

SCA 5

MAJOR CLINICAL OUTCOMES IN ADULTS UNDERGOING THORACIC AORTIC SURGERY REQUIRING DEEP HYPOTHERMIC CIRCULATORY ARREST

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Introduction: Deep hypothermic circulatory arrest (DHCA) in adults undergoing thoracic aortic surgery has a high mortality (10-14%) and morbidity^{1,2}. Recent DHCA studies have focused on mortality, bleeding, blood component transfusion, and renal dysfunction^{1,2}. These studies include data from the last ten years, allowing the possibility that improvements in patient management may significantly alter clinical outcome after DHCA³. There is limited contemporary outcome data on DHCA. Therefore, we reviewed our extensive recent DHCA experience to delineate perioperative outcomes beyond those already studied. Due to the potential benefits of aprotinin as an anti-inflammatory agent, we further subdivided our outcomes by antifibrinolytic (AF)³.

Methods: With IRB approval, 110 patient charts from 2000 and 2001 were retrospectively analyzed in a Microsoft Access database. Patients received either aprotinin or epsilon-aminocaproic acid (E-ACA). Aprotinin dosage was at either full Hammersmith (FH) dose (2 X 10⁶ kallikrein inhibition units (KIU) patient load, 2 X 10⁶ KIU bypass load, 5 X 10⁵ KIU/hr infusion) or half Hammersmith (HH) dose (1 X 10⁶ KIU patient load, 1 X 10⁶ KIU bypass load, 5 X 10⁵ KIU/hr infusion. E-ACA dosage was at either 5 g or 10 g initial load with 1g/hr IV infusion. Preoperative, intraoperative, and postoperative variables were examined. The computer software Stata was used for statistical analysis.

Results: Out of 110 patients, 76 (69.1%: 72 FH and 4 HH) were given aprotinin and 34 (30.9%) were given E-ACA. The following were not significantly different (p>>0.05) between AF groups: gender, age, BSA, CBC, PT/PTT, baseline creatinine, CPB time, DHCA time, ACT, heparin dose and protamine dose. However, 87.1% (27/31) of emergency cases, 88.2% (15/17) of reoperation cases, and 100% (26/26) of acute type A dissections received aprotinin (p=0.0007, p=0.0518, and p<0.00005 respectively). Outcomes after DHCA are presented in Table 1.

Discussion: Our mortality rate is better than predicted by the literature. Our 24-hr mortality rate is 0.9%, as opposed to 10% (N=183)¹. Despite a 28.2% incidence of emergencies, our mortality rate is almost 6% less than the 14% from a purely elective adult DHCA group (N=50)². This reduction in mortality may be due to advances in patient management and/or choice of AF. Aprotinin appears significantly associated with prolonged LOS ICU, with a trend to significance for prolonged ventilator dependence. However, AF choice does not significantly affect LOS ICU (p=0.165) or prolonged ventilator dependence (p=0.288) when the high-risk patient groups are excluded (emergencies, reoperation, acute type A dissection). This finding in the elective cohort argues against a drug effect due to aprotinin. Mortality and CVA are closely related in DHCA. ST and STPH account for 55% (6/9) of total mortality. The STPH mortality rate is 40% (2/5), and the ST mortality is 33% (3/9). AF choice is not significantly associated with ST. STPH has preoperative hypotension as a major confounder and therefore is excluded from analysis. Afib after DHCA is common; a multivariate analysis of risk factors is in progress.

References: [1] Mora Mangano CT, Neville MJ, Hsu PH, et al: Aprotinin, Blood Loss, and Renal Dysfunction in Deep Hypothermic Circulatory Arrest. *Circulation*. 2001;104:1276-1281; [2] 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; [3] Smith CR, Spanier TB: Aprotinin in Deep Hypothermic Circulatory Arrest. *Ann Thorac Surg* 1999;68:278-86.

Table 1: Major Clinical Outcomes after DHCA

	Total (N=110)	Aprotinin (N=76)	E-ACA (N=34)	p-value
Total In-Hospital Mortality	9 (8.2%)	9 (8.2%)	0	0.169
Length of Stay (LOS) Hospital (days)	14.0 14.9	15.1 16.5	11.4 10.2	0.409
Length of Stay (LOS) ICU (days)	6.82 10.6	7.64 11.9	3.97 6.25	0.039
> 72 hrs on Ventilator	21 (19.1%)	18 (16.4%)	3 (2.7%)	0.053
Total # of strokes	14 (12.7%)	13 (11.8%)	1 (0.9%)	-
Stroke w/preoperative hypotension (STPH)	5 (4.5%)	5 (4.5%)	0	-
Stroke w/o preoperative hypotension (ST)	9 (8.2%)	8 (7.3%)	1 (0.9%)	0.169
Atrial Fibrillation (Afib)	48 (43.6%)	32 (29.1%)	16 (14.5%)	0.390
Intra-Aortic Balloon Counterpulsation	2 (1.8%)	1 (0.9%)	1 (0.9%)	-
> 72 hrs of Inotropes/Pressor	11 (10.0%)	10 (9.1%)	1 (0.9%)	0.103