

# Role of Operative Early Total Cervix Occlusion for Prevention of Late Abortion and Early Prematurity

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## Summary

Ascending genital infection is one of the main causes for late abortions or early premature births. The Early Total Cervix Occlusion (ETCO) is an early preventive measure for women with a history of  $\geq 2$  late abortions or early premature births ( $< 32+0$  gw). The operative technique, own results, as well as results from a multi-center-investigation undertaken in Germany are discussed. In both evaluations the women within this high risk group had after a Total Cervix Occlusion (TCO) a surviving infant in about 70%. Differentiated in „early“ TCO (ETCO) and „late“ TCO the success rate has been 80% respectively 40%. The ETCO is quite different from a Cerclage. Whereas the ETCO really closes the cervical canal (total barrier) - and thus prevents ascension of organisms - the Cerclage only tightens the canal. The inevitably much poorer results achieved by Cerclage are compared with the results of the ETCO.

## Introduction

Recurrent late abortions and early prematurity continue to be two of the up to now unsolved problems of modern obstetrics and perinatal medicine. The patients concerned often feel heavily burdened: On the one hand they deeply long for an infant and on the other hand they experience recurrent losses, which are often accompanied by increasing psychological problems. To achieve a surviving infant is in such cases a particularly important medical and psychological task.

A large number of reasons are known to cause late abortions and prematurity. Lockwood and Kuczynski [4] divided most of the known causes of prematurity into four pathogenetic processes. However, as far as the avoidable causes are concerned, infection, particularly ascending genital infection is known to be the most common cause (compare also the article „Prevention of Preterm Delivery“ in this issue). The most efficient measure for preventing ascending genital infections in cases of recurrent late abortions and early prematurity is to establish a total barrier within the cervical canal by Early Total Cervix Occlusion (ETCO). We introduced this measure in 1981 [9, 11]. Before that time there were, in the literature, only very few reports about operative cervix occlusion for treatment of imminent abortion, mainly in advanced stages. For instance, 40 years ago Szendy published two articles on the topic „measures to prevent the birth of the infant in advanced premature labor“ (translation from German) [12, 13]. Thus it was thought of as an emergency measure, to be taken often when prolapse of membranes had occurred. We introduced the ETCO as an original early preventive

measure for use when the cervix is still in an anatomically normal state and which should be performed early in pregnancy at about 12 gw, and only in women with previous critical history. It is important to note, that the ETCO is quite different from a Cerclage. Whereas the ETCO really closes the cervical canal, thus preventing ascension of organisms, the Cerclage by contrast, only tightens the canal (Fig. 1). The much poorer results achieved by Cerclage will be discussed below.

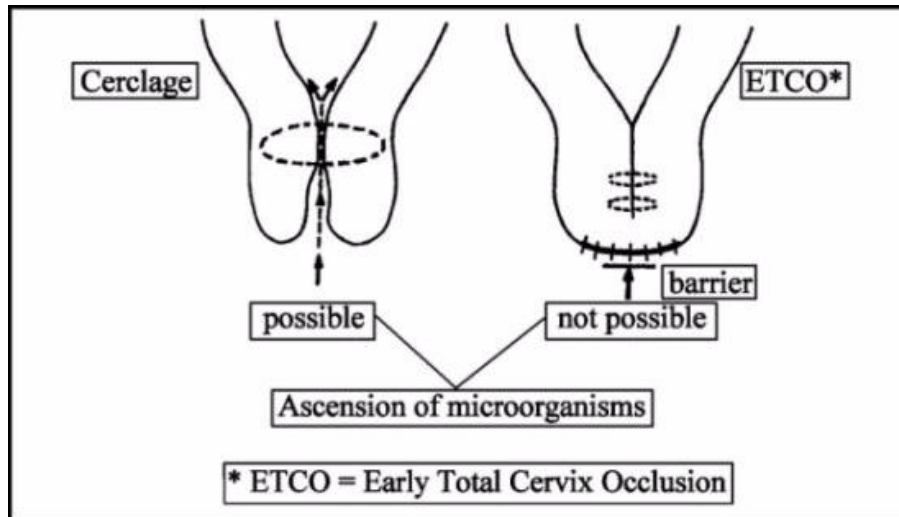


Figure 1: Comparison between ETCO and Cerclage

## Method

### *Definition, indication and contraindication*

We differentiate between „early“ and „late“ Total Cervix Occlusion (TCO):

- *Early Total Cervix Occlusion (ETCO)*, performed at < 16+0 gw and a modified [6] Bishop-score of  $\leq 4$  (almost normal portio), and
- *Late Total Cervix Occlusion*, performed at  $\geq 16+0$  gw or a modified Bishop-score of  $> 4$  (critical portio).

Because of the much better results to prevent prematurity (see below) we recommend to perform the TCO „early“ (ETCO) rather than „late“. Indication for ETCO is two or more late abortions ( $\geq 12+0$  gw) or early premature births ( $< 32+0$  gw) in the patient's history. A contraindication is opening of the cervix with signs of infection and labor which can not be inhibited.

### *Preoperative diagnostics and measures*

Examinations for infections are compulsory, for example vaginal and cervical smears with microscopic and/or bacteriologic examinations. Further, should pathological findings be present - such as bacterial vaginosis, a fungus, trichomonas or chlamydia infection - the patient should be given an appropriate local therapy or a systemic therapy with antibiotics.

After an ETCO has been performed there is no further chance to examine whether organisms occasionally have already ascended to the intrauterine space. Therefore we recommend that a so-called egg-pole lavage, which we introduced in 1992 should be performed directly before the operative closure of the cervix. The technique is described

in detail in [8]. With this method we can get important bacteriological information and apply antibiotics if necessary.

### *Operation technique*

Before starting the actual operation, we recommend using a procedure which we specially introduced to avoid considerable bleeding. This involves a tight circular ligation of the portio as high as possible, so that the circulation is almost cut off. This measure has two particular advantages: Firstly, the blood loss, which can be considerable on account of the hypervascularisation, is reduced to a minimum, and secondly, it is much easier to see the operation area. For a simple and successful ligature we have developed a special loop instrument [5] (s. square 1).

Square 1: Ligature with the loop instrument

#### **Ligature with the loop instrument [5]**

There is a ratchet on the traction stick with a blocking spring. This allows the stainless steel plaited wire loop, to be attached in a circle around the portio and to be fixed up in a tightened state. We always try to clamp the loop so tight that there is only minimal bleeding. This is a sign that the tissue circulation is not completely interrupted. When the haemostasis has to be suspended at the end of the operation, the traction stick is turned about 90°. The blocking spring slides out of the traction and the loop is set free.

In order to allow the os uteri to grow completely together, the upper surface of the portio has to be dissected, that is to say, the epithelium has to be almost completely removed. So as to clearly mark the surface to be removed, but also to find the exact positioning of the wounded area later for the row of stitches adapting the upper surface of the portio, we make a circular incision one millimeter deep with a radius of 10 - 15 mm round the external os uteri with a scalpel.

Then we remove the portio epithelium with a quick rotating wire brush or a special metal rasp in a similar way as is used in dermatology to smooth out scars. This method of removing the tissue is more effective and preserves the tissue better than the method we previously used, when we removed the epithelium by sharp dissection using a scalpel.

Afterwards, the glandular epithelium of the cervical canal is also removed, as far as possible to a depth of about 1 to 2 cm using the same rotating device, whilst the os uteri is spread using mosquito clamps. Then 2-3 inner circular stitches are made to close the cervical canal. Consequently two rows of knotted stitches are made, which close the outer os uteri completely (Fig. 2). For all the stitching we use synthetic monofile thread like PDS or plaited thread, such as Vicryl. These threads, when compared to catgut, are much better for the healing process and are reabsorbed much more slowly.

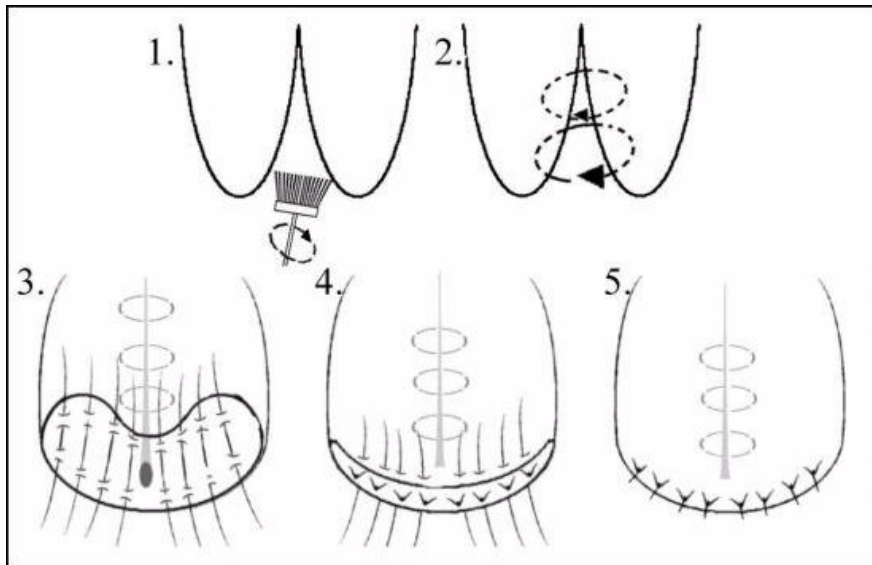


Figure 2: Operation technique of ETCO: 1. removing of glandular epithelium, 2. 2-3 circular cervical sutures, 3. transverse stitching of the whole dissected area for deep adaptation, 4. second row of knotted stitches adapting the surface tissue, 5. situation after operation.

### *Measures at the end of pregnancy*

The scar should be opened:

- when labor starts spontaneously,
- when an induction of labor is planned, or
- when 37 weeks of gestation are completed.

We generally cut the portio scar with scissors under local anaesthesia. Then we penetrate with the finger to a depth of about 1-2 cms into the loose cervical tissue in the assumed direction of the cervical canal. If the patient wants to leave the hospital after the scar has been opened, to wait until labor starts spontaneously, we see no reason why she should not do so, provided there are no signs of any risk.

We do not think that a primary cesarean section is necessary at all. Quite the contrary when a recanalization of the cervix takes place during a vaginal delivery, this is in fact a good prerequisite for the reestablishment of normal anatomic conditions.

## **Results**

To assess the results of ETCO, particularly in comparison to the Cerclage, one should only look at high-risk-groups such as matching the above mentioned indications for an ETCO. We have no knowledge of any randomized study about the ETCO. On the basis of the results published so far we do not think that the operation can be withheld from any woman with such a critical history. A randomized study would not receive the approval of any ethic council - at least not in Germany - and no woman is likely to agree to being integrated into a control group anyway. Therefore an acceptable solution is to compare the outcome of pregnancies after performing an ETCO with the outcome of former pregnancies of these patients [e.g. 2, 6, 11]. We should also consider that the chances of giving birth to a surviving infant are reduced the more late abortions or premature births the woman has previously had [3].

In 1990 [10] we evaluated retrospectively the data of a group of 113 patients with previous recurrent abortions. From a total of 389 wanted pregnancies only 101 infants were born alive (26%). However, 35 of these infants died in the neonatal period. In total 66 survived, which means that only 17 % of all these pregnancies resulted in a surviving infant. Through the introduction of the total cervical occlusion (either early or late TCO) the same patients achieved 132 pregnancies with 94 live and surviving infants (71% !). We could also show, that the results in cases with an „early“ TCO are twice as good as with a „late“ TCO (80% vs. 40%) [10].

Similarly good results have been obtained by other clinicians performing the TCO: In 1996 we reported the results of a multi-center-investigation, in which 11 German hospitals took part [6] and the outcome of a total of 819 pregnancies with TCO was assessed. It emerged that the rate of surviving infants in the pregnancies before TCO had been performed was 21% compared to 74% in the pregnancies with TCO. Hormel and Künzel [2] reported similar good results.

As far as the mode of delivery is concerned, 71% of the patients with a cervical occlusion had a spontaneous delivery and 15% had an operative vaginal delivery. The rate of cesareans was 14% in comparison to 9% for the whole department at that time [10].

In 1997 we reported the results of a follow-up examination carried out on 52 women who had previously had a total cervical occlusion [7]. On the basis of these results generally we can conclude that up to now no remarkable negative effects have been proven in connection with the operative total cervical occlusion.

#### *ETCO versus Cerclage*

The Cerclage is a widespread measure and numerous publications exist. Some authors report good results - but one should look at these reports very closely and verify whether or not the Cerclage had been performed on women at similar high risk (see above). But the Cerclage is hardly capable of preventing ascending infections because this method only tightens the cervical canal and does not close it (Fig. 1). In our sample of women treated with ETCO we found that in 51 previous pregnancies in which Cerclage was performed, only 13 infants survived. This is a survival rate of only 26%. These results underline how advisable it is to give the ETCO preference over Cerclage in cases with such critical history.

## **Conclusion**

On the basis of previous experiences and available results the Total Cervix Occlusion - in particular the early occlusion - is a convincingly efficient operative measure for the prevention of late abortions and early prematurity, particularly in cases where such events had previously happened recurrently.

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