

SCA 50**RENAL DYSFUNCTION AFTER DEEP HYPOTHERMIC CIRCULATORY ARREST: IMPACT OF DEFINITION ON CLINICAL OUTCOME**

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Introduction: Renal dysfunction(RD) after cardiac surgery is significantly associated with increased mortality and prolonged ICU stay.(1) Although RD after deep hypothermic circulatory arrest (DHCA) is common, its relationship to clinical outcome after DHCA has not been addressed. Furthermore, at least two different definitions for RD after DHCA exist in the literature.(2;3) This study tested the null hypothesis that RD has no relationship to clinical outcome after DHCA.

Methods: With IRB approval, 144 adults (2000/1) undergoing thoracic aortic surgery requiring DHCA with retrograde cerebral perfusion were studied. All medical records were archived in an Access database and statistically interrogated with Stata 7 software. All patients received an antifibrinolytic and were cooled during extracorporeal circulation with a standard protocol.(4) Anticoagulation with heparin was titrated for an activated clotting time (ACT) greater than 400 seconds (celite ACT for aminocaproic acid; kaolin ACT for aprotinin). RD was defined as 25% or greater decrease in creatinine clearance (RD-25CRCL)(2), a 50% or greater increase in serum creatinine (RD-50CR)(3), or a 50% or greater increase in serum creatinine coupled with an abnormal peak creatinine (RD-AB50CR).

Results: Antifibrinolytic exposure was 100%: 65.9% aprotinin and 34.1% epsilon-aminocaproic acid. The dialysis incidence was 2.8%. Although dialysis was univariately associated($p<0.05$) with mortality and prolonged ICU stay, it was not a significant multivariate predictor for either variable. RD incidence varied with definition

as follows: 42.4% (RD-25CRCL), 31.9% (RD-50CR), and 22.9% (RD-AB50CR). RD-50CR and RD-AB50CR were univariately associated with mortality ($p=0.01$, and $p=0.001$). However, no definition of RD-DHCA was a significant multivariate predictor of mortality after DHCA ($p>0.05$). RD-25CRCL, RD-50CR and RD-AB50CR were all univariately associated with prolonged ICU stay ($p=0.006$; $p=0.0001$; $p<0.0001$). Only RD-AB50CR was a significant multivariate predictor of prolonged ICU stay (OR 4.8:1; CI 1.7-13.6; $p=0.003$).

Conclusions: RD-DHCA requiring dialysis is uncommon. RD-DHCA is common: the incidence varies significantly with definition. RD-DHCA is not associated with mortality. RD-DHCA is a significant multivariate predictor of prolonged ICU stay. RD-AB50CR has the most statistical power of the three RD-DHCA definitions evaluated. RD-DHCA merits further investigation because it is common and affects outcome after DHCA.

References:

1. Mora Mangano CT, Diamondstone LS, Ramsay JG, et al: Renal Dysfunction after Myocardial Revascularization: Risk factors, Adverse Outcomes and Hospital Resource Utilization. *Ann Int Med* 1998; 128:194-203
2. Mora Mangano CT, Neville MJ, Hsu PH, et al: Aprotinin, Blood Loss, and Renal Dysfunction in Deep Hypothermic Circulatory Arrest. *Circulation*. 2001; 104: I276-I281.
3. Ehrlich M, Grabenwoger M, Cartes-Zumelzu F, et al: Operations on the Thoracic Aorta and Hypothermic Circulatory Arrest: Is Aprotinin Safe? *J Thorac Cardiovasc Surg*. 1998; 115: 220-5.
4. Stecker MM, Cheung AT, Pochettino A, et al: Deep Hypothermic Circulatory Arrest: I. Effects of Cooling on Electroencephalogram and Evoked Potentials. *Ann Thor Surg*. 2001; 71: 14-21.