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## Preterm Deliveries in Twin Pregnancies in Oxford

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**Abstract.** The incidence of preterm delivery among twin maternities in Oxford between 1973 and 1983, was 39.4%. Preterm delivery was more common in MZ than DZ twins, and this was associated with higher incidence of spontaneous rupture of the membranes associated with monozygosity.

**Key words:** Preterm delivery, Twin zygosity, Spontaneous rupture of membranes, Sex ratio

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### INTRODUCTION

Preterm labour is one of the most important factors contributing to the higher perinatal mortality in twins as compared with singleton pregnancy. Furthermore, it has not yet been established why preterm labour is more common in twin than in singleton pregnancies. A recent paper by MacGillivray et al [2] attempted to shed more light on this issue by examining the relationship between preterm labour and twin zygosity in twin deliveries in Aberdeen. They found that preterm delivery was more common in MZ than DZ twins and that this was associated with a higher incidence of spontaneous rupture of the membranes. The aim of the study reported here was to replicate MacGillivray et al's study in Oxford and to assess whether the unpredicted associations they observed were confirmed.

### MATERIALS AND METHODS

A total of 609 of the 624 twin deliveries which occurred in the John Radcliffe Hospital, Oxford (which served South Oxfordshire) between January 1973 and October 1983 were

studied to determine the incidence of preterm delivery. The notes for the other 15 deliveries were unavailable for study. Preterm delivery was defined as delivery occurring before 37 completed weeks (less than 259 days). Placentation was determined by histological examination, there being 11 cases where this was not recorded.

Zygoty was deduced as follows. Twins were deemed to be MZ if the placentation was monochorionic. They were deemed to be DZ if they were of unlike sex or blood group determinations showed two like-sexed twins to have different blood groups. This still left 210 pairs of dichorionic like-sexed twins whose zygoty was unknown. All statistical analysis was done using a chi-squared test.

## RESULTS

Preterm deliveries were divided into those which followed spontaneous onset of preterm contractions, those which followed spontaneous rupture of the membranes, and those in which labour had been induced or an elective caesarean section performed (Table 1).

**Table 1 - Preterm Delivery of Twin Pregnancies in the John Radcliffe Hospital, Oxford, 1973-1983 and in Aberdeen 1968-1977**

		Oxford	Aberdeen
Total twin deliveries	N	609	624
	%	100	100
Preterm deliveries	N	240	176
	%	39.4	28.2
<i>Type</i>			
Induction of labour or elective caesarean section	N	24	31
	%	3.9	5.0
Spontaneous onset of contractions	N	125	72
	%	20.5	11.5
Spontaneous rupture of membranes	N	91	73
	%	14.9	11.7

The incidence of preterm delivery in Oxford (39.4%) was considerably higher ( $P < 0.001$ ) than that in Aberdeen (28.2%). This difference was due to the incidence of preterm delivery following spontaneous onset of preterm contractions in Oxford being twice that in Aberdeen.

The indications for the termination of pregnancy by caesarean section or induction of labour are shown in Table 2, with proteinuric preeclampsia being the most frequent reason.

In Aberdeen, 38.5% of the twin pregnancies were MZ and 61.5% were DZ. The situation in Oxford was remarkably similar. Of those twins of known zygoty, 38.1% were MZ and 61.9% were DZ. Of all the twin deliveries, there were 210 dichorionic like-sexed

**Table 2 - Indications for Elective Caesarean Section or Induction of Labour in 24 Twin Pregnancies at the John Radcliffe Hospital, Oxford, 1973-1983 (October)**

Proteinuric preeclampsia	19
Hyperemesis	2
Antepartum haemorrhage	1
Fetal distress	1
Intrauterine death of one twin	1

pairs (36.4% of the total deliveries) whose zygosity was unknown. Considering those twin deliveries of known zygosity it was found that MZ pregnancies were more likely ( $P < 0.05$ ) to have preterm labour than DZ pregnancies (Table 3). On subdividing preterm deliveries into the three groups described above, it was found that there were twice as

**Table 3 - Preterm Delivery by Zygosity in Twin Pregnancies at the John Radcliffe Hospital, Oxford, 1973-1983 (October)**

		All	MZ	DZ	Unknown
Twin pregnancies	N	609	152	247	210
Term deliveries	N	369	86	164	119
	%		56.6	66.4	56.7
Preterm deliveries	N	240	66	83	91
	%		43.4	33.6	43.3
<i>Type</i>					
Induction or elective caesarean section	N	24	4	10	10
	%		2.6	4.0	4.8
Spontaneous onset of contractions	N	125	33	51	41
	%		21.7	20.6	19.5
Spontaneous rupture of membranes	N	91	29	22	40
	%		19.1	3.9	19.0

many preterm deliveries associated with spontaneous rupture of the membranes in the MZ as in the DZ twin pregnancies ( $p < 0.02$ ).

When the association between placentation and preterm delivery was considered (Table 4), it was found that overall monochorionic pregnancies were more likely ( $P < 0.001$ ) to have delivered preterm than dichorionic pregnancies. This difference seemed to be largely attributable to a higher proportion of preterm deliveries following spontaneous rupture of the membranes in the monochorionic group, although this difference was not statistically significant.

The overall male/female ratio in Oxford (1.13:1) among twin pregnancies was similar to that in Aberdeen (1.07:1). Since MacGillivray et al [2] found a preponderance of boys in twin deliveries which had occurred preterm, the sex of twins was examined in relation to preterm delivery (Table 5). However, no statistically significant differences were found in the male/female ratio in the total number of preterm deliveries, or in the subgroups de-

Table 4 - Preterm Delivery by Placentation in Twin Pregnancies at the John Radcliffe Hospital, Oxford, 1973-1983 (October)

		All	Monochorionic	Dichorionic	Unknown
Twin pregnancies	N	609	152	446	11
Term deliveries	N	369	86	278	5
	%		56.6	62.3	45.5
Preterm deliveries	N	240	66	168	6
	%		43.4	37.7	54.5
<i>Type</i>					
Induction or elective caesarean section	N	24	4	20	0
	%		2.6	4.5	
Spontaneous onset of contractions	N	125	33	91	1
	%		21.7	20.4	9.1
Spontaneous rupture of membranes	N	91	29	57	5
	%		19.1	12.8	45.5

Table 5 - Preterm Delivery and Sex of Twin

		MM	MF	FF	Total (M/F)	Ratio (M:F)
All twins	N	231	183	195	645/573	1.13:1
Preterm deliveries	N	97	48	85	252/228	1.11:1
	%	42.0	31.7	43.6		
<i>Type</i>						
Induction or elective caesarean section	N	6	9	9	21/27	0.78:1
	%	2.6	4.9	4.6		
Spontaneous onset of contractions	N	46	36	43	128/122	1.05:1
	%	19.9	19.6	22.0		
Spontaneous rupture of membranes	N	45	13	33	103/79	1.30:1
	%	19.5	7.1	16.9		

scribed above. In the group born preterm following spontaneous rupture of the membranes, the MF combination is the least prevalent ( $P < 0.01$ ).

The relationship between preterm delivery and the combination of the babies sex and zygosity was also examined. For both MZ (Table 6) and DZ (Table 7) twins, however, no statistically significant differences were found. In those MZ twins who were delivered preterm following spontaneous rupture of the membranes, there was a preponderance of MM pregnancies over FF pregnancies, to almost the same extent as Aberdeen. However, unlike Aberdeen, the Oxford data was not statistically significant probably because of smaller numbers.

There was no association found on analysing the DZ twins with regard to sex of infants, presumably partly because of the way in which zygosity was determined. In addi-

Table 6 - Sex of Babies in MZ Preterm Twin Deliveries

	MM	FF	Ratio (M:F)
All MZ twins	84	68	1.24:1
Preterm total	36	30	1.20:1
<i>Type</i>			
Induction or elective caesarean section	1	3	1:3
Spontaneous onset of contractions	17	16	1.06:1
Spontaneous rupture of membranes	18	11	1.64:1

Table 7 - Sex of Babies in DZ Preterm Twin Deliveries

	MM	MF	FF	Total (M/F)	Ratio (M:F)
All DZ twins	39	183	25	261/233	1.12:1
Preterm total	15	58	10	88/78	1:13:1
<i>Type</i>					
Induction or elective caesarean section	0	9	1	9/11	0.82:1
Spontaneous onset of contractions	11	36	4	58/44	1.32:1
Spontaneous rupture	4	13	5	21/23	0.91:1

tion, there was a large number of like-sexed twins for whom zygosity was not known (Table 8).

## DISCUSSION

The incidence of preterm labour in twin pregnancies in Oxford was 39.5%, significantly higher than that in Aberdeen (28.2%). This difference was due to the higher incidence in Oxford of preterm delivery following spontaneous onset of labour for reasons which are not clear.

Preterm delivery was more common in MZ than in DZ twins (43.4% vs 33.6%). This difference was due mainly to the higher incidence of preterm delivery following spontaneous rupture of membranes in MZ twins. Both these findings confirm associations observed in the Aberdeen study. The first conclusion, however, disregards the 210 deliveries of unknown zygosity. The effect of these could be considered by various hypothetical

Table 8 - Sex of Babies in Preterm Deliveries of Unknown Zygosity

	MM	FF	Ratio (M:F)
All unknown zygosity	108	102	1.06:1
Preterm total	46	45	1.02:1
<i>Type</i>			
Induction or caesarean section	5	5	1:1
Spontaneous onset of contractions	18	23	0.78:1
Spontaneous rupture of membranes	23	17	1.35:1

calculations, but so many assumptions would have to be made that any conclusions reached would not be very significant.

Preterm delivery was more common in monochorionic than dichorionic twin pregnancies (43.4% vs 37.7%) in Oxford. This association was not observed in the Aberdeen study. Unlike the findings of MacGillibray et al [2] and those of Hall and Carr-Hill [1] in singleton pregnancies, no association was found between preterm twin delivery and male fetuses.

In the Aberdeen study, the occurrence of hydramnios was ventured as a possible explanation for the more common onset of preterm labour in MZ twinning. However, three studies [3] have reported that hydramnios is not more common in MZ than in DZ twin pregnancies.

Thus, this study in Oxford confirms the unpredicted associations found in Aberdeen by MacGillivray et al that preterm delivery is more common in MZ than in DZ twins and that this difference is due to a higher incidence of spontaneous rupture of the membranes. It is suggested that zygosity should be taken into account when considering the effectiveness of B-adrenergic drugs in preventing preterm labour in twin pregnancies.

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