Original Article

Contemporary Results Following Surgical Repair of Acute Type A Aortic Dissection (AAAD): A Single Centre Experience

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Objectives: **The study aims to define predictors of neurological dysfunction, 30-day mortality, long-term survival and quality of life following repair of acute type A aortic dissection (AAAD).**

Methods: **Between 2000 and 2008, 65 patients underwent repair of AAAD. Sixty-four pre-, intra- and post-operative variables were studied. Mean follow-up was 26.6 months.**

Results: **The mean age was 61 years; 60% were male and five had Marfan's syndrome. At presentation, ischaemic ECG changes were seen in 45%, malperfusion syndrome in 59%, moderate–severe aortic regurgitation in 48% and tamponade in 16%. EF was <40% in 17%. There was a delay of >12 hours between diagnosis and operation in 64%. Axillary cannulation was performed in 37%. Cerebral protection was by hypothermic arrest (HCA) alone (19%), HCA with retrograde cerebral perfusion (RCP) (11%), or HCA with antegrade cerebral perfusion (ACP) (46%). The procedure was performed on cross-clamp in 24%. Full arch replacement was performed in 14% and concomitant coronary artery grafting was performed in 11%. Post-operative neurological dysfunction was present in 33.8%. The only significant predictor of poor neurological outcome was full arch replacement ($p = 0.04$) on univariate analysis. In-hospital OR 30 mortality was 23.53%. Significant predictors of mortality were low ejection fraction ($p = 0.017$) and post-operative renal failure ($p = 0.012$). Long-term survival was 70% at two years, 50% at five years and 25% at nine years. Functional outcomes and long-term quality of life were assessed in 69% of patients who were alive at last follow-up. Ninety percent of patients reported minimal limitation on functional scores. Quality of life was assessed using the EQ-5D questionnaire. Forty-eight percent of patients recorded full health with an overall mean index of 0.854 (where the best possible score is 1) using the US preference weighted index score.**

Conclusions: **Discharged patients have reasonable long-term survival and good quality of life.**

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Keywords. Aortic aneurysm; Outcome; Mortality; Prognosis

Introduction

Stanford type A acute aortic dissection (AAAD), encompassing DeBakey types I and II, remains a condition associated with significant morbidity and mortality despite recent advances in surgical treatment and diagnosis. The International Registry of Acute Aortic Dissection (IRAD) recently reported an overall in-hospital surgical mortality of 23.9% based on a combined series of 682 patients [1].

The decrease in operative mortality in the last 30 years coincides with the advent of cerebral protection strategies. There is a developing body of literature to suggest that recent changes in technique will improve outcomes, however there is insufficient data to support such assertions at this time.

Current data does suggests that a range of pre-operative variables, more so than intra-operative variables [1–6], influence short-term morbidity and mortality, however there remains a paucity of data with respect to long-term survival and outcomes following surgical repair of AAAD.

We aim to define the predictors of post-operative neurological dysfunction and mortality, and we aim to improve the understanding of long-term outcomes and quality of life after repair of AAAD.

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Methods

Patients

Sixty-eight patients underwent emergent repair of type A aortic dissection between January 2000 and December 2008. Complete data was available in 65 patients. Data was prospectively collected and retrospectively analysed. Patients were excluded if they presented with chronic type A dissection.

The mean age at presentation was 61.15 ± 11.44 years (range 24–80), 60% of patients were male, and five patients had Marfan's syndrome. There were 12 patients over the age of 70.

A delay of greater than 12 hours between diagnosis and operation was present in 35.7% of cases. At presentation, 30% of patients were clinically shocked, 3% required CPR and 59% of patients had documented malperfusion syndromes. Pre-operative aortic regurgitation (AR) was seen in 81% of patients, with moderate to severe AR seen in 48%. Tamponade was seen on echo in 16%. A pre-operative ejection fraction of <40% was seen in 17% of patients.

Variables and Definitions

A range of 63 pre-, intra- and post-operative variables were collected for each patient (see Tables 1–3). Malperfusion syndromes were defined by clinical evidence of underperfusion of a particular organ system. Malperfusion syndromes included: neurological dysfunction (e.g. hemiparesis) including blindness; ECG evidence of myocardial ischaemia; acute renal failure as indicated

Table 1. *Pre-operative Variables (Variables Not in Table: Diagnosis Modality, Proximal Extent of Dissection, Distal Extent of Dissection). Numbers Represent Percentages, Except Where Indicated.*

Variable	Overall	30-Day survival	30-Day mortality	No Neurology	Neurology
Mean age at presentation (years)	61 (24–80)	60 (24–80)	63 (40–78)	60 (24–78)	60 (33–80)
Male	60	57	69	53	68
Body mass index >25	68	66	73	62	78
Time from onset to diagnosis >6 h	35	40	20	47	16
Shock	30	26	44	27	27
Cardiopulmonary resuscitation	3	2	6	3	0
Tamponade	15	9	38	11	14
New electrocardiogram findings	42	42	73	59	24
Other malperfusion syndrome	57	53	75	57	55
Mean ejection fraction (%)	56	58	47	58	51
Creatinine	121	120	122	118	127
Previous cardiac operation	6	4	13	0	9
Atrial fibrillation	5	4	6	3	9
Previous myocardial infarction	11	8	19	5	18
Hypertension	61	63	56	63	59
Marfan's syndrome	8	11	0	8	10
Giant cell arteritis	2	2	0	0	5
Smoker	56	59	50	55	60
Pre-operative anticoagulation	30	31	25	30	30
Aortic regurgitation on echo	68	83	77	80	94
Time to operation >12 h	36	41	20	44	25

Table 2. *Intra-operative Variables (Variables Not in Table: Freestyle Aortic Root Bioprosthesis [Medtronic, Minneapolis, MN], Intra-operative TOE (Transoesophageal Echocardiogram), Blood Products Administered (Packed Red Cells, Platelets, Cryoprecipitate, Fresh Frozen Plasma, Novoseven [Novo Nordisk, Denmark])). Numbers Represent Percentages, Except Where Indicated.*

Variable	Overall	30-Day survival	30-Day mortality	No neurology	Neurology
AVR	34	31	44	26	41
Valve resuspension	17	12	31	21	14
Root	32	31	36	25	36
Hemi-arch	63	63	60	62	64
Full arch	14	12	20	8	18
Coronary reimplant	25	24	25	21	27
Coronary artery bypass graft	11	8	19	8	14
Glue	75	73	80	73	77
Antigrade cerebral perfusion	46	48	40	43	48
Retrograde cerebral perfusion	11	13	7	5	19
Axillary cannulation	35	39	21	43	19
Femoral cannulation	65	61	79	57	81
Deep hypothermic circulatory arrest	52	49	63	39	64
No circulatory arrest	23	24	13	27	21
Aprotinin	60	68	56	61	75
Mean pump time (minutes)	206	187	261	192	216
Mean cross-clamp (minutes)	115	107	135	106	124
Mean arrest time	31	28	37	27	38