

Contemporary Patient Blood Management in Acute Type A Aortic Dissections: Reducing Intraoperative Blood Product Usage and Waste

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The American Association for Thoracic Surgery (AATS) Aortic Symposium 2024

Presentation on Demand Abstract – P093

Thursday, April 25, 2024 – Friday, April 26, 2024, New York, NY, USA

Presented Thursday, April 25, 2024: 5:38 PM – 7:00 PM



Disclosures

- None

Background

- **Type A aortic dissection (TAAD) repair** produces a **significant coagulopathy**¹
- Recently, **blood product usage** has been reported as a **risk factor** for **mortality** in these patients,^{2,3} **even after matching** for baseline characteristics⁴

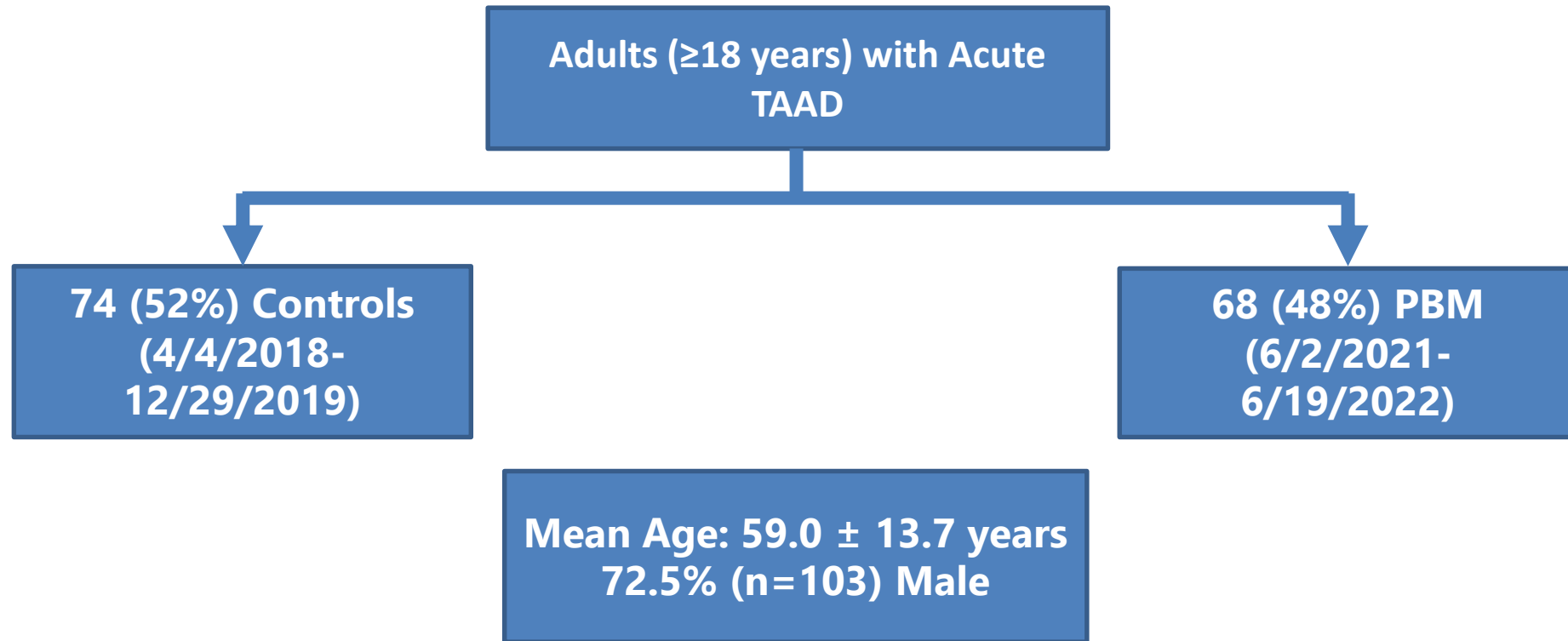
Purpose

- Evaluate and compare **intraoperative blood product usage and waste** in **adult patients** (≥ 18 years) undergoing repair of **acute or hyperacute type A aortic dissection** *before* and *after* implementation of a **comprehensive patient blood management (PBM) program**

Methods

- Retrospective **single-center** study
 - **Controls** (4/4/2018 – 12/29/2019)
 - **PBM Group** (6/2/2021 – 6/19/2022)
- **PBM Program** initiated in **May 2021** to reduce blood product usage and waste
 - 6 months of lectures and 6-week trial period
 - Point-of-care viscoelastic testing
 - Team education to reduce blood transfusion
 - Concentrated fibrinogen administration when indicated
 - Improved tracking to reduce waste
- **Waste** = Products **ordered** but **not administered**
- Wilcoxon two-sample tests for continuous variables; Chi-Square tests for categorical variables

Study Population



Baseline Characteristics

	All Patients (n=142)	PBM Group (n=68, 48%)	Controls (n=74, 52%)	P-value
Female	39 (27.5)	17 (25.0)	22 (29.7)	0.528
BMI, kg/m ²	30.3 ± 6.3 29.25 [26.36, 33.75]	31.3 ± 6.9 30.0 [26.7, 34.2]	29.3 ± 5.6 28.9 [25.9, 32.2]	0.055
Diabetes mellitus	12 (9.1)	6 (9.5)	6 (8.7)	0.869
Hypertension	116 (83.5)	54 (81.8)	62 (84.9)	0.622
PVD	47 (37.6)	15 (26.8)	32 (46.4)	0.025
Preoperative Hgb, g/dL	12.9 ± 2.1 13.1 [11.5, 14.3]	12.5 ± 2.3 12.5 [10.9, 14.1]	13.2 ± 1.8 13.4 [12.4, 14.4]	0.040
Preoperative Hct	38.2 ± 5.9 38.4 [34.6, 42.4]	37.3 ± 6.3 36.4 [32.5, 42.2]	39.0 ± 5.3 39.4 [36.3, 42.4]	0.078
Preoperative Plt, per mL	190.3 ± 68.5 180 [148, 223]	190.6 ± 75.2 179 [144, 220]	190.1 ± 62.4 183 [154, 228]	0.969

Procedures Performed

	All Patients (n=142)	PBM Group (n=68, 48%)	Controls (n=74, 52%)	P-value
Procedure	---	---	---	---
Ascending only	5 (3.5)	2 (2.9)	3 (4.1)	0.719
Hemiarch	74 (52.1)	27 (39.7)	47 (63.5)	0.005
Transverse arch	56 (39.4)	35 (51.5)	21 (28.4)	0.005
Zone 1	3 (2.1)	1 (1.5)	2 (2.7)	0.610
Zone 2	54 (38.0)	34 (50.0)	20 (27.0)	0.005
Total arch	6 (4.2)	3 (4.4)	3 (4.1)	0.916
Concomitant procedure	112 (78.9)	56 (82.4)	56 (75.7)	0.330
Antegrade TEVAR	11 (7.8)	4 (5.9)	7 (9.5)	0.426
Aortic root intervention	54 (38.0)	26 (38.2)	28 (37.8)	0.961
AV intervention	64 (45.1)	28 (41.2)	36 (48.7)	0.371
Arrhythmia procedure	4 (2.8)	2 (2.9)	2 (2.7)	0.932
ASD/PFO closure	2 (1.4)	1 (1.5)	1 (1.4)	0.952
ECMO/VAD	2 (1.4)	1 (1.5)	1 (1.4)	0.952
CABG	8 (5.6)	4 (5.9)	4 (5.4)	0.902
MV intervention	2 (1.4)	0 (0)	2 (2.7)	0.172
TV intervention	1 (0.7)	1 (1.5)	0 (0)	0.295
Other	18 (12.7)	11 (16.2)	7 (9.5)	0.229

Intraoperative Details

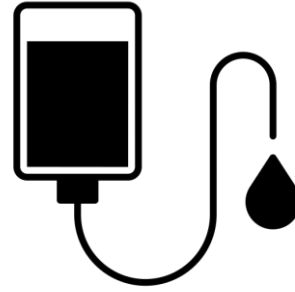
	All Patients (n=142)	PBM Group (n=68, 48%)	Controls (n=74, 52%)	P-value
Cerebral perfusion type	---	---	---	0.052
None	56 (39.4)	22 (32.4)	34 (46.0)	---
Antegrade	73 (51.4)	42 (61.8)	31 (41.9)	---
Retrograde	13 (9.2)	4 (5.9)	9 (12.2)	---
Times, minutes	---	---	---	---
CPB	229.2 ± 78.8 214 [180, 259]	224.2 ± 73.5 211 [175.5, 256]	233.7 ± 83.7 217 [187, 259]	0.474
Cross clamp	154.9 ± 61.9 147.5 [110, 192]	158.9 ± 69.6 153.5 [112, 193.5]	151.2 ± 54.1 144 [110, 192]	0.465
DHCA	19.9 ± 11.3 21 [13, 28]	20.1 ± 11.4 21 [13, 27.5]	19.6 ± 11.3 21.5 [12, 29]	0.784
ACP	42.7 ± 18.6 43 [28, 52]	48.1 ± 18.8 45.5 [35, 57]	35.3 ± 15.9 35 [24, 47]	0.0023
RCP	27.2 ± 10.5 28 [25, 31]	26.3 ± 3.9 27 [23.5, 29]	27.7 ± 12.6 28 [25, 34]	0.766
Total body ischemia	44.3 ± 25.6 36 [26, 63]	51.4 ± 29.6 55.5 [26.5, 72.5]	37.8 ± 19.2 34 [26, 48]	0.0016

Blood Product Usage and Waste

Fewer PBM Patients (than controls)

Received:

- ❖ FFP (1.9% [n=1] versus 18.9% [n=14], $p<0.001$)
- ❖ Factor 7 (0% [n=0] versus 8.1% [n=6], $p=0.016$)



More PBM Patients (than controls)

Received:

- ❖ PCC (41.2% [n=28] versus 18.9% [n=14], $p=0.004$)
- ❖ Fibrinogen (5.9% [n=4] versus 0% [n=0], $p=0.034$)

No Differences in Usage of:

- ❖ RBC
- ❖ Cryoprecipitate
- ❖ Platelets
- ❖ Cell Salvage

PBM Patients Had Decreased Waste of:

- ❖ RBC (60.3% [n=41] versus 86.5% [n=64], $p<0.001$)
- ❖ FFP (16.2% [n=11] versus 51.4% [n=38], $p<0.001$)
- ❖ Platelets (4.4% [n=3] versus 29.7% [n=22], $p<0.001$)
- ❖ Cryoprecipitate (4.4% [n=3] versus 21.6% [n=16], $p=0.003$)

Postoperative Outcomes

	All Patients (n=142)	PBM Group (n=68, 48%)	Controls (n=74, 52%)	P-value
Unplanned reoperation for bleeding	9 (6.3)	6 (8.8)	3 (4.1)	0.244
Sepsis	11 (7.8)	5 (7.4)	6 (8.1)	0.867
Any CVA	20 (14.1)	8 (11.8)	12 (16.2)	0.446
Minor	11 (7.8)	5 (7.4)	6 (8.1)	0.867
Disabling CVA	9 (6.3)	3 (4.4)	6 (8.1)	0.367
Preop modified Rankin score	0.58 ± 1.30 0 [0, 0]	0.57 ± 1.51 0 [0, 0]	0.58 ± 1.24 0 [0, 0.5]	0.726
Postop modified Rankin score	2.95 ± 2.31 3 [0.5, 5]	2.75 ± 2.55 3 [0, 5]	3.08 ± 2.23 3.5 [1, 5]	0.728
Prolonged ventilation (>24h)	77 (54.2)	43 (63.2)	34 (46.0)	0.039
Tracheostomy	21 (14.8)	9 (13.2)	12 (16.2)	0.617
Pneumonia	30 (21.1)	15 (22.1)	15 (20.3)	0.794
DVT	4 (2.8)	3 (4.4)	1 (1.4)	0.271
Acute kidney injury	27 (19.0)	14 (20.6)	13 (17.6)	0.647
Dialysis	20 (14.0)	11 (16.2)	9 (12.2)	0.492
Pericardiocentesis	2 (1.4)	2 (2.9)	0	0.137
Postoperative LOS, days	15.1 ± 8.9 13.5 [9, 19]	16.8 ± 9.2 14 [10.5, 20]	13.5 ± 8.4 12 [7, 17]	0.024
30-day mortality	17 (12.1)	9 (13.2)	8 (11.1)	0.701

Conclusion

- Despite **higher surgical complexity** in the Patient Blood Management cohort, there were **no differences** in **major complications or mortality**
- A **contemporary Patient Blood Management program** in acute TAAD with point-of-care viscoelastic testing **reduced FFP transfusion and blood product waste without any adverse effects** on **postoperative outcomes**