ment cannot be derived from a discussion such as this, then we may possibly have to look to the Ministry of Health or to some equally authoritative source to frame one.

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PREVENTION OF PUERPERAL SEPSIS*

BY

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No excuse is needed for the detailed consideration of a subject like puerperal sepsis, where slight carelessness, or even too great enthusiasm on the part of the nursing or medical personnel for remaining on duty, may result in tragedy.

The Modern View of Puerperal Infection

It is of great interest to notice the complete change of attitude since the war regarding the causes of the condition. This shows more clearly than any other fact the progress that has been made, and gives us increasing hope for the future. When the Public Health Act, 1936, officially eliminated the term "puerperal fever" the end of an epoch was indicated. The very points I have been asked to discuss to-day emphasize the general acceptance of the modern view of puerperal infection. We are no longer content to consider the possibility of infection in relation to the delivery alone. It is recognized that during the ante-natal period certain definite precautions should be taken.

A good deal of stress is laid by some authorities on the importance of dental care. It is obvious that a clean mouth is a first step in personal hygiene, and the provision of dental treatment in connexion with ante-natal clinics is now recognized to be not only advisable but necessary. During 1937, 8,974 women received treatment at the child welfare dental clinics in Birmingham. The majority, or about 60 per cent., were sent from the ante-natal clinics and represent roughly 50 per cent. of those attending the clinics. This does not give a complete picture of the need, for there is still a good deal of prejudice against dental care. The provision of cheap dentures does much to encourage the removal of decayed teeth, however, and actually 968 women were supplied with dentures in 1937. At the City Maternity Homes the women are so anxious to obtain admission that they submit to having dental care whenever the medical officer considers it necessary, this being a condition of admission.

* Read in opening a discussion at a joint meeting of the Sections of Public Health and Hygiene, and Obstetrics and Gynaecology at the Annual Meeting of the British Medical Association, Plymouth, 1938.

The careful examination of every woman suffering from a vaginal discharge, with an inspection of the cervix, is an essential step in the preventive side of ante-natal care, and the treatment required must be insisted on. The possibility of throat and sinus infections must be remembered also.

On the educational side, while the preparation of the delivery room is asked for by every district midwife, instruction should also be given to report the occurrence of any infective condition in the family, not forgetting the child with impetigo or otorrhoea. Such conditions should, of course, receive immediate attention. Health talks at ante-natal clinics should include information on such points.

Ante-natal Care

There is also the very important question of building up resistance. It is obvious that an anaemic and badly nourished woman will have a poor chance of recovery if she should be infected, and she is more liable to infection. A complete system of ante-natal care should include the provision of a satisfactory diet. Milk alone is obviously not enough, although it is so valuable a food. The supply of meals in necessitous cases meets the need to some extent, but in the worst cases only. In the diet of a large proportion of working-class women iron, calcium, and vitamins are primarily deficient, and these can be supplied as useful supplements.

Ante-natal care plays its full part in the prevention of sepsis only when every effort is made to obviate mal-presentations and disproportions, causing difficulties at labour. The importance of early induction of labour or of Caesarean section in suitable cases should not be overlooked in this connexion. The association of toxæmia and ante-partum haemorrhage with sepsis is universally recognized. It is not possible to deal successfully with toxæmia outside an institution, and ante-partum haemorrhage, however slight, also requires full investigation. Sepsis often follows where repeated small haemorrhages have been allowed to occur.

An obvious step is the provision of sterile dressings for district midwifery. The maternity packet is now very generally available, but it is not yet very generally used. I should like to see such sterile dressings supplied in every case and the cost included in the midwife's fee. Meanwhile the careful instruction of the expectant mother in the proper preparations for the delivery is essential. The supply of drums of sterile dressings to every midwife rather than the use of sterile packets involves a prohibitive cost for transport as well as a high original expenditure, but some such provision for emergencies is advisable.

The development of ante-natal care has proceeded very rapidly during the last ten years and the general standard is constantly rising, but even yet there is too little appreciation of the amount of actual ill-health requiring investigation and treatment in an institution properly equipped for such work; such investigations, moreover, require to be guided by the physician rather than by the surgeon, for pregnancy furnishes more medical than surgical problems.

The ante-natal clinics must be used to assist the district midwives, but there need be no failure in co-operation with general practitioners or hospitals if there is sufficient understanding and good will on both sides.

The Spread of Infection

The spread of infection by the midwife or doctor in puerperal sepsis is now more often due to direct infection,

as in early throat, nose, and ear conditions, than to dirty instruments or neglect of personal hygiene. It is the attendant in the early stages of a sore throat, where there is little more than malaise to suggest danger, or again one who has not sufficiently recovered from such a condition, who most frequently appears to be responsible for normal labours becoming septic. Where inquiries are made, such infections are often found to have been present; or, for that matter, a husband or child may be the origin of the infection, though in such cases there is less opportunity for direct contagion. Naturally with increased manipulation the possibility of infection is greater.

It is essential that the midwife and doctor should regard their own state of health as an important factor, and those with any septic condition, however mild, should feel themselves bound to avoid midwifery. Even where some condition like otitis media or a chronic antrum appears completely quiescent there is danger, for with fatigue and strain the infecting organisms reappear. This may be observed, for instance, in the case of a midwife so affected: two or three notifications of puerperal pyrexia in her practice will be associated with a rush of work and a discharging ear or a painful sinus. Suspension for weeks follows, with apparent recovery, and after some months the same incidents recur. The danger of a healthy individual becoming a carrier for a short time cannot be overlooked.

The need for a high standard of personal hygiene is now so clearly understood that it need hardly be referred to, but those responsible for housing midwives should remember that a bathroom is as necessary as a kitchen and that facilities for sterilization of bowls, instruments, etc., are essential. A brief summary of the instructions issued to Birmingham City midwives may be of interest, and is available.

The Midwifery Service in Birmingham

One of the essentials of a midwifery service is the provision of sufficient relief midwives. It is necessary to arrange that the relief midwife does not come into contact with her sick colleague, a precaution that is easily forgotten. The wearing of masks by midwives, whether acting as maternity nurses or midwives, is now practically universal in Birmingham—only a few independent midwives are not using them. The city midwives wear gowns with masks attached. The patients raise no objections, and the measure of protection afforded is considered well worth while.

With regard to institutional care, I should like to mention the very good record established at two of our maternity homes. The larger of the two homes, with 847 deliveries in 1937, had only thirteen cases of notifiable pyrexia and no case of puerperal sepsis; the second home, with 518 deliveries, had not a single case of notifiable pyrexia. These are genuine records, and most careful supervision is exercised to see that no rise of temperature is overlooked. The aseptic technique employed in these homes has justified itself. As regards the methods used, I should like to draw attention to a few points.

All attendants are gowned and masked throughout all contact whatever with the patient. Dettol and flavine are the chief antiseptics used. Boiled bed-pans are employed on every occasion, and a second bed-pan is provided for swabbing. A gown for the use of the nurse when giving bed-pans and swabbings hangs at each bed. Masks are of fourfold gauze with paper between folds, and on removal they are placed in antiseptic lotion. Fresh sterile masks are available at the entrance to all wards. All

bedding is disinfected after each case, as well as beds, lockers, etc. All wards are washed down after each batch of patients. Ward floors are never swept, but are polished and kept clean with damp mops to avoid raising dust. Nurses do not sort dirty linen, which is immediately removed from the vicinity of the wards.

Time does not permit of other details, but I might add that each patient is provided with a paper bag to hold dirty handkerchiefs, etc., and that only husbands are allowed to visit. No nurse or doctor with the slightest cold or sore throat is permitted to enter the wards. If anything, the smaller home has observed a more stringent antiseptic technique, and this has been justified by the result.

Throat and Nose Swabs

The nurses are not accepted at these institutions without a preliminary medical examination and they are all general trained nurses. At one time a throat swab was taken, and if a haemolytic streptococcus was found the applicant was rejected, but the percentage of rejections was so high that this had to be abandoned. It must be understood that no typing was carried out. Swabbing would only be done at the institution in the presence of several cases of pyrexia, and so has not been found necessary in the maternity homes.

With regard to throat and nose swabs in district practice, it is advisable to take these where several cases of puerperal pyrexia have been notified in a midwife's practice. The swabs are almost inevitably positive to the haemolytic streptococcus, and it is then necessary to suspend the midwife till two negative swabs are obtained, which may mean weeks off duty. Typing may help here, but when not available attention paid to the throat and nose and the usual holiday in the country undoubtedly benefit the midwife's health. Bacteriologists appear to vary in their findings, and it is sometimes helpful to try a second expert when the period of off duty is too prolonged. Without typing, swabs give only a vague indication of the source of infection, but in an outbreak with one common attendant swabs are worth while and offer some measure of protection.

Notification of Pyrexia

On the occurrence of puerperal pyrexia it is the midwife's duty to send for medical help at once. She must then notify the supervising authority through the midwives' supervisor that she has been "in contact with a person, whether or not a patient, suffering from puerperal fever or any other condition which may raise suspicion of infection," in the words of Rule 9.

The medical practitioner often misunderstands the situation. He considers the pyrexia is not yet notifiable and he mistakenly instructs the midwife that there is no need to inform the supervisor. There is, as a matter of fact, no connexion: the one is a question of keeping the rules of the Central Midwives' Board, and the other is a notification. No midwife can notify puerperal pyrexia, but having been in contact with it she is bound to obey the rule. Our own practice is to instruct the midwife to inform the doctor that she will not be allowed in the ordinary course to continue on the case, and to request him to call in the district nurse, whose fee will be met by the local authority. Only under very exceptional circumstances would the midwife be permitted to continue in attendance. She would then attend no other case.

A further safeguard in relation to midwives and spread of infection is the enforcement of a rule that the practising district midwife must not attend miscarriages owing

to the frequency of sepsis in these cases. As a matter of fact they seldom would, for as a rule they have not been booked so early in pregnancy, but there is some danger that the midwife might be called in by a doctor. The district nurse is obviously the right person, and there appears to be no reason why she should not be used.

The District Nurse-Midwife

Rural areas are frequently served by a district nurse-midwife. This is, in my opinion, a bad practice, and is no longer needed, with the sufficient use of motor cars and telephones. Where distances are too great for this, it is surely the duty of the local authority to provide institutional care and a home-help service. Rural local authorities are too often content to throw up their hands and talk only of the difficulties of long distances, meanwhile making no effort to meet them. There is also a great tendency to say countrywomen will not accept this and that, when they are given no chance to say they will. As a matter of fact the patience and long-suffering of the rural population are wonderful, but are wearing rather thin.

Provision for Emergency Cases

The situation in a maternity institution admitting emergencies is often very difficult, and there is undoubtedly a higher sepsis rate in such institutions than there would be if the accommodation was of a higher standard.

Separate delivery rooms and separate wards, with ample single-room isolation, are essential for satisfactory work with emergencies, but are seldom or never available. Frequently the institution tries to do more than it has accommodation for and so lowers the general standard. No maternity institution, moreover, can afford to be without isolation rooms for the potentially septic cases, and these should be provided even where arrangements are made for the immediate removal of every case of notifiable pyrexia.

Conclusion

I would like to emphasize that the prevention of puerperal sepsis depends on intensive and intelligent antenatal care, with precautions directed towards safeguarding the patient from infection carried by the attendants, both during and after delivery. The greatest danger lies in the patient being infected through the attendant's own failure in health, and the best safeguard is the building-up of the patient's resistance by proper nutrition and the early and efficient treatment of all toxic or debilitating conditions, as well as by intelligent anticipation and treatment of obstetric abnormalities. At the same time the most stringent precautions should be taken in relation to asepsis, dust infection, etc., since all the ordinary risks of wound infection are constantly present.

The results of a careful technique show that institutional care can be rendered free from risks other than those inseparable from midwifery. The situation is very different where proper care is not exercised.

I should like to add a plea for closer co-operation with the public health authorities on the part of general practitioners. Notification of puerperal pyrexia is not a meaningless formality; it helps to ensure efficient supervision of midwives and gives information of the utmost interest in assessing the value of various precautionary and preventive measures.

The present statistics of puerperal pyrexia are valueless for district practice: they are fallacious, since a very large number of cases are never notified.

THE PREVENTION AND CONTROL OF PUERPERAL SEPSIS : ADMINISTRATIVE ASPECTS*

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Extent and Nature of the Problem

The Report on an Investigation into Maternal Mortality published by the Ministry of Health last year contains interesting figures relating to the role of sepsis in the causation of puerperal mortality. In this connexion, for example, it is shown that in a series of 770 maternal deaths investigated in selected areas puerperal sepsis was deemed to have been the cause in no less than 39 per cent. of cases. In the country generally it appears that 30 per cent. to 40 per cent. of all maternal deaths are attributable to sepsis. For the year 1937 in England and Wales the maternal mortality rate was 3.11 per 1,000 total births, the rate for puerperal sepsis being 0.94. Although figures relating to maternal morbidity are not available, it is safe to assume that sepsis is similarly a dominant factor in causation.

Maternal Mortality for the Year 1937 in Certain Towns

Town	Maternal Mortality per 1,000 Total Births	From Sepsis	From Other Causes
Barrow-in-Furness	4.90	0.98	3.92
Bolton	6.10	0.87	5.23
Bootle	3.66	1.83	1.83
Bournemouth	2.85	0.71	2.14
Bristol	3.53	1.12	2.41
Coventry	3.06	0.30	2.76
Darlington	1.68	0.84	0.84
Derby	4.66	1.39	3.27
Dundee	5.12	1.92	3.20
Eastbourne	4.69	1.56	3.13
Edinburgh	4.55	1.17	3.38
Liverpool	2.31	0.58	1.73
Middlesbrough	4.59	1.77	2.82
Stoke-on-Trent	4.59	0.84	3.75
Sunderland	3.45	1.06	2.39
Walsall	4.04	2.02	2.02

These considerations underline at the outset the first importance of measures directed to the prevention and control of puerperal sepsis. It must be confessed, however, that hitherto these measures have been attended with but limited success. It is notorious that, in contrast with a spectacular reduction in infantile mortality, little or no impression has been made upon the maternal mortality rate. Maternal deaths due to sepsis have in fact increased to some extent in recent years. The measures of social, economic, and environmental amelioration that have lowered the infantile death rate in so marked a fashion have hitherto proved of much less avail against maternal mortality. Some investigators, indeed, have adduced findings to indicate that the incidence of puerperal sepsis actually tends to increase on ascent of the social

* Read in opening a discussion at a joint meeting of the Sections of Public Health and Hygiene, and Obstetrics and Gynaecology at the Annual Meeting of the British Medical Association, Plymouth, 1938.