

Blood Cardioplegia: Protecting Hearts During Surgical Operations

At one time, open-heart surgery was a much more risky operation than it is today. While already a common procedure in the seventies, many patients did not do well, despite having undergone a flawless operation. And no one understood why.

The heart surgeon has two jobs. First, the operation must perfectly repair the heart's problem. Second, the heart cannot become damaged while it is being fixed. The ideal technique is to make the heart "still" during the operation, since its beating movements can compromise the surgeon's accuracy. The challenge is to find a way to halt its motion without causing cardiac damage.

Stopping the heart is accomplished by shutting off its blood supply (a process called ischemia). The heart is not pumping during the cardiac operation, but a heart-lung machine delivers blood and oxygen to the rest of the body. But there are risks, since cardiac injury may occur if this stoppage lasts for more than 15 minutes, and death may occur in thickened hearts, when more than 30 minutes have elapsed without the heart receiving blood supply.

Strategies to solve this problem were developed, but many were cumbersome and sometimes not effective. Building upon my earlier studies to understand and correct inadvertent cardiac damage during open-heart operations... I discovered blood *cardioplegia* (cardioplegia derives from the Greek, meaning "stop the heart"). We initially realized the return of regular blood to a heart that has been without blood supply, will create severe damage. We then discovered how to prevent this injury – by using a blood cardioplegic solution that contains selected chemical ingredients (including key amino acids needed to produce energy) that safely protects the heart.

We also learned that the effectiveness of these solutions depended upon their arriving at specific locations within the heart. But many of our patients had narrowed arteries, so proper distribution is not possible when only the arteries are used for delivery. This barrier was overcome by delivering it in a "backward direction" via the heart's main vein. Moreover, its effectiveness was further enhanced by administering it at different temperatures during the beginning and end of the operation.

Finding these answers was an exciting journey, and has resulted in the use of our discoveries in 85% of cardiac procedures in the U.S... and nearly that many around the globe. Over 25 million people worldwide have received this treatment.

Summary of Chapters 6 and 7 from the book:

SOLVING THE MYSTERIES OF HEART DISEASE
Life-saving Answers Ignored by the Medical Establishment
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