PAPERS AND SHORT REPORTS

Perinatal mortality: a continuing collaborative regional survey

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Abstract

A collaborative survey of perinatal mortality in each district of the Northern region set up in July 1980 was able to obtain information on 99% of all the registered perinatal deaths among babies born in 1981-2 to mothers resident in the region. There were 12·4 perinatal deaths/1000 births over this two year period, but 41% of the stillbirths and early neonatal deaths were of babies with a lethal malformation or weighing less than 1000 g at birth (or both). All causes of perinatal mortality had become less common than they had been at the time of the National Birthday Trust survey in 1958, though there had been a relatively small decrease in the number of deaths due to malformation (in the absence of any neural tube defect) and in the number of stillbirths of normally developed fetuses: 36% of the antepartum stillbirths among non-malformed singleton fetuses were associated with poor fetal growth (weight below the fifth centile at birth) and 21% were due to sudden unexplained placental abruption.

Introduction

Obstetricians have always been in the forefront of initiating medical audit. The value of the Confidential Enquiry into Maternal Deaths is widely acknowledged, and there have been several calls over the past 10 years for a similar system for monitoring perinatal death.[1-3] Progress, however, has been slow: most studies have covered a relatively small area for a limited period of time, and nearly all have been specially funded.[4] No two surveys have analysed their results in a comparable manner, and attempts to identify "avoidable factors" centrally have provoked mixed reactions. We report here our experience in creating a continuing collaborative survey of all the stillbirths and neonatal deaths to mothers resident in the Northern region; it has now been running successfully for more than three years without special funding.

Methods

The Northern Regional Health Authority, with a population of roughly three million, covers the counties of Northumberland, Durham, Cumbria, Cleveland, and Tyne and Wear. It is served by 20 consultant obstetric units and six small independent general practitioner units, which are responsible for delivering nearly 40 000 babies each year. Thirteen of the 26 units deliver fewer than 1500 babies a year; only about 250 deliveries take place at home each year.

Our aim, from the outset, was a collaborative survey between each health district and maternity unit in the region based on the mechanisms already in existence in nearly every hospital for reviewing perinatal deaths on a regular basis.[2] We thought it important that reporting should be sufficiently similar in structure that data for each district could be aggregated, but we left the conduct of the review itself to the team concerned. Each maternity unit was asked to set up a small local review team with an obstetrician, a paediatrician, and a midwife on the panel (together with a pathologist, general practitioner, and community physician as appropriate) under an elected convenor.

A survey form, which comprises just one sheet of paper, is completed by the team in consultation with the relevant midwifery and medical staff for every stillbirth and every death occurring within 28 days after birth. The form asks for certain basic information but also provides space for a brief, unstructured summary of management. Units are also encouraged to report all spontaneous and therapeutic abortions of fetuses weighing 500 g or more (or those babies delivered after a gestation of at least 22 weeks if birth weight is unknown) in line with recent recommendations of the World Health Organisation.[5] (These returns are not incorporated in the main analysis but are included in local analyses on request.)

Survey forms are normally completed by the team in whose unit the baby dies. If a baby is transferred to another unit before death the reporting team liaises with the clinicians who previously cared for the mother and baby to produce a single, joint return. The

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district medical officer (or nominated specialist in community medicine) is responsible for initiating a return on any infant not under the care of hospital consultant staff, and on the few infants dying outside the region whose mothers are normally resident in the region.

Completed forms are sent to the regional medical officer, who is responsible for maintaining medical confidentiality. One of us reviews each form to verify its accuracy and consistency; subsequent editing, coding, and analysis are then the responsibility of the statistical staff of the regional health authority. Receipt of the forms is always acknowledged, and a duplicate copy of the acknowledgment is sent to the district medical officer in the district where the mother is normally resident (as he will have been automatically notified of the death by the local registrar of births and deaths). This helps to ensure that all relevant deaths are included in the survey and avoids duplication. Though every effort is made to obtain permission for necropsy, convenors are asked to make a return without waiting for reports of histological examination (as these can, when necessary, be submitted later).

Every perinatal death is classified in two ways to show both the obstetric factor that probably initiated the train of events leading to death and the underlying pathological process actually responsible for the death. The classification of the obstetric factor is that described by Baird and Thomson,[6] while the classification of the underlying pathological process is a development of that of Bound *et al*[7] used in the National Survey of Perinatal Mortality in 1958.[8] For this purpose the primary fetal or neonatal process ultimately responsible

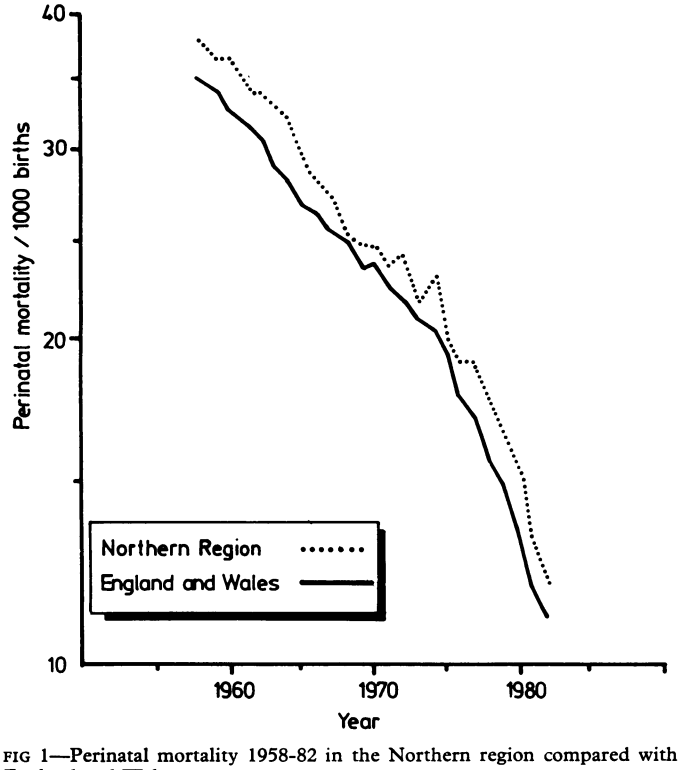

FIG 1—Perinatal mortality 1958-82 in the Northern region compared with England and Wales.

for the death is identified from a list of 22 possible conditions after all the clinical and postmortem evidence available has been taken into account. The possible causes are arranged in a strict hierarchy, and several simple rules help to ensure the consistency of diagnosis and classification necessary for any epidemiological analysis. For many purposes these 22 conditions are then regrouped into just six major categories in the manner first pioneered by Butler and Bonham[9] and recently advocated by Wigglesworth.[10]

No attempt is made to list avoidable factors centrally, but each year certain causes of perinatal death are selected for more detailed study by the coordinating committee using supplementary information provided by the convenors in each district. One such study examined all deaths due to intrapartum trauma or asphyxia or both, and another looked at the circumstances surrounding the death of every normally developed liveborn baby weighing less than 2500 g at birth over a one year period. A study of all perinatal deaths due to congenital malformation is now in progress.

Results

The survey identified 988 perinatal deaths (588 stillbirths and 400 early neonatal deaths) among the 79 717 babies born in 1981 and 1982 to mothers resident in the Northern region. This gave a perinatal mortality of 12·4 deaths/1000 births compared with 11·6 for England and Wales as a whole. Civil registrations identified 1000 perinatal deaths in the same period: six of the discrepant cases appeared to have been missed by the survey, but the other six were known to have been misclassified by the civil registration system. Perinatal mortality in the Northern region has always been above

TABLE I—*Changes in main constituent causes of perinatal mortality from 1958 (British Perinatal Mortality Survey) and 1981-2 (present survey). Figures are numbers of deaths/1000 singleton births*

	1958*		1981-2	
	⩽1000 g	>1000 g	⩽1000 g	>1000 g
Malformation	0·6	5·8	0·3	2·2
Non-malformed antepartum stillbirth	0·8	6·1	0·5	4·1
Intrapartum trauma or anoxia, or both	0·2	10·5	0·1	1·8
Problems of prematurity	0·9	3·2	1·1	0·6
Infection	0·1	1·5		0·3
Miscellaneous (including rhesus disease)	0·3	3·2		0·3

*Babies not classified in 1958 because necropsy was not performed (7%) were assumed to have the same distribution of causes of death as those in whom necropsy was performed.[8]

the average for England and Wales, but both mortalities are now a third of what they were in 1958 and the rate of decline (expressed as a percentage of the existing mortality) has increased since 1974 (fig 1).

Regional trends in mortality have followed national changes quite closely, so that the findings from the regional survey for 1981-2 could be compared with those from the national survey in 1958 (table I). Mortality due to intrapartum anoxia or trauma or both in 1981-2 was only a quarter of what it had been 24 years previously. Mortality from infection appeared to have fallen even faster, as had mortality from "miscellaneous causes" owing to the virtual elimination of rhesus isoimmunisation (table II).

TABLE II—*Obstetric antecedents of perinatal death of singleton babies (number of perinatal deaths/1000 births)**

	1958, United Kingdom[6]	1970, United Kingdom[11]	1981-2 Northern region
Neural tube malformation	3·6	2·6	0·9
Other malformation	2·4	2·7	1·5
Rhesus disease	1·6	1·0	0·1
Pre-eclampsia (with or without antepartum haemorrhage)	4·3	2·0	0·8
Antepartum haemorrhage	4·3	3·5	1·7
Mechanical problems	4·3	1·2	0·3
Maternal disease	0·8	1·2	0·5
Infection and miscellaneous	1·0	0·6	0·4
Uncertain, ⩽2500 g	5·8	4·9	3·6
Uncertain, >2500 g	5·0	1·7	1·4
Total	33·2	21·2	11·3

*Multiple births were excluded in this analysis because the only published data from the 1958 survey excluded these cases.

Congenital malformation—When babies dying with a severe congenital malformation were excluded from analysis there were only 9·8 perinatal deaths/1000 births in the Northern region in 1981-2. The reduction in perinatal mortality due to malformation was mainly due to a fall in the number of deaths associated with neural tube defects (table II) both within the region[12] and nationally.[13] Selective termination of pregnancy is unlikely to have accounted for more than a small fraction of this decrease in north east England, but

to establish this a supplementary study of terminations for suspected fetal abnormality has now been launched. Neural tube defects are now reported at birth with greater frequency in this region than in any other part of England and Wales.[13]

Preterm deaths—Deaths due to "problems of prematurity"[10] appear to have declined relatively slowly, but mortality among babies weighing over 1000 g in 1981-2 was only a quarter of what it had been in 1958 (table I). Hyaline membrane disease with or without intraventricular haemorrhage is responsible for the vast majority of deaths. Nearly a quarter of the deaths due to problems of prematurity are now associated with twin pregnancy. Half of all the twins who died in the present survey weighed 1000 g or less, and in 36% of the twin pregnancies when one baby died the other did too. Perinatal mortality among twins in 1981-2 was half what it had been in 1958, but perinatal death is currently more than five times as common among twins as among singleton infants: a prospective study of all twin pregnancies has therefore been planned for 1984. The attitude towards civil registration of babies of less than 28 weeks' gestation (as judged by the proportion of all liveborn infants recorded as weighing less than 1000 g at birth) does not seem to have changed materially, either nationally or regionally, over the past 20 years, but there was good evidence that some units treated such cases as registrable births more often than others. Such differences in approach influence any comparison of local perinatal mortalities if these have not first been standardised by the exclusion of babies weighing less than 1000 g (as recently suggested by the International Federation of Gynaecology and Obstetrics).[14] Such an adjustment brings perinatal mortality for the Northern region down from 12·4 to 9·4 deaths/1000 births in 1981-2 (and 7·3 when babies dying with a severe malformation are also excluded from analysis).

Antepartum stillbirth—Table I highlights the continuing challenge posed by the stillbirth of infants without malformations: perinatal mortality was still two thirds of what it had been 24 years previously. Twenty one per cent of stillbirths of singleton fetuses were due to placental abruption, and in a further 36% of cases the fetus was unusually small (weight for gestational age at death below the 5th centile); many cases were associated with pre-eclampsia (fig 2). Of

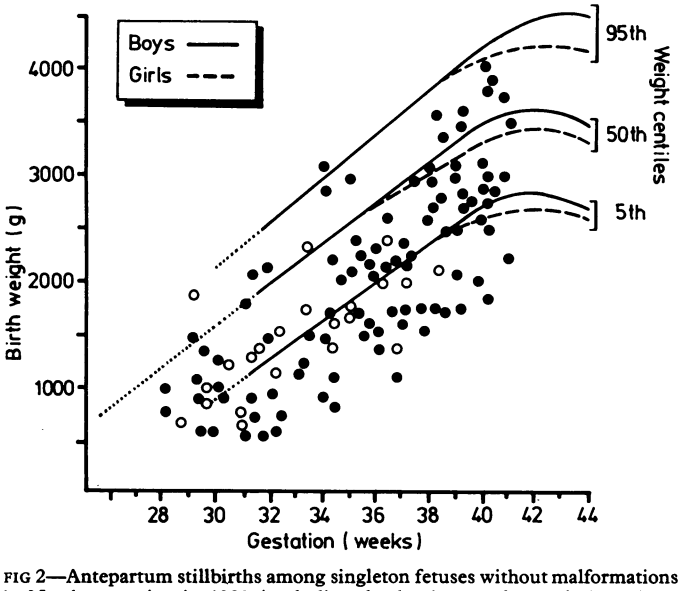

FIG 2—Antepartum stillbirths among singleton fetuses without malformations in Northern region in 1982 (excluding deaths due to placental abruption), showing gestational age at time of death and weight at birth. (Note that gestational age at time of death is not necessarily synonymous with gestational age at delivery.)

O=Pregnancies complicated by pre-eclampsia. Weight centiles were derived from data on 30 000 singleton liveborn infants in Newcastle upon Tyne between 1960 and 1968.[15]

the stillbirths not associated with abruption or fetal malformation, 47% were of fetuses that were light for dates (below the 5th centile). Reducing perinatal mortality among non-malformed babies that are light for dates depends on improved antenatal recognition and care because, though 133 of these babies died in utero, only 11 died after birth. Reduced fetal size was often not recognised before delivery.

Discussion

The survey produced information on nearly 1000 perinatal deaths over two years, making this the largest survey to be reported in England and Wales since 1958.[8] Many recent surveys have been costly to mount,[4] but this continuing survey was initiated by the obstetric and paediatric subcommittees of the local regional medical advisory committee without special funding at any stage. It would have been impossible without the active support of the statistical staff at the regional health authority, the stamina of the steering committee, and the dedication of one or two key clinicians, but its ultimate success was due to the part played by the collaborating review groups in each health district. No valid judgment could have been made about the primary cause of many of the deaths without their help.

In their discussions the review groups often brought to light circumstances in which a different management policy or a different reaction on the part of the mother might have altered the eventual outcome. Local teams varied in their perceptions in this regard, however, and we therefore thought it presumptuous to make any general judgment from the written records. There was also little objective evidence available in many cases to support any assertion that different management would have been less likely to lead to the loss of the baby. We did not, therefore, attempt to model our approach on that adopted by the Confidential Enquiry into Maternal Deaths, or to enumerate avoidable factors. Issues of recurrent concern quickly became apparent, however, and we had no difficulty in identifying several topics requiring further examination. Several of these are now being subjected to special study, and the findings are presented to medical and midwifery staff in the region at a series of annual clinical meetings.

Comparisons are, of course, valid only when terminology and classification remain consistent, and the classification has to be kept simple if it is to be of use in monitoring changes in perinatal mortality in health districts where there are fewer than 2000 births a year. We have found that consistency can be maintained only if written guidelines are drawn up: even then a medically qualified assessor has to review every return. The existing system for certifying death should, in theory, be able to provide much of the information provided by this regional survey. Unfortunately, however, such attempts as have been made to analyse national trends in certification in recent years have provided only limited information[16] because certificates are not always completed with as much care and consistency as they should be. The new perinatal certificate currently being piloted may eventually prove more informative if it is completed by a motivated and relatively senior clinician. Additional information on all births such as is obtained with the recently developed standard maternity information system[17] or the minimum data set proposed by the Körner committee[18] would further enhance the value of perinatal certificates by defining more precisely the social and obstetric backgrounds of all the mothers in the study population.

In the interim, the system currently in operation in the Northern region certainly provides valuable information at little overt cost. The system has many similarities to that proposed in the report of the study group on perinatal audit and surveillance of the Royal College of Obstetricians and Gynaecologists in 1980,[3] but we have looked on our approach as being a collaborative survey rather than a regional inquiry and as being anonymous rather than confidential. If other regions were to adopt a similar approach Britain might soon have national data on a continuing basis comparable in many ways with those provided by the National Perinatal Mortality Survey in 1958.[8]

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Comparison of single and multichannel cystometry in diagnosing bladder instability

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Abstract

The abilities of single channel cystometry and standard multichannel cystometry to diagnose bladder instability were compared in 100 women taking part in a single blind crossover trial. In 93 of the women both tests yielded the same result. The single channel system detected every case of detrusor instability but in seven women suggested detrusor contractions that were not evident on multichannel cystometry. These were probably due to changes in abdominal pressure.

It is concluded that single channel cystometry when used in conjunction with simple urethral tests can provide most of the information that is obtained in specialist centres investigating bladder function.

Introduction

A patient with detrusor instability cannot inhibit the abnormal detrusor contractions caused by either filling of the bladder or provocations such as changes of posture and coughing. The reported prevalence of detrusor instability in women with incontinence varies from 8·7%[1] to 63%[2]; the higher estimates are probably associated with the type of patient referred to specialist centres. None the less, detrusor instability is a major cause of incontinence in women and must be diagnosed accurately so that inappropriate surgery is not done. Incontinence due to detrusor instability responds poorly to surgery, and conservative methods of treatment should always be tried first.[3] Bates *et al* found that 58 (71·5%) of 81 patients who had symptoms of incontinence after repair operations had unstable bladders—that is, detrusor instability.[4] Arnold *et al* found an incidence of instability of 67% in women who had had previous surgery compared with an incidence of 48% in women who had not.[5]

Cystometry is used to study the relation between bladder pressure and volume. Single channel cystometry has been used to study bladder function for over 100 years[6] but in many centres is now regarded as being insufficiently sensitive to record accurately true changes in detrusor pressures. "Subtracted cystometry" is used instead, in which abdominal pressure (measured via a rectal catheter) is electronically subtracted from total bladder pressure (measured via the bladder catheter) to give a recording of true detrusor pressure. Only in this way can artefacts due, for example, to variations in abdominal pressure be eliminated. The apparatus for single channel cystometry is simple and cheap whereas the multichannel apparatus needed for subtracted cystometry is complicated and expensive.

Patients and methods

We studied 100 women aged from 22 to 78 (mean 47) years attending an incontinence clinic for evaluation of their symptoms before treatment. All patients underwent both single and multichannel supine and erect cystometry with isotonic saline at 37°C infused at 50 ml/min (medium fill cystometry). (All methods, definitions, and units used in this study, except where specifically noted, conform to the standards proposed by the International Continence Society.[7 8]) In each case provocative tests were introduced when the patient was standing up. These included coughing and heel bouncing. Both types of cystometry were done on the same day according to a single blind crossover programme. Fifty patients were randomly allocated to undergo single channel cystometry first and 50 to undergo multichannel cystometry first.

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