

COMPARATIVE ANALYSIS OF PERINATAL OUTCOMES IN MECONIUM-STAINED AMNIOTIC FLUID

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Abstract. Several publications describe a strong correlation between fetal hypoxia and meconium-stained amniotic fluid, while others refute this link, focusing instead on the role of infection. **Objective:** To determine, based on dynamic cardiotocography, whether there is a connection between meconium-stained amniotic fluid and negative perinatal outcomes. **Patients and methods:** A prospective cohort study of perinatal outcomes was conducted on 27 parturients with antenatally detected hyperechogenicity in amniotic fluid based on transvaginal sonography. **Conclusion.** It is important to note that deliveries complicated by the presence of meconium in the amniotic fluid increase the risk of operative delivery via cesarean section for fetal indications, as they may lead to the development of newborn aspiration syndrome and increase the incidence of severe asphyxia at birth.

Keywords: fetal hypoxia, meconium staining, fetal asphyxia indicator.

Introduction:

Intrauterine passage of meconium can be a normal process, occurring in approximately 10-15% of term or post-term deliveries. Physiological stress during labor (e.g., due to hypoxia and/or acidosis caused by umbilical cord compression, placental insufficiency, or infection) can lead to the passage of meconium by the fetus into the amniotic fluid before delivery. Consequently, the presence of meconium in the amniotic fluid is assessed as an indicator of neonatal asphyxia and is observed in 7-22% of all deliveries. Approximately 5% of infants born with meconium-stained amniotic fluid develop meconium aspiration syndrome, with a mortality rate of 2.5% in developed countries and up to 35% in developing countries. Several publications describe a strong association between fetal hypoxia and meconium-stained amniotic fluid, while others refute this association, emphasizing the role of infection. Thus, discussions continue regarding the optimal method of delivery for women with meconium-stained amniotic fluid. A correlational link has also been established between the presence of meconium in amniotic fluid and low Apgar scores in newborns. Among the most severe complications of labor with meconium-stained amniotic fluid is meconium aspiration syndrome, which leads to neonatal death in 4-19% of cases.

Purpose: Based on dynamic cardiotocography, to determine if there is a connection between meconium-stained amniotic fluid and adverse perinatal outcomes.

Patients and methods: A prospective cohort study of perinatal outcomes was conducted on 27 parturients with antenatally detected hyperechogenicity in the amniotic fluid based on transvaginal sonography. All parturients were admitted to the maternity department of the maternity complex at City Clinical Hospital No. 4 named after I.I. Irgashev during the period 2020-2021. The gestational age at detection of the hyperechogenicity ranged from 34 to 37 weeks. Exclusion criteria included fetal anomalies, preterm rupture of membranes, severe preeclampsia, fetal growth restriction syndrome, birth with uterine scar, multiple pregnancies, and refusal of participation by the parturient. The parturients were divided into 2 groups. The first group comprised 12 (44%) parturients with hyperechogenicity, who underwent cardiotocographic

examination (CTG) during labor to assess fetal functional status. The second group included 15 (56%) parturients with hyperechogenicity in the amniotic fluid who had standard labor management, with fetal heart rate monitoring conducted using a midwife's stethoscope. Both groups were representative in terms of mean age, parity, and Doppler characteristics.

Results:

Based on interviews with parturients from both groups, a spectrum of anamnestic risks associated with meconium presence in the amniotic fluid was identified. The spectrum of somatic pathology was dominated by respiratory organ diseases, particularly COVID-19 in early pregnancy, urinary tract infections, including post-coital cystitis with subsequent asymptomatic bacteriuria, and chronic pyelonephritis. Among sexually transmitted infections, information was obtained about herpesvirus infections (CMV, HSV), chlamydia, and ureaplasmosis. The contribution of gynecological history was also considered: abortions, bacterial vaginosis, colpitis, cervicitis, and cervical ectopy. All these conditions can contribute to placental dysfunction, fetal hypoxia, and alter the nature of the intrauterine environment. Signs of intranatal fetal hypoxia, as indicated by CTG (tachycardia with variable or late decelerations, bradycardia), were found in 4 (25%) parturients in Group 1 during the active phase of the first stage of labor. These parturients underwent cesarean section due to fetal distress. The meconium nature of the amniotic fluid was confirmed upon uterine cavity exploration. Overall, Apgar scores at 5 minutes for 2 newborns born with severe asphyxia in this group were optimized to 6-7 points. One newborn (8.3%) required transfer to the neonatal intensive care unit due to meconium aspiration syndrome. In the second group of 15 parturients, adverse delivery outcomes were observed in 7 newborns (25.1%). Among them, 4 (14.8%) deliveries were completed by cesarean section due to "non-reassuring fetal status." Comparison of the cesarean section frequency showed a significant difference compared to patients in Group 1 ($p < 0.05$). Eleven women (40.7%) delivered vaginally. Among them, 3 (11.1%) newborns were born in severe asphyxia according to the Apgar criteria. Due to intranatal meconium aspiration, 4 (33%) newborns were transferred to the neonatal intensive care unit ($p < 0.05$ compared to the first group), and one newborn had a fatal outcome. Comparative analysis of perinatal outcomes in both groups showed that the use of CTG monitoring during labor with meconium-stained amniotic fluid resulted in a reduction in meconium aspiration cases, severe neonatal asphyxia, neonatal intensive care unit transfers, and prevention of neonatal death.

Conclusion:

It is important to note that deliveries complicated by the presence of meconium in the amniotic fluid increase the risk of operative delivery via cesarean section based on fetal indications, as they can lead to the development of aspiration syndrome in newborns and increase the risk of delivering babies in a state of severe asphyxia. It is well known that the use of CTG does not improve perinatal outcomes in low-risk pregnancies/labor; on the contrary, false-positive results can lead to unjustified interventions, including cesarean sections. However, in high-risk deliveries, such as those with meconium in the amniotic fluid, a more accurate diagnosis of fetal hypoxia can be established with CTG. Timely cesarean section without prior use of uterotonic agents significantly improves perinatal outcomes even in thick meconium-stained amniotic fluid.

Thus, meconium-stained amniotic fluid undoubtedly indicates a potential adverse delivery outcome. Therefore, CTG monitoring of fetal cardiac activity during labor appears to be optimal. The application of this method has significantly optimized perinatal outcomes in cases of meconium-stained amniotic fluid in parturients.

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