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PREVENTION OF PUERPERAL SEPSIS IN GENERAL PRACTICE*

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In spite of the large amount of research work which has been undertaken and the numerous papers which have been written in the last ten years on the causation of puerperal sepsis, the position shows no improvement, but rather grows worse. Twenty years ago the death rate from puerperal sepsis was 1.42 per 1,000 live births; last year it was 1.61.¹

If we turn back to the days before the introduction of antiseptics into midwifery practice we find little upon which to congratulate ourselves. The Registrar-General's figures before the year 1892 are not quite comparable with those of to-day, since some of the maternal deaths from sepsis were entered under erysipelas and other septic diseases instead of under puerperal fever. Nevertheless, it is interesting to note that in 1862 the rate calculated from these returns was 1.3; in 1872, 1.8; and in 1882, 2.9. When the assignment of all deaths from puerperal sepsis to that heading was made there was a slight fall to 2.6. These figures at least suggest that the deaths from sepsis did not reach such an appalling height as we frequently suppose.

More reliable information has been presented to us by James Young,² who found from the records of the Edinburgh General Hospital that during the years 1826-57 the death rate from sepsis was 2 per 1,000. Further, most of the deaths occurred in epidemics, so that in some years there were large numbers and in others none at all. Collins reported that during his mastership of the Dublin Lying-in Hospital (1826-33) there were eighty-eight deaths from sepsis in the first three years and none at all in the last four, during which time 8,000 women had been delivered. The serious epidemics which broke out from time to time in all maternity hospitals, and which contributed so largely to the total number of deaths from sepsis, are now almost things of the past. The Departmental Committee on Maternal Mortality and Morbidity, which investigated the circumstances of 5,805 maternal deaths spread over a period of about three years, reported that

"the majority of deaths from sepsis seem to have occurred as isolated cases in the practice of an individual or hospital, and the committee has been unable to find any convincing evidence of direct spread from patient to patient as an important factor in maintaining the high and increasing death rate from puerperal fever."³

If the epidemics have disappeared and the death rate remains about the same, it follows that the number of deaths from isolated cases of puerperal sepsis has risen since the introduction of antiseptics into the practice of midwifery. That is in this country, but in the Scandinavian countries, which have not altered their statistical methods to any material extent during the last

fifty years, we find a definite drop synchronizing with the introduction of antiseptics.⁴ Thus in Denmark the puerperal sepsis death rate remained almost steady at 2.6 per 1,000 from 1856 until 1900-4, when it dropped to 1.5, and has since shown no tendency to rise.

Intervention in Normal Labour and Puerperal Sepsis

It would seem that the good effect of antiseptic precautions which is apparent in Scandinavia has been masked in this country by some change in our midwifery practice. Those of us who can look back forty years know that during that time there has been a great increase in obstetrical interference with the course of labour, and this is confirmed by the records of many hospitals. At Guy's Hospital in the years 1863-75 there was intervention in 1.35 per cent. of all labours, whereas in 1928 the rate was 18.6—fourteen times as much.⁵ Has any change in the women made this increase necessary? Rickety deformity of the pelvis is one of the commonest legitimate reasons for artificial intervention, yet it is very uncommon in London, and is probably less common now than fifty years ago. Women to-day are more anxious to have their labours terminated by forceps, but that applies far more to the upper than to the working classes. Is it not more likely that the change is in the doctors? Since the development of pelvic surgery few obstetricians limit their practice to obstetrics; they have all become operating gynaecologists, and I suggest that the surgical bias which this has given to their minds has swept them away from the sound foundations of midwifery laid down by Smellie and his successors. Their pupils, worried by the exigencies of private practice, have all too readily followed in their footsteps. Many general practitioners use forceps in 60 per cent. of their cases. Simpson found it necessary only once in 472.⁶

No similar increase of the intervention rate has occurred in the Scandinavian countries; in Utrecht, Holland, the forceps rate over a number of years was 0.6 per cent.; in Copenhagen, 0.8 per cent.; and in Gothenburg, Sweden, 0.4 per cent.; and the intervention for other reasons was also low. This is very significant, for Holland has the smallest death rate from sepsis in the world—namely, 0.99 per 1,000. (There is doubt as to the comparability of the figures from the other countries with our own.)

The close connexion between low intervention and low death rate from sepsis is pointed out by Munro Kerr.⁸ He picks out two London maternity hospitals as having almost reached the irreducible minimum for maternal deaths, and in both of them the forceps rate is under 3 per cent. Further light is thrown upon this question by the investigations of the Maternal Mortality Committee, which found that the number of deaths from sepsis after abnormal labour was equal to that following

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normal labour, although abnormal labours amount to only about 5 per cent. of the whole. The following table, compiled from a series of cases attended by the East End Maternity Hospital, shows an incidence of non-fatal sepsis over twenty times as high after abnormal as after normal labour.

	Confinements	Pyrexia	Percentage
Normal ...	8,010	15	0.18
Abnormal	476	20	4.20
	(5.6 per cent.)		

Consideration of all these points leads to the inevitable conclusion that a low sepsis rate in any practice depends upon success in securing spontaneous labour and in avoiding intervention.

Abnormal Labour Followed by Sepsis

It is of great practical importance to know the kind of abnormal condition which is likely to be followed by sepsis. In seven out of the twenty cases referred to above the hand was introduced into the uterus during or after the third stage of labour. This should be considered the most dangerous operation in the whole realm of midwifery, and should always be avoided if possible. There are three types of case in which it is commonly performed:

1. Cases in which the contraction and retraction of the uterus are unsatisfactory on account of the retention of small pieces of placenta or membranes; they can be much reduced in number by waiting patiently and allowing the uterus to expel the placenta into the vagina, instead of keeping up a continual massage of the uterus, which irritates it to contract before the whole of the placenta is separated.

2. Those in which, after the delivery of the child, there is such severe haemorrhage as to necessitate immediate manual removal of the placenta; they occur after prolonged labour, probably terminated by difficult forceps and chloroform anaesthesia, and can be avoided by careful examination and treatment before and during labour.

3. Cases in which the placenta is long retained without serious bleeding, and cannot be expressed by Credé's method; the injection of four ounces of glycerin into the umbilical vein will almost always cause a violent contraction of the uterus and expulsion of the placenta.

Ten of the twenty cases followed ante-partum haemorrhage, prolonged labour, or extensive trauma. Ante-partum haemorrhage cannot always be avoided, but the well-proved connexion between toxæmia and accidental haemorrhage, and the liability of placenta prævia to give rise to warning haemorrhages during the last few weeks of pregnancy, give us a guide to the steps which we may take towards their reduction. Prolonged labour and exhaustion are frequently due to disproportion between the head and the pelvis or to a posterior position, and can often be obviated by ante-natal care and attention during the first stage of labour, while the usual cause of severe trauma of the cervix and the vaginal walls is premature application of forceps. The ante-natal diagnosis of severe degrees of contraction is so easy that there is no excuse for unforeseen Caesarean sections late in labour, with their death rate of 265 per 1,000, mostly from sepsis.⁹ Forceps, used with proper antiseptic precautions merely to draw the head through the vulval orifice, do not increase the incidence of sepsis, and the only objection to their use for this purpose is that the very ease with which delivery can be accomplished is likely to lead to their misuse in cases which turn out to be difficult. We use them in only 2.6 per cent. of our cases.

Predisposing Factors

Although difficult to show by figures, it is within our knowledge that both chlorosis and pyelitis of pregnancy are factors predisposing to sepsis; toxæmia has no such connexion. A uterus left with placenta or blood clot

inside it must be guarded against, and free drainage must be encouraged by seeing that the mother moves about and is allowed to sit up in bed on the second day. It is almost universally stated that insanitary surroundings predispose to sepsis, but in a long series of normal cases we found that the incidence of septic infection was the same whether the confinement took place in hospital or in the slums. All serious abnormalities are brought into hospital because it is impossible to carry out the necessary obstetric treatment and nursing care in the poor homes of the patients.

I have been led to dwell upon the so-called predisposing causes of sepsis because by eradicating them general practitioners can halve their mortality from sepsis without even considering the bacteriological aspect of the subject. Trousseau,¹⁰ speaking of the causation of puerperal purulent infection in 1868, said: "Every disease has two elements; there is the cause, properly so called; and the state of the economy recipient of the morbid impression. These two elements are always present; the first to follow out its results; and the second to combat the cause." In the attempt to prevent the access of the first of these elements the second is often neglected, whereas both are of equal importance. Tissues, if healthy, can deal with a few pathogenic germs, or there would be no women alive to-day. I am convinced that the aim of the bacteriologists to prevent the access of germs to the genital canal from any source whatever is difficult, if not impossible, of attainment in actual practice, and that even if it be accomplished the germs which are always present in the vagina before labour begins, and which are harmless to healthy tissues, are able to attack those which have had their resistance lowered by the predisposing causes we have described. If not, why should a difficult forceps case, carried out under the strictest antiseptic ritual, so often become septic? The means which suffice to prevent sepsis after normal labour will not prevent it following abnormal labour.

Nothing I have said must be taken as implying that we may neglect antiseptic precautions, either in abnormal or normal labour; on the contrary, the fact that one-half the deaths from sepsis follow normal labour¹¹ shows that they are inadequate. I do not intend to enter into speculations from a bacteriological point of view as to what constitute adequate antiseptic precautions, for I am not competent to do so, but I will give an outline of those we use and the result we obtain, and draw what conclusions we may from them.

The routine is as follows. The patients in hospital are given a bath before labour. All are given an enema; the vulva is well washed with soap and water, the hair is clipped short with scissors, the vulva is re-washed, swabbed with clean water, and finally with perchloride of mercury 1 in 2,000. Attendants scrub their hands and forearms with soap and water, rinse in clean water, and scrub with perchloride of mercury 1 in 1,000. These processes are repeated frequently during labour, so that the hands of the attendants and the vulva of the patient are always damp with perchloride. Since the hospital is a training school, of necessity many vaginal examinations are made by the pupil midwives, but always under the direction of the sister in charge of the case. No gloves or masks are used. Silence or quiet speaking is enjoined in the labour ward, but I have no means of finding out whether this rule is observed in the absence of the doctor or matron. A douche is given after labour to hospital patients, again for teaching purposes, but not to those confined in their own homes. There is nothing new or startling in these precautions, but as they are made under supervision we know that they are carried out. It will be appreciated that for such a routine to be properly performed in private practice the help of a midwife or

trained nurse is necessary, and it is therefore important that the practice of attending midwifery cases without such help should be discontinued.

Now for the results. During the last ten years 20,705 cases were attended—12,505 in the hospital and 8,200 in their own homes. The number of deaths from sepsis was five, giving a rate of 0.24 per 1,000, and they all followed abnormal labour. As the number of cases and the time over which they were spread are more than sufficient to eliminate chance errors, we may fairly draw the following conclusions: (1) that death from endogenous infection after normal labour is an uncommon occurrence; (2) that the antiseptic precautions used were effective in preventing deaths from exogenous infection following normal labour; and (3) it is doubtful whether these measures are carried out to their full extent throughout England and Wales. The results also exemplify what I have already said, that measures which are effective in preventing death from sepsis after normal labour will not prevent it after abnormal labour.

In this series of cases there was no evidence of spray infection. This might have been a matter of chance, for none of our midwives might have been carriers of *Streptococcus haemolyticus*. To meet this possibility Dr. Leonard Colebrook examined swabs taken from the throat and nose of every pupil midwife when she began her month on the district. From October, 1932, to April, 1933, forty-five district pupils and sisters were examined, and haemolytic streptococci were found in five, which I am told is about the proportion in the general population. The first of these five wore a mask during her month, but the rest carried on their duties without special precautions. To discover if there was any streptococcal infection of our mothers a swab was taken from the cervix of every woman delivered between June, 1932, and May, 1933, who developed a temperature of 100° F. or more, unless a definite extragenital cause for the rise was found. One gave a positive result, but the throats were probably not the cause, for one of the children sleeping with the patient had impetigo, which, on culture, yielded a haemolytic streptococcus. Although typing failed to identify it, the presumption is that it was the source of the mother's infection. In view of this evidence it appears likely that the person who is usually stigmatized as a carrier is a perfectly harmless individual. At the same time, I am not prepared to say that anyone with active disease of the nose or throat is not a danger to the mothers, and as a matter of precaution we preclude any such person from practising midwifery until the disease has cleared up.

A few words are necessary upon our attitude towards gloves. We have tried them and found that they have certain disadvantages: (1) they are expensive; (2) the pupil midwives who wear them are unable to find out whether the os is fully dilated or the membranes ruptured, two very important practical points; and (3) the pupil midwives are inclined to be less careful in washing their hands, and find it difficult to manage the wrists of the gloves without getting them contaminated. I am also satisfied that doctors wearing gloves find it more difficult to perform intrauterine manipulations. For these reasons we have discarded their use, and our results show that we have not needed the added margin of safety that they are said to give. In my opinion it is probable that a simple routine such as has been described here will be more faithfully carried out than a more complicated one, and so in actual practice will ensure a greater degree of safety to a greater number of mothers.

We will now collect in the form of axioms the conclusions at which we have arrived, being confident that if general practitioners would base their methods of midwifery upon them they would effect a very definite

diminution in the number and the severity of their cases of puerperal sepsis.

Summary

1. A low sepsis rate in any practice depends upon success in securing spontaneous labour and in avoiding intervention.
2. Efficient care of the patient during pregnancy and labour will reduce the predisposing causes of sepsis to a minimum.
3. The practice of attending midwifery cases without the help of a trained midwife or nurse is dangerous, and should be discontinued.
4. A simple routine for antiseptic precautions is more likely to be faithfully carried out than a more complicated one, and so in actual practice will ensure a greater degree of safety to a greater number of mothers.

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SOME OBSERVATIONS ON THE ACUTE ABDOMEN*

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Acute abdominal conditions still loom largely on the horizon of medical practice. Their frequency does not appear to be abating, and the mortality rates of such examples as intestinal obstruction and perforated peptic ulcer still indicate the need for earlier treatment. In many instances a careful history and a complete clinical examination will indicate the correct diagnosis. Those conditions which may simulate an acute abdomen can usually be excluded, if the possibility of their occurrence is borne in mind and confirmatory evidence sought; such, for instance, as pneumonia with its referred pain, uraemia with its vomiting and abdominal distension, lead poisoning with its colic, or pregnancy and the various complications associated with it. Again, the history, the clinical signs, and an analysis of the character of the pain will usually serve to indicate those cases which do not necessitate an immediate operation—for example, renal or biliary colic.

The picture presented by many acute abdominal conditions necessitating urgent surgical treatment may be so typical that a diagnosis is readily made. Certain circumstances, however, may alter the local and general appearances and cause considerable difficulty. This paper is concerned with some of these conditions, and certain points in their diagnosis will be discussed.

The Influence of Old Age

The aged are subject to the same abdominal catastrophes that beset those of lesser years, and in many of them the manifestations may differ but little from those usually encountered. It is characteristic of old age, however, that the mental and physical response to stimuli tends to become sluggish, and this slow response is not

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