Low-dose steroids: Helping babies come off ventilators and preserving the heart at the same time

September 5 2022

Credit: Pixabay/CC0 Public Domain

In the United Kingdom 60,000 babies are born prematurely each year. Many of them will be treated with steroids, such as dexamethasone

sodium phosphate, to aid with lung development. A new study published in the *Journal of Physiology* shows that treating these babies with a lower dose of dexamethasone, not only leads to less time on ventilators, but for the first time, notes its beneficial effects on blood circulation to the lungs, influencing better cardiorespiratory outcomes.

Babies born before the 28th week of pregnancy are classed as extremely preterm. These babies have under developed lungs and require mechanical ventilation to keep them alive. To speed up lung development and to allow weaning from ventilator support, these babies are routinely given systemic corticosteroids, such as dexamethasone sodium phosphate (Dex), which reduces inflammation and aids ventilation. However, in high doses (5-10mg per kilo for six weeks) Dex can lead to significant thickening of the walls of the heart and developmental issues in infants.

Researchers in the department of Neonatal Cardiovascular Research (Monash Newborn) at Monash Children's Hospital in Melbourne, Australia studied 30 preterm babies born at 24 weeks (full term is 40 weeks) receiving low-dose Dex (1mg or less per kilo for 10 days) to help their lung development. A bedside echocardiogram was done on the babies to measure cardiorespiratory indices before and after receiving this steroid.

The research team found that the lower dose of Dex lead to reduced respiratory support requirements and no left ventricular hypertrophy (thickening of the walls of the heart). Furthermore, they found significant lowering of resistance and pressure in the babies' lungs, which allows better blood circulation and therefore better oxygenation.

Lead author and clinician-researcher Professor Sehgal says that "this study came out of clinical experience. We knew that the lower dose regimen worked from a respiratory perspective, but what was new was

the knowledge that it improves lung blood circulation, and does not adversely affect the heart. Parents of preterm babies suffer from a lot of understandable anxiety, which is exacerbated by being able to find out on the internet about the side-effects of the higher dose of dexamethasone. This study will reassure them and the clinicians that the lower dose both works well on the lungs and leaves the heart architecture unaffected."

More research is needed to understand if any effects on the heart appear after discharge.

This study paves the way for future research, specifically looking at effects on babies with poor growth.

More information: Sehgal et al, Cardiorespiratory adaptation to low dose dexamethasone for lung disease in extremely preterm infants: A prospective echocardiographic. *Journal of Physiology*. DOI: 10.1113/JP282973

Provided by The Physiological Society