A TEN-YEAR STUDY OF TWINS IN TOA PAYOH HOSPITAL 1973 — 1982

N K Ho

Neonatal Department
Toa Payoh Hospital
Toa Payoh Rise
Singapore 1129

N K Ho, AM, MBBS, M Med (Paed), FRACP
Senior Paediatrician and Head

SYNOPSIS

A retrospective study of twins born over a 10 year period from January 1973 to December 1982 was done to examine the incidence, zygosities, mortalities and morbidities etc. One in 145 hospital deliveries was twin delivery and monozygotic twins were more than dizygotic twins. Stillbirth rates and neonatal mortalities were higher in twins. Morbidities like asphyxia neonatorum, neonatal hypoglycemia, neonatal hyperbilirubinemia were also seen commonly in twins. There is, however, no significant difference in congenital malformations in twin babies and in singletons.

INTRODUCTION

383 pairs of twins were born in Toa Payoh Hospital, out of 55,431 deliveries from 1973 to 1982. It is the purpose of this paper to examine the various aspects of twins, eg. incidence of asphyxiated births, neonatal hypoglycemia, neonatal hyperbilirubinemia etc, to enable us to know the common neonatal problems in twins so that better management of twins can be planned.

METHODS AND MATERIALS

Data on twins are extracted from the Neonatal Department Record Book. Other data on stillbirth twins are extracted from the Labour Ward Register and the Stillbirth Registration Book of the hospital.

It has been the policy of the Department to examine all twin placentae and define the types of placental membranes, by using Bleisch's stripping method (1).

RESUTLS

From 1973 to 1982, 55431 women delivered in Toa Payoh Hospital and the total number of livebirths is 55448 (Table 1). Altogether, 383 pairs of twins were born in the Hospital (Table 2) and there were 3 sets of triplets and 1 pair of conjoined twins (Figure 1) (Table 3). The twinning rates are given (Table 4) and the twinning rates are compared with that of Kandang Kerbau Maternity Hospital, Singapore (KKMH) (Table 5).

The occurrence of twin deliveries in different ethnic groups is shown (Table 6). As the records of deliveries of different ethnic groups were incomplete, only the incidences of twin deliveries of different ethnic groups of 1981 and 1982 are given (Table 7). Note that the Malays have a higher twinning rate though the rate in 1982 is closer to that of the Chinese.

The sex distributions of twins are shown (Table 8, 8a). The male, male; female, female; and male, female ratio is 2.9:3.19:1. Weinberg's differential method is used to compute the number of monozygotic and dizygotic twins (2). The number of dizygotic twin pairs is obtained by multiplying the number of different sex pairs by 2 and the monozygotic twin pairs are obtained by subtracting the number of dizygotic twin pairs from the total. The monozygotic/dizygotic MZ/DZ ratio is 2.68 and the MZ/DZ ratios of Chinese, Malays and Indians are computed (Table 9, 10).

It is known that twinning among Caucasians is mainly dizygotic and the form of twinning may be hereditary related. The MZ/DZ ratio is about 0.5 or even lower with sex group ratio of male, male; male, female; female, female equal to 1:1:1(3). In Mongolian races, as found out by Komai and Fukuoka (4), the twins are monozygotic mainly. The MZ/DZ ratio for Japanese is 1.87 and for Singapore 1.6 and 1.9 (5). Our figure of 2.68 confirms their findings but appears to be higher than that obtained by the previous authors. Studies in KKMH reveal a MZ/DZ of 2.3 and 2.7 in Chinese and Malays respectively (6). Our figures are 3.08 and 1.95. The Indians gave a MZ/DZ ratio of 3.25, but the samples collected are rather small for the ratio to be significant (Table 10).

All the twin placental membranes were examined and of the 383 placentae examined, 205 were monochorionic and 156 were dichorionic, 22 were unknown. The monochorionic: dichorionic ratio is 1.31:1 as compared with that of KKMH 1:1. In caucasian twins, it is 1:4 (Table II).

2.6% or 20 out of 766 twin babies were stillborn. The stillbirth rate is calculated to be 25.4 per 1000 total twin births and still births, which is very high (Table 12). Stillbirths occur significantly higher in twins than in singletons (Table 12a) (X^2 39.7, $p < 0.001$).

The twin babies also have high death rates and 51/766 or 6.66% died during neonatal period. Neonatal deaths are shown to occur significantly higher in twins than in singletons ($X^2 = 240.6$, $p < 0.001$) (Table 13). The causes of deaths are shown (Table 13a).

It has been shown that birth weights and gestational periods of multiple pregnancies decline with the increasing number in the litter. The mean weight of a twin in Singapore is 2275 gm (5.01 lbs) as compared to that of England's 2395 gm (5.27 lbs) (7). In KKMH, nearly 50% of the twins were 2275 gm (5 lbs) and below at birth (6). Our experience of low birth weight twins are shown (Table 14). The overall incidence of low birth weight babies in TPH is shown (Table 15).

Among these low birth weight babies, 17.2% were assessed to be premature, by applying Dubowitz & Dubowitz assessment method (8). 45 of the 132 premature twin babies or 34.09% developed RDS (respiratory distress syndrome). In other words, 14.47% or 1 in 7 low birth weight twins had RDS (Table 16).

Asphyxia neonatorum is also encountered in twin deliveries. 24 of 766 twin babies or 3.13% were born asphyxiated (Table 17).

Though the incidence of congenital malformations was reported to be higher in twins, it is not our experience in TPH. The incidence and types of malformations are shown (Table 18, 19).

Neonatal hyperbilirubinemia, ie serum bilirubin level of 15 mg/dl or higher, was found in 59 twin babies (7.7%). The overall incidence of hyperbilirubinemia in TPH is 2.86% (Table 20). Hyperbilirubinemia is found to occur significantly higher in twins than in singletons. Such high incidence may be due to prematurity, higher haematocrit possibly from foeto-foetal transfusion etc.

Neonatal hypoglycemia is also seen in twin babies. 43 babies had hypoglycemia, mostly asymptomatic. Cornblatch criteria (9) is used for the diagnosis of hypoglycemia. Neonatal hypoglycemia occurs almost equally in first and second twins. However, smaller of twins appear to have higher incidence of neonatal hypoglycemia (Table 22). We also note that neonatal hypolycemia occurs in both in 9 pairs of twins.

It is noted that 12 twin pairs had haemoglobin difference of 5g/dl or more.

Figure 1
A pair of cephalo-thoracopagus conjoined twins, both female.

TABLE 1:

TOTAL NUMBER OF DELIVERIES AND LIVEBIRTHS IN TPH 1973 — 1982

Year	Deliveries	Livebirths
1973	7129*	7133
1974	5655	5654
1975	4919	4920
1976	5588*	5595
1977	5843	5543
1978	5272*	5287
1979	5344	5551
1980	5822	5821
1981	5337	5328
1982	4823	4815
Total	55431	55448

* one set of triplets

TABLE 2:

NUMBER OF PAIRS OF TWINS IN TPH 1973 — 1982

Year	No. of Pairs of Twins
1973	51
1974	43
1975	39
1976	39 + +
1977	36
1978	46
1979	41
1980	28
1981	28
1982	32
Total	383

+ + conjoined twins (FF)

TABLE 3:

TRIPLETS IN TPH 1973 — 1982

Year	Sex	Status
1973	FFF	Alive
1976	MMM	Alive
1978	MMM	Alive

TABLE 4:

TWINNING RATES IN TPH 1973 — 1982

Year	No. of Deliveries	No. of Twins	Per 1000
1973	7129	51	7.15
1974	5655	43	7.60
1975	4919	39	7.93
1976	5588	39	6.98
1977	5843	36	6.16
1978	5272	46	8.73
1979	5543	41	7.40
1980	5822	28	4.81
1981	5837	28	4.80
1982	4823	32	6.64

TABLE 5:

COMPARISON OF TWINNING RATES

Hospital	Year	Per 1000 Deliveries	Ratio
TPH	1973—1982	6.9	1:144.9
KKMH	1967—1969	8.3	1:120.5
KKMH	1969—1970	7.9	1:126.6

TABLE 6:

TWIN PAIRS ACCORDING TO MOTHER'S ETHNIC GROUP, TPH 1973 — 1982

Year	Chinese	Malay	Indian	Others
1973	43	7	1	0
1974	37	6	0	0
1975	25	8	6	0
1976	35	4	0	0
1977	28	5	2	1
1978	34	10	2	0
1979	33	5	3	0
1980	21	6	1	0
1981	16	12	0	0
1982	22	8	2	0
Total	294	71	17	1

TABLE 7:

TWIN DELIVERY RATE IN CHINESE & MALAY, TPH

YEAR	Total Livebirths	Twins	Rate per 1000 Livebirths	Total Livebirths	Twins	Rate per 1000 Livebirths
1981	3855	32	8.3	1072	24	22.38
1982	3429	44	12.83	1020	16	15.69

TABLE 8:

SEX DISTRIBUTIONS OF TWIN PAIRS, TPH 1973 — 1982

Year	Male & Male	Female & Female	Male & Female	Unknown
1973	18	22	9	1
1974	14	18	11	0
1975	15	17	6	1
1976	20	16	3	0
1977	19	17	1	1
1978	19	20	7	0
1979	20	15	6	0
1980	13	13	1	0
1981	7	18	3	0
1982	9	13	6	4
Total	154	169	53	7

Ratio = 2.9 : 3.19 : 1
(MM : FF : MF)

TABLE 8a:

SEX DISTRIBUTIONS OF TWIN PAIRS IN DIFFERENT ETHNIC GROUPS

Ethnic Group	Same Sex M-M	Same Sex F-F	Unlike Sex M-F	Unknown
Chinese	111	142	36	4
Malay	30	27	12	—
Indian	11	1	2	—
Others	1	—	—	6

TABLE 9:

ZYGOCITIES IN DIFFERENT ETHNIC GROUPS, TPH 1973 — 1982

Year	Total Pairs of Twins	DZ Twins (2x unlike sex pairs)	MZ Twins
1973	51	18	33
1974	43	22	21
1975	39	10	29
1976	39	6	33
1977	36	2	34
1978	46	14	32
1979	41	12	29
1980	28	2	26
1981	28	6	22
1982	32	12	20
Total	383	104	279

MZ/DZ Ratio = 2.68

TABLE 10:

UNLIKE SEX PAIRS AND MZ/DZ RATIOS IN DIFFERENT ETHNIC GROUPS

TPH 1973 — 1982

Year	Chinese	Malay	Indian
1973	6	3	0
1974	8	3	0
1975	2	2	1
1976	3	0	0
1977	1	0	0
1978	5	1	1
1979	4	1	0
1980	1	0	0
1981	2	1	0
1982	4	1	0
Total	36	12	2
DZ twins	72 (2 × 36)	24 (2 × 12)	4 (2 × 2)
MZ twins	294 – 72 = 222	71 – 24 = 47	17 – 4 = 13
MZ/DZ ratio	3.08	1.96	3.25

TABLE 11:

TYPES OF PLACENTAL MEMBRANE IN TWINS,
TPH 1973 — 1982

Year	Monochorionic	Dichorionic	Unknown
1973	24	24	3
1974	21	21	1
1975	20	13	6
1976	25	10	4
1977	28	8	0
1978	28	17	1
1979	16	24	1
1980	17	9	2
1981	13	15	0
1982	13	15	4
Total	205	156	22

MC:DC = 1.31:1

TABLE 12:

NUMBER OF STILLBIRTHS IN TWIN DELIVERIES

TPH 1973 — 1982

Year	No.	Male	Female	Unknown Sex
1973	2	1	0	1
1974	2	1	1	0
1975	2	0	0	2
1976	0	0	0	0
1977	3	2	1	0
1978	2	0	2	0
1979	0	0	0	0
1980	1	0	0	0
1981	1	0	1	0
1982	7	5	2	0
Total	20	9	8	3

TABLE 12a:
STILLBIRTHS IN TWINS
TPH 1973 — 1982

YEAR	SINGLETONS		TWINS	
	Stillbirths + Livebirths	Stillbirths	Stillbirths + Livebirths	Stillbirths
1973	7078	47	104	2
1974	5610	42	88	2
1975	4878	36	80	2
1976	5551	34	78	0
1977	5304	32	75	3
1978	5226	31	94	2
1979	5502	33	82	0
1980	5821	28	57	1
1981	5308	36	57	1
1982	4790	33	71	7
Total	55068	352	786	20

$X^2 = 39.7$ $p < 0.001$

TABLE 13:
NEONATAL DEATHS IN TWIN BABIES,
TPH 1973 — 1982

YEAR	SINGLETONS		TWINS	
	Livebirths	Neonatal Deaths	Livebirths	Neonatal Deaths
1973	7031	68	102	8
1974	5568	47	86	3
1975	4842	47	78	11
1976	5517	48	78	4
1977	5272	52	72	7
1978	5195	52	92	5
1979	5469	59	82	2
1980	5793	57	56	4
1981	5272	42	56	1
1982	4757	40	64	6
Total	54710	512	766	6

$X^2 = 240.6$ $p < 0.001$

TABLE 13a:
CAUSES OF NEONATAL DEATHS IN TWINS
TPH 1973 — 1982

Immaturity (Birthweight of less than 1000 gm)	22 +
Respiratory Distress Syndrome (RDS)	14
Asphyxia Neonatorum	4
Infections & Sepsis	6
Congenital Malformations	4
Sudden Unexpected Infant Death (SUID)	1
Total	51

+ including 9 pairs of twins, both immature.

TABLE 14:
LOW BIRTHWEIGHT TWINS IN TPH
1973 — 1982

Total twin pairs	383
Total number of twin babies	766
Total number of low birthweight twins (below 2275 gm)	311
Percentage of low birthweight twins	40.6%
Total number of premature twins	132
Percentage of premature babies	17.2%

TABLE 15:

LOW BIRTH WEIGHT (LBW) BABIES IN TPH

1973 — 1982

YEAR	SINGLETONS	LBW	TWINS	LBW
1973	7031	268	102	43
1974	5568	194	86	33
1975	4842	184	78	29
1976	5517	172	78	35
1977	5272	199	72	25
1978	5195	208	92	48
1979	5469	215	82	35
1980	5793	222	56	18
1981	5272	180	56	22
1982	4757	197	64	23
Total	54710	2037	766	311

$X^2 = 2522.9$ $P<0.001$

TABLE 16:

PREMATURE BABIES WITH RESPIRATORY DISTRESS SYNDROME (RDS), TPH 1973 — 1982

Total number of premature twins	132
Total number of RDS	45
Percentage of premature twins with RDS	34.09%

TABLE 17:

ASPHYXIA NEONATORIUM IN TWIN DELIVERIES, TPH

1973 — 1983

Total number of twin babies born	766
Total number of asphyxiated twins	24
Percentage of asphyxiated twin babies	3.13%

TABLE 18:

CONGENITAL MALFORMATION IN TPH

197 — 1982

Year	Singletons		Twins	
	Livebirths	Malformations	Livebirths	Malformations
1973	7031	212	102	2
1974	5568	204	86	3
1975	4842	158	78	1
1976	5517	167	78	7
1977	5272	212	72	1
1978	5195	219	92	3
1979	5469	190	82	1
1980	5793	196	56	2
1981	5272	174	56	2
1982	4751	103	64	1
Total	54710	1835	766	23

$X^2 = 0.2704$

There is no significant difference in congenital malformations in twin deliveries and in singletons.

TABLE 19:

CONGENITAL MALFORMATIONS IN TWINS

TPH, 1973 — 1982

I CNS Disorder	
i) Anencephaly	1
ii) Spina bifida occulta	1
II Musculoskeletal	
i) Arthrogryposis	1
ii) Polydactyly	1
III Cardiovascular	
Congenital heart disease	1
IV Genitourinary	
i) Congenital nephrotic syndrome	1
ii) Bilateral hydronephrosis	
iii) Undescended testes	1
	7*
V Orofacial	
i) Cleft lip/cleft palate	4*
ii) Neonatal teeth	4*
iii) Auricle in face	1
Total	23

* Congenital defects occur in both twins.

TABLE 20:

HYPERBILIRUBINEMIA IN TWIN BABIES

TPH, 1973 — 1982

Year	Singletons Livebirths	Singletons Hyperbilirubinemia	Twins Livebirths	Twins Hyperbilirubinemia
1973	7031	107	102	10
1974	5568	148	86	9
1975	4842	130	78	3
1976	5517	113	78	4
1977	5272	169	72	10
1978	5195	228	92	7
1979	5469	192	82	10
1980	5793	196	56	4
1981	5272	121	56	2
1982	4751	115	64	0
Total	54710	1529	766	59

$X^2 = 59.05$ $P < 0.001$

Hyperbilirubinemia occurs significantly higher in twins than in singletons.

TABLE 21:
NEONATAL HYPOGLYCEMIA IN TWINS
TPH, 1973 — 1982

Year	Livebirths	Hypoglycemia	Twins Livebirths	Twins Hypoglycemia
1973	7031	9	102	1
1974	5568	50	86	7
1975	4842	114	78	7
1976	5517	54	78	4
1977	5272	66	72	6
1978	5195	39	92	7
1979	5469	32	82	2
1980	5773	36	56	4
1981	5272	42	56	3
1982	4757	19	64	0
Total	54710	459	766	43

$X^2 = 186.8$ $P < 0.001$
Neonatal hypoglycemia occurs significantly higher in twins than in singletons.

TABLE 22:
NEONATAL HYPOGLYCEMIA IN TWINS
TPH 1973 — 1982

Total number of neonatal hypoglycemia	43
Hypoglycemia in bigger of twins	15
Hypoglycemia in smaller of twins	28
Hypoglycemia in both twin	9 pairs

DISCUSSION

The incidence of twins in England is approximately 1 in 87. The incidence of twinning in the orientals is low, eg. Japane 1:150, China 1:300. We also see a lower twinning incidence in this Hospital, the patients of which are mainly Asians (10)½ .

It is difficult to interpret the twinning rates in different ethnic groups. We agree with Foong (6) that higher twinning rates in Malays could be "the result of a greater porportion of twin deliveries as compared to their singletons, that it could be just relative".

The Mongolian race has higher monozygotic twins and some workers thought that the incidence of monozygotic twins is one of chance and the incidence of monozygotic twins is constant, about 3.5 per 1000 deliveries (the incidence of monozygotic twins in this Hospital is calculated as 5 per 1000 deliveries). The lower rate of twinning is thought to be due to low incidence of dizygotic twins.

There are many problems associated with multiple pregnancy. The high morbidity is related to prematurity. The incidences of stillbirths and neonatal asphyxia are higher than that seen in singletons. Though it is mentioned in many reports that the incidence of congenital malformations is higher in multiple pregnancies, it is not the experience in this Hospital.

Other neonatal morbidities eg. neonatal hyperbilirubinemia and neonatal hypoglycemia have been shown to be significantly higher in multiple pregnancies.

Neonatal mortality is also significantly higher in twins than in singletons, possibly relating to the increased frequency of premature births especially babies born with birth weight of less than 1000 gm. Conjoined twins are a rare event and have been reported to occur 1 per 33,000 to 1 per 65,000 livebirths. We saw only one pair of conjoined twins in the 10-year period, an incidence of 1 in 55,431 deliveries.

We also saw 3 sets of triplets, giving an incidence of 1:18,477 deliveries.

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