A hope to save Esperanza. Robert Bartlett and the 50th anniversary of the first neonatal ECMO patient

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In 1965, Dr. Robert Bartlett was a resident at a hospital in Boston, where Robert Gross was the chief of surgery. One day the pupil asked his master a question about the possibility of treating acute respiratory failure using a heart-lung machine. Less than a decade later, this former pupil had an extracorporeal oxygenation device ready and able to keep dogs alive for five days. As Robert Bartlett recalled, his main motivation was the very high mortality rate after complex surgeries for congenital heart defects. Low cardiac output, respiratory failure, and finally death occurred in 50% of children after surgery for complex heart defects [1–3].

The first success with the use of extracorporeal oxygenation is credited to Donald Hill from Santa Barbara (US). It was in 1971, and the patient was a 24-year-old man with multi-organ trauma and acute respiratory distress syndrome. During the next 4 years, 150 people (only adults) were treated in this way, and a several percent of them survived [1, 3].

One night in the year 1975, Dr Robert Bartlett from the University of California — Irvine was asked for help by neonatologists caring for a newborn with severe respiratory distress due to meconium aspiration. The baby was born full-term on April 29, 1975, weighing 3370 g. The mother was a 29-year-old Mexican woman from Baja. It was her seventh pregnancy and sixth delivery. As an illegal immigrant, she had crossed the Mexico — US border to give her child a chance for a better life. But during the journey, the labor began. The baby was born with central cyanosis, with an Apgar score of 6 and 7 (at 1 and 3 minutes, respectively). The desperate mother signed a consent form for an experimental therapy that had never been used in neonates before. The woman was discharged soon after giving birth and never returned to the hospital. The nurses named the child "Esperanza," meaning "Hope"… (Figure 1)[1–3].

It was a hopeless case, meaning there was nothing to lose, because the partial pressure of oxygen in the newborn's arterial blood (pO_2) was only 17 mm Hg. Cardiac catheterization and angiocardiography revealed significantly limited blood flow through the lungs, a wide pulmonary trunk, and a patent ductus arteriosus with a right-to-left shunt (i.e., persistent fetal circulation). The patent ductus arteriosus was closed and extracorporeal membrane oxygenation (ECMO) support was continued (venoarterial bypass was begun 20 hours after birth). Pulmonary function gradually

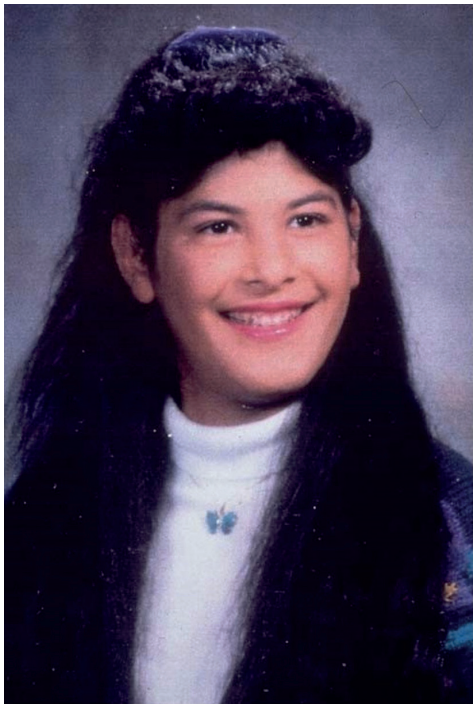

Figure 1. Esperanza Pineda ("Baby Esperanza") at the age of 14 (courtesy: Dr Robert Bartlett)

improved from minimal gas exchange (due to a high pulmonary vascular resistance) to adequate gas exchange. After 7 days, the child was disconnected from ECMO, and after 9 days, mechanical ventilation was discontinued. Baby Esperanza was discharged 10 weeks after birth. At 12 months of age, she had a growth curve in the 10th percentile and normal psychomotor function [1, 2].

A case report was prepared for publication, but interestingly the work was rejected. This is how Robert Bartlett recalled it years later: *In 1975, we successfully used prolonged extracorporeal support for a newborn infant with severe respiratory failure. At the time, we thought the single case was worth reporting to demonstrate the feasibility and technology of ECMO in neonatal respiratory failure. Journal editors disagreed, and the report was never published* [1, 2]

This work, rejected by the editors, was published only in 2017 with the author's commentary [2]. Photos of 21-year-old Esperanza-Hope and her doctor, Robert Bartlett, who met at The Extracorporeal Life Support Organization conference in 1996 went down in the history of cardiac surgery and intensive care (Figure 2). Today, Esperanza Pineda is a happy wife, a mother of three children, and an advocate for ECMO patients and their families [3].

Robert Bartlett (born May 8, 1939) graduated from the University of Michigan Medical School. *I wanted to be a professional hockey player, but I could see that wasn't going to work. And then I thought about being a professional musician*, he recalled in an interview years later.

As a young doctor Bartlett started a team for medical students named "Hockey Docs". He played until the age of 50. He still plays the bass violin and the euphonium. Professor emeritus (aged 86) is still active in research; with his team he is working on the next generation of life-support extracorporeal devices like wearable artificial lungs or artificial placentas [4].

The era of circulatory support started by John Gibbon in 1953 with his successful correction of an atrial septal defect using an extracorporeal circuit was continued almost a quarter of a century later by the first use of ECMO in a newborn as a method of treating cardiorespiratory failure. There are now over 170 000 cases (children and adults) in the Extracorporeal Life Support Organization Registry (ELSO, formed in 1989) [5].

Figure. 2. The patient and the doctor, Esperanza Pineda (at the age of 21) and Robert Bartlett (courtesy: Dr Robert Bartlett)

Article information

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