EXCERPTS --
EDINBURGH OBSTETRICAL SOCIETY SESSION 1880-1881

"On the systematic use of antiseptics in midwifery practice"

Editor's Note: These ideas were developed and the paper delivered at the Obstetrical Society before the "germ theory" of infection and contagion was generally understood or accepted. Even for those who had been exposed to the ideas, there was a lot of controversy and difference of opinion.

The existence of microscopic organisms and the role of bacteria (pathological micro-organisms) was promoted by Dr Louis Pasteur (son of a vintner!). He presented this radical explanation for puerperal sepsis at a meeting of the medical society in France in 1881.

In this treatise by the Edinburgh Obstetrical Society, the word bacteria and germs occur only once, at the very end of the paper. Until the end of the 19th century, the "problem" of infection was though to be the effect of "poisons" or "noxious material".

Now, concerning the question of maternal deaths, it must be admitted that the diminution of maternal mortality is the main object of our art. These maternal deaths or deaths during childbed – by which is meant death occurring within four weeks after delivery, -- have been shown by Duncan, M'Clintock, LeFort and other to be **striking in their frequency**; Duncan finding the proportion 1 in 120, M'Clinctock 1 in 128.

In our own hospital I have gone over the books …and find that out of 10,043 women who have delivered in it, almost 2 percent or nearly 1 in 50 have died. …… There is a sort of melancholy satisfaction to be derived from ….the fact that we have not as yet reached a mortality to be compared with that of some of the German and French hospitals, where a mortality of 1 in eleven is by no means uncommon."

In response to an observation by Dr McClintock as to what he thought ought to be a 'normal' death rates associated with childbirth (1 out of 128) is the rhetorical question: "One feels disposed to ask whether it can be true that in the hands of educated accoucheurs, the inevitable fate of women undergoing, not at a disease, but an entirely natural condition … is that 1 out of 128 must die. If the facts are correct, one cannot help feeling that they present a very strong *prima facie* case for inquiry, with the view of devising a remedy for the present state of things." And if a mortality of 1 in 128 justifies such a remark, how much more a death-rate of 1 in 50.

Let us look at Munro's table, where we find that of the 66,762 women dying during the first 4 weeks after childbed, 22,355 or 1 in 3 died from puerperal fever.

….a maternity charity [hospital] should, *prima facie*, be expected to have a higher death rate than an extern (home) practice, because to it are sent many serious operative cases. I do not think this is the case to the extent that might be supposed. ….the great majority of cases are not sent but come voluntarily, not because of any perculiarity in their case but simply for shelter till the confinement is over. No doubt serious operative cases are occasionally sent to hospital, but not in anything like the proportion that might be expected.

Since the opening of the (Edinburgh) hospital there have been 12 deaths…., 10 have taken place from this cause. What I believe to have been the origin of the disease, viz, the want of a separate mortuary and the performance of post-mortem examinations in the hospital. Since that report, the fault has been remedied and the hospital thoroughly and repeatedly disinfected.

Notwithstanding all this, the deaths from puerperal fever have continued. Yet during that period there has **not be recorded a single case of death from a similar cause in the extern practice (birth occurring at home)**… although the births are double, amounting to 625, and the general death rate only 1 in 156.

This brings us back to the old question long ago worked out by Sir J Simpson, Evory Kennedy and others of **home versus hospital practice and of the GREATLY INCREASED mortality of hospital as compared with home**.

….. To me it seems sufficiently established that maternity hospitals must exist, as much for the benefit of women at a time when they most need shelter and assistance, as for the clinical instruction which the medical student can receive there and there only.

(2d) It must be borne in mind that the majority of the intern cases [hospital instead of home] are single women who have been seduced, and who, apart from their mental condition, …. have previous to admission, been in straitened circumstances and badly nourished, and are consequently specially liable to be quickly and gravely affected by any septic influence under which they may be brought.

The present Maternity Hospital being a necessity and puerperal fever having been shown to exist there, and to have been the direct cause of death in 1 out of every 32 women and as all needful sanitary improvement have been made, it becomes necessary to look for the prevention of this scourge by means apart from the building itself.

I speak of prevention rather than cure because the experience of most if not all of us who have had to deal with a pronounced case of puerperal fever that in its presence we are nearly powerless or at least not in a position to rely with certainty of the efficacy of any of the means employed [i.e. no known treatments].

….it would appear that the pharmacopoeia has been ransacked and drugs of all kinds have been [used] but with very uncertain effect. At most we are fortunate if we alleviate pain by narcotics or prolong life for a brief period by the free administration of alcohol. If

we are comparatively unable to cope with puerperal fever once established, it become our duty to be all the more anxious to adopt any precaution which may offer a reasonable hope of preventing it.

What then is the nature of this disease, which has proved fatal in our new hospital to one out of every 32 women who have been delivered here? And is it feasible to suppose that it can be prevented? I do not believe that we can hope to prevent puerperal fever entirely….but I feel certain that by strict attention to antiseptics we shall be able to reduce its occurrence to a minimum and render its presence in hospital practice, where I have just said it is most common, a rarity.

By an almost general consensus of opinion, puerperal fever is regarded as a wound disease resulting from a poison introduced into the wound. Of wounds in the puerperal condition there is not lack, and then after the most normal labors. If there be any want of harmony in the three factors of labor, the wounds at the perineum and cervix become more extensive and there is super-added the crushing and bruising of the parts from a prolongation of the labour as well as the application of instruments. These wounds are specially liable to absorb and rapidly spread noxious material through the system; for we must recollect the extreme vascularity of the genital organs and the parts in the neighborhood, the expansion of the venous and lymph channels as well as the diminished vitality of the parts close to the wounds.

Now I have referred to these wounds probably in the order in which infection takes place; no doubt, the external wounds are the most likely and frequent conductions of infection. Next in order comes cervical tears and least frequently, the placental site. Of the conditions favoring the development and spread of infection in puerperal women by the vascularity of canals, the presence of open wounds and the destruction of the vitality of the parts surrounding, we can only to a very limited extent modify the latter two; i.e., by a **timely use of the forceps** we may possibly prevent a deep tear and certainly will **prevent continued contusion and consequently, impaired vitality**. [wrong!]

Whence comes the infection? For sources of infection we have not far to look. These may either be from without or from within – autogenetic or heterogenetic. Of the former we can readily observe several sources. Even the normal lochia have been shown to be of importance, containing, as they do copious debris; and if the normal lochia are to be considered possible sources of infection, what shall be said about this discharge when it has become fetid? Decomposing blood-clot, as well as pieces of retained placenta and membrane are by no means uncommon accidents during the puerperium. Then again the liquor amnii may become septic from contamination with external air [!!!] in the cases of early rupture of the membranes.

To the hererogenetic there is scarcely a limit. First, there are the fingers of the accoucheur and the nurse as well as unclean instruments and appliances. In our own Maternity where both the University and the extra-mural students are taught, there is the additional risk from **students who, in spite of instructions to the contrary, may have come from post-mortem or dissection rooms and from attending infectious cases**. Further, there is

possibility of infection from insufficiently cleansed linen, as was shown to be the case in a recent report of an outbreak of puerperal fever in the Queen Charlotte Lying-in Hospital in London.

The medical report of this hospital for the past year shows that in the spring of the year 1879, sixteen deaths occurred from disease comprised under the name puerperal fever – a fatality which very properly lead to the temporary closing of the hospital and a careful inquiry in the case of the mortality. The result of the inquiry was…. The discovery that the ***fons et origo mali*** lay in imperfectly cleansed linen. ….since its reopening the death-rate has fallen to 1 in 350. It need scarcely be pointed out that the presence of any decaying animal matter is sufficient to cause infection as well as the proximity of fever. But, apart from these,** the mere aggregation of lying-in women (in a hospital) is itself a cause of danger**.

By strict attention to cleanliness an immense amount of prevention may be accomplished but in our hospital every attempt has been made. The hospital has been cleaned and disinfection again and again; one set of wards have been changed for another and yet the mortality has gone on.

The remedy then as Bischoff showed twelve years ago [actually Dr. Semelweis taught the same thing in the 1840s] consists in preventing the septic germs or bacteria from entering the wounds; and as carbolic acid is destructive to the vitality of these germs, the obvious indication is the employment of this or some other antiseptic systematically in the treatment of all cases of labor.

It is impossible we must admit, to carry out antiseptics completely and thoroughly in obstetrics…except by the adoption of elaborate contrivances which would be impracticable. But although absolute asepticism is not attainable yet by a strict adherence to the rules we shall by modifying the poison, either render it inert or else greatly diminish the severity of the infection.

Rules to be observed by [Medical] Students

1. No student shall be allowed to visit the hospital who is engaged in the dissecting-room, or in attending post-mortem examination or infections cases, either in hospital or dispensary practice.
2. No student shall examine any patient in the hospital, in any way whatsoever, except in the presence of the ordinary physician or the resident medical officer.
3. Before each per vaginam examination the student shall thoroughly wash his hands in carbolic wash (2 in 30).
4. In all vaginal or uterine examination 1 in 20 carbolic oil shall be used for lubricating the fingers. [note – exam gloves had not yet been invented]
5. Each student, on entering the hospital daily, shall sign the album.

Rule to be strictly observed by the nurses (partial list of original 15 points)

1. Washing Hands – No nurse shall tough or make any application whatever, to the genital organs of a patient, without having first thoroughly rinsed the hands in carbolic wash (1 to 30)
2. A large bottle containing a solution of 1 in 30 carbolic acid and a small bottle of carbolic oid (1 in 20) shall permanently stand on the table in eary ward and delivery room.
3. Diapers [i.e,, perineal pads] each diaper, on removal from a patient, shall at once be taken out of the ward or delivery-room downstairs to the wash-house and then placed in a tub containg carbolic wash.
4. Each diaper/perineal pad shall be washed, boiled and dried by the laundress.
5. Immediately before application to the patient's genitals the nuse in charge of the case shall soak the diaper in 1 in 20 carbolic wash and afterwards dry it or apply it wet, according to instructions.

12. All mackintosh sheets shall be thoroughly washed in carbolic acid

14. Deaths – On the death of any patient, the body shall at once be removed to the mortuary outside the hospital.

15. Visitors – No visitor whatever shall be allowed admittance to the hospital unless provided with a special pass from the resident medical officer on duty.

With respect to these rules there are one or two points which require special notice:

1st, In regard to the application of diapers/peri-pads. In the hospital it has been the custom to use the same diapers over and over again, which in itself I hold to be a source of danger but further, if the nurses are allowed to apply the diapers dry there is not sufficient guarantee of when they have been dipped and dried.

As the first 24 hours are the most dangerous period, the wounds being raw and the vagina more or less patent, I have adopted the precaution of having the diapers applied when still wet with carbolic wash during that period [wet peripads must be incredibly uncomfortable, to say nothing of the tendency of wetness to facilitate the growth of bacteria!] This precaution I hold to be of great importance.

2nd, All operative procedure, such as application of forceps, and the introduction of entire hand into the vagina or uterus, I have conducted under the carbolic spray with the instrument and arm well lubricated with carbolic oil. The latter is absolutely essential under all circumstances. The former –viz., the use of the spray—is **needful only in hospital, where infection is greater than in home practice** and also because in hospital, at least in teaching hospitals, the measure to be properly demonstrated, requires longer time and more exposure of parts.

From these and such like causes I fear it is utopian to hope that we shall ever be able to prevent puerperal septicemia entirely. I feel convinced however that by a strict observance of these or some such antiseptic rules we shall very materially diminish its frequency, certainly prevent anything like an epidemic, and render its presence a rarity in our hospital, where **hitherto it has been a scourge**.