

**Partial Cardiopulmonary Bypass in
Thoracoabdominal Aorta Repair: A Safe
Alternative in a Low Volume Center**

Introduction

- **The gold standard of TAAA treatment remains open surgical repair.**
- **Careful consideration of patient risk factors and a collaborative team effort to reduce perioperative complications.**
- **In high volume centers, left heart bypass is the preferred perfusion strategy.**
 - » **Team coordination (anesthesia, perfusion and surgery)**
 - » **In low-volume centers this can be challenging (learning-curve).**

Objective

- **Describe the experience in thoracoabdominal aorta (TAA) repair using partial CPB at a cardiac surgery referral center.**

Methods

- **Single center retrospective study**
- **All patients undergoing open TAA repair (2002-2023)**
- **Crawford I-IV + extension 0 for isolated descending aorta surgery**
- **In-hospital follow-up**
 - **Mortality**
 - **Kidney injury / post-op RRT requirement**
 - **SCI**
 - **GI ischemic events**
- **Descriptive analysis using standard statistical measures**

Surgical Approach

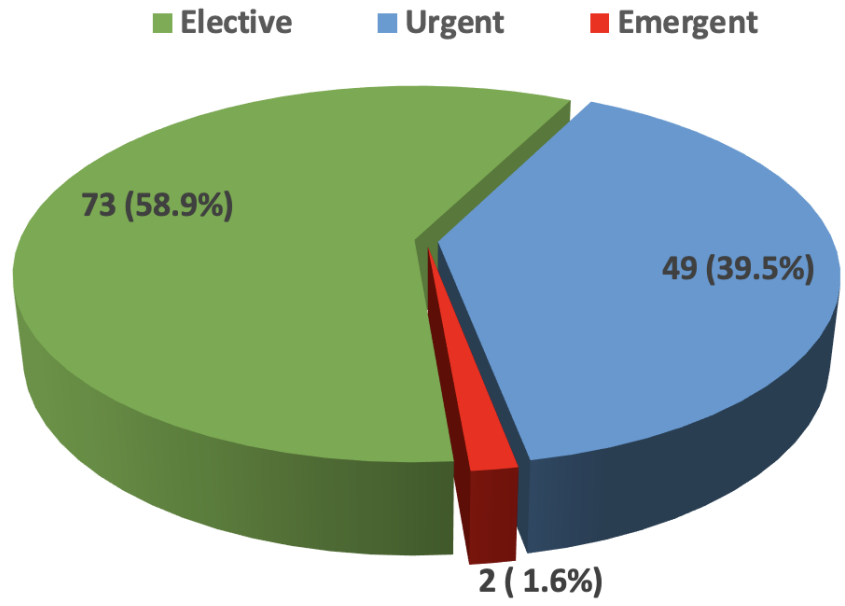
- **Femoral cannulation for partial CPB for all cases.**
- **Selective visceral perfusion with continuous blood + infused cold crystalloid to renal arteries.**
- **Sequential clamp for reconstruction.**

Results

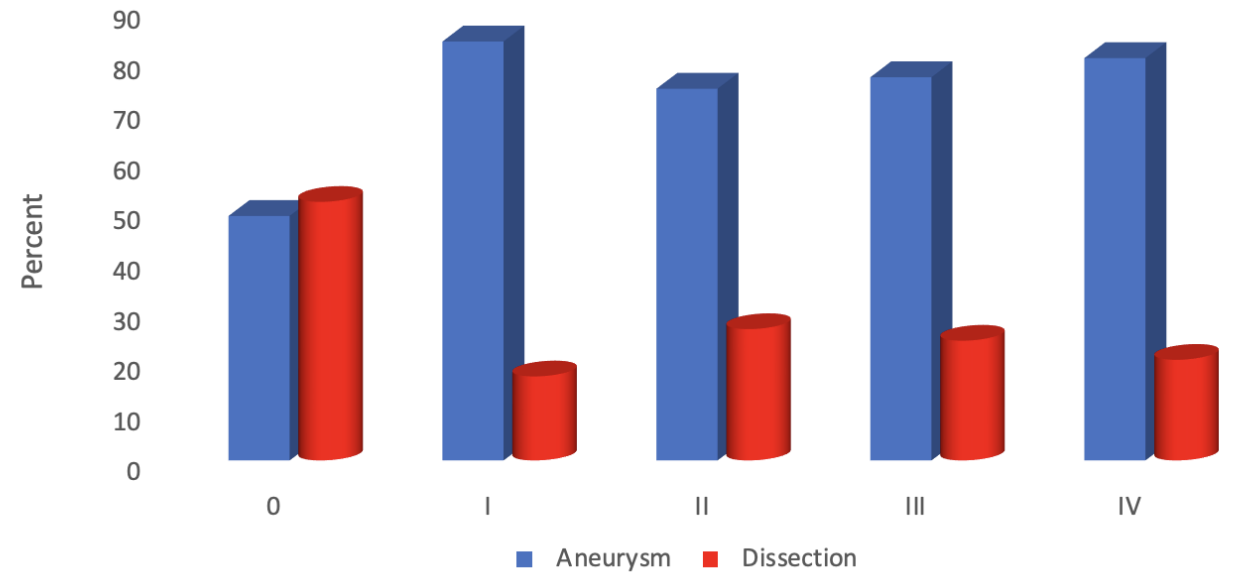
	Total N=124	0 N=37	I N=18	II N=23	III N=21	IV N=25
Age	58 (44.3-65.6)	56.5 (47.8-64.3)	59.75 (40.3-67.3)	47.6 (40.1-61.2)	64 (48-68.1)	58.8 (47-69.8)
Diabetes	8 (6.5%)	1 (2.7%)	1 (5.6%)	2 (8.7%)	2 (9.5%)	2 (8.0%)
Hypertension	89 (71.8%)	28 (75.7%)	13 (72.2%)	16 (69.6%)	15 (71.4%)	17 (68.0%)
Preop. RRT	5 (4.0%)	0 (0.0%)	0 (0.0%)	1 (4.3%)	2 (9.5%)	2 (8.0%)
Stroke	7 (5.6%)	4 (10.8%)	0 (0.0%)	1 (4.3%)	2 (9.5%)	0 (0.0%)
Chronic lung disease	120 (96.8%)	35 (94.6%)	17 (94.4%)	23 (100.0%)	21 (100.0%)	24 (96.0%)
Arrhythmia	2 (1.6%)	1 (2.7%)	0 (0.0%)	0 (0.0%)	1 (4.8%)	0 (0.0%)
Baseline Creatinine	1 (.9-1.09)	1 (.88-1)	1 (.8-1)	1 (.9-1)	1 (1-1.2)	1 (.9-1.1)
Previous MI	4 (3.2%)	2 (5.4%)	0 (0.0%)	0 (0.0%)	2 (9.5%)	0 (0.0%)
Heart Failure	2 (1.6%)	1 (2.7%)	0 (0.0%)	0 (0.0%)	1 (4.8%)	0 (0.0%)
LVEF	54 (51-59)	53 (51-60)	52.5 (51-57.5)	55 (51-58)	48 (42-54)	55.5 (54-63)
EuroScore II	4.0 (2-15)	4.0 (2-11)	3.6 (2.5-18)	2.96 (1.8-18)	5.7 (1.6-7.2)	4.0 (2.2-38.8)

Results

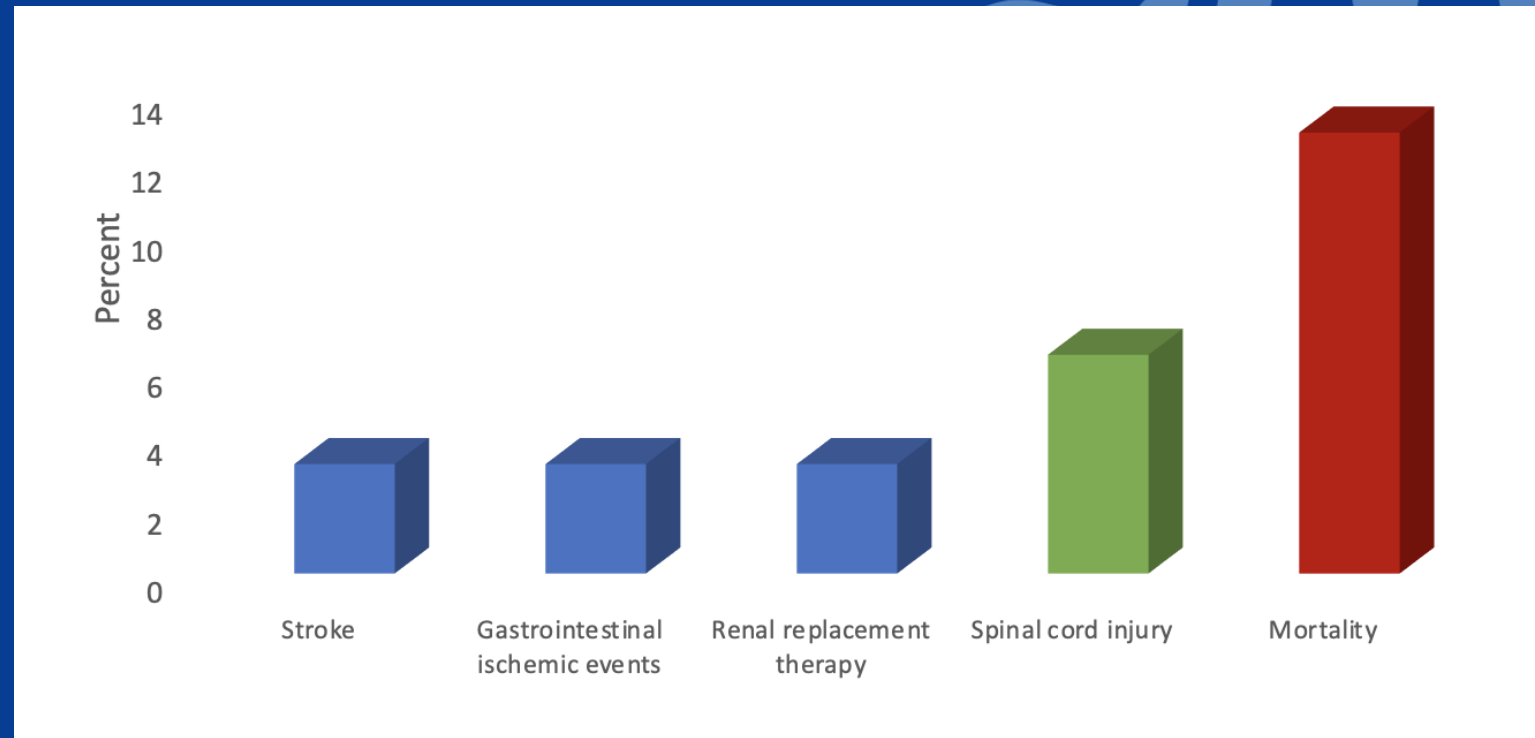
Baseline Characteristics



Primary indication for surgery



Main Outcomes



	0 N=37	I N=18	II N=23	III N=21	IV N=25
Postoperatrive stroke	3 (8.1%)	1 (5.6%)	0 (0.0%)	0 (0.0%)	0 (0.0%)
Lower extremity paralysis >24 hr.	0 (0.0%)	0 (0.0%)	2 (8.7%)	0 (0.0%)	1 (4.0%)
Lower extremity paresis >24 hr.	1 (2.7%)	1 (5.6%)	2 (8.7%)	0 (0.0%)	1 (4.0%)
Postoperative RRT	1 (2.7%)	0 (0.0%)	2 (8.7%)	0 (0.0%)	1 (4.0%)
GI ischemic complications	0 (0.0%)	2 (11.1%)	0 (0.0%)	1 (4.8%)	1 (4.0%)
Postoperative mortality	1 (2.7%)	4 (22.2%)	4 (17.4%)	0 (0.0%)	7 (28.0%)

Main Outcomes

Secondary Outcomes

	Total	0	I	II	III	IV
	N=124	N=37	N=18	N=23	N=21	N=25
Bleeding reoperation	8 (6.5%)	0 (0.0%)	5 (27.8%)	2 (8.7%)	0 (0.0%)	1 (4.0%)
Surgical site infection	3 (2.4%)	0 (0.0%)	0 (0.0%)	1 (4.3%)	1 (4.8%)	1 (4.0%)
Sepsis	14 (11.3%)	3 (8.1%)	1 (5.6%)	5 (21.7%)	1 (4.8%)	4 (16.0%)
Post-op AKI	21 (16.9%)	2 (5.4%)	2 (11.1%)	8 (34.8%)	5 (23.8%)	4 (16.0%)
Post-op AF	4 (3.2%)	1 (2.7%)	1 (5.6%)	1 (4.3%)	0 (0.0%)	1 (4.0%)
ICU length of stay	4 (3-7)	4 (1.1-5)	4 (3-11.5)	5 (3-7.5)	4.3 (3.1-5.45)	5 (3-7.8)
Total length of stay	14 (10-23)	13 (9-25)	13 (8-17)	17 (10-33)	14 (13-23)	17 (11-21)

Discussion

Advantages of pCPB in a low-volume center

- In low-volume centers acquiring the experience for LHB can be challenging.
- Partial CPB allows easier operative team coordination due to the use of standard CPB equipment.
- pCPB ensures a better intraoperative volume control with minimized blood loss, guaranteeing a clean operative field and adequate organ perfusion.

Conclusions

- **Our results show comparable mortality to high volumen centers that use LHB.**
- **Low rates of SCI, GI bleeding and renal replacement therapy.**
- **Partial CPB can still be an adequate alternative for TAA surgery in low-volume centers.**