STILLBIRTHS — TEN YEARS EXPERIENCE AT TOA PAYOH HOSPITAL

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ABSTRACT

An analysis of 287 consecutive stillbirths associated with 47,171 deliveries in Toa Payoh Hospital between 1978 and 1987 was undertaken.

The incidence of stillbirths was 6.1 ± 1.26 per 1,000 total births. 149 out of 287 cases (51.9%) had known causes of death. Intrauterine anoxia and congenital malformations are the commonest diagnosis. In contrast, in 48.1% (138/287) of the stillbirths, we were unable to determine the underlying causes because of maceration and a low autopsy rate.

Among the 287 stillborn infants, 54% were born prematurely, and 64.2% were born with birth weights of less than 2,500 g. 8.4% of the mothers had a past history of one to three abortions, and 5.6% of the mothers had a past history of one or more stillbirths.

This study showed that the stillbirth rate in this hospital has not changed significantly in the last ten years.

Keywords: Stillbirth rate, causes of late fetal death, Toa Payoh Hospital.

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INTRODUCTION

Parents who experience the loss of an infant in the perinatal period always want to know the cause of their baby's death. They may be asking their obstetrician if something they did or failed to do is responsible for the death of their infants, and the chance of having another stillbirth in their subsequent pregnancies.

Review of perinatal mortality and identification of specific causes of fetal death will certainly help in the counselling of the family regarding the cause of the baby's death, the recurrence risk, and the plan of management in their future pregnancies, and hence, lead to a reduction in stillbirth rate. The objectives of this study were to determine the incidence of stillbirth in this hospital in the past ten years and to identify the causes of intrauterine fetal death.

MATERIALS AND METHODS

The present retrospective study of stillbirths from January 1, 1978 to December 31, 1987 was conducted at Toa Payoh Hospital in Singapore. All cases of stillbirths from the STILLBIRTH Register Book and Delivery Record Book were analysed. The definition and classification of stillbirth statistics used in this study complied with the recommendations of World Health Organisation (1).

RESULTS

Incidence

During the 10-year period (1978 — 1987), there was a total of 287 cases of stillbirths born to 281 mothers (including 6 pairs of twins) among 47,179 deliveries. Table 1 shows the number of infants born and the stillbirth rate for each year. The number of corrected stillbirths (birth weight > 1,000 g) are presented in parentheses. The yearly stillbirth rates ranged from 4.7 to 8.9 per 1,000 total births with an overall stillbirth rate of 6.1 ± 1.26 per 1,000 total births. The corrected stillbirth rate was 5.5 ± 1.14 per 1,000 total births.

TABLE 1
YEARLY STILLBIRTH RATE AT TOA PAYOH HOSPITAL

Year	No of livebirths	No of stillbirths	Stillbirth Rate (per 1,000 births)
1978	5,287	27 (25)*	5.1 (4.7)*
1979	5,551	35 (34)	6.3 (6.1)
1980	5,821	31 (28)	5.3 (4.8)
1981	5,328	37 (34)	6.9 (6.3)
1982	4,815	43 (40)	8.9 (8.2)
1983	4,852	23 (23)	4.7 (4.7)
1984	4,518	24 (22)	5.3 (4.8)
1985	3,939	28 (22)	7.1 (5.5)
1986	3,325	18 (15)	5.4 (4.5)
1987	3,456	21 (20)	6.0 (5.8)
Total	46,892	287 (263)	6.1 (5.5)

* Number of corrected stillbirths (birth weight > 1,000 g) and corrected stillbirth rate are presented in parenthesis.

Race

The racial distribution of stillbirths in Toa Payoh Hospital was Malays 26.5%, Chinese 61.3%, Indians 11.1%, and others 1.1% (Table 2).

Maternal Age

The age distribution of mothers who have had stillbirths is shown in Table 3. It was highest in those between 25 and 29 years of age. Unfortunately, the Hospital does not keep a record of deliveries according to maternal age. The higher incidence of stillbirths may be due to higher births in this particular age group.

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TABLE 2
STILLBIRTH RATE IN DIFFERENT ETHNIC GROUPS

Year	Malays No.	Malays Rate	Chinese No.	Chinese Rate	Indians No.	Indians Rate	Others No.	Others Rate
1978	3*		20		4		0	
1979	10*		21		3		1	
1980	6*		22		3		0	
1981	11	10.3	18	4.7	8	23.5	0	0
1982	14	13.7	27	7.9	2	6.0	0	0
1983	7	6.4	13	3.8	2	6.4	1	28.6
1984	7	5.9	16	5.4	1	3.3	0	0
1985	12	10.7	14	5.5	2	7.8	0	0
1986	4	4.1	9	4.5	5	17.6	0	0
1987	2	1.9	16	7.7	2	8.0	1	11.8
Total	76	7.6	176	5.6	32	10.5	3	5.3

TABLE 3
DISTRIBUTION OF STILLBIRTHS BY MATERNAL AGE

Age (years)	78	79	80	81	82	83	84	85	86	87	Total
< 20	1	1	0	5	1	1	1	2	3	1	16
20 — 24	10	15	10	16	15	5	7	5	3	4	90
25 — 29	13	8	7	8	12	10	12	16	6	5	97
30 — 34	1	7	11	6	12	4	3	4	4	9	61
35 — 39	2	2	3	2	2	1	1	1	2	2	18
40 — 44	0	2	0	0	1	2	0	0	0	0	5
Total	27	35	31	37	43	23	24	28	18	21	287

Parity

Table 4 shows the distribution of parity. The occurrence of stillbirths appeared to be highest in primigravidae (42.5%). This finding is in parallel to the higher births in primigravidae in this hospital as well as in Singapore.

TABLE 4
DISTRIBUTION OF STILLBIRTHS BY PARITY

Parity	78	79	80	81	82	83	84	85	86	87	Total
0	12	16	11	20	13	11	10	10	10	9	122
1	7	10	12	9	14	10	7	15	6	8	98
2	3	4	4	4	10	0	5	3	1	3	37
3	4	5	3	3	3	0	1	0	1	1	21
4	1	0	1	1	1	0	0	0	0	0	4
5 & +	0	0	0	0	2	2	1	0	0	0	5
Total	27	35	31	37	43	23	24	28	18	21	287

Gestational Age

The distribution of gestational age is given in Table 5. Prematurity is the predominent feature which occurred in 155 out of 287 cases (54%). In contrast, only three cases were born post-maturely. Of these 3 cases, 2 were anencephalic monsters, and 1 was a macerated stillbirth.

Sex of Infants

Stillbirth was more common in male infants. The male to female ratio of stillborn infants is 1.26 to 1 (Table 6).

TABLE 5
DISTRIBUTION OF STILLBIRTHS BY GESTATIONAL AGE

Gestation Age (wks)	No. of Stillbirths 78	79	80	81	82	83	84	85	86	87	Total
< 28	2	1	3	2	2	3	1	0	1	0	15
≥ 28-< 32	2	8	4	6	12	4	4	6	3	6	55
> 32-< 37	6	10	10	12	13	5	7	11	6	5	85
> 37-< 42	16	16	14	16	16	11	12	10	8	10	129
> 42	1	0	0	1	0	0	0	1	0	0	3
Total	27	35	31	37	43	23	24	28	18	21	287

TABLE 6
DISTRIBUTION OF STILLBIRTHS BY SEX

Sex	78	79	80	81	82	83	84	85	86	87	Total
Male	13	18	17	22	29	10	15	17	9	11	160
Female	14	17	14	15	14	13	9	11	9	10	127

Male : Female stillborn infants = 1.26 : 1

Birth Weight

The distribution of stillbirth by birth weight is shown in Table 7. 184 out of 287 cases (64.2%) were born with birth weight of less than 2,500 g. Among these low birth weight deliveries, 24 infants (8.4%) weighted below 1,000 g (extremely low birth weight infants), 62 (21.6%) weighted 1,000 — 1,499 g (very low birth weight infants), and 98 (34.2%) weighted 1,500 — 2,499 g (low birth weight infants).

TABLE 7
DISTRIBUTION OF STILLBIRTHS BY BIRTH WEIGHT

Birth Wt (gms)	No. of Stillbirths 78	79	80	81	82	83	84	85	86	87	Total
< 999	2	1	3	3	3	0	2	6	3	1	24
1000-1499	6	2	7	7	12	5	7	3	7	6	62
1500-1999	5	9	4	4	15	4	5	2	1	4	53
2000-2499	3	10	8	8	5	4	0	4	1	2	45
2500-2999	6	8	6	10	5	4	2	6	2	2	51
3000-3499	3	3	3	4	3	3	6	4	2	5	36
3500-3999	2	2	0	0	0	0	1	2	2	1	10
> 4000	0	0	0	1	0	3	1	1	0	0	6
Total	27	33	31	37	43	23	24	28	18	21	287

Condition of Fetal Death

Among the 287 stillbirths, 82 (28.6%) were recorded as fresh stillbirths, 56 (19.5%) were macerated stillbirths. Only 149 cases (51.9%) had known causes of death.

Causes of Death

The causes of fetal death are showed in Table 8. Intrauterine anoxia was responsible for 40% of all still-

births and major congenital malformations accounted for 26%. Tables 9 and 10 show the further break down of these two major causes. In cases of maternal medical complications, there were 3 cases of diabetes mellitus, 2 cases of septicemia, 1 case of schizophrenia, and 1 case of syphilis.

TABLE 8
MAJOR CAUSES OF STILLBIRTHS

Cause of Death	No.	Per cent
Intrauterine anoxia	59	39.6
Congenital malformations	38	25.5
Extremely low birthweight	24	16.1
Complications of multiple pregnancy	21	14.1
Maternal medical complications	7	4.7
Total	149	100.0

TABLE 9
STILLBIRTHS CAUSED BY INTRAUTERINE ANOXIA

Cause of Intrauterine Anoxia	No.	Per cent
Cord accidents	17	28.8
Intrauterine asphyxia	14	23.7
Abruptio placentae	10	16.9
Pre-eclampsia/eclampsia	7	11.9
Placenta previa	6	10.2
Rupture of uterus	2	3.4
Shoulder dystoxia	2	3.4
Fetal distress	1	1.7
Total	59	100.0

TABLE 10
STILLBIRTHS CAUSED BY CONGENITAL MALFORMATIONS

Congenital Malformations	No.	Per cent
Anencephalus	17	44.7
Hydrops foetalis	9	23.7
Hydrocephalus	3	7.9
Microcephalus	1	2.6
Edward's trisomy	1	2.6
Dwarfism	1	2.6
Absence of abdominal wall	1	2.6
Unidentified	5	13.2
Total	38	100.00

Number of Past Abortion and Stillbirths

Twenty four patients (8.4%) had past histories of induced abotion. Of which, 22 had a past history of one abortion, 1 with two abortions, and 1 with three past abortions. On the other hand, 16 patients (5.6%) had past histories of stillbirths. Thirteen cases had one past stillbirth, and 3 with two past stillbirths.

DISCUSSION

In Singapore, the stillbirth rate fell steeply after the Second World War, and in 1980 the figure was 6.4 per 1,000 total births (2). In this study, the overall stillbirth rate of 6.1 per 1,000 total birth (corrected stillbirth rate 5.5) is comparable to the findings in New Zealand (2), Switzerland (2) and Finland (3), and is lower than that of England (4), Greece (2) and South Africa (5).

The time-trend of stillbirth rate in the 10-year period has not changed significantly ($X^2 = 1.06$, $p > 0.5$). This finding is similar to that of other countries (2 — 4).

The distribution of stillbirths among the ethnic groups in the present study showed the higher stillbirth rates among Indians (10.5) and Malays (7.6) compared to the Chinese (5.6). The difference in stillbirth rates among these ethnic groups is most probably due to lower utilisation rate of antenatal services and obstetric delivery care (6).

The present analysis showed a preponderance of male infants (55.7%), that is, a ratio of 1.26:1 male to female stillborn infants. This finding is in agreement with other studies (3, 5, & 7).

In the index group, 149 stillborn infants (51.9%) had a disease which was considered to complicate significantly the course of the pregnancy and ended up with intrauterine fetal death. The diagnosis of causes of fetal death was mainly based on gross post-mortem examination, including evaluation of the placentae. Autopsy rate in stillbirths was rather low in this hospital because of traditional, embarrassing, and/or religious reasons. Incidentally, Mueller and his associates (8) at the University of Washington, USA evaluated a costly protocol, including gross and microscopical autopsy, photography, radiography, bacterial cultures, and chromosome studies, for postmortem examination of stillbirths and suggested that the single yet most useful tool for establishing a specific diagnosis was the gross post-mortem examination.

The features of major causes of intrauterine fetal death in this study as shown in Table 8, were comparable to other studies (3, 5, 11). It is interesting to review the prevalent causes of fetal death in the history of perinatal medicine. Dippel (9) in 1934 reported that syphilis (42%) played a major role in fetal death at the Johns Hopkins Hospital between 1896 and 1932. Twenty years later, Trichomi & Kohl (10) at the King's County Hospital, New York (1951 — 1955) suggested placental abruptio as the commonest cause of stillbirth, followed by toxemia (21%) and diabetes (11%), and no fetal deaths were attributable to syphilis. An analysis of 765 consecutive stillbirths associated with 98,927 pregnancies conducted by Morrison & Olsen (11) at the University of Manitoba in Canada, showed that hypoxia (43%) was the most common cause of fetal death. Hovatta and co-workers analysed 243 stillbirths among 39,318 total births (1974 — 79) at Helsinki University Central Hospital in Finland, and found that 57% of late fetal death were caused by placental failure, 17% were major malformations, and 12% were cord complications. In China, Chen and Jiang (12) autopsied and analysed 645 dead fetuses and newborns and found that intrauterine anoxia was the commonest cause of death in infants, followed by malformation. Woods and Draper (5) at the University of Cape Town and Groote Schuur Hospital in South Africa discovered abruptio placentae was the commonest cause of stillbirth.

In the present analysis of 281 women, 24 (8.5%) had a past history of induced abortion, and 16 (5.7%) had a past history of stillbirths. This finding is in agreement to some studies where abortion is being adopted for birth control and subsequent abnormal pregnancy has been correlated. Newcombe (13) determined the risks of siblings of stillborn children over the six-year period in Canada and concluded that after the birth of one still-born child, the risk of further stillborns to the same mother is more than double. Where two previous children have been stillborn, the risk is increased fivefold, and affects one child out of every three. Richardson and Dixon (14) in England found 4.3% of all subsequent pregnancies to mothers with a past history of induced abortion ended in

first trimester abortion, 8.5% in second trimester abortion and 13.7% in premature labour. Pantelakis et al. (15) in Greece found that the percentage of stillbirths and premature births among women with previous abortions, either induced or spontaneous, was double that of the control group. A collaborative study conducted by a task force of the World Health Organisation (16) on the sequelae of abortion has shown similar results.

CONCLUSION

The trend of stillbirth rate in this hospital has not changed significantly in the 10-year period. Although some of the causes of fetal death such as immaturity may still remain "idiopathic" in the present stage, many of the diseases may be related to socioeconomic and family living conditions. For example, poor hygiene and malnutrition may be related to congenital malformations; alcohol consumption, cigarette smoking, and drug abuse may be related to fetal death (7). Hence, improvement of prenatal care and prevention should be possible to reduce the stillbirth rate.

In this study, stillborn infants without any clinically determinable cause of death form a significant percentage (48%) of all the stillbirth cases. It is in this group that gross and microscopical autopsy would be most helpful in determining a specific diagnosis. Thus, establishment of the cause of death is often a source of comfort to parents, and the information may also be of help in genetic counselling of the family and in the planning and management of future pregnancies.

Of the 149 known cases of stillbirths, intrauterine anoxia is the most common cause of fetal death, followed by major congenital malformations, extremely low birth infants and immaturity, complications of multiple pregnancy, and maternal medical complications. The occurrence of intrauterine anoxia which accounted for 40% of stillbirths especially those onset in the third trimester is preventable to certain extent. Perinatal problems such as maternal diabetes, infection, toxemia, cord accidents, placenta previa and abruptio placentae may be reduced by good antenatal and intrapartum care. On the other hand, routine ultrasound and laboratory screening would be useful in detecting most of the major congenital abnormalities and chromosomal disorders in the earlier stage of pregnancies and therapeutic abortion would be the method of choice to reduce the stillbirth rate.

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