

Trisomy 18 (Edward Syndrome) – A Case Report Diagnosis and Management

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Abstract: Trisomy 18 (Edward Syndrome) is the second most common autosomal trisomy in newborn and almost always lethal, in 95% survive less than a month and 5% life to a year. The incidence is about 1 in 5000 live birth. We present a case of Edward Syndrome due to its rarity. A 39 y.o. female, G3P2A0 came with polyhydramnion, breech presentation and fetal multiple congenital abnormalities (Ventricular Septal Defect - Cardiomegaly, Omphalocele, Dandy Walker Malformation) at 22-23 weeks GA. Amniocentesis done at 23-24 weeks GA, with karyotyping result 47 XX + 18 (Edward Syndrome). It decided to do pregnancy termination with C-section and sterile at 27 weeks GA with delivery of 810 gram female baby, Apgar scores 8-9, congenital abnormalities (Strawberry shaped fetal head, Cyanotic Congenital Heart Disease-VSD, Rupture of Giant Omphalocele sac, clenched fists with overlapping fingers which matched with Edward Syndrome. The baby was died 2 days after born. In conclusion, Edward syndrome is a rare genetic disorder associated with multisystem involvement. Hence, data collection and frequent review of cytogenetically proven cases is must to study in detail about the association of genetic defect and organ system involved. It is also helpful to compare with other known genetic disorder.

Keywords: Karyotyping, Amniocentesis, Edward Syndrome, Ventricular Septal Defect, Omphalocele, Dandy Walker Malformation

1. Introduction

Trisomy 18 (Edward Syndrome) is hereditary disorder caused by an extra 18th chromosome in the karyotype study. This Syndrome is the second most common autosomal trisomy in newborn after trisomy 21 and almost always lethal, in 95% survive less than a month and 5% life to a year. The incidence is about 1 in 5000 live birth. It occurs in 80% female due to non-disjunction during maternal or paternal germ cell development. Edward syndrome has been proved by karyotyping through amniocentesis sampling. There is a 3:1 ratio in the prevalence of female to male. In more than 50% of cases, both maternal and paternal age is less than 30 years. Most common abnormality associated with extremity (fetal finger abnormality), abnormal shaped fetal head, 2 vessel umbilical cord, cardiac defects (ventricular septal defect), and gastrointestinal tract (such omphalocele). In conclusion, Edward syndrome is a rare genetic disorder associated with multisystem involvement such as Dandy Walker malformation. Hence, data collection and frequent review of cytogenetically proven cases is must to study in detail about the association of genetic defect and organ system involved. It is also helpful to compare with other known genetic disorder.^{1,2,3} Here, we present a case of Edward Syndrome due to its rarity.

2. Case Report

A 39 year old female, G3P2A0 came to our Polyclinic which detected for the first time by fetal scanning ultrasound at 22-23 weeks of GA with polyhydramnion, breech presentation and fetal multiple congenital abnormalities (VSD - Cardiomegaly, Omphalocele, Dandy walker malformation). It already done amniocentesis at 23-24 weeks of GA. The evolution after amniocentesis was favorable with normal uterine tone, without uterine contraction, without blood or amniotic fluid loss. Karyotype analyze of amniotic fluid result (9/9/2018) was 47 XX + 18 (Edward Syndrome), female gender. Multidisciplinary team meeting already done,

after genetic counseling of couple decided to terminate of pregnancy with misoprostol insertion but the couples choice performed C-section and sterile at 27 weeks of GA with delivery of a female baby weighing 810 gram, Apgar scores 8-9, congenital abnormalities (Strawberry shaped fetal head, Cyanotic Congenital Heart Disease-VSD, Rupture of Giant Omphalocele sac, clenched fists with overlapping fingers which matched with Edward Syndrome. The baby was died 2 days after born.

3. Methods

Fetal scanning was done and found any evidence of fetal abnormalities from USG screening, confirmed by amniocentesis and analysis of fetal karyotype followed by multidisciplinary team meeting.

4. Discussion

Trisomy 18 (Edward Syndrome) is the second most common autosomal trisomy in newborn and almost always lethal, in 95% survive less than a month and 5% life to a year. The death usually is due to central apnea, upper airway obstruction, respiratory insufficiency, aspiration, cardiac failure, or a combination of these and other factors (including decisions for palliative care). Currently most cases of Edwards' syndrome are prenatally diagnosed, based on several methods: maternal serum screening in the first trimester (β HCG dosing and PAPP-A), ultrasound in the first trimester that can detect increased nuchal translucency, maternal serum screening in the second trimester (AFP dosing, β -hCG and uE3), morphological ultrasound in the second trimester that can detect neural tube defects, growth retardation, choroid plexus cyst, overlapping of fingers, and congenital heart defects. Final diagnosis is performed by amniocentesis or chorionic villus biopsy, followed by fetal karyotype analysis. Several reports of biochemical markers have suggested that trisomy 18 is associated with a decrease in maternal serum free β -hCG and PAPP-A.³

Ultrasonographic features of trisomy 18 in the first trimester include increased nuchal translucency, in about 75 percent of cases, early onset intra-uterine growth retardation and exomphalos found in about 30 percent of fetus. Edwards' syndrome markers detected at ultrasound in second trimester classified as minor and major. Typical minor anomalies include characteristic cranio-facial features, clenched fist with overriding fingers, small fingernails, underdeveloped thumbs, and short sternum. The presence of major malformations is common, and the most frequent are heart and kidney anomalies. The most common abnormalities

were persistent abnormal position of fetal fingers (89%); choroid plexus cysts (43%); abnormally shaped fetal head (strawberry or lemon) (43%); 2 vessel umbilical cord (40%); cardiac defects (37%); intrauterine growth restriction (29%); omphalocele (20%); neural tube defects (9%); and cystic hygroma or lymphangiectasia (14%). Amniotic fluid volume abnormality (12%) and renal defects (9%) were less frequently. In the third trimester, some fetuses with trisomy 18 may primarily have intrauterine growth restriction, which is often associated with polyhydramnion.³

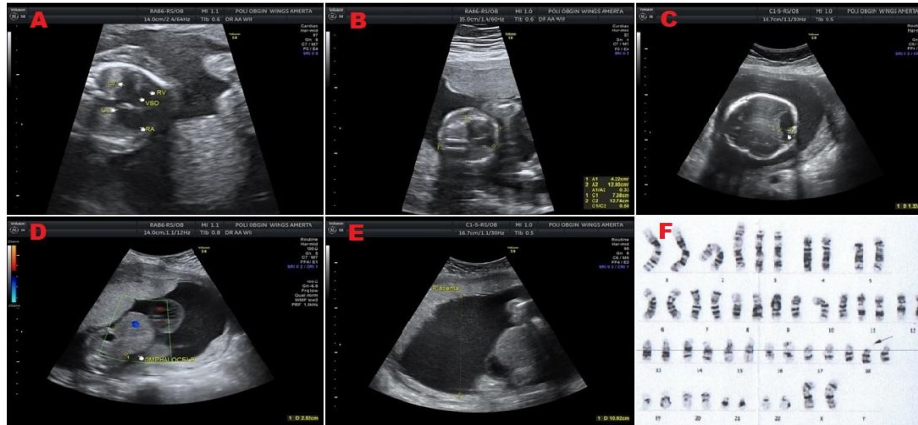


Figure 1: Ultrasonography Finding and Edwards' Syndrome Karyotyping

A. Ventricular Septal Defect (VSD); B. Cardio-Thoracic Ratio (CTR) 58%; C. Dandy Walker Hypoplasia of Cerebral Vermis; D. Omphalocele; E. Polyhydramnion; F. Edwards' Syndrome Karyotyping

These data suggest that in the early second trimester, the time of most routine screening ultrasonographic examinations, most but not all fetuses with trisomy 18 have sonographically detectable anatomic abnormalities. In our case, antenatal screening ultrasonographic examinations were polyhydramnion, breech presentation and fetal multiple congenital abnormalities (Ventricular Septal Defect - Cardiomegaly, Omphalocele, Dandy Walker Malformation) and renal abnormalities were absent at 22-23 weeks GA. The diagnosis is confirmed by antenatal amniocentesis and fetal karyotype analysis was 47 XX + 18 (Edward Syndrome).

Antenatal diagnosis of trisomy 18 leads to termination of pregnancy in 86% of case, there is a high risk fetal loss and stillbirth. In our case, multidisciplinary team meeting decided to terminate pregnancy with C-section and sterile at 27 weeks of GA. Dandy walker malformation associated with a high mortality (70%).⁴ Giant Omphalocele (GO) when the abdominal wall defect exceeds 5-6 cm in diameter and the sac contain whole of liver, with mortality rates 30-46%. In our case, correlate with poor prognosis are large size of defect, omphalocele sac rupture, low birth weight, low GA. Phenotypically baby after birth include Strawberry shaped fetal head, Cyanotic Congenital Heart Disease-VSD, Giant Omphalocele sac rupture, clenched fists with overlapping fingers, characteristics frequently seen in trisomy 18.^{3,5}



Figure 3: The Appearance of the Baby with Signs Matched for Edwards' Syndrome

A. Strawberry shaped head; B. Giant omphalocele sac rupture; C. Clenched fists with overlapping fingers

Management

Recently, studies have begun to appear in the literature that document the needs of more aggressive approach to the treatment of infants and children with trisomy 18. These studies, reveal the benefit of intensive care units hospitalization, mechanical ventilation, cardiovascular drugs, parenteral nutrition, and surgical treatment of congenital anomalies. Grahametal (2004) reported on cardiac surgical results in 24 infants with trisomy 18. The overwhelming majority of infants survived the surgery and were discharged alive. Although there may be slightly increased 1-year survival rates with aggressive treatment, it is important to realize that all long-term survivors with trisomy 18 are profoundly retarded. The management continued with strict evaluation or follow up.⁶

Evaluation and Prognosis

The most important parameter must be evaluated on trisomy 18 babies before going home is ventilation, respiration, cardiac function, the ability to have breast feeding, intestinal absorption function, hearing function, vertebral evaluation, gastric function, and the possibility of tumor. These evaluation due to average number of trisomy babies using ventilator at hospital 10.1 days. Five percent of trisomy 18 babies went home on oxygen, 12% went home on a cardiac monitor, and 44% were bottle-or breast fed. Nineteen percent of patients eventually required placement of a gastrostomy tube, but the average age of insertion of this tube was 8.4 months. Of long-term survivors, 17% had a known hearing loss, and of these patients, 41% eventually obtained a hearing aid. The major medical problems for long-term survivors with trisomy 18 include scoliosis, gastroesophageal reflux, hearing loss, and Wilms' tumor. For the trisomy 18 patients which survive more than 1 year, the evaluation needed are growth and developmental parameter, motoric, and communication skills.⁶

The prognosis of trisomy 18 babies is bad. The most common causes of death in individuals with trisomy 18 are apnea, cardiopulmonary arrest, congenital heart disease, and pneumonia. Many long-term survivors develop secondary protective lesions, such as pulmonary artery stenosis in the presence of a large VSD. Eighty percent of their trisomy 18 cases went home from the hospital, but with several problems. Average length of survival of 1.4 months for males with trisomy 18 and 9.6 months for females with trisomy 18. Many obstetricians and pediatricians mistakenly think that trisomy 18 is lethal during the newborn period. Although 55% to 65% of newborns with trisomy 18 die during the first week of life, 5% to 10% of infants are alive at 1 year of age.⁶

5. Conclusion

Edward syndrome is a rare genetic disorder associated with multisystem involvement. Hence, data collection and frequent review of cytogenetically proven cases is must to study in detail about the association of genetic defect and organ system involved. It is also helpful to compare with other known genetic disorder. The prognosis of trisomy 18 is bad. The holistics management needed including intensive care units hospitalization, mechanical ventilation, cardiovascular drugs, parenteral nutrition, and surgical treatment of congenital anomalies continued with strict evaluation or follow up.

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