policy, which is that all children should be immunised in the second year of life? In practice this policy is taken up very haphazardly producing what might be called an entirely "laissez-faire" position. It could be argued that this produces the worst of all worlds—in that measles continues in the community—although admittedly at a considerably reduced incidence; we will tend, on the lines of the American experience, to make measles an adult disease as a result of loss of vaccine-induced immunity in the group aged over 15, and may also produce a considerable body of susceptible adults who have never been immunised and who escaped the disease in childhood because of partial success of the present immunisation programme.

A second alternative is to emulate the American programme for eradication. It remains to be seen if the USA policy succeeds, and in any event acceptance rates in Britain are never likely to reach the 80-90% that eradication seems to demand. With very rapid communications to countries where measles is still endemic, eradication of measles in Britain at present is a non-starter.

We are left with a policy of selective immunisation—that is, the policy of routine immunisation should cease and be replaced by one in which only vulnerable patients are offered vaccine. Admittedly there might be some difficulty in identifying all vulnerable children, but a start could be made by including those with chronic respiratory disorders, Down's syndrome, and those underweight; the severe malnutrition in African children, which appears, in part at least, to account for the high measles mortality in that continent, is not seen in Britain, but it would

seem wise to include poorly nourished children in a selective measles immunisation programme. The results of this selective immunisation would be a rise in the overall incidence of the disease, prevalent for the most part in children, with little or no commensurate rise in mortality, given that the selection and immunisation of susceptibles had been successfully achieved. A further benefit might accrue from reduced expenditure on vaccine and serological testing.

This policy might be summed up as the use of measles vaccination as a compromise between the ideal of eradication and the natural incidence of the disease—but selective immunisation would be a planned compromise rather than the haphazard compromise inevitably produced by present policy.

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Pathological investigation of maternal deaths: a cause for concern

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The latest report on confidential inquiries into maternal deaths in England and Wales covering the years 1973-5¹ is critical of the standard of reports provided by some pathologists performing necropsies on maternal deaths. In particular the inadequacy of the histological data is emphasised. Thus for the first time the compilers of the report have accepted only cases of amniotic fluid embolism that have been confirmed histologically. In previous reports over half of the cases have been included on the basis of clinical data alone.² There is also criticism that the source of pulmonary emboli is often unsought. Such criticisms are clearly valid,³ and while to some they may seem rather minor points they must be an indication that these clinical tragedies are not always given the attention they deserve at necropsy.

At a time when the value of the necropsy has been questioned⁴ and the number of necropsies performed in hospitals has declined⁵ these criticisms should arouse much concern among morbid anatomists. It is all the more unfortunate in that obstetricians were the first to attempt to audit their clinical practice by producing the confidential inquiries into maternal deaths, and undoubtedly an enormous amount of work by both the obstetric and anaesthetic assessors may be at least partially confounded by inadequate pathological reports. The purpose of this paper is to indicate the size of the problem and suggest some ways in which the pathological component of these inquiries might be improved.

Size of the problem

The current report deals with 390 deaths, which represent 94% of the known deaths. Thus on average during 1973-5 about 140 maternal deaths occurred a year. Probably the current annual rate is somewhat lower. Of these, 235 deaths were directly attributable to pregnancy or childbirth and 155 were due to associated causes. Attributable deaths are defined in the Fédération Internationale de Gynécologie et Obstétrique classification as deaths occurring within six weeks of delivery. The report, however, does include eight true maternal deaths and 45 associated deaths occurring after this period. The major causes of true maternal death include abortion, pulmonary embolism, haemorrhage, and hypertensive disease in pregnancy. These four categories account for just over half the deaths, but further important causes cited include ectopic pregnancy, sepsis, amniotic fluid embolism, and ruptured uterus. Among the associated deaths blood diseases, epilepsy, intracranial haemorrhage, neoplastic disease, and suicidal or accidental death are the most common causes.

Purpose of the necropsy

The prime purpose of the necropsy is to determine the cause of death. The determination of the cause of death, however, does not absolve the morbid anatomist from further responsibility in the investigation of maternal deaths. In the past he has contributed considerably to knowledge of both the normal and abnormal changes occurring in pregnancy. The discovery of

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postpartum pituitary necrosis⁶ was a direct result of careful post-mortem examination performed after routine requests. Advances in knowledge of the pathology of pregnancy allow the pathologist to confirm clinical diagnoses by appropriate studies on necropsy material. Thus pre-eclampsia or eclampsia may be diagnosed with a high degree of certainty by finding lipid-containing foam cells in the terminal basal branches of the spiral arteries of the placental bed.⁷ Equally careful necropsy technique may allow the demonstration of unsuspected pathology, which may provide an explanation for a hitherto mysterious clinical event which, though not the immediate cause of death, may have materially contributed to it. I have found that transient hypotension in labour may result from a small amniotic infusion that was entirely unsuspected in a patient who subsequently almost died of haemorrhage from a ruptured uterus. The postpartum hysterectomy specimen showed large aggregates of amniotic debris in the uterine veins.

It may be argued that some of the information indicated above, which may be obtained at necropsy, may be outside the remit of the pathologist who has been asked to determine the cause of death. Clearly, this argument is fallacious, however, and in fact every one of these clinical tragedies should be treated as a research case. Little may be salvaged from a maternal death, but the pathologist should feel obliged to obtain all the data he can, whether or not they are relevant to the immediate cause of death.

In recent years the pathologist has been faced with a new problem, which to a great extent remains unsolved. The introduction of modern life-support systems has meant that a patient with a lethal disease that would, in the past, have led to a rapid death may now be kept alive for days or weeks before death finally ensues. While many of the patients maintained on these systems are known to have had serious disease before requiring support—for example, heart disease, major trauma, etc—many pregnant patients are fit and healthy before the often dramatic clinical catastrophe that leads to intensive care. In such cases by the time the patient eventually succumbs from the complications of the catastrophe the initial pathology associated with it may have completely resolved. The pathologist performing the necropsy will then be profoundly influenced in his decisions by the clinical data available to him, recorded at the time of the patient's collapse. While, however, it is incumbent on the clinicians concerned to provide accurate and relevant clinical data in such cases the pathologist must not accept these data unreservedly, since in doing so he may neglect some part of the examination which might show an entirely unsuspected event.

Amniotic fluid embolism is an illustrative example. Diagnosis can be unequivocally confirmed only by the demonstration of the constituents of amniotic fluid (squames, vernix, mucin) in the pulmonary vessels, as is emphasised by the current report. As cited above, amniotic fluid infusion into the uterine veins may be entirely unsuspected and is not infrequently seen in postpartum hysterectomy specimens when the operation has been performed as a life-saving procedure (unpublished data).

The problem of hypotension and sudden cardiac arrest in an otherwise fit pregnant woman is of considerable concern, since in many cases the necropsy findings are inconclusive for the reasons indicated above. The need to produce a "cause of death" for the purposes of certification or for HM Coroner inevitably results in deaths being ascribed to particular causes in the absence of unequivocal necropsy evidence of a specific aetiological factor. In such cases the cause of death is often arrived at by consideration of the clinical data and the exclusion of other causes. The importance of the pathologist's conclusions may be far reaching, be they based on clinical or pathological data, in that new therapeutic regimens may be introduced or old regimens questioned as a result.⁸ It must not be forgotten that the purpose of the confidential inquiries into maternal deaths is to attempt to assess the avoidability of these deaths and, more importantly, suggest ways by which they may be prevented in the future. The pathologist must therefore bear a considerable responsibility if treatment is revised as a result of his findings.

There is perhaps a lesson to be learned from perinatal and

paediatric pathology. It has long been accepted that among stillborn infants an appreciable number will be found with no lesions or alternatively with evidence of lesions accepted as consistent with intrauterine anoxia.⁹ Many of the latter are also unexplained in that the cause of the anoxia is unknown. Equally, a significant proportion of sudden unexpected infant deaths cannot be explained on the basis of the necropsy findings.¹⁰ Pathologists are, however, reluctant to admit that they are uncertain of the cause of death after completing a necropsy on an adult. The realisation that this was so for sudden infant deaths stimulated much research into this problem, a parallel of some note in that by their very nature these deaths are frequently not related with a preceding illness that causes clinical concern. While it is arguable whether or not a separate category of unexplained maternal deaths should be introduced for the purposes of registration, it is readily apparent that such doubts fully expressed in adequate necropsy reports could be emphasised in the confidential inquiries. In doing so research into the causes of these deaths would undoubtedly be stimulated. Certainly the attachment of a particular cause of death on the basis of the clinical data and in the absence of thorough microscopic as well as macroscopic examination must be entirely unacceptable.

What can be done?

The discussion above by no means covers all the possible criticisms that might be made, but it does indicate that there is a problem. During the coming years the numbers of maternal deaths will undoubtedly continue to drop as clinical practice advances. As a result individual pathologists will see perhaps only one or two maternal deaths in a career. Many will be unfamiliar with advances made in obstetrics and in the pathology of pregnancy. The Royal College of Pathologists³ is already aware of dissatisfaction among clinical specialty groups who are concerned with infant, perinatal, and maternal deaths. It would seem that some or all of the following changes in current practice might be possible with little or no additional expense to the health service, and they would almost certainly be beneficial.

(1) The introduction of a standard protocol for the performance of necropsies on maternal deaths throughout England and Wales (and possibly the entire United Kingdom). This should be designed so that in addition to recording the pathology present in an individual case specific pertinent lesions may be positively excluded.

(2) The establishment of a panel of assessors, as exists for the obstetricians and anaesthetists, to examine the reports of necropsies and if necessary review the histological material. This would be particularly valuable in those cases where the cause of death is uncertain.

(3) The inclusion of pathologists on the panel preparing the confidential inquiries with, if necessary, a separate chapter on particular aspects they would wish to emphasise.

(4) The introduction of nominated pathologists in each region to perform all necropsies on maternal deaths. In the largest region not more than 20 deaths might be expected each year. To allow for travelling, sickness, and annual leave a maximum of five would be required in such a region. There might be organisational problems initially, particularly in respect of HM Coroners' cases, but these should not be insurmountable.

(5) The stimulation of research into both the clinical and pathological aspects of maternal deaths by closer co-operation among all those concerned with the pregnant patient. As maternal deaths decrease the proportion of inadequately explained deaths will probably increase, and individual clinicians and pathologists will be less familiar with the problems peculiar to this group.

Almost 60% of the deaths due to obstetric factors in the current report had one or more avoidable factors. Forty per cent were unavoidable, and a better understanding of the pathology

and pathogenesis of these deaths may, it is hoped, be expected to lead to a reduction in their number. There is clearly cause for concern about the role of the pathologist in the investigation of maternal deaths.

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Management of minor illness

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It has frequently been asserted that general practitioners spend too much of their time dealing with minor illness that could be treated adequately by home remedies.¹ Studies of patients' demands for care carried out in this department over the past decade have shown that nearly half the general practitioners' work load is concerned with the continuing care of chronic disease,² which will probably increase with the increasing life span and changing pattern of illness. It is therefore important to determine whether new demands for care can be reduced. We found in an earlier study that for children aged under 16 years, over half of new demands for care were concerned with six common symptoms—stuffy or runny nose, sore throat, cough, vomiting, diarrhoea, and minor trauma. Clearly the appearance of these symptoms in children provokes parental anxiety, and high anxiety scores measured by a standard questionnaire are related to high levels of patient-initiated consultations.³

In an attempt to help parents manage these common symptoms a booklet was produced to inform them about the meaning of these six symptoms, the appropriate type of medication, and guidance on when a doctor should be consulted. The whole book consisted of just 16 pages, containing a separate chapter on each symptom, and was illustrated with cartoons. Written by one of us (DM), the book was edited by the leader writer of the *Daily Mirror*, and was tested in a group of young mothers in a different district for acceptability and comprehension. In addition to the symptom chapters a section of the book described how the general practitioner could be contacted in an emergency and gave advice on stocking the home medicine cupboard. An important feature of the book was that it was presented to the mothers of young families as a service provided by the partners of the practice.

Objectives of study

A study was then designed to measure the effect of this booklet on the pattern of medical demand of patients registered with a group practice with an attached health visitor providing medical care for a

population of about 8500 in the London Borough of Lambeth. The study was designed as a randomised controlled trial to test three hypotheses:

- (1) That the patient-initiated consultation rate of members of those families receiving the booklet would be lower than for a control group of families not receiving the booklet;
- (2) That the consultation rate for those symptoms described in the booklet would be lower for the study group than for the control group;
- (3) That patients receiving the booklet would on questioning show better knowledge of the management of the conditions described in the booklet than the control group.

This paper is concerned primarily with the first two hypotheses and refers only briefly to the third.

Method

The sampling frame for the study consisted of all the families in the practice with at least one child under the age of 5 years and identified from the attached health visitor's records. The advantage of using such records for the sampling frame is that they are much more sensitive to patients moving in and out of the practice than the age/sex register. There were 284 such families containing 999 individuals.

The families were allocated at random to the study and control groups. The study group received a copy of the booklet with a covering letter from their own general practitioner explaining that he hoped that the booklet would help them to manage the common symptoms of illness in the family. The practice records of all the family members of both the study and control groups were marked with a red label but the doctors in the practice did not know which patients were in which group. At each consultation with a patient whose record carried a red label, the doctor recorded the date and place of the consultation. He identified each consultation as either doctor- or patient-initiated according to a definition used extensively in previous studies in this practice.² For all patient-initiated consultations he recorded the presenting symptom according to a previously tested definition,⁴ the duration in days of the symptom before the consultation, the diagnosis, and the treatment prescribed. At the end of every consulting session in the practice, a research assistant examined all the records from that session and extracted the prescribed information for each patient. If the information was not recorded the doctor responsible was contacted within 24 hours to make good any deficiencies.

The study started in December 1977 and ended in December 1978. For each patient in the study, the age, sex, and social class were recorded and consultation data extracted for every consultation during the study year. Social class was based on the occupation of the father or, in single-parent families, the parent. At the end of the year a random sample of 50 patients from the study and 50 from the control group was interviewed to test their knowledge of the symptoms described and the use they had made of the booklet.

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