
Fetal Deformity	16.4	11.5	7.4	9.2	18.5	
Premature, Cause Unknown						
Immature	30.5	46.0	33.5	36.7	6.2	8.1
Growth Retarded	21.1	20.7	26.0	27.5	12.4	8.1
Mature, Cause Unknown	4.7	2.3	3.7			
Antepartum Haemorrhage	14.1	2.3	14.9	13.8		
Trauma	11.7	9.2	11.2	9.2		
Toxaemia	2.4	16.1	7.4	4.6		
Maternal Disease		13.8	3.7			
Rhesus	4.7		3.7			
Other	9.4	2.3			6.2	

(Table 4). In each period between 50% and 60% of infants weighed less than 2500 g compared with around 8% of singletons. Although there was no change in the incidence of birthweight under 2500 g over the study period, there was a reduction in very low birthweight infants (less than 1500 g) after 1975, from 11% to 4% of the total. Similarly, the distribution of normal twins by gestation (Table 5) showed a reduction in the percentage of infants delivered at or before 28 weeks gestation after 1970 but also a reduction in the number of infants delivered beyond 38 weeks in the years 1976-83, the latter associated with an increase in elective delivery of twins prior to 40 weeks gestation.

In addition to the reduced incidence of very low birthweight and gestation infants, there was also a decrease in perinatal mortality in infants of low birthweight (Table 6) and gestation (Table 7) from 1976 onwards. This occurred in association with the elimination of perinatal death in infants weighing 2500 g and over or beyond 38 weeks gestation.

Obstetric Management

Many changes occurred in obstetric management during the period under study. In the 1960s, as the total number of births fell, antenatal care came under Consultant supervision and all patients were delivered in hospital. Routine early pregnancy ultrasound scanning was introduced after 1975, which made it possible to identify virtually all twin pregnancies before 20 weeks gestation. Prior to this time the majority of twins were diagnosed only when a pregnancy complication occurred or at delivery. Throughout the period there was a policy of admitting for rest, from 28 weeks gestation, patients with twins who were primigravida or who had developed a pregnancy complication. The earlier diagnosis of twin pregnancy in recent years resulted in an increased number of admissions to hospital for rest. The use of tocolytic drugs to inhibit or suppress uterine activity was initiated between 1965 and 1975 when 2% of patients received such drugs, the number increasing dramatically between 1976 and 1980 to 32%.

The introduction of a 24-hour epidural service by 1975 has resulted in virtually all patients with twins being delivered under epidural block and the elimination of the use of narcotic drugs in twin labour. Intrapartum fetal monitoring of both twins was also introduced around the same time.

A marked change in the choice of method of delivery of twins has also occurred (Table 8) with a marked reduction in vaginal delivery when the leading twin presented as a breech and a smaller reduction when a breech followed a vertex presentation. This resulted in a Caesarean section rate of 39% in 1981-83.

Table 4. Percentage Distribution by Weight of Normal Twins

Years	Weight (g)				
	< 1000	1000-1499	1500-1999	2000-2499	≥ 2500
1956-60	2.9	4.8	15.5	36.7	40.1
1961-65	2.3	8.9	15.9	26.2	46.7
1966-70	3.4	7.2	14.7	28.7	46.0
1971-75	1.9	10.2	13.0	31.2	43.7
1976-80	1.3	2.6	15.7	30.8	49.6
1981-83	2.4	1.6	17.7	33.1	45.2

Table 5. Percentage Distribution by Gestation of Normal Twins

Years	Gestation (weeks)			
	≤28	29-34	35-38	≥39
1956-60	2.9	16.7	50.2	30.2
1961-65	2.8	16.6	45.6	35.0
1966-70	4.9	13.6	45.7	35.8
1971-75	0.5	18.1	45.1	36.3
1976-80	0	16.4	58.5	25.1
1981-83	1.6	14.5	59.7	24.2

Table 6. Perinatal Mortality Rate (per 1000 births) by Weight in Normal Twins

Years	Weight (g)				
	<1000	1000-1499	1500-1999	2000-2499	≥2500
1956-60	1000	450	141	40	24
1961-65	1000	500	162	45	20
1966-70	889	579	51	53	25
1971-75	1000	591	71	15	0
1976-80	500	250	0	41	0
1981-83	0	1000	0	0	0

Table 7. Perinatal Mortality Rate (per 1000 Births) by Gestation in Normal Twins

Years	Gestation (weeks)			
	≤28	29-34	35-38	≥39
1956-60	883	174	53	56
1961-65	1000	282	56	40
1966-70	923	194	50	32
1971-75	1000	359	41	13
1976-80		115	11	0
1981-83	500	56	0	0

Table 8. Percentage Incidence of Vaginal and Caesarean Section Twin Delivery

Years	Vaginal		Caesarean section
	First twin vertex	First twin breech	
1956-60	78	20	2
1961-65	74	23	3
1966-70	72	18	10
1971-75	72	16	12
1976-80	64	10	26
1981-83	61		39

DISCUSSION

Until recently, perinatal mortality rates reported in twin pregnancy have been consistently high, between 80 and 120 per 1000 [8,14] and the 1977 Scottish Perinatal Mortality Survey figure of 95 per 1000 twins births [11], a rate six times that in singleton pregnancies, compared closely with the results in Dundee until 1975. The dramatic reduction in deaths in Dundee since 1975 appeared worthy of more detailed investigation in the hope of identifying factors responsible for the improvements.

Our finding that the majority of deaths were related to prematurity is in agreement with other studies [9,11] as is the increased frequency of deaths due to fetal deformity compared with singleton pregnancy [11].

During the early 1970s many changes in obstetric management occurred which individually or in combination may have been responsible for the marked improvement in pregnancy outcome in the years 1976-83. We feel the introduction of ultrasound scanning which resulted in early diagnosis of twin pregnancy was particularly valuable. Late diagnosis has been shown to be associated with a greatly increased perinatal mortality rate [6]. Ultrasound assessment of fetal growth in twin pregnancy has resulted in increased awareness of cases of intrauterine growth retardation and elective delivery in these cases may have contributed to the fall in perinatal mortality.

There has been conflicting evidence on the value of admitting patients with twins, for rest, in the prevention of premature labour. Laursen [10] showed a prolongation of pregnancy but these findings were not confirmed in other studies [14]. The value of tocolytic drugs either on a prophylactic basis or to suppress contractions has not been satisfactorily assessed in twin pregnancy, but the early diagnosis by ultrasound has alerted the obstetrician to the risk of prematurity and tocolytic drugs have been employed with the aim of prolonging pregnancy. It is of interest to note in our series that, during the time that ultrasound scanning and tocolytic drugs were employed, the incidence of very low birthweight and low gestation delivery decreased. Ingemarsson [4] has noted a similar decrease in very low birthweight and gestation in total pregnancies in Sweden since the introduction of β -receptor agonists.

New innovations in intrapartum care also appear to have contributed to the improved results. The use of continuous fetal heart rate monitoring of both twins enables fetal hypoxia to be more accurately diagnosed [13] and delivery by Caesarean section performed if necessary. We have shown in singleton pregnancies [12] that the use of epidural analgesia rather than narcotics and the avoidance of traumatic delivery in low birthweight infants resulted in a reduction in low apgar scores, hyaline membrane disease, and perinatal mortality, and we believe that adopting a similar policy in twins has resulted in the delivery of preterm infants in good condition which have an improved chance of survival with the increasing sophistication of current paediatric care.

Another marked change has been to perform Caesarean section in twins when the first presents as a breech. If the complications of preterm breech delivery are similar to those in singleton pregnancy [3,7] one could expect a similar improvement in mortality and morbidity by performing Caesarean section in these cases [3,5].

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