



Outcome of Elderly Pregnancy Complicated with Anaemia and PROM

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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Case Report

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ABSTRACT

Introduction: Premature rupture of membranes (PROM) is defined as the amniotic sac rupture before labor occurs. If PROM occurs at 37 weeks of gestation or more, it is called term PROM or premature rupture of membranes (PROM); conversely, if it occurs before 37 weeks of gestation, it is called preterm PROM or preterm premature rupture of membranes (PPROM). The problem of PROM requires greater attention, because its prevalence is large and tends to increase.

Aim: Reporting a case of premature rupture of membranes > 12 hours in a 24-year-old female patient.

Case Detail: Case of a 24-year-old female patient G1P0A0, 36-37 weeks pregnant, with complaints of water leaking from the birth canal and diagnosed with premature rupture of membranes > 12 hours.

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Results: Anemia in pregnancy can worsen the prognosis of PROM through the mechanisms of tissue hypoxia and membrane weakness. In advanced pregnancy, decreased physiological reserves increase the risk of complications. Prompt and appropriate management, including treatment of anemia and close monitoring for infection, is essential to improve maternal and neonatal outcomes. There was active amniotic fluid and red litmus turned blue on speculum examination, and Hb 10 g/dL from blood test, so the patient was diagnosed with G1P0A0, 36-37 weeks pregnant with KPD > 12 hours + anemia.

Conclusion: Advanced pregnancy with anemia and PROM requires a multidisciplinary approach to achieve optimal outcomes. Early detection and aggressive intervention can reduce the risk of serious complications.

Keywords: Premature rupture of membranes; cesarean section.

1. INTRODUCTION

Pregnancy is a physiological process that brings various complex changes to a woman's body. However, during its course, it is not uncommon for a pregnancy to experience complications that can threaten the health of the mother and fetus. Two of them that are quite often found in health services are premature rupture of membranes (PROM) and anemia in pregnancy. These two conditions not only have the potential to cause acute complications, but can also interact with each other and worsen the clinical condition of pregnant women. Premature rupture of membranes (PROM) is defined as the rupture of the amniotic membranes before labor occurs. Premature rupture of membranes is the rupture of the amniotic sac before labor begins, usually before uterine contractions occur. The incidence of PROM ranges from 8–10% of all pregnancies, and this condition can cause various complications such as intrauterine infection, premature labor, and respiratory distress in neonates. Risk factors for PROM vary widely, ranging from infection, low socioeconomic status, to poor maternal nutritional status. If PROM occurs at 37 weeks of gestation or more, it is called term PROM or premature rupture of membranes (PROM), conversely, if it occurs before 37 weeks of gestation, it is called preterm PROM or preterm premature rupture of membranes (PPROM) (Mori 2024). The combination of PROM and anemia can form a complex cycle of problems. Anemia worsens the immune system, increases the risk of genital tract infections, and can ultimately trigger premature rupture of membranes. Conversely, PROM that causes premature labor can worsen nutritional status and prolong the recovery process in anemic mothers. Therefore, a comprehensive understanding of the risk factors, the relationship between these two conditions, and a comprehensive management strategy is

needed to prevent and treat the complications that arise. PROM or PPRM can occur for various reasons, including physiological weakening of the amniotic sac at term, increased intraamniotic pressure, intraamniotic infection or inflammation, oxidative stress, and abnormalities in amniotic remodeling capacity (Meller et al. 2018). The problem of PROM requires greater attention, because its prevalence is quite large and tends to increase. Preterm birth is the most common cause of neonatal morbidity and mortality, with 70–75% of cases ending in neurodevelopmental disabilities. In 2020, there were 13.4 million preterm births (9.9% of all births worldwide). PROM occurs in 8–10% of all pregnancies, while PPRM occurs in 2%–4% of singleton pregnancies and 7%–20% of twin pregnancies (Ubom et al. 2023).

2. CASE REPORT

A 24-year-old woman, 36–37 weeks pregnant, presented to the Emergency Department of RSU UKI with a complaint of watery discharge from the birth canal for the past 13 hours before admission. The complaint was accompanied by lower abdominal pain and intermittent abdominal tightening, which had been occurring since two days before admission, after using Flagystatin prescribed by a midwife to treat vaginal discharge that was itchy but not foul-smelling. The tightening sensations tended to occur more frequently at night. When the patient visited the midwife two days before admission, she was noted to have cervical dilation of 1 cm, and upon returning to the midwife one day before admission, the cervical dilation had progressed to 2 cm. She was then advised by the midwife to proceed to RSU UKI for further management. The patient reported no longer experiencing vaginal discharge upon arrival at RSU UKI. She denied complaints of nausea, vomiting, dizziness, mucus discharge, spotting, or bleeding

from the birth canal. She also denied any urinary or bowel movement problems.

The patient first found out she was pregnant after she felt her menstrual cycle was 2 weeks late from June 14, 2024, when a test pack was performed the result was positive. During this pregnancy, the patient usually had check-ups at the clinic with an obstetrician and the patient routinely made antenatal care visits once a month. During this pregnancy, the patient routinely consumed one capsule of folamil genio per day and one tablet of calcium per day. The patient denied any history of high blood pressure, diabetes, history of allergies or history of surgery either before or during pregnancy. The history of TORCH, hepatitis B, syphilis, and HIV examinations is unknown, the patient did not bring the results of laboratory tests that had been carried out during pregnancy. The patient stated that she started menstruating at the age of 12, with a regular cycle every 28 days with a menstrual period of 5-7 days each cycle. The patient stated that when the patient was still menstruating, the patient usually changed her sanitary napkins 2-3 times per day. The patient also stated that every menstruation always felt like cramps in the lower abdomen, but the patient never felt pain that interfered with the patient's activities and never took painkillers during menstruation. The patient has been married for 1 year and her current pregnancy is the first pregnancy in her first marriage.

On physical examination, GCS E4M6V5 was obtained, blood pressure 124/81 mmHg, pulse 85x/minute, regular, lifting strength, sufficient

volume, respiratory rate 20x/minute, temperature 36.4°C, and saturation 99% on room air. Examination of the head, eyes, neck, and thorax was within normal limits. Examination of the abdomen showed a distended abdomen. Examination of obstetric status found bilateral mammary glands within normal limits, linea nigra and striae gravidarum were visible on the abdomen, and examination of the external genitalia was within normal limits. Examination of the height of the uterine fundus (TFU) was felt 3 fingers below the xiphoid process (31 cm), abdominal circumference was found to be 90.5 cm, Leopold examination found Leopold 1 felt a round, soft, non-bounced part with the impression of a buttocks, Leopold 2 felt a straight, elongated, and hard part that was not interrupted on the mother's left side with the impression of the left back, Leopold 3 felt a round, hard, bounced part with the impression of the head, and Leopold 4 converged with the impression of the lowest presentation of the fetus not yet entering the upper pelvic inlet (PAP).

On speculum examination, portio livid, closed external ostium uteri (OUE), fluor (-), fluxus (-), active amniotic fluid (+), erosion/laceration/polyp (-), red litmus (+) turns blue.

Cardiotocography (CTG) examination showed a baseline rate of 140x/minute, normal variability, acceleration (+), deceleration (-), fetal movement (+) 1x/10 minutes, his (+), so that the CTG results can be categorized as category 1.



Fig. 1. Nitrazine Test Results (02/28/2025)



Fig. 2. CTG Examination Results (02/28/2025)

Laboratory examination on February 28, 2025 found hemoglobin 10 g/dL, hematocrit 33%, leukocytes 14.2 thousand/uL, platelets 243 thousand/uL, bleeding time 2 minutes, clotting time 15 minutes, control prothrombin time 14 seconds, patient prothrombin time 16 seconds, and GDS 87 mg/dL. The pre-operative diagnosis was G1P0A0 pregnant 36-37 weeks with PROM > 12 hours and anemia. The patient was planned to undergo a cesarean section at 11.00 WIB, given IVFD RL 500 cc 20 tpm, and prophylactic antibiotic ceftriaxone 1 g given 1 hour before surgery. The post-operative diagnosis was P1A0 post-SCTP a.i PROM > 12 hours and anemia. Post-operative instructions consist of observing blood pressure, pulse, respiratory rate, temperature, bleeding and contractions, total bed rest for 12 hours after spinal anesthesia, H2TL check 12 hours after surgery, IVFD RL 500 cc + oxytocin 10 IU 20 tpm, ceftriaxone 2x1 g IV, fetik supp 3x1 rectal suppository, lavit C 1x1000 mg IV, and catheter use until the first 24 hours.

Follow-up was conducted on March 1, 2025. The patient stated that there was still pain in the area of the surgical stitches, breast milk had not yet come out but the patient had started early initiation of breastfeeding. The patient was able to tilt right and left but could not walk, the patient had not defecated but had flatus. The patient had a urinary catheter installed with morning urine output at 06.00 WIB of 100 cc. On physical examination, GCS E4M6V5 was obtained, blood pressure 102/62 mmHg, pulse 61x/minute, regular, lifting strength, sufficient content,

respiratory rate 18x/minute, temperature 36.4°C, and saturation 98% on room air. On examination of obstetric status, it was found that the breast had breast milk -/-, tenderness -/-, nipple retraction -/-, mass -/-, linea nigra and striae gravidarum were visible on the abdomen, and examination of the external genitalia showed lochia rubra.

Examination of the height of the uterine fundus (FFU) was felt 1 finger below the umbilicus and the uterus felt hard. Laboratory examination on March 1, 2025 found hemoglobin 10.7 g / dL, hematocrit 35%, leukocytes 21.6 thousand / μ L, thrombocytes 234 thousand / μ L. The therapy given was IVFD RL 500 cc + oxytocin 10 IU 20 tpm (second colf), ceftriaxone 2x1 g IV, fetik supp 3x1 rectal suppository, lavit C 1x1000 mg IV, moloco (placental extract protein 15 mg + cyanocobalamin 20 mcg) 3x1 tab PO, inbion (ferrous gluconate 250 mg + manganese sulfate 0.2 mg + copper sulfate anhydrous 0.2 mg + vitamin C 50 mg + folic acid 0.8 mg + vitamin B12 7.5 mcg) 1x1 caps PO, channa plus (ophiocephalus striatus extract 5 g + sea cucumber extract 2.5 g + citrus sinensi fructus extract 2 g + curcuma domestica rhizoma 500 mg) 1x1 sachet PO, vitamin A 1x200,000 IU PO.

The second follow-up was conducted on March 2, 2025. The patient stated that the pain in the area of the surgical sutures had decreased, breast milk had come out of the right breast only. The patient was able to walk, the patient had not had a bowel movement since 02/28/2025 but had flatus. The patient no longer had a urinary

catheter. On physical examination, GCS E4M6V5 was found, blood pressure 90/60 mmHg, pulse 78x/minute, regular, lifting strength, sufficient volume, respiratory rate 20x/minute, temperature 36.5°C, and saturation 98% on room air. On obstetric status examination, breast milk was found +/-, tenderness -/-, nipple retraction -/-, mass -/-, linea nigra and striae gravidarum were visible on the abdomen, and external genitalia examination showed lochia rubra. Examination of the uterine fundus height (TFU) was felt 1 finger below the umbilicus and the uterus was felt hard. The therapy given was cefadroxil 3x500 mg PO, mefenamic acid 3x500 mg PO, moloco 3x1 tab PO, inbion 1x1 caps PO, channa plus 1x1 sach PO, vitamin A 1x200,000 IU PO. On the second day of treatment, the patient was given a dressing change (GV) and taught breast care. The patient was allowed to be an outpatient on March 2, 2025 at 12:33 WIB with home medication cefadroxil 3x500 mg PO, mefenamic acid 3x500 mg PO, inbion 1x1 caps PO, moloco 3x1 tab PO, and dulcolax supp for pain. The patient is planned to return to the obstetrician on March 10, 2025 at 16:00 WIB.

3. DISCUSSION

Premature rupture of membranes (PROM) is defined as the rupture of the amniotic membranes before labor occurs. If PROM occurs at 37 weeks of gestation or more, it is called term PROM or premature rupture of membranes (PROM), conversely, if it occurs before 37 weeks of gestation, it is called preterm PROM or preterm premature rupture of membranes (PPROM) (Mori 2024). Based on the duration of rupture of membranes, PROM is divided into early PROM (< 12 hours) and prolonged PROM (\geq 12 hours) (Addisu, Melkie, and Biru 2020; Ahmad, Utomo, and Ramadhan 2021). There are various risk factors for PROM, namely a history of PROM in previous pregnancies, a history of preterm labor, vaginal discharge/leukorrhea, cervical incompetence, increased vaginal pH, maternal age, and excessive contractions. A history of premature rupture of membranes (PROM) in a previous pregnancy is a major risk factor that can increase the likelihood of PROM or premature labor in subsequent pregnancies. This can be caused by physiological or structural factors that lead to instability of the amniotic membranes in previous pregnancies, which can recur in subsequent pregnancies (Ahmad et al. 2021; Byonanuwe et al. 2020). The presence of preterm labor in previous pregnancies also

increases the risk of PROM. Pregnancy that ends before 37 weeks may indicate an abnormality in the structure or function of the cervix, which causes the amniotic fluid to rupture more easily. Uncontrolled vaginal discharge during pregnancy, especially if caused by bacterial or fungal infections, can disrupt the pH balance of the vagina. This discharge can increase the risk of vaginal and cervical infections, which can lead to ascending infections and ultimately trigger premature rupture of membranes. This infection leads to weakening of the amniotic membranes, increasing the risk of PROM.

Cervical incompetence is a condition where the cervix is unable to maintain a pregnancy until delivery, which often occurs after medical procedures such as previous delivery, curettage, or cervical surgery. In this condition, the cervix can open early and lead to PROM, because changes in the structure of the cervix cause instability of the amniotic membranes. An increase in vaginal pH above 4.5 can increase the risk of PROM. A higher pH can create a better environment for pathogenic bacteria to grow, which increases the risk of infection in the cervix and vagina, which can then cause ascending infections and damage the amniotic membranes (Ahmad et al. 2021). In mothers who are too young, namely less than 20 years old, the uterus is still not physiologically mature to receive and undergo pregnancy, as well as to undergo the labor process. This can cause premature rupture of membranes because the uterus is not fully developed, both in terms of the strength of the uterine muscles and in terms of the resistance of the amniotic membranes themselves. At this age, the immaturity of the reproductive organs makes the amniotic membranes more susceptible to tearing or rupture.

In addition, mothers over 35 years old are also at high risk of premature rupture of membranes. The older age factor affects the decline in body function, including a decrease in the quality and strength of connective tissue in the uterus, as well as a decrease in collagenase production in the amniotic membrane. Collagenase is an enzyme that functions in the process of repairing and strengthening body tissue. A decrease in collagenase causes the amniotic membrane to become weaker, making it easy to rupture. In addition, in mothers over 35 years old, uterine tissue tends to be less fertile and effective than in younger women, which functions as a place for

the attachment and development of the placenta (Ahmad et al. 2021; Byonanuwe et al. 2020).

In this case, several things that can be suspected as triggers for premature rupture of membranes are a history of vaginal discharge that improves with the use of vaginal medication and uterine contractions that have started since 2 days of SMRS. Uncontrolled vaginal discharge during pregnancy can increase the possibility of infection in the vagina and cervix. Infections that occur in the genital tract can spread to the intrauterine space (ascending infection), which increases the risk of damage to the amniotic membrane. Pathogens such as *Neisseria gonorrhoeae*, *Chlamydia trachomatis*, and Group B streptococcus are often found in genital tract infections and can release inflammatory mediators such as cytokines, which trigger uterine contractions and damage the amniotic membrane, which ultimately causes premature rupture of membranes. Meanwhile, repeated contractions can increase intraamniotic pressure, triggering rupture of the amniotic membrane. Friction between contractions and the amniotic membrane that is weakened due to infection or inflammation can also worsen the condition and increase the possibility of rupture of the amniotic membrane (Ahmad et al. 2021; Padmaja and Swarupa 2018).

In this case, through anamnesis, there was a complaint of watery discharge since 13 hours SMRS, where through this complaint various things can be suspected such as ruptured membranes, lower genital tract infection, and urinary incontinence. On physical examination, GCS E4M6V5 was obtained, blood pressure 124/81 mmHg, pulse 85x/minute, regular, lifting strength, sufficient volume, respiratory rate 20x/minute, temperature 36.4°C, and saturation 99% on room air. On speculum examination, the presence of fluid that appeared to come out of the OUE plus a positive nitrazine test result helped to establish the diagnosis of premature rupture of membranes in the patient. Under normal conditions, the pH of vaginal fluid ranges from 4.5-5.5, while the pH of amniotic fluid is usually 7.0-7.5. If amniotic fluid comes out, the Nitrazine paper will change color to blue, indicating an alkaline pH and confirming the diagnosis of PROM. Although this test has a false negative rate of 12.7% and a false positive rate of 16.2%, it remains a simple, rapid, and inexpensive method for diagnosing PROM. This test result confirms the presence of premature rupture of membranes in the patient. PROM that

has lasted > 12 hours increases the risk of infection, such as chorioamnionitis, which can affect the mother and fetus. In addition, a longer duration of PROM also leads to the risk of fetal distress due to decreased oxygenation, which can trigger asphyxia (Ahmad et al. 2021).

In the supporting examination, hemoglobin was 10 g/dL, hematocrit 33%, leukocytes 14.2 thousand/uL, platelets 243 thousand/uL, bleeding time 2 minutes, clotting time 15 minutes, control prothrombin time 14 seconds, patient prothrombin time 16 seconds, and GDS 87 mg/dL. Hemoglobin <11 g/dL in the 3rd trimester indicates anemia, while leukocytosis indicates an inflammatory process and possible infection in the patient, although it could also be a change related to blood and fluid composition during and after delivery (Cunningham et al. 2014). At a gestational age of more than 34 weeks, maintaining pregnancy will increase the risk of chorioamnionitis and sepsis, so far various studies have concluded that maintaining pregnancy is worse than giving birth to PROM with a gestational age of 34-38 weeks. In pregnancies ≥ 37 weeks, early induction with oxytocin is preferred over expectant management, although expectant management is still possible.¹ Vaginal delivery itself has various complications that can occur at any time of delivery and are influenced by many factors.

Failure of labor to progress in the first stage can be in the form of prolonged labor defined as a cervical dilation ratio of <1-2 cm/hour in a cervix that has been dilated by at least 6 cm, and obstructed labor defined as no change in cervical dilation for >4 hours in women with adequate uterine contractions and >6 hours in inadequate uterine contractions. Prolonged labor can be treated by administering uterotonic agents, namely oxytocin, while obstructed labor can be treated by switching from vaginal delivery to CS (Desai and Tsukerman 2023). In this patient, there was no progress in cervical dilation for >4 hours, so it is included in prolonged labor which is treated by cesarean delivery. In addition, KPD of more than 12 hours increases the risk of high intrauterine infection and the risk of fetal distress due to decreased oxygenation (the effect of the fetus being pressed/squeezed in the uterus due to decreased amniotic fluid), which can trigger asphyxia. (Ahmad et al. 2021; Suciawati and Nuryani 2021).

Surgical Site Infection (SSI) is a serious problem after cesarean section and causes increased

morbidity, prolonged hospitalization, and death. SSI accounts for 20% of all Healthcare Associated Infections (HAIs) and is associated with a 2 to 11-fold increased risk of death with 75% of deaths directly related to SSI. The report on surveillance data on post-surgical SSI events in 2010-2011 from The European Center for Disease Prevention and Control (ECDC), stated that the incidence of SSI after cesarean section was the third highest. Prophylactic antibiotics have been shown to reduce the risk of SSI after cesarean section. The Indonesian Ministry of Health recommends the use of cefazolin as a prophylactic antibiotic for cesarean section, while WHO recommends the use of first-generation cephalosporins or penicillins as prophylactic antibiotics for cesarean section. Prospective observational studies have shown that the use of ceftriaxone as a prophylactic antibiotic is more effective when compared to amoxicillin. However, other studies have shown that the use of cephalosporin and penicillin antibiotics was found to have the same efficacy in caesarean sections in preventing SSI (Fajriyah et al. 2023).

The current study found that some obstetricians continue to provide routine antibiotics after CS, either IV (28%) or oral (32.8%). The type of IV antibiotics used is the same as prophylactic antibiotics; only the duration is extended postoperatively; the majority is between 1–3 days. In addition, some obstetricians and gynecologists also provide routine oral antibiotics after CS, regardless of the presence/absence of infection risk. Cefadroxil and amoxicillin are the main types of oral antibiotics given, which last 3–5 days. To date, there is no substantial evidence to support this routine protocol. A study involving 301 patients undergoing elective CS showed that extending IV antibiotics after CS for 72 hours did not reduce the risk of SSI. The use of routine oral antibiotics after CS may be inappropriate because they are not prophylactic or therapeutic if not based on the presence or absence of infection (Akbar et al. 2023). In this patient, there was an increase in leukocytes, although physiologically it can increase up to 25,000/uL, but it does not rule out the possibility of infection so that antibiotic administration is still considered while monitoring the patient's clinical condition continues.

There are various uses of oxytocin administration in the postpartum period. Oxytocin is an oligopeptide hormone that is endogenously produced from the paraventricular nucleus of the hypothalamus and secreted through the posterior pituitary gland. This hormone is a hormone that

will form a positive feedback cycle, where its secretion will further stimulate the release of oxytocin. Exogenous oxytocin has a similar response to endogenous oxytocin, in addition to being able to stimulate uterine contractions that will help prevent and overcome postpartum hemorrhage. oxytocin also causes contractions of myoepithelial cells in the mammary glands that occur in the alveolar ducts, thereby increasing breast milk expulsion. The prophylactic dose of PPH is 10 units IM/IV after placental birth, which in this patient was given in the operating room IV. In this patient, oxytocin 20 units in 1 liter of lactated Ringer's was given in the ward for 24 hours, where in women who are at high risk of experiencing postpartum hemorrhage or who have undergone a CS operation, it is recommended that the infusion be continued for > 4 hours. (Lee et al. 2009; Pantoja et al. 2016; Warning 2025; Wormer, Jamil, and Bryant 2023).

To support successful breastfeeding, based on the 2019 AKG in the guidelines from the Indonesian Ministry of Health in 2021, breastfeeding mothers need additional protein of 20 g/day in the first 6 months and 15 g/day in the second 6 months during breastfeeding, and additional fat of 2 g/day compared to non-pregnant women. Not only macronutrients, breastfeeding mothers also need additional micronutrients such as vitamin A, vitamin E, various B vitamins, and vitamin C. Meanwhile, the minerals that increase during breastfeeding are calcium, iodine, zinc, selenium, manganese, chromium, potassium, and copper. Breastfeeding mothers need an additional 350 RE of vitamin A to 950 RE/day (50 RE higher than during pregnancy) and 100 mcg of Folate to 500 mcg/day (100 mcg lower than during pregnancy) per day. Therefore, it is recommended that breastfeeding mothers continue to consume prenatal vitamins every day while breastfeeding. Although breastfeeding mothers do not need additional iron for their babies compared to before pregnancy (iron cannot be distributed through breast milk), additional iron consumption through a balanced diet during breastfeeding and iron supplement consumption during the postpartum period is needed to replace iron stores that decrease during pregnancy, or improve Hb status if the breastfeeding mother experiences anemia (Warning 2025).

4. CONCLUSION

Advanced pregnancy complicated by anemia and premature rupture of membranes (PROM)

carries a high risk of maternal and neonatal morbidity. This combination of conditions requires early detection, aggressive management of anemia, prevention of infection, and planned labor management. A multidisciplinary approach is essential to minimize complications and achieve optimal pregnancy outcomes. Particular attention needs to be paid to efforts to optimize nutritional status and close monitoring during pregnancy and postpartum.

DISCLAIMER (ARTIFICIAL INTELLIGENCE)

Author(s) hereby declare that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc.) and text-to-image generators have been used during the writing or editing of this manuscript.

CONSENT

As per international standards or university standards, patient(s) written consent has been collected and preserved by the author(s).

ETHICAL APPROVAL

As per international standards or university standards written ethical approval has been collected and preserved by the author(s).

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

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