

Multi-vessel Arch Branch Ostial Stenosis: Outcome of Extra-anatomical Bypasses

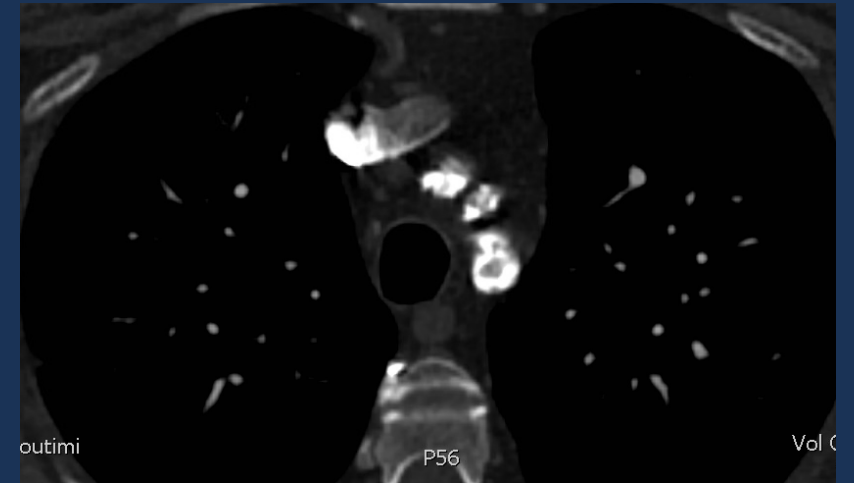
Dagenais F, Abdelli R, St-Louis R, Dumont E, Voisine P.

**Institut Universitaire de Cardiologie et Pneumologie de Quebec
Quebec, Canada**

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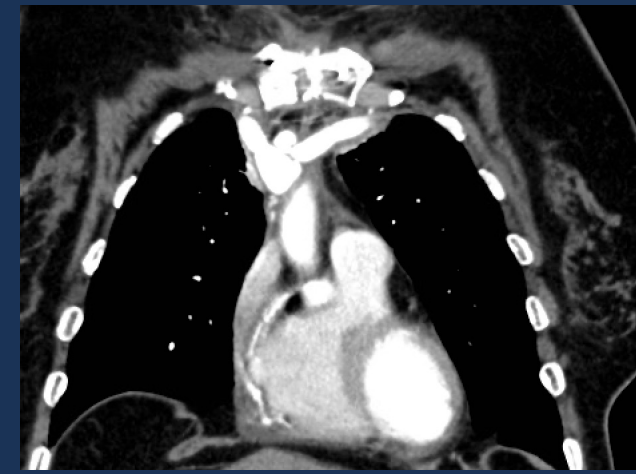
Background

- Symptomatic multi-vessel arch branch ostial stenosis is a rare condition.
- Operative technique remains controversial and few reports assess the outcome of these different techniques.
- We propose a strategy incorporating the use of aorto-axillary extra-anatomical bypass grafts in the management of patients with symptomatic multivessel arch branch ostial stenosis. Safety and efficacy outcomes are reported.



Methods

- Since 2015, 8 consecutive patients with symptomatic multi-vessel (≥ 2) arch vessel ostial stenosis were referred for operative treatment.
- Operative technique:
 - All operations were conducted without cardiopulmonary bypass.
 - A multi-branch (8mm branches) custom or commercially available dacron graft with a 12 or 14 mm main branch anastomosed to the ascending aorta (using a side bite clamp) was initially constructed.
 - The extra-anatomical aorto-axillary bypass (es) was (were) initially performed to increase cerebral perfusion through the posterior circulation. Subsequently, the most severe carotid artery was revascularized in an end to end fashion followed by revascularization of the other arch branch vessels.
 - Patients were followed prospectively in a dedicated aortic clinic.



Patient characteristics

	N=8
Age	63.6±3.4
Neurological symptoms	8 (100.0)
Female	7 (87.5)
Redo	1 (12.5)
History CVA/TIA	6 (75.0)
Diabetes	3 (37.5)
BMI	26.9±5.0
Hypertension	5 (62.5)
COPD	1 (12.5)
Active smoker	2 (25.0)
Renal insufficiency*	1 (12.5)
Creatinine	101.6±71.4

Values are mean±STD or n (%)

*Creatinine>150 or dialysis

BMI = body mass index; CVA = cerebrovascular accident; COPD = chronic obstructive pulmonary disease; TIA = transient ischemic attack

Intraoperative characteristics

	N=8
Number of bypass/patient	3.1±0.8
Distribution of bypass	27
Aorto-innominate	1
Right aorto-axillary	6
Right aorto-carotid	6
Left aorto-axillary	7
Left aorto-carotid	7
Concomitant surgery	
Off pump CABG (LIMA to LAD)	1

Values are mean±STD or n(%).

CABG = coronary artery bypass grafting

Perioperative outcomes

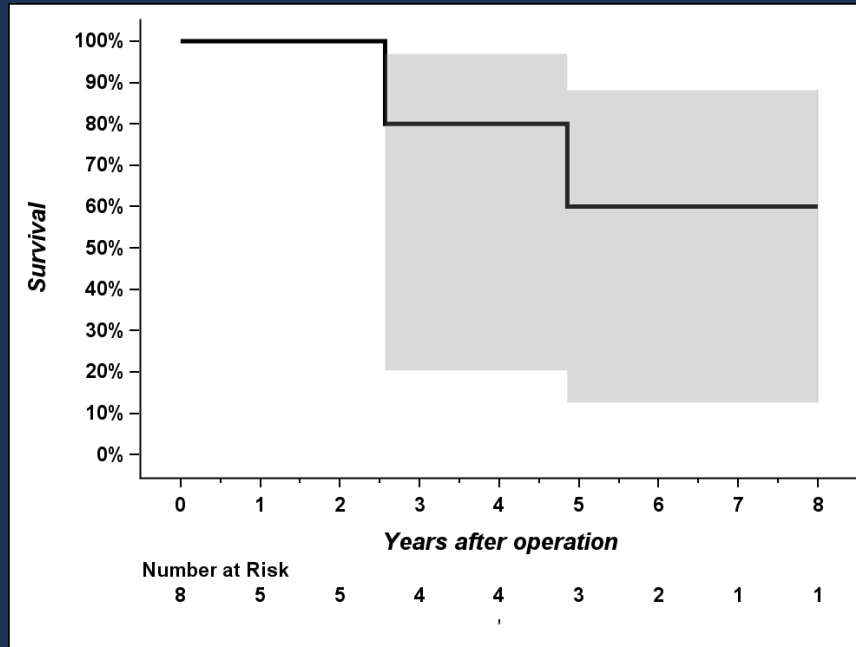
	N=8
Stroke/TIA	0
Seizure	1 (12.5)
Septicemia	0
DSWI	0
Pulmonary infection	1 (12.5)
De Novo AFib	2 (25.0)
Renal insufficiency	1 (12.5)
Reop for bleeding	0
Intubation > 48h*	1 (12.5)
Tracheostomy*	1 (12.5)
LOS in hospital (days)	7.6±5.3
In-Hospital mortality	0

Values are mean±STD or n(%).

AFib = atrial fibrillation; DSWI = deep sternal wound infection; LOS = length of stay in hospital; TIA = transient ischemic attack

* Tracheostomy required for bilateral recurrent nerve palsy, weaned after 4 days

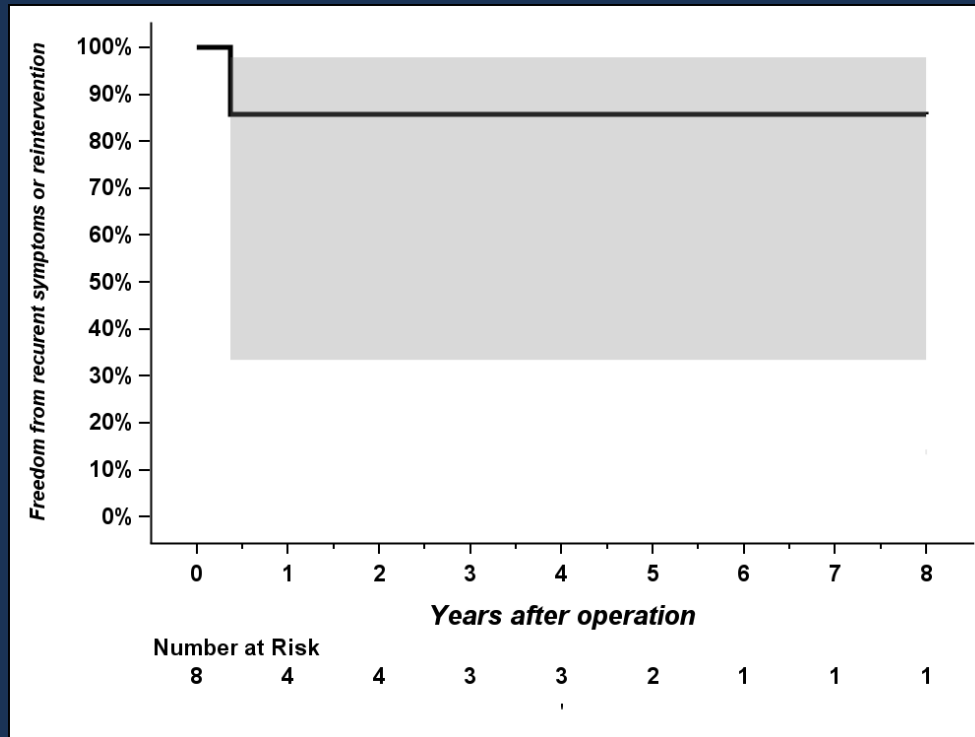
Survival (mean follow-up 3.6y±3.2)



1y : 100%, 3y : 80%, 5y: 80%

- Two non-vascular deaths:
 - 1st death 2.6 years post-op from pulmonary complications of lung cancer.
 - 2nd death 4.9 years post-op from ischemic cardiomyopathy.

Freedom from recurrent symptoms or reoperation

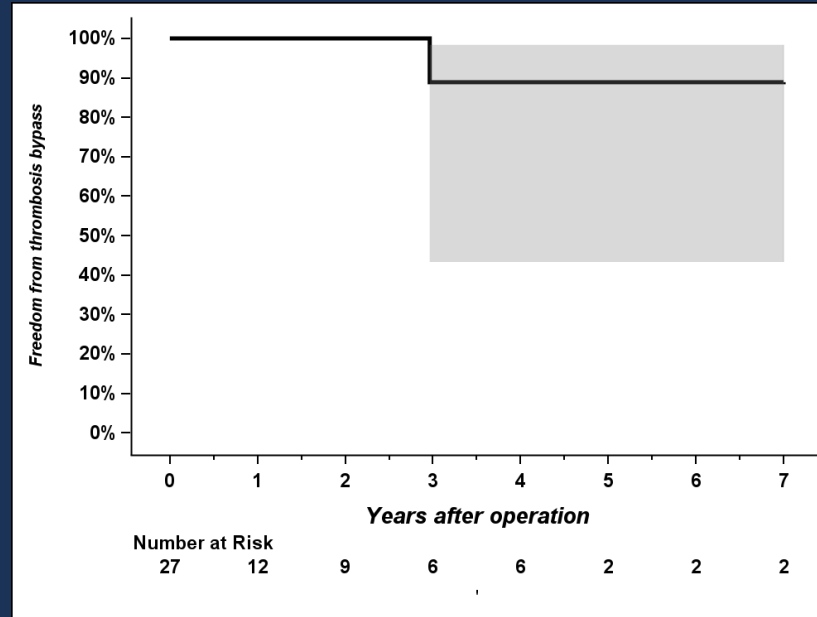


1y : 100%, 3y : 85,7%, 5y: 85,7%

- One patient required a planned additional extra-intracranial bypass 4 months post-op.

Bypass patency

Freedom from bypass thrombosis/stenosis



- One patient presented asymptomatic thrombosis of right carotid bypass 3 years post-op.

Conclusion

- Operative treatment of symptomatic multivessel arch branch ostial stenosis offers excellent symptom relief.
- Use of extra-anatomical aorto-axillary bypass is safe, enhances cerebral perfusion through the posterior circulation before revascularizing the carotid arteries.
- Mid-term outcome shows excellent clinical outcome with ongoing symptom relief and excellent graft patency.