

Re-oxygenation Injury: Protecting Vulnerable Babies

Today, wonderful operations can be performed on babies to repair heart defects. This includes “blue babies.” Also called *cyanotic*, their skin has a blue hue because their blue venous blood (whose oxygen has been depleted) is incorrectly sent back into the body rather than to the lungs for oxygenation.

During the corrective procedure, high levels of oxygen are typically administered by a heart-lung machine to the baby, and initial results appear positive as the heart defect is fixed and a healthy pink glow returns to the baby’s skin. But then lung and heart damage may worsen. (The same dire results can occur with babies similarly treated with oxygen to remedy congested lungs.) Oftentimes, these children develop swollen lungs, and most importantly, their hearts can become “stunned” and their contraction diminished. This can lead to an awful situation where the child’s chest sometimes must remain open after surgery, because closing it would put too much pressure on the already swollen, poorly contracting heart. The child remains in the ICU under careful watch, with a biologic dressing on the surface of the heart, while the organs and tissues dry out for two to three days before the chest can be closed.

While dreadful, this was thought to be a necessary consequence of some infant cardiac operations.

We discovered one cause of the problem were the high levels of oxygen administered during the operation, as toxic substances are produced when such oxygen concentrations are metabolized. Babies are particularly vulnerable to this. Yet we found this “re-oxygenation injury” could be avoided by lowering oxygen levels delivered during surgical procedures.

After testing in the lab, this approach was used in 72 patients with severe cyanosis. There was excellent recovery of heart function without lung or body swelling. There was no need to leave a baby’s chest open after surgery due to a swollen heart. A 2012 overview on re-oxygenation injury was published in the *World Journal for Pediatric and Congenital Heart Surgery* that summarized international papers from others in the United States, England, Turkey, Germany, Japan, and China. Again, cyanotic children treated with “controlled re-oxygenation” (normal oxygen levels delivered in a controlled manner) offset the impairment of heart function and oxidative reserve capacity.

Yet raising such questions to traditionalists garners vehement rejection, along with counterarguments that keeping oxygen levels high is a strategy that has “proven itself” over many decades (since not *all* blue babies suffer damage from such operations). They perceive the greater risk is losing the baby because of “insufficient amounts of oxygen” from the heart-lung machine, and instead blame these unforeseen complications on other factors.

Yet conclusive answers are not gained by adhering to past beliefs – or by assuming that what seems logical is valid. The answer is *only revealed through investigation*.

As Frank Lloyd Wright, the renowned architectural genius, said, “*An expert is a man who has stopped thinking because ‘he knows.’*”

Summary of Chapter 10 from the book:
SOLVING THE MYSTERIES OF HEART DISEASE
Life-saving Answers Ignored by the Medical Establishment
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