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Commentary: Should it be hot or not?

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Nakao and colleagues¹ present a comparison of 120 minutes of cold del Nido (DN) cardioplegia versus DN with terminal warm blood cardioplegic reperfusion (TWBCP) in 21 anesthetized open chest piglets. The authors conclude that TWBCP promotes a prompt restoration of left ventricular performance after a prolonged single-dose DN cardioplegic arrest in the early phase.

This is a well-designed and well-executed study that clearly shows early functional and probable histologic benefit from a single dose of TWBCP after 120 minutes of single-dose DN cardioplegia in piglets. As the authors state, these data do suggest but do not prove that a single dose of TWBCP may prolong the safe single-dose ischemic time for DN cardioplegia from 90 minutes to 120 minutes in humans.¹ These data will need to be confirmed.

Several questions remain. First, do the benefits result from simply giving a terminal dose of any cardioplegia at any temperature? Prior studies have shown that giving any cardioplegia dose just before unclamping has benefit over no terminal dose. Second, how important is the warmth of the redosing to the benefits? A warm terminal dose has been shown to minimize ventricular fibrillation on reperfusion simply by eliminating temperature gradients. Whether there are biochemical benefits to having the terminal dose warm is less clear. Third, are there specific chemical ingredients in the warm redosing that are important? The current study used a St Thomas Hospital blood cardioplegia formulation for the terminal cardioplegia dose. Fourth, how important is specific volume of redosing to the benefits

Improved contractility with DN plus hot shot.

CENTRAL MESSAGE

Terminal hot shot added to 120 minutes of del Nido arrest showed early functional and probable histologic benefit in piglets.

seen? The current study used the average adult human equivalent of about 250 mL over 3 minutes for the terminal dose. Lastly, how long can the clamp time safely go with warm terminal redosing? Is 120 minutes the limit? All of the above questions may have differing answers depending upon the use of topical rewarming and systemic hypothermia. In this study, myocardial temperature was maintained at 20°C–25°C, whereas many prior studies have aimed for myocardial temperature under 15°C. Many of these questions were partially addressed by Buckberg and colleagues² 30 years ago using a different formulation.

Although the data will need to be confirmed, this study does suggest potential clinical value from a so-called hot-shot dose while using DN cardioplegia clinically. This study is limited in examining piglets and not adult humans where most of the interest in DN cardioplegia lies. Thus, in adult humans receiving DN cardioplegia, further work is needed to establish whether a terminal cardioplegia dose is indeed beneficial and whether it should be hot or not.

References

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