

Unimpaired neurodevelopmental outcome in one year old borderline viable twins born at 22 weeks gestation: A Case Report

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Abstract

Infants born at 22–23 weeks rarely survive, and most develop severe complications, especially in the case of multiple births. This age is considered the threshold for active intervention. We report the survival of twins born at 22 2/7 weeks gestation. Recently, advances in neonatal care have improved infant survival.

Introduction:

We present a case of twin survivors, born at the edge of viability, without any major morbidities, and despite unfavorable factors.^{1,2} We believe that they are one of the youngest twin survivors ever reported and the only twins without major complication for both. The risk factors for them included twin birth, male sex of the second twin who had birth weight of less than 500 g, poor antenatal care, late administration of steroids, and prolonged maternal rupture of membranes with chorioamnionitis. Since the twins were conceived via in vitro fertilization (IVF), the gestational age could be confirmed as 22 2/7 weeks. However, neither infant developed serious complications, such as intraventricular hemorrhage or necrotizing enterocolitis.

In this report, we share our experience in the United Arab Emirates and reflect on how the advances in management strategies have decreased the viability threshold to 22 weeks. This case added to our expertise and our clinical and communication protocols. It has changed our perspective on resuscitation near viability and has led to a shift toward considering more active resuscitation in our perinatal discussions with parents

Case report

A 30-year-old woman who was pregnant with diamniotic dichorionic twins at 22 2/7 weeks gestation was admitted to the delivery room for preterm labor. She experienced bleeding, and her membranes had ruptured 23 hours before admission. Her condition was complicated by chorioamnionitis, fever, tachycardia, and elevated inflammatory markers. She had a white blood cell count of $24 \times 10^9/L$, an absolute neutrophil count of $23 \times 10^9/L$, a C-reactive protein level of 105 mg/L, and a negative test result for procalcitonin. Both fetuses exhibited good cardiac activity and active movements. The mother had conceived after undergoing in vitro fertilization (IVF) and embryonal transfer. She is a mother of healthy 3-year-old twins, who were also conceived by IVF. The medical team offered antenatal comfort and counseling regarding resuscitation and intensive care to the parents, who requested that all available life-support measures be applied, despite their complete understanding of the risks and long-term expected problems.

The decision of the parents for initiating full resuscitation was unique to our unit. A complete plan, with some flexibility under our policy, was adopted in consultation with the obstetricians and the parents. After

completing the antenatal steroid course, a live female (Twin A) weighing 504 g with Apgar scores of 4, 5, and 7 at 1, 5, and 10 min, respectively, was spontaneously delivered. Then, a live male infant (Twin B), weighing 475 g, was delivered with breech presentation and Apgar scores of 3, 5, and 7 at 1, 5, and 10 min, respectively. Both newborns were resuscitated, intubated, and given one dose of surfactant.

Twin A required six weeks of mechanical ventilation. She initially received conventional support but eventually needed high-frequency oscillation. She was extubated to non-invasive positive airway pressure ventilation at 28 weeks and two days post-conception and was eventually supported by nasal high-flow oxygen. Two weeks later, Twin B was extubated to biphasic positive airway pressure. However, he required re-intubation and ventilation after a few days. His second intubation lasted for three weeks due to bilateral irreducible inguinal hernias that required an urgent herniotomy. Finally, he was extubated successfully after 11 weeks of ventilation to continuous positive airway pressure on day 92 (33 weeks and three days post-conception). He was weaned to nasal high-flow oxygen after three weeks.

Parenteral nutrition was started on the first day of life via an umbilical venous catheter and continued via a peripheral venous catheter for both twins. The mother's breast milk was initially administered on their second day of life by trophic feeding through a nasogastric tube. This was continued with a gradual, incremental increase in volume until full feeding was tolerated. For Twin B, oral feeding was suspended several times due to intolerance and abdominal distension. However, his serial abdominal radiographs exhibited non-specific findings. Eventually, the gastric tube was removed for both twins, and breastfeeding was successful upon discharge.

Their serial cranial ultrasound scans were normal. On echocardiography, Twin A had normal heart anatomy, while Twin B had a patent ductus arteriosus with a maximum size of 2.5 mm. This was conservatively managed with fluid restriction. Follow-up echocardiography revealed a closed ductus arteriosus in Twin B. Twin B, the male twin, had a more complicated course. He had a right femur fracture due to osteopenia of prematurity, bilateral retinopathy of prematurity treated with ranibizumab (Lucentis®), Genentech, South San Francisco, CA, USA) injections, and bilateral inguinal hernias that were treated surgically.

Four months after birth, respiratory support was weaned at the postconceptional age of 40 weeks and five days for Twin A and 43 weeks and two days for Twin B. Both twins are currently in excellent condition. They have returned home without respiratory or feeding support (Table 1).

At discharge, Twin A weighed 3708 g (47.35 centile), her length was 50 cm (16.27 centile), and her head circumference was 33.5 cm (5.21 centile). Twin B was discharged with a weight of 4120 g (3.52 centile), length of 49 cm (< 1st centile), and head circumference of 34.8 cm (< 1st centile). Their neurological examination at a chronological age of 12 months, which corresponded to the corrected age of 8 months and two days, was normal and without focal deficit. Moreover, an age-appropriate neurodevelopmental test did not exhibit developmental delay in all domains for both infants considering their corrected age. Their growth is being monitored, and their parents are satisfied with their progress (Table 2).

Discussion

Infants born at periviability at 22–25 weeks of gestation could potentially survive with active support. However, their risk for mortality and morbidity is high. Furthermore, the survival of extremely preterm newborns has increased steadily during the last decade due to advances in intensive care and the greater willingness of obstetric and neonatal care providers to provide active care.^{3–7}

The risk of severe disability increases with increasingly extreme preterm births. Among actively managed infants, the rate of severe disability is approximately one in seven at 24 weeks gestation, one in four at 23 weeks gestation, and one in three at 22 weeks gestation. Patients born at 22 and 23 weeks of gestation have a higher risk of severe disability, even though data for babies at 22 weeks is based on small numbers.^{5,8–10}

Absolute survival and survival without severe impairment have been associated with protective factors. These include, but are not limited to, exposure to antenatal corticosteroids, female sex, singleton birth, higher birth weight, and an advanced clinical setting with experienced staff. However, the decision to administer intensive

care at the lower end of viability between 22–23 weeks gestational age is challenging for clinicians and parents due to variable and complex ethical components and institutional practices and policies.^{5,11}

Risk assessment and effective parental counseling should be undertaken, including explaining the risks and aiding in decision-making. The family needs support to help them understand the expected outcomes, bearing in mind that each case is individualized, and the parents' wishes should be considered in the decision to resuscitate.

CONCLUSION

The gestational limits of survival, established as 22–25 weeks, have decreased due to the technological advances in neonatal and obstetric care over the past few years. As a result, the survival rates of significantly premature babies have improved. There have been rare cases of infants delivered before 23 weeks of gestation who survived without developing significant disability.

This report aimed to document the uniqueness of each case of premature birth and to emphasize that the decision to resuscitate infants, born at the lower end of the viability range, is shared between clinicians and parents. Each case is individualized, based on the risk factors, and the wishes and beliefs of the parents.

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