The clamp and early controversy

Magennis (1899) described a surgical clamp for midwifery in a brief article in The Lancet. See figure 9. Midwifery, with the advent of anesthesia and possibility of cesarean delivery, had become a surgical specialty. However, note the instructions for use of the clamp:

“The clamp having been opened, the cord when it has ceased to pulsate is placed between the blades, resting on the plain side; the knifed edge is then pressed firmly down and retained in position by the catch. The clamp is removed a few seconds after application, and if the accoucheur is afraid of haemorrhage (although French authorities say there is no need for ligatures) he can tie the cord on either side of the clamp before releasing the catch.” [1, p1373]

Wechsler (1912) published a brief note in the American Journal of Obstetrics and Diseases of Children on use of an obstetric clamp, stating:

"I desire to present to the profession a little device for use on the cord instead of the usual ligature." [2, p85].

Wechsler reported that on a recent visit to Vienna, he had witnessed the method of clamping and dressing without ligature in the Schauta Clinic. The clamp is pictured and noted to be smaller than the "ordinary Hemostat" used in Vienna. The rationale for use of a clamp was that it lessens the danger of infection. Its use was described as follows:

"Clamping the cord is accomplished in the following way:
1. Wait until pulsation has ceased;
2. Clamp cord about one inch from umbilicus;
3. Cut cord even with clamp.

The infant is then removed by the nurses and the clamp allowed to remain on stump of cord for fifteen minutes, or about the time the placenta has been expelled then the clamp is ready to be taken off." [2, p86]

In the same journal ten years later, Zeigler (1922) published an article on instruments used in obstetrics, and commented on use of a clamp as follows:

"The primary object of ligating or clamping the cord is, of course, to prevent hemorrhage; and while it is true that hemorrhage would rarely occur even were the cord not compressed, especially after the establishment of respiration, the fact is that hemorrhages have occurred and even with fatal termination. In fifteen years I have had two cases of secondary hemorrhage from the cord which were all but fatal. It is likely, therefore, that some form of compression will always be regarded as necessary." [3]
Note Ziegler's remark that hemorrhage would rarely occur even were the cord not compressed, especially after the establishment of respiration.

Three and a half decades later Gunther (1957) observed that cessation of placental transfusion was often apparent after a main reservoir had been filled [4]. This reservoir would appear to be the capillary system surrounding the alveoli of the lungs, as described by Jäykkä (1958) and more recently by Mercer & Skovgaard (2002) [5, 6]. Placental blood is respiratory blood. Research by Redmond et al. (1965) provided dramatic evidence that the infant's first breath redirects blood from the placenta to the lungs [7].

Ziegler's paper described several new devices for use in obstetrics, of which the clamp was one, a replacement for the earlier technique of tying the cord. That not all obstetricians clamped or tied the cord at that time can be inferred from his next statement:

"To those members of the profession whose custom it is to clamp the cord, this clamp will make its strongest appeal."

In a presentation in April 1925 at the meeting of the New Orleans Gynecological and Obstetrical Society, Dicks (1925) promoted use of a clamp to prevent infection. He described his procedure as follows:

"After the cord and surrounding skin are painted with one-half strength tincure of iodine and pulsation has ceased, the Martinez clamp, which of course, has been sterilized, is placed on the cord as near the skin margin as possible in the long axis of the body. The jaws are closed slowly; if this is done too rapidly there is some danger of rupturing the cord below the clamp. The cord is then cut off close to the jaws of the clamp, and an alcohol sponge applied for a few minutes to dehydrate it. A gauze roll is place about the body, including the clamp. Twenty-four hours later the instrument is removed and that portion of the cord which has been compressed and which is as thin as a piece of parchment can either be trimmed off at once or left to fall off, which it does within a few days." [8, p 708].

Among the discussants of this paper, Levy (1925) commented:

"I am rather inclined to disagree with those who advocate the use of a clamp. To me the ligation of the cord is one of the simples processes in obstetrics, and why complicate what is inherently simple? I quite agree that the cord should be tied as close as possible to the skin margin, but a piece of tape does that just as well as an instrument. The clamp crushes and macerates the tissues, and macerated tissue, as is well known, is prone to develop bacteria. This also holds true of the so-called milking of the cord, which frequently breaks down the outer surface and so favors the entrance of infection." [9, p740]
Of note is that during the early twentieth century, use of sterile techniques and antiseptic agents became increasingly important. However, waiting for pulsations of the umbilical cord to cease before ligating it in the traditional way, or by use of the newly introduced clamp, remained the standard of care. The comment by Levy above provides evidence that milking the cord to maximize transfer of blood to the baby was a technique used by some.

References

3. Ziegler CE (1922) Additions to our obstetric armamentarium.
7. Redmond A et al. (1965) Relation of onset of respiration to placental transfusion.

Text of the article by Magennis from the page of the Lancet shown in figure 9 below

A MIDWIFERY SURGICAL CLAMP

In the old method of dividing the umbilical cord the accoucheur after tying the first thread pressed the blood in the vessels some distance along the cord which was then held by an assistant until the second thread was tied, the object being to avoid the escape of blood on to the bedclothes. This part of the accoucheur’s work may, however, be accomplished more conveniently by making use of a clamp which I have designed and which is represented open in Fig. 1 and closed in Fig. 2, for it by the same movement cuts the cord and compresses both the cut ends, thereby supplying the place of scissors and ligatures. The clamp having been opened, the cord when it has ceased to pulsate is placed between the blades, resting on the plain side; the knifed edge is the pressed firmly down and retained in position by the catch. The clamp is removed a few seconds after application, and if the accoucheur is afraid of haemorrhage (although French authorities say there is no need for ligatures) he can tie the cord on either side of the clamp before releasing the catch. The instrument is neat and easy to use. Messrs. Arnold and Sons, London, are the makers. EDWARD MAGENNIS, M.D. R U.I.
Lurgan, Ireland.
From a few experiments which we have made with it we cannot allow that it is strictly speaking an allogeneic form of mercury. Thus on heating it splits up into mercury and ammonia gas. It is a hard, brittle solid, somewhat resembling the black scales so often seen in the forge of a smithy.

(1) ANTIUSSEIN; (2) FLUOR-MERHINUM; and (3) EPIDERMUM.

These three compounds are derived from fluor-di-phenyl. The formula for di-fluor-di-phenyl is C₆H₅C₆H₅F₂, and is obtained by acting upon certain phenyl compounds with concentrated hydrofluoric acid. Antiussein is a colantine containing di-fluor-di-phenyl and is described as "a certain cure for whooping-cough and diseases of the throat and neck," the solution to be applied very energetically. Fluor-merhinum is another colantine containing as a base fluor-phenyl di-fluor-di-phenyl and is said to give marked relief in rheumatism, lumbago, and influenza. Epidermum is a related compound but with xylol in the molecule. Contained in an ointment it is said to serve as a medicant antiseptic in the treatment of unhealthy suppurations as well as of burns. Fluorine compounds have been known for some time as powerful antiseptics and their combination with phenyl groups would appear to afford a series of medicated unguents which deserve attention.

New Inventions.

ASEPTIC INSTRUMENTS.

At the present day most surgeons will agree that any instrument which is to be employed in a surgical operation should be capable of being boiled and is as necessary for pocket instruments as for those used in the more important operations. The figures illustrate a very neat arrangement for a portable knife which is constructed entirely of metal and may therefore be boiled. The handle encloses the blade (Fig. 1) and when the handle is opened the blade is placed in position and then the handle fixes it firmly by an ingenious spring so that there is no fear of its closing unexpectedly. The blade is interchangeable with three others which are kept in a metal case (Fig. 2) in which these blades include all the forces which are likely to be required. The knives are made by J. Albert Schmidt, Solingen, whose agent in London is Mr. W. S. Osweill, 22, Lime-street, London, E.C.

A MIDWIFERY SURGICAL CLAMP.

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Plymouth Asylum.—At a meeting of the Plymouth Town Council held on May 8th the report for 1888 of the visiting Committee of the Plymouth Borough Asylum at Blackdown was presented. This stated that the result of the recent controversy between the guardians and the council with regard to the weekly rate charged for pauper patients from Plymouth was that the council in future would pay £1000 a year extra and the guardians £1000 per annum less than formerly. The weekly maintenance rate of patients had been reduced from 12s. 1d. to 11s. 6d.

Diphtheria in London.—Alike as regards amount, mortality, and relative fatality, diphtheria in London in the four weeks ended on April 22nd showed great decline as compared with the like period ended on March 25th. In the earlier period the total of notified cases of the disease was 791, or 196 per week, whilst in the April period the total was only 665, and the weekly average 166 cases. In both all sanitary districts save two were invaded, but whereas in March there were four districts with upwards of 50 notified cases each and 240 in all there was only one such district in April, while other five areas had only a total of eight cases in all. The weekly average of 46 deaths from diphtheria in the March period, amounting to 166, gave place to an average of 29 in April and a total of 115 deaths. The records of the several weeks in this later period showed 31 deaths (or six below the corrected decennial average), 34 (equal to the average), 20 (being 16 below the average), and 29 (or six below the average). Had the corrected averages for the corresponding four weeks of 1889-90 been maintained the actual 114 deaths would have been 125. The case mortality yielded was 17.7 per cent. in place of the 29.9 per cent. of the March period. In the outer circle above there was a falling off in the number of deaths from diphtheria, the 58 of the earlier period, of which 29 were in West Ham registration district, being replaced by 44, of which 19 were in that particular area.

Figure 9: Midwifery surgical clamp described in The Lancet, May 20 1899

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