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A Novel Management of Monoamniotic Twin Pregnancy

Aditya Prabawa[1], I Made Bharata Deandra[2]

[1]Obstetrics and Gynecology Department Faculty of Medicine Universitas Pendidikan Ganesha

[2]Junior Clerkship Faculty of Medicine Universitas Pendidikan Ganesha
E-mail: *adityaprabawa2[at]gmail.com*

Abstract: ***Monoamniotic twin pregnancies are usually associated with poor prognosis when not managed carefully. The objective of this study was to analyze antenatal diagnosis of cord entanglement in monoamniotic pregnancy, obstetrics management, and potential maternal and neonatal complications. The diagnosis of chorionicity and amnionicity in multiple pregnancies is important to determine the optimal management of the patient and to prevent neonatal mortality. Monoamniotic twin pregnancies are associated with higher risk of perinatal morbidity and mortality associated with twin to twin transfusion syndrome (TTTS), congenital anomalies and cord entanglement. Monoamniotic twin pregnancy exposes high risk of morbidity and mortality on neonates. Close monitoring in the highest medical facility is mandatory. Delivery at 32-34 weeks of gestational age should be considered to prevent unwanted complication.***

Keywords: Monoamniotic, twin pregnancy, management

1. Introduction

The incidence of multiple pregnancies is reported to reach 3% of all live births, but constitutes 6.3% of cases of stillbirth and 12.7% of all neonatal deaths [1]. Monozygous pregnancy rates are relatively constant worldwide, in contrast to dizygous pregnancies. From 1973 to 1990, the incidence of twin pregnancies in America increased by 65% [2]. This increase is paralel with the increasing demand and the development of assisted reproductive methods [1, 3]. Monoamniotic twin pregnancies are reported as many as 1-5% of all monozygous pregnancies [4]. Twin pregnancies have a perinatal mortality risk 3-7 times compared to single pregnancy [2], and monoamniotic twin pregnancies present the highest risk of mortality, with perinatal mortality rates of 30-70% [4].

The diagnosis of monoamniotic pregnancy may be established during antenatal visit with several ultrasonographic criteria and confirmed by pathologic examination after delivery [5, 6]. Determination of chorionicity and amnionicity are crucial for deciding patient's management and prognosis [9, 10]. Optimal prenatal care for monoamniotic twin pregnancy remains controversial [10]. Some authors report an increase in neonatal survival rates with in-hospital care [11, 12] However, others allow both outpatient and inpatient monitoring [7] For the time and method of delivery, most authors suggest cesarean section at 32 weeks of gestational age (GA) after fetal lung maturation [5, 6, 13], however, some suggest 34 weeks of GA as a safe point [2]

2. Literature Review

The incidence of multiple pregnancies is increasing, which is associated with an increase in assisted reproductive methods use [1, 3]. In the United States, twin pregnancy rates increased 101% from 1980 compared to 2006; similar rates are also reported in many developed countries [3]. Monozygous pregnancy rates worldwide (3-5 / 1, 000 pregnancies) are more evenly distributed than dizygotes (1.3-49 / 1, 000 pregnancies) [1]. Maternal age and race also are also thought to play a role in prevalence variation [3].

The diagnosis of chorionicity and amnionicity in multiple pregnancies is important to determine the optimal management of the patient and to prevent neonatal mortality [15]. Common USG criteria for monoamniotic pregnancy are: a) no amniotic membranes are seen dividing the two fetal compartments, b) single placenta, c) the fetal genders are identical, d) sufficient amniotic fluid in both fetuses (to exclude twin to twin transfusion syndrome), and e) free fetal movement [6]. First-trimester USG examination is recommended, and may be undertaken at 11-14 weeks of GA. Other diagnostic marks are the close proximity of cord insertions on placenta, closely adjacent fetal position, and the discovery of one yolk sac [15]. However, monoamniotic pregnancy has ever been reported with two yolk sacs [16, 17]. Early diagnosis in the first trimester gives broad opportunities for better evaluation and monitoring of pregnancy. The absence of a dividing amniotic membrane in twin pregnancy of same gender became an important sign that we found. In the final trimester, diagnosis is very difficult, and decision on management becomes a dilemma.

Monoamniotic twin pregnancies are associated with higher risk of perinatal morbidity and mortality associated with twin to twin transfusion syndrome (TTTS), congenital anomalies and cord entanglement [1]. Cord entanglement is the most frequent complication, and is reported to occur in 42-80% of cases [14]. Some protective factors include low friction between the umbilical cord surface, Wharton-jelly protection, and vascular resistance to suppression [14]. Cord entanglement can be well visualized using color doppler USG in two or three dimension, as early as 14 weeks of GA [18, 19]. Abnormalities of cord insertion such as forked cords can also be detected since the first trimester of pregnancy, but are not expected to interfere with circulation or affecting management [20]. In the first case, monoamniotic diagnosis can not be achieved due to technical difficuties (size of fetuses and decreased fetal

compartments). However, the presence of cord entanglement from macroscopic placental examination after delivery is a definitive sign of a monoamiotic twin pregnancy (or pseudomonoamnion). Color doppler USG is a good tool to predict cord abnormalities, as in the second and third cases. When a monoamniotic twin pregnancy suspected, color doppler USG confirmation is strongly recommended.

Compared with other types of twin pregnancies, monoamniotic twins are associated with higher mortality of 30-70% [4, 21]. First-trimester fetal deaths are mostly associated with major congenital abnormalities (26% of monoamniotic twins, 40% mortality) [4]. On the second and third trimesters, neonatal mortality rate without congenital abnormalities was reported 18%, which increased after 32 weeks of GA [4, 22]. Morikawa et al [21] reported a 13.9% prospective mortality rate at 22 weeks of GA or above. In pregnancies between 30 to 36 weeks of GA, they reported a range between 4.5%-8.0% [21]. Some authors reported that the there was no increase in fetal mortality after 32 weeks of GA, and overall neonatal outcomes have now improved [23]. However, most still suggest termination at 32-34 weeks of GA, because of high risk of cord accident [24]. With this approach, perinatal mortality rate in pregnancies with no congenital abnormalities is 2.4% [25]. In general, the prevalence of complications between monochorionic-monoamniotic and monochorionic-diamniotic pregnancies were not found to be significantly different, nor were pseudomonoamnion [23, 26].

In-patient monitoring at 26-28 weeks of GA is recommended [27]. Patients who choose outpatient setting may undergo fetal heart rate recording 2-3 times a week [13]. Hospitalization since 24 weeks of GA may also be undertaken, with better outcomes than outpatients monitoring [11]. Although most suggest hospitalization, the recommended method and monitoring interval are still varied. Continuous electronic fetal heart beat monitoring can better predict vascular events [4]. However, intermittent recording method 1-3 times per day is also widely used [11, 12, 25]. Continuous monitoring is not always easy, especially in early pregnancies due to fetal movement (only 57% of total observation time at age> 30 weeks is successfully recorded) [10]. USG examination 2-3 times a week with biophysical profile evaluation are important to assess cord entanglement and intrauterine fetal well-being [12, 24, 25]. Psychosocial impacts on mothers are said to be insignificant between inpatient or outpatient setting, but the outpatient group was reportedly tend to experience feeling of guilty [27].

Some authors reported that vaginal delivery may be performed in monoamniotic twins [24]. However, most suggest elective cesarean section at 32 to 34 weeks of GA [4, 24]. Other literature describes optimal labor at 32-36 weeks [30]. However, the study states that for twin pregnancies in general, the perinatal morbidity rate was lowest at 37 to 38 weeks [29]. Our protocol is to treat every patient with hospitalization for conservative care and fetal lung maturation after fetal viability. Continuous monitoring has been proven to be effective in preventing complications. Cord accidents are something that can happen suddenly, thus, intermittent monitoring is not always adequate. Despite little experiences, our protocol was proven effective in preventing fatal neonatal morbidity and mortality.

3. Conclusions

Monoamniotic twin pregnancy is still a major challenge in the field of obstetrics. The very high risk of neonatal death is the main concern. Management of this condition varies and is highly dependent patient's condition and hospital's resources. We recommend in-patient care for monoamniotic twin pregnancy at 28 weeks of gestational age for conservative treatment and lung maturation, followed by lung maturity testing at 32 weeks of gestational age. Close fetal heart beat monitoring is mandatory, combined with doppler USG and biophysical profile evaluation three times a week. Termination of pregnancy is considered at 32-34 weeks of gestational age by cesarean section. Through this intensive approach, we hope to significantly reduce the rate of neonatal morbidity and mortality. We strongly recommend that similar case treatments be undertaken at the highest health facilities with adequate resources for monitoring, as well as emergency cesarean section facilities.

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