OBSTETRIC MORTALITY

An Analysis of 2268 Maternity Cases at the Bronx Hospital*

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IN VIEW of the latest report on obstetric mortality in New York City, which emphasizes the high rate as compared with other cities of this and European countries, a determined effort has been made on the part of the several medical societies of New York City to ascertain the facts and conditions leading to this high death rate. The purpose is to correct the causes at their origin, or at least, to bring before the attention of the medical profession those elements which contribute directly or indirectly to the ill effects on mother and child.

This paper, in an attempt to bring out the details leading up to such maternal and fetal deaths, is presented in the hope that by means of such figures and data as have been gathered over a period of three and one-half years from 2268 consecutive cases on the Obstetric Service of the Bronx Hospital, some further light may be shed upon the relation between the obstetrician's handling of the case in accordance with the best teaching of today and the ultimate result.

As a preliminary it is necessary to define certain terms and conditions referred to in this paper:

1. The Obstetric Service of the Bronx Hospital admits patients pregnant five months or more. The "lying-in" period averages ten days postpartum.

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2. The Prenatal Department admits patients at any time after a positive diagnosis of pregnancy has been made.

3. The Ward Service and Prenatal Clinic are directly under the supervision of the Obstetric Staff, but the "courtesy" or private service is not subject to the same strict surveillance, although it is necessary for the latter to observe the same rules for asepsis and medical care as the former.

4. A stillbirth is a fetus in whom there has been no respiratory effort on the part of the child, whether or not there has been any heartbeat before or after delivery.

5. A neonatal death is one that occurs any time after the first respiratory gasp and within the ten-day "lying-in" period in the hospital.

6. A premature baby is one that was less than nine lunar months in utero, or, where the time factor was not available, that weighs less than 1600 grams (3½ pounds). This figure is chosen arbitrarily as the one closest to the period of viability.

During the years of 1927, 1928, 1929, and the first six months of 1930, there were delivered at the Bronx Hospital, 2268 mothers and 2290 babies. During this period there were 6 maternal deaths, 52 stillbirths, and 30 neonatal deaths.

Considering the maternal cases first, there were 6 deaths out of 2268 total consecutive confinements, a mortality rate of 0.27 per cent; i.e., 2.7 per thousand, or 1 in 377 cases. The histories of two of these patients who died are briefly as follows:

1. A case of uterus didelphys in which there appeared symptoms of acute inflammation of abdominal viscera. The patient was operated upon and found to have a necrotic right ovary and diffuse Streptococcus hemolyticus peritonitis from which she died three days later. Within twenty-four hours postoperative a premature stillbirth was delivered spontaneously.

2. A case of acute intestinal obstruction with possible neoplasm, complicating a pregnancy in a cardiopath. Surgical consultation advised against laparotomy. Labor was induced by means of a Voorhees bag, and the baby delivered with medium forceps; but the patient died suddenly four hours later of cardiac decompensation.

In an attempt to arrive at a figure directly attributable to institutional care and Obstetric Staff responsibility, it has been deemed advisable to subtract these two cases from the total of six maternal deaths, thus leaving a corrected percentage of 0.18 per cent; i.e., 1.8 per thousand, or 1 in 566 cases. In this connection the figures for the New York City Health Department for the entire city show for the

TABLE I. MATERNAL DEATHS

	YEAR	NUMBER OF CASES	NUMBER OF DEATHS	PER CENT RATE	PER THOUSAND
New York City	1929	124,404	629	0.50	5.0
Nursery and Child's Hospital	1929	2,180	6	0.27	2.7
Woman's Hospital	1928-9	2,713	26	0.95	9.5
Lying-In Hospital	1929	4,653	21	0.45	4.5
Bronx Hospital	1927-8-9	2,268	6	0.27	2.7

corresponding period of time a maternal death rate of 0.52 per cent in 379,625 births.

Table I shows a comparison of figures of maternal deaths in several hospitals of New York City.

In the four remaining maternal deaths there were:

One cesarean section
One internal podalic version and extraction
One forceps delivery
One spontaneous delivery

A consideration of the operative cases follows:

There were performed 23 cesarean sections in 2,268 cases delivered, an incidence of 1.0 per cent, or 1 in 98 cases, with a maternal mortality rate of 4.3 per cent for this operation. Death in this case was due to eclampsia with hypertension, cerebral hemorrhage, and coma. The operation per se was not in any way responsible for the fatal outcome, since the patient at the time of the cesarean section was unconscious and moribund.

Internal podalic version and extraction were resorted to in 25 of the 2,268 deliveries; i.e., 1.1 per cent, or 1 in 90 cases, with a maternal mortality rate of 4.0 per cent for this maneuver. Death here occurred in a patient admitted to the hospital as an emergency case because of prolonged labor and exhaustion. To correct a persistent occipito-posterior position, the Kielland forceps were applied but without success. This was followed by an internal podalic version and the baby extracted. The mother, however, died within twenty-four hours with symptoms of acute cardiac failure.

Forceps deliveries were accomplished 137 times in 2,268 confinements, an incidence of 6.04 per cent, or 1 in 16 cases, with a maternal mortality of 0.67 per cent for this operative procedure. This included high forceps, midforceps A and B, Kielland and Scanzoni maneuvers, and low forceps. Death occurred in a case of persistent occipito-posterior position in which Kielland medium forceps were employed to hasten the second stage of labor. Following delivery, symptoms of concealed hemorrhage appeared, and the patient died on the third day postpartum.

In the remaining patient who was delivered spontaneously of triplets, death was due to postpartum sepsis following the retention of secundines with subsequent infection.

In considering the death of the babies, there are the following items of interest. There were born 2,290 babies to these 2,268 mothers, including 20 sets of twins and 1 set of triplets. Of these there occurred:

Stillbirths	52, or 2.2%, or 22 per thousand
Neonatal deaths	30, or 1.3%, or 13 per thousand

a total death rate of 82 in 2,290 births; i.e., 3.5 per cent, or 1 in 28. The Department of Health (1929) figures show a fetal death rate of 7.6 per cent. This, however, includes embryos in all periods of gestation. Table II shows a comparison of fetal death rate of various hospitals in New York City:

TABLE II. FETAL AND NEONATAL DEATHS

	YEAR	NUMBER OF CASES	NUMBER OF DEATHS	PER CENT RATE	PER THOUSAND
New York City	1929	124,404	9,496	7.6	76
Nursery and Child's Hospital	1929	2,174	110	5.0	50
Woman's Hospital	1928-9	2,748	175	6.3	63
Lying-In Hospital	1927	5,508	379	6.8	68
Bronx Hospital	1927-8-9	2,290	82	3.5	35

Bearing in mind the definition previously given of a stillbirth, as a baby in whom no respiratory effort has been made at any time, these cases are further classified as follows in Table III.

TABLE III. STILLBIRTHS

	NUMBER OF CASES	PER CENT OF TOTAL BIRTHS
Premature (1600 gm. or less)	10	0.39
Full-term, operative	22	0.96
Full-term, spontaneous	20	0.87
Total	52	2.27

In the consideration of neonatal deaths all cases are included in which the baby breathed even once and in which death occurred either immediately thereafter or within the first ten days of the puerperium at the hospital. These are classified in Table IV as follows:

TABLE IV. NEONATAL DEATHS

	NUMBER OF CASES	PER CENT OF TOTAL BIRTHS
Premature (1600 gm. or less)	15	0.69
Full-term, operative	5	0.21
Full-term, spontaneous	10	0.42
Total	30	1.32

Also it is of interest to consider the type of delivery in conjunction with the death of the full-term baby. This is detailed in Table V:

TABLE V. FULL-TERM FETAL MORTALITY

	STILLBIRTHS		NEONATAL	
Operative delivery	22		5	
Spontaneous delivery	20		10	
Total	42	+	15	= 57

We see here that of the full-term babies, the number of stillbirth and neonatal deaths total 57 out of 2,290 births. Also, that the fetal deaths occurring in spontaneous deliveries outnumbered those in operative deliveries, 30 to 27.

Next in order is a consideration of the important causes of death in these 82 babies, of which 57 were of full-term gestation and 25 were premature. This is shown in detail in Table VI.

TABLE VI. CAUSE OF DEATH

	FULL-TERM		PREMATURE	TOTAL
	STILLBIRTH	NEONATAL		
Asphyxia and atelectasis	36	4	23	63
Cerebral hemorrhage	1	8		9
Anomalies and malformations	4	3	2	9
Fractured vertebra	1			1
Total	42	15	25	82

It is seen thus that asphyxia and atelectasis accounted for the greatest number of deaths, 63, most of which occurred in utero. The diagnoses of these deaths were based on clinical, x-ray, and autopsy findings. The 9 cases of congenital anomalies, all of which occurred in the fetal deaths noted above, are detailed in Table VII.

TABLE VII. CONGENITAL MALFORMATIONS AND ANOMALIES

	STILLBIRTH	NEONATAL
Diaphragmatic hernia		2
Patent foramen ovale		2
Hydrocephalus	1	
Polycystic kidney	1	
Cleft palate and harelip	1	
Anencephalus		1
Spina bifida	1	

Possibly of greatest importance in the study of cause and effect are Tables VIII and IX in which are set down the more common causes and conditions occurring in obstetric practice, and the methods employed to deliver the baby in these cases.

TABLE VIII. ABNORMAL CONDITIONS DURING LABOR

	FULL-TERM		PREMATURE	TOTAL
	STILLBIRTHS	NEONATAL		
Maternal toxemia	9		2	11
Prolapsed cord	8			8
Placenta previa	1	1	2	4
Persistent posterior position	6			6
Maternal cardiac decompensation			2	2

Of these the greatest incidence of fetal mortality occurred with maternal toxemia as a cause eleven times, while prolapsed cord accounted for eight deaths. The operative procedures employed in the delivery of the baby are detailed in Table IX.

TABLE IX. OPERATIVE PROCEDURES

	MOTHER			BABY				
				FULL-TERM		PREMATURE		
	TOTAL	MATERNAL DEATHS	PER CENT RATE	STILL-BIRTH	NEONATAL	STILL-BIRTH	NEONATAL	PER CENT RATE
Forceps	*137*							
High	2			1				50
Mid	29			4			1	16
Low	83			1				1.1
Scanzoni	3			1				33
Kielland	20	1	5.0	1				5
Cesarean section	23	1	4.3	2	1	1		17
Internal podalic version and extraction	25	1	4.0	10	3	1	1	60
Breech presentation and extraction	38			4		1	1	15
Total	223	3	1.3	24	4	3	3	14

It must be noted here that 2 cases have been omitted from this table, the two maternal deaths not considered as purely obstetric fatalities. These have been discussed in the early part of this paper.

It is interesting to observe that of the 2,268 deliveries, 233 were operative procedures; yet there were only 3 maternal deaths (corrected), or 1.3 per cent, and 34 fetal and neonatal deaths, or 14.5 per cent. Among the spontaneous deliveries, which numbered 2,035 cases, there was but 1 maternal death, or 0.04 per cent; while there were 48 fetal and neonatal deaths, or 2.3 per cent.

At the Bronx Hospital, the Kielland forceps were usually applied in cases of persistent occipitoposterior position in preference to the Scanzoni or Pomeroy maneuvers. In 22 attempts at Kielland maneuver, internal podalic version was subsequently employed twice. Among the remaining 20 successful attempts, there was one maternal death (the concealed hemorrhage), and one fetal death.

In reviewing the foregoing facts and figures, one is struck by the various causes of maternal and fetal death, and the numerous operative procedures. The question naturally arises, have the greatest care and maximum precautions been taken to insure the best results for the patient? Is it possible to reduce the death rate still further? According to Polak, "maternal mortality is made up of infections, toxemias, hemorrhages, obstetric accidents, and operative deaths, all to some extent preventable."

It is conceded that prenatal care is of utmost value in the reduction of obstetric morbidity. However, it is inevitable that even in clinics in which prenatal care is strongly emphasized, a certain number of patients will be lost. There will always be some deaths due to embolism and cardiac failure. Cerebral hemorrhages and paralyses occasionally occur, as well as acute abdominal infections, with a high mortality rate. Eclampsia may occur even in the most carefully watched case in which all precautions have been taken, though the

incidence has been markedly diminished in the last few years. The "human factor" is always present, more so in the class of people that goes to make up ward cases, and the strictest warnings and sincerest advice often fall upon deaf ears and ignorant minds, rendering valueless all the scientific precautions and skillful obstetric procedures.

This, in a measure, is also true of fetal mortality which depends upon several factors.

1. Placental disease caused by intercurrent infections, toxemias, and lues. These explain the majority of prematures, macerated babies and congenital anomalies and malformations.

2. Malposition and disproportion causing dystocia and increasing fetal distress.

3. Character of labor and type of operative delivery causing cerebral hemorrhage, asphyxia, fractures, palsies, etc.

Owing to strict supervision of obstetric cases, during the antepartum period as well as during the hospital stay, the number of fetal deaths would seem to have been materially reduced here as compared with published figures of other institutions and of New York City generally. However, this paper is not intended as a comparative study of the several hospitals mentioned in the tables, since the conditions governing the admission of patients vary, as well as the social status of the patients themselves.

SUMMARY

The figures quoted above and the tables outlined, indicate a maternal mortality per 1000 of 2.7, a stillbirth rate of 22, and a neonatal death rate of 13. The number of maternal and fetal deaths has reached a low figure at the Bronx Hospital. This has been brought about, first, by concentration of care upon the mother in the last three months of pregnancy; second, by a general attitude of conservatism during labor, with interference only when delay and procrastination might possibly result in morbidity or death.

We wish to express our deep appreciation to Drs. Meyer Rosensohn and Hyman J. Epstein, the attending obstetricians at the Bronx Hospital, for the privilege of reporting this material and for their aid in making this study.