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Case report

Complete Occlusion of the Cervical Canal and External Os after Rupture of Membranes in the Early 2nd Trimester in Two Cases

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Abstract

Rupture of membranes at an early stage of pregnancy usually ends with the termination of pregnancy and is associated with a considerable psychological burden for the person concerned. Two cases of rupture of membranes in the early 2nd trimester are reported here, in which a complete occlusion of the cervical canal and the external os was successfully performed. After placing a McDonald cerclage, the cervical canal and the surface of the portio uteri were de-epithelized and sutured separately. In both cases, the pregnancy proceeded uneventfully afterwards. Both children (today six and eleven years old, respectively) have developed well. Both mothers would opt for this procedure again. In cases of a very early rupture of membranes and exclusion of local infection, it is possible to maintain a pregnancy by means of the complete occlusion of the cervical canal and the external os under maximum monitoring.

Tweetable Abstract: Normal pregnancies after very early rupture of membranes due to complete closure of the cervix.

Keywords: Early pregnancy loss: Surgical, Miscarriage

Introduction

A spontaneous premature rupture of membranes in the early 2nd trimester considerably impairs the formation of the fetal skeletal system, as well as inhibiting the maturation of the lungs and kidneys due to the absence of amniotic fluid. Intrauterine infections can occur, which can also endanger the mother. This often leaves no other option than to advise the mother to terminate the pregnancy. Loss of amniotic fluid is observed in rare cases even after amniocentesis. In most cases, the defect is self-locking. In two-thirds of cases, abortion occurs, especially if larger amounts of amniotic fluid (15 ml) have been removed [1]. The termination of pregnancy is usually associated with considerable psychological stress for the patient.

After Szendi [2] initially described total cervical occlusion, Saling [3, 4] modified it in a prophylactic approach to habitual abortion. We successfully applied this method for many years in a prophylactic and therapeutic approach, modified it and always combined it with McDonald cerclage [5]. The experience we had gained here placed us in a position to perform complete occlusion of the cervical canal and external os in two cases of ruptured membranes at 14 and 16 weeks of pregnancy, respectively.

Method

After 24 hours administration of the antibiotics cefuroxime and metronidazole, a cerclage is first placed according to McDonald. This is placed as high as possible

using a mersilene tape connected with 2 blunt needles (Ethicon BT 3–5 mm 40 cm). Supplementary descriptions can be found in Spätling et al. [5]. Our aim is to use a safe procedure which stabilizes the cervix and provides effective protection against ascension of microbes; thus we always perform cerclage first, even if the cervix is not affected. This also makes it easier to push back the amniotic membranes in case of a prolapse. Furthermore, the cerclage protects the membranes from possible injury during manipulations in the cervical canal.

After two lateral holding threads (Vicryl 0, CT-2 plus) have been placed in the portio uteri, the inside of the cervical canal is de-epithelized with a serrated curette (Aesculap ER 580R). The curettage is performed vigorously with the aim of removing the epithelium of the cervical canal in order to achieve complete adhesion of the walls. This is supported by joining of the walls by means of 2–4 single button sutures using a fine curved needle (diameter 14 mm, Vicryl 2–0, Ct-3). The threads are cut off close to the stiches to prevent ascension of microbes by means of a wicking effect. A thin 3–5 mm wide epithelial strip is removed from the surface of the portio uteri with an angled scalpel (Swan-Morton) intended for conization. If you begin with the posterior cervical lip, the bleeding will only slightly impair vision. Despite the strong blood flow, no further blood-reducing measures are necessary. The wound surfaces are sutured together continuously (Vicryl 0, CT-2 plus) including the holding threads. An even, not too superficial suture at a suture distance of approx. 4 mm facilitates healing, which results in a complete vaginal dermis at the end of the pregnancy.

A tamponade soaked at the tip with povidone-iodine solution is placed for 24 hours.

Antibiosis with cephalosporins combined with metronidazole is continued for 5–7 days. A low dose bolustocolysis with 4 micrograms of fenoterol initially every 6 minutes, halved on the 2nd day to every 12 minutes is given for 2–3 days [6]. The dose is not increased so as not to conceal contractions caused by an early infection. We always supplement 20 mmol magnesium/day [7]. The inflammation parameters (C-reactive protein, leukocytes) were monitored by taking several blood samples daily. The temperature was measured every eight hours. The patient was instructed to report at the first sign of feeling ill or having pain, however slight, as this is considered an early indicator of infection. The amount of amniotic fluid was checked daily by abdominal sonography. The abdomen was checked manually by a doctor three times a day.

Case 1

In 2009, a patient (35 years old, 5 Gravida/1 Para) presented in my office with a request for examination. She had suffered a rupture of membranes in her previous pregnancy at the same time (16 weeks of pregnancy), which led to the termination of the pregnancy. She had also suffered another early miscarriage. I performed a vaginal exam and the diagnosis was normal, with no sign of infection and normal fetal development. I tried to calm the patient down and discharged her. Two days later, at 15 weeks and 6 days she came back to the clinic with ruptured membranes and a living fetus without any amniotic fluid. After I had explained the necessity for a further termination of pregnancy, the patient asked if there was really nothing else that could be done. I mentioned the method of complete closure of the cervical canal and the external os, which would not normally be carried out in this situation and therefore did not correspond to the general therapeutic procedure. The patient wanted to risk this operation.

Course of events

As expected, neither the vaginal smear nor the laboratory showed any evidence of infection. Four days after the rupture of the membranes, the amniotic fluid was still observed to be leaking. The fetus remained without amniotic fluid. The patient received exhaustive information regarding the risk that a cervical occlusion in the case of rupture of the membranes could lead not only to losing the child but also to severe maternal illness and even to removal of the uterus, but she wanted maximum effort, nonetheless. The patient agreed to maximum therapy and intensive monitoring, accepting the possibility of an unfavorable outcome. This was the process by which the decision was made to perform the procedure.

The procedure was performed under spinal anesthesia and tolerated by the patient without complications. After a slight increase in leukocytes and CRP, the infection parameters returned to normal. No further loss of

amniotic fluid was detected either subjectively or using the litmus test. On the 3rd postoperative day a small quantity of amniotic fluid was observed in the uterine cave by abdominal sonography. After 7 days the quantity of amniotic fluid was still reduced but was accompanied by good child movements. The administration of the antibiotics cefuroxime and metronidazole, which was started four days before the procedure, was continued until 8 days after the procedure. Thrombosis prophylaxis was carried out with enoxaparin 4000 IU (Clexane, Sanofi Aventis, Frankfurt Germany). On day 13 the patient was discharged home after inconspicuous vaginal sonography and speculum examination without manual examination. Fenizolan (fenticonazole nitrate, Recordati, Milan, Italy) was administered prophylactically. The application of Lactobacillus preparations is thought to support the formation of normal vaginal flora. The patient initially presented weekly, later at 14-day intervals. The development of the female fetus controlled by sonography proceeded according to schedule. The speculum examination showed completely smooth skinned-portio uteri.

At 38+2 weeks of pregnancy a healthy girl (2850 g) was born with good Apgar (9/10/10) and pH-values (7.37) by means of re-section under spinal anesthesia. In the same session, the cerclage was removed, and the closed cervical canal was opened with a Hegar dilator. The postpartum period was uneventful for both mother and child. During the first three years of life the girl showed temperature-associated cramps which could be linked to the SCN1A gene. Mother and brother have the same variation, but only the brother showed corresponding cramps in the first years of life. On subsequent visits twice a year, the girl, now 11 years old showed normal development with above-average school performance.

Case 2

A 40-year-old 4 Gravida/2 Para (14 weeks and 6 days) was admitted to hospital with a loss of amniotic fluid. On the same day an amniocentesis was performed without complications. The indication for amniocentesis, besides maternal age, was a megacystis, an intracytolpasmatic sperm injection and abortus imminens at 10 weeks. At the time of amniocentesis, a retroamnial hematoma was visible by ultrasound. The aspirated amniotic fluid was tinged with old blood. The patient reported two unremarkable pregnancies which ended in spontaneous delivery. After one early abortion, the patient did not have a curettage. At the examination on admission, the patient showed old-blood discharge diluted with amniotic fluid, the cervix was not shortened, and the cervical canal was closed. Microscopically and microbiologically there was no evidence of infection. No amniotic fluid could be seen in sonography.

Course of events

As the leakage persisted and the fetus continued to show a hydramnios the prognosis was discussed with the patient, including the risks for mother and child. When asked about an alternative to terminating the pregnancy, we explained the procedure of complete closure of cervical canal and external os and the positive outcome of the case described above (see case 1). The patient then decided she wished to have the procedure, combined with a cerclage after McDonald according to the procedure described above. This was performed under spinal anesthesia on the 4th day after rupture of the membranes (15 weeks and 2 days) without any complications. Intravenous antibiotics (3 × 1.5 g cephalosporin) were administered over 11 days. In contrast to the first patient, metronidazole was not administered i.v., but was applied as a vaginal suppository after removal of the tamponade. As in the first case, Lactobacillus preparations were subsequently administered to support the formation of normal vaginal flora. On the 3rd postoperative day the C-reactive protein increased from 0.4 to 1.3 mg/dl, sank to 0.8 mg/dl on the 3rd day and remained at this level until the patient was discharged". After an inconspicuous exam and with sufficient amniotic fluid, the patient was discharged at 16 weeks and 6 days of pregnancy. The rest of the pregnancy was without any complications. At 37 days and 0 days the cerclage tape was removed during a speculum examination and revealed a completely smooth-skinned portio uteri.

A spontaneous delivery was planned. The patient requested a primary c-section, which we performed at 38 weeks and 0 days under spinal anesthesia without complications. In the same session, the cervical canal was opened using a Hegar dilator. A boy (2890 g) was delivered from vertex presentation (Apgar 9/10/10, pH

arterial 7.29). The boy showed a slight stridor, which did not regress and led to home monitoring by pulse oximetry at the age of three months. The cause of the stridor was diagnosed as unilateral vocal cord paralysis, the cause of which could not be found. An enquiry to the parents, six years after birth, showed that the vocal cord paralysis had worsened, so that a tracheotomy had had to be performed at the age of seven months. The operation was excluded as the cause of the stridor. Despite his handicap, the boy, now six and a half years old, has developed well. The mother would decide to have the operation again.

Discussion

The happiness of both families with their children, who are now 11 and 6 years old, as well as the argument of one of the mothers that the publication of the procedure could perhaps save some children and spare mothers the trauma of losing a child, prompted me to publish this article. We have been able to accept the increased risk of such an operation in the case of ruptured membranes, since we have a great deal of experience with the complete closure of the cervical canal and the external os. In addition, in our maximum care hospital we are able to closely monitor the patients clinically and biochemically around the clock - always in the knowledge that even the slightest indication of an infection endangering the mother will terminate the pregnancy. It is worth mentioning that, for an indication of ruptured membranes, we have only performed this operation in the two cases described here.

The reason for the poor assessment of the complete closure of the cervical canal and the external os is due, on the one hand, to the difficulties involved in systematizing this approach and in conducting corresponding clinically controlled studies. On the other hand, the randomized study by Brix [8] gives the impression that they also investigated the complete occlusion of the cervical canal and external os. In fact, in the described group, neither was the cervical canal closed after de-epithelization, nor was the external os suture performed after removal of the superficial epithelium. In their study, they did not set a real barrier to prevent ascension of microbes, which we consider to be an essential prerequisite for the success of the procedure. In addition, they only investigated the prophylactic approach in cases of habitual abortion. In our opinion, the complete occlusion of the cervical canal and the external os is successful with a therapeutic approach, with massively shortened portio and with amniotic sac prolapse [5]. In seemingly hopeless cases, we were able to prolong the pregnancy by many weeks and the patients did not have to spend many weeks in hospital. The feared risk of a severe infection was much lower than expected.

We therefore consider the term “complete occlusion of the cervical canal and the external os” necessary to point out the importance of deep de-epithelialization as a prerequisite for the merging of the structures. In the cases described here, this procedure not only sealed the amniotic fluid leakage, but also hindered ascension of microbes. It may also stabilize the cervix. We consider the routine additional application of cerclage important for the success of the therapy, as it promotes healing by keeping the pressure away from the affected part of the cervix. We prefer the McDonald cerclage, as it can be performed with much less tissue traumatization.

Conclusion

The two cases of rupture of membranes in the early 2nd trimester show that in the absence of local infection and under maximum monitoring the complete occlusion of the cervical canal and the external os may help to avoid termination of pregnancy.

Details of Ethics Approval

Both patients agreed in writing to their interviews and the publication of the details of their medical history. The Ethics Commission of the State Medical Association of Hesse does not consider a vote for such individual case treatment necessary, as no systematic research approach in the sense of the Declaration of Helsinki was pursued.

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