

# Pulmonary embolism during delivery – treatment and outcome

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## Summary

Pulmonary embolism during delivery is not a frequent occurrence. It is often impossible to ascertain whether it is a case of embolism by amniotic fluid or thromboembolism. Diagnostics of pulmonary embolism in labor is based solely on clinical symptoms. Immediate interdisciplinary treatment with cardiopulmonary resuscitation, hemodynamic stabilization, and correction of haemostasis disorders play a decisive role in prognosis. This paper presents diagnostics, treatment, and consequences of pulmonary embolism in expulsion phase during delivery in epidural anesthesia of a multiparous patient aged 37.

*Key words:* Pulmonary embolism; Delivery; Amniotic fluid embolism.

## Introduction

Amniotic fluid embolism is a life-threatening obstetric complication in pregnancy and delivery. According to data from references, it occurs in two to eight of every 100,000 deliveries [1]. The fact that mortality is 11% to 44%, places it among the leading causes of maternal death.

Etiopathogenesis of amniotic fluid is still not thoroughly clarified. Amniotic fluid can reach mother's circulation by endocervical veins, lesions of the uterus or the site of placental attachment. According to references, amniotic fluid embolism occurs most commonly during cesarean section (76% of all cases described in literature), followed by vaginal deliveries of patients with polyhydramnion and multiple pregnancies (55% of all cases described in literature). In rare cases, it also occurs during pregnancy following intrauterine surgery or blunt abdominal trauma.

As far as pulmonary thromboembolism during labor is concerned, according to data from references, venous thromboembolism is the major cause of maternal morbidity and mortality during pregnancy or early after delivery and it remains a diagnostic and therapeutic challenge. The Confidential Enquiry into Maternal Deaths (2006-2008) showed that venous thromboembolism is nowadays the third leading cause of direct maternal mortality, beside sepsis and hypertension [2]. The prevalence of venous thromboembolism has been estimated to be one per 1,000-2,000 pregnancies.

There is not much data to be found in references concerning pulmonary embolism during delivery itself. Mortal outcome can be avoided by quick clinical diagnostics and urgent treatment either in case of thromboembolism or amniotic fluid embolism [3].

This paper presents diagnostics, treatment, and consequences of pulmonary embolism occurring in the expulsion phase of delivery in epidural anesthesia in the case of a multiparous patient aged 37.

## Case Report

Patient whose case is described in this paper was admitted to the Clinic for delivery which started by spontaneous uterine contractions at 37 weeks of gestation. The pregnancy was complicated by gestational diabetes, diagnosed at 21 weeks of pregnancy. During pregnancy, a hygienic dietary regime was followed. Even though glycemia was maintained within normal physiological range, fetal biometric parameters during the last trimester indicated a macrosomic fetal growth and polyhydramnion. Aside from gestational diabetes mellitus, the patient did not suffer from any other illnesses. During labour, epidural anesthesia was performed with 0.125% bupivacaine in bolus, followed by continuous anesthesia by pump. Uterine contractions were made painless. Induction of delivery was stimulated with oxytocin. Amniotomy was performed, showing clear and abundant amniotic fluid. Fetal heartbeat and uterine contractions were monitored throughout delivery, which had a normal course. The dosage of epidural anesthetic was reduced when cervical dilation reached eight cm, so that the patient gradually started to feel uterine contractions, followed by labor pains with two expulsion uterine contractions, baby's head reached the pelvic floor. At this moment the patient started to complain of nausea and urge to vomit. Epidural anesthesia was discontinued. During the next contraction patient complained about chest pains, and consequently started to cough. Coughing then became more severe. Bloody secretion discharged from the mouth. Uterine contractions and pains continued while patient first became cyanotic, then lost consciousness, pulse in large blood vessels became impalpable, and arterial pressure immeasurable. Patient went into cardiac arrest. The baby was extracted by vacuum extractor. At the same time, the patient was intubated and cardiopulmonary resuscitation was started. A live female baby was born, weighing 3,350 grams and 51 cm in length, having the Apgar score of 5/6. Baby was immediately put in care of

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a pediatrician. The placenta was extracted manually, followed by manual revision of the uterine cavity, and perineal laceration was sutured. Cardiopulmonary resuscitation was performed simultaneously with obstetric interventions in the fourth stage of labor. Due to suspected pulmonary embolism, indicated by the clinical picture, bolus dose of 5,000 i.j. of heparin was administered intravenously. Patient was ventilated through the tube by Ambu balloon accompanied by external heart massage and therapy by medicaments. Since heartbeat was not reestablished by urgent cardiopulmonary reanimation, heart defibrillation was performed. Heart function was reestablished only after the third defibrillation cycle and stabilized after two to three minutes. After heart function was restored, patient started to bleed vaginally, probably due to previous intravenous administration of heparin. Thus manual revision of the uterine cavity had to be repeated and intravenous therapy by uterotonics was administered. Protamine sulphate was prescribed to contrast the heparinic action and uterine bleeding was stopped.

Mechanical ventilation type IPPV was continued in the ICU, monitored by an anesthesiologist and accompanied by therapy. A consultation with a neurologist was performed immediately. It was concluded that patient's condition was caused by hypoxic-ischemic encephalopathy which occurred as a consequence of cardiac arrest caused by acute pulmonary embolism. Differential diagnostic dilemma remained whether this was a case of pulmonary embolism by amniotic fluid or thromboembolism. General state of the patient required acute recoument of blood, blood derivatives, plasma expanders, fluids, and other medicaments under intensive monitoring. MR scan, performed several days later, when patient's condition became more stable, verified subacute ischemic lesions in temporofrontoparietal region and to a lesser extent in the occipital lobe, accompanied by lacunar infarctions in corpus callosum. Since gynecological findings after childbirth were normal, treatment was continued under supervision of a neurologist. Patient recovered, but consequences remained. Hypoxia related sequelae, such as hemiparesis of the right arm and global aphasia were present. Patient was sent to rehab including speech therapy to which she responded well; only a mild, almost imperceptible, hemiparesis of the right arm still persists, while auditory comprehension and verbal capabilities have been significantly improved.

## Discussion

Amniotic fluid embolism is a disorder with a high mortality rate, because it often causes sudden respiratory failure, circulatory collapse and disseminated intravascular coagulation (DIC) [4]. Fortunately, both pulmonary thromboembolism and amniotic fluid embolism rarely occur.

According to available data from references, amniotic fluid embolism occurs more frequently during labor than during pregnancy, while pulmonary thromboembolism is less frequent during delivery but occurs during pregnancy.

Both described conditions are very complex and difficult to diagnose and choose appropriate treatment. They are life threatening both for the mother and for the child. During delivery, it is very difficult to diagnose the pathogenetic mechanism of pulmonary embolism. Pulmonary embolism, amniotic fluid embolism, cardiomyopathy, arrhythmias, sepsis, and non-cardiogenic pulmonary oedema were considered as differential diagnoses [5]. Rapid diagnosis and immediate interdisciplinary treatment are essential for good outcome.

As it was ascertained that the most significant risk factors for pulmonary embolism during delivery are mother's age over 35, placenta previa and multiple pregnancies, and keeping in mind that the number of expectant mothers with above described risk factors has been on the rise recently, an increase in the number of embolic complications during pregnancy and delivery itself is expected in the future. In order to prevent sudden maternal death, the following is necessary: urgent treatment with cardiopulmonary resuscitation, hemodynamic stabilisation, correction of haemostasis disorders, as well as prompt extraction of the baby and timely application of intensive therapy.

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