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Case Report

# Use of Polyglycolic Acid Mesh in Extreme Preterm Premature Rupture of Membranes (PPROM)

## Abstract

**Introduction:** Extreme Preterm Premature Rupture of Membranes (PPROM) is a condition that increases maternal, fetal and neonatal morbidity and mortality to a large extent. In this study, we aimed at prolonging the gestational periods of 3 patients with extreme PPROM by way of sealing the cervical os using PGA mesh and fibrin glue to stop physical amniotic discharge.

**Materials and Methods:** We used the system based on fixing a piece of PGA (Polyglycolic Acid – NeoveiL absorbable polyglycolic acid felt) mesh on cervical os in patients with extreme PPROM. A fibrin glue solution (TISSEEL Lyo) was heated in a Fibrinotherm device to be used for fixing the PGA mesh. The risk of infection was monitored in the patients through measurements of fever and C reactive protein (CRP) levels and hemogram parameters. For infection prophylaxis, each patient was given antibiotherapy, and after the 24th gestational week, 24 mg of betamethazone in 24-hour intervals and ultrasonographic assessments and contraction monitoring were carried out twice a week.

**Results:** The gestational periods of all the patients we treated were prolonged at least a month. No maternal or fetal infections were seen in any of the patients. One of the patients had a delivery at her gestational week 28 and her baby is still alive. The other 2 patients had deliveries after 26 gestational weeks and 3 days and 29 gestational weeks and 5 days, the former infant dying immediately after birth and the latter a week after birth.

**Conclusion:** The management of extreme PPROM is still a controversial issue worldwide. Its high maternal and fetal morbidity impedes adaptation of a certain treatment approach. We presented in our study a different way of managing extreme PPROM cases. Our rate of success is around 33%. We think that broader series of studies are needed to assess the reliability and effectiveness of this approach.

## Introduction

Occurring before gestational week 26, extreme Preterm Premature Rupture of Membranes (PPROM) is one of the important problems of obstetrics that may involve serious complications for both the mother and the baby [1]. PPROM is seen in 0.4-0.7% of pregnancies and increases fetal death risk by 1.2% [2]. The fetal adversities it may cause include neonatal sepsis and respiratory distress syndrome. Seen in 13-60% of the cases, the maternal complications are chorioamnionitis and intra-amniotic infections. Postpartum infections and endometritis may occur in 2-13% of pregnancies involving PPROM [1]. Other than antibiotherapy, steroid administration and expectant approach, there are no options in the treatment of PPROM today. Our goal in this study was to prolong as much as possible the pregnancies of the 3 patients who had spontaneous PPROM between gestational weeks 22 and 26, which are at or below the viability limit, and in this way to minimize the fetal morbidity and mortality associated with such pregnancies and extend the pregnancy to the most advanced weeks attainable.

## Materials and Methods

The study protocol was approved by the Ethical Committee of the Medical Faculty of Ondokuz Mayıs University. The study included patients with extreme PPROM who had a membrane rupture before their gestational week 26 and diagnosed with PPROM, who were suitable for the intended procedure, who had no signs of active infection and who had no maternal or fetal indication that would put the mother or the baby at risk if pregnancy continued. The present study used the system based on fixing a piece of PGA (Polyglycolic Acid – NeoveiL absorbable polyglycolic acid felt) mesh with fibrin glue, which had been previously used with success to prevent cerebrospinal fluid (CSF) escape due to a defect of dura mater. A fibrin glue



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solution (TISSEEL Lyo) was heated in a Fibrinotherm device to be used for fixing the PGA mesh. Having been used with success in the treatment of CSF escape before, this system consisting of a bioabsorbable product and fibrin glue was used in 3 extreme premature membrane rupture cases to stop the amniotic discharge that clogged the cervical os. No tocolysis was administered to the patients. Each patient was given detailed information about the procedure and their informed consents were obtained.

### Implementation of the technique

An oval piece of PGA (neoveil, gunzo, Kyoto, Japan) mesh was cut in a way to cover the cervix and the fibrin glue was applied to its edges to fix it on the cervix (Figure 1). PGA is a homopolymer weighing 100,000 Daltons which hydorlizes into hydrogen and carbondioxide with the help of pyruvic acid.

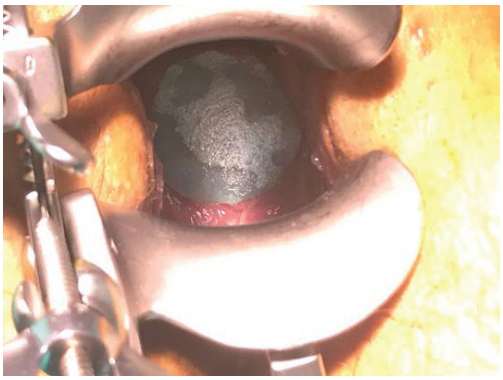

**Figure 1:**

### Case 1

A 25-year-old patient with gravida 2, parity 1 and living 1 (G2P1L1) presented to our clinic with a complaint of leaking amniotic fluid at week 22 and day 2 with respect to her last menstrual date (LMD). Active amniotic leakage was observed in her physical examination. The patient did not have any contractions or any cervical opening and effacement. Her ultrasonographic measurements were compatible with her gestational week. Her amniotic fluid decreased to a large extent. The patient was monitored for 3 weeks without any signs of chorioamnionitis. When her spontaneous pain started at week 26 and day 3, she gave birth through vaginal route to an 1120-gram male offspring with 7 apgar scores.

### Case 2

A 22-year-old G1 patient presented to our clinic complaining about leaking fluid at week 25 with respect to her LMD. Amniotic discharge in the form of leakage was observed in her physical examination. Cervical opening and effacement was not found. Having no contractions and a decrease in amniotic fluid, the patient's ultrasound measurements were compatible with her gestational week. She had no signs of chorioamnionitis and since her pain started at week 29 and day 5, she was administered a cesarean section. A 900-gram male offspring with 8 apgar scores was delivered. The newborn died a week later.

### Case 3

PPROM developed in a 33-year-old G1 patient at week 24 and day 2. She had vaginal amniotic leak. In her ultrasonography, her biometric measurements were compatible with her gestational week and her amniotic fluid decreased. As in the other patients, she was administered betamethazone and anti-infection therapy. The patient gave birth at her gestational week 28. The baby is still alive with no morbidities. After routine examinations, all the patients were administered polyglycolic acid mesh and fibrin glue. Prophylactic antibiotics were given to them during this time. They were monitored with ultrasonography twice a week. Increased amniotic fluid was seen in ultrasonography in all patients. The patients were checked with pads and no further fluid discharge was seen. They were monitored for fever everyday and for hemogram and CRP (C reactive protein) values twice a week. After they reached 24 week of gestation, they were administered 12 mg of intramuscular betamethazone twice in a 24 hour interval.

## Discussion

PPROM is defined as a rupture of membranes occurring before gestational week 24. Its prevalence is less than 1% of all pregnancies [3-5]. The most common risk factor is Group B streptococcal infections. Its more frequent occurrence in white and Hispanic women indicates the importance of ethnic background. Its other causes include urogenital system infections, exposure to diethyl stilbestrol in the intrauterine period, maternal weight, uterine distension (multiple pregnancy, polyhydramniosis), gestational diabetes, cervical cerclage, smoking, a history of preterm labor in previous pregnancies, iatrogenic membrane rupture during amniocentesis or cervical cerclage, and antepartum hemorrhage [6]. Its major neonatal morbidities are pulmonary hypoplasia, bronchopulmonary dysplasia, contractures and infections [7,8]. The most common maternal complications include endometritis, placental abruption and retained placenta. Less common maternal complications are sepsis and maternal death [9-11]. A study stressed, considering its maternal, fetal and neonatal outcomes, the importance of making a good decision when planning for treatment [12]. Studies in recent decades have expressed that neonatal outcomes are partially a little better. However, this is thought to occur due to different study designs in different sites, gestational age during PPROM, different inclusion criteria and different treatment protocols [4,13,14]. In their study investigating the fetal and maternal outcomes of 44 patients with PPROM, Riyami et al. found that infection occurred in 45% of the cases and antepartum bleeding in 25%; cesarean section was necessary in 27% of the cases [1]. Van der Marel et al. assessed a total of 160 women in their study and found intra-uterine infection, retained placenta, placental abruption or sepsis in 56% of their subjects. They reported that the number of fetuses reaching the postpartum period was 68 and Persistent Pulmonary Hypertension (PPHN) occurred at a rate of 64% and contractures at a rate of 58% [15]. In our series of cases, only 1 baby out of 3 pregnancies survived



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and none of the mothers had any fever, endometritis or other complications.

## Conclusion

PPROM is known to increase morbidity and mortality at a high rate. The most important problem in the management of PPROM is the morbidity developing in living babies. Given that, our goal should be to minimize fetal morbidity. We managed to prolong the gestational period up to one month in extreme PPROM cases. Although this time span is not very effective for a 22-week PPROM case, it should be considered as a very meaningful period of time for more advanced weeks. In our study, none of the lost babies died due to infection and one of these newborns still continue to live as a healthy baby. The other two babies were lost as a result of extreme prematurity. Therefore, by practicing this treatment method in more advanced weeks in broader series, pregnancies can be prolonged into weeks ahead and better neonatal outcomes can be obtained.

### Author contribution

İdris Koçak: Project development, Data Collection

Ayşe Zehra Özdemir: Data collection

Pervin Karlı: Manuscript writing

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