Proper Management of Malperfusion in Acute Type A Aortic Dissection

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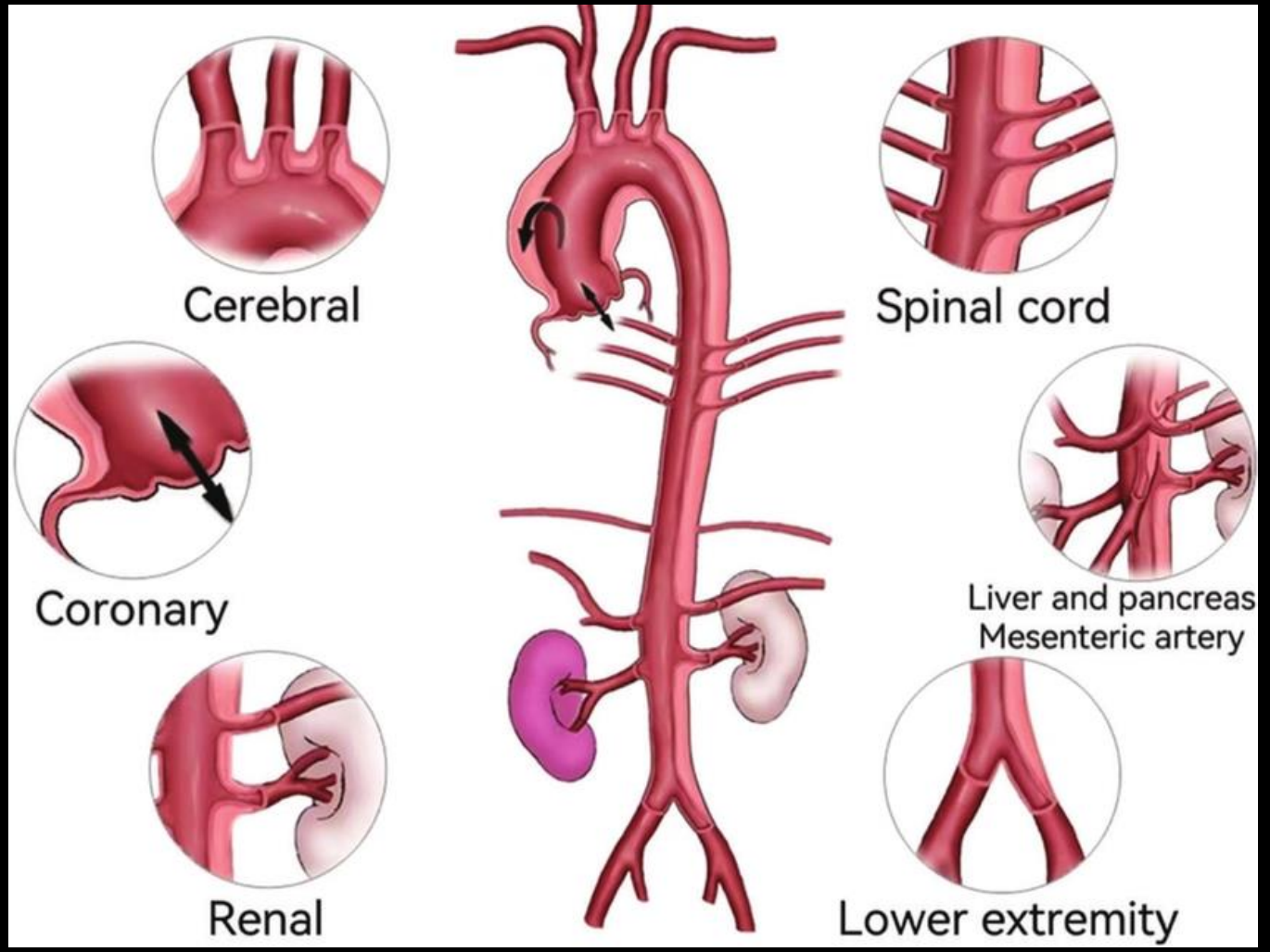
Malperfusion following AD

- Preoperative malperfusion 20-40%
- Signiant risk factor for the hospital death and stay



Incidence rate of malperfusion

Malperfusion Syndrome	Incidence Rate (%)	Mortality Rate (%)
Coronary	1.7-10	15-100 (according to involving vessels)
Cerebral	5-13.1	30-50
Spinal	2-5	Variable, high morbidity
Visceral	4-6	50-80
Limb	5-10	20-30

	Total (n = 2,137)	Pre-Operative Malperfusion (n = 717)	No Pre-Operative Malperfusion (n = 1,420)	p Value
Age, yrs	60.5 ± 13.6	59.7 ± 13.2	60.9 ± 13.8	0.064
Male	1,318	463 (65)	855 (60)	0.050
Aortic valve pathology				<0.001
Third-degree aortic valve regurgitation	344	142 (20)	202 (14)	
Fourth-degree aortic valve regurgitation	153	58 (8)	95 (7)	
Pre-operative neurological dysfunction				
Hemiparesis/hemiplegia	146 (7)	112 (16)	34 (2)	<0.001
Paraparesis/paraplegia	66 (3)	55 (8)	12 (1)	<0.001
Aphasia	36 (2)	27 (4)	9 (1)	<0.001
Coma	237 (11)	143 (20)	94 (7)	<0.001
Type of pre-operative malperfusion				
Coronary	205 (10)	–	–	
Cerebral	236 (11)	–	–	
Spinal	44 (2)	–	–	
Visceral	124 (6)	–	–	
Renal	185 (9)	–	–	
Peripheral	270 (13)	–	–	

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The Impact of Pre-Operative Malperfusion on Outcome in Acute Type A Aortic Dissection

Results From the GERAADA Registry

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TABLE 2 Survival per Number of Pre-Operative Malperfused Organ Systems

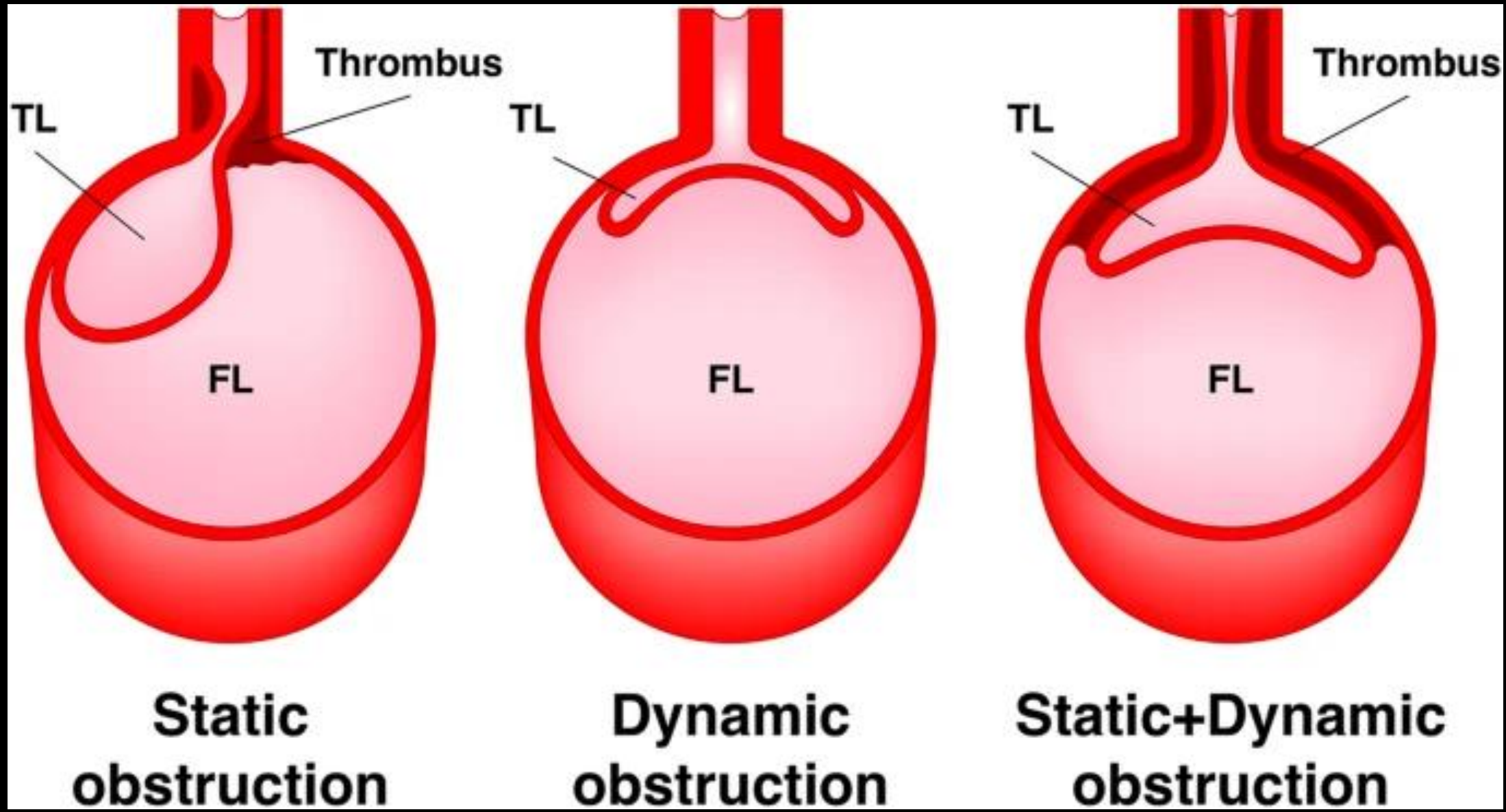
Malperfused Organ Systems	Total	Survivors	Dead	Percent Dead per Group
None	1,420 (66.4)	1,241 (58.1)	179 (8.4)	12.6
1	494 (23.1)	389 (18.2)	105 (4.9)	21.3
2	139 (6.5)	96 (4.5)	43 (2.0)	30.9
3	53 (2.5)	30 (1.7)	23 (1.1)	43.4

Values are n (%).

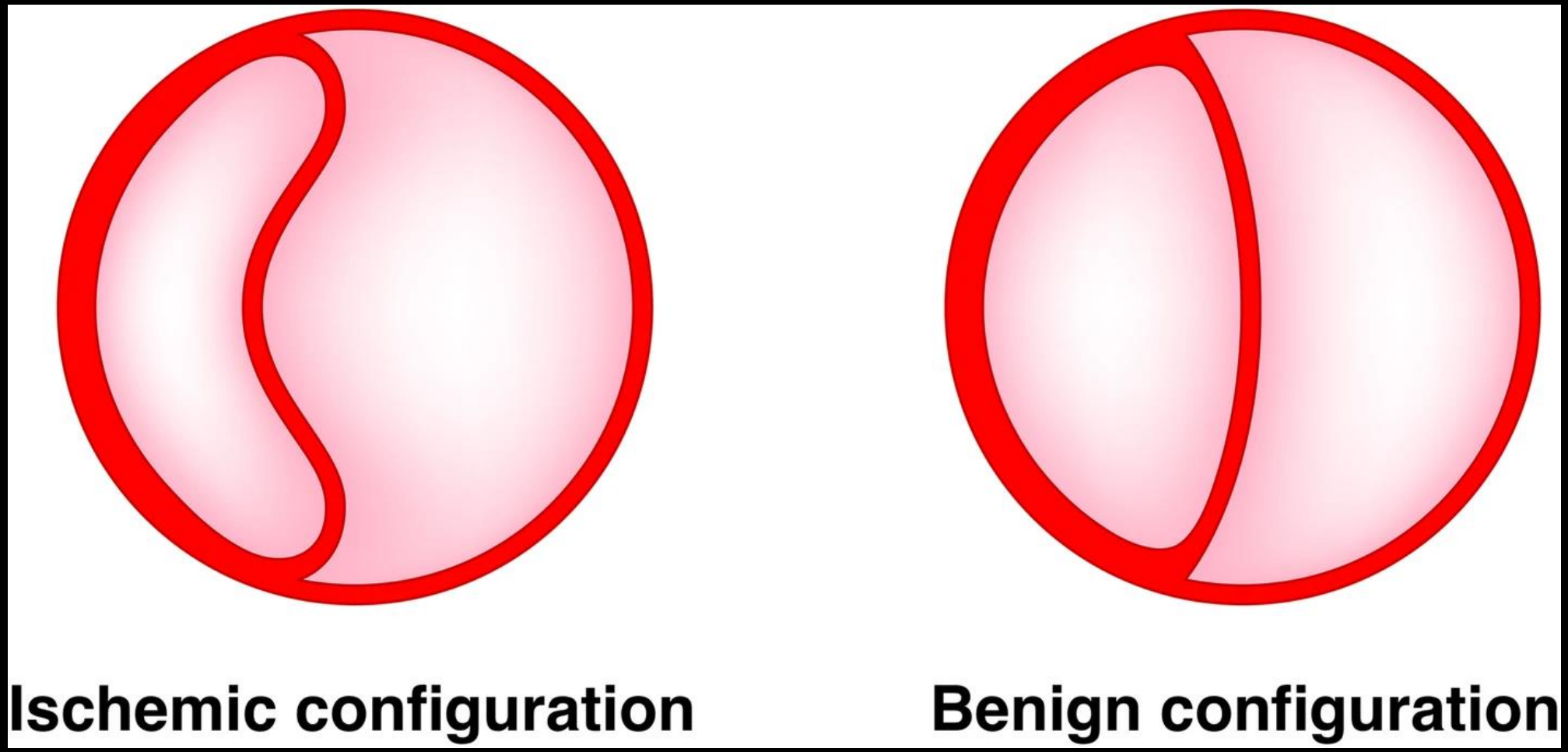
Czer
Impact of Pre-Operative Malperfusion on Outcome in Acute Type A Aortic Dissection: Results From the GERAADA Registry. J Am Coll Cardiol. 2015;65(24):2628-35.

Cause of Malperfusion

Cause	Mechanism	Impact
Branch Vessel Obstruction	Dissection flap extends into branch vessels, obstructing blood flow	Reduced perfusion to downstream organs/tissues
Dynamic Obstruction	False lumen expands, compressing true lumen; varies with cardiac cycle	Intermittent or persistent blood flow obstruction
Static Obstruction	Fixed compression or occlusion of branch vessels by dissection flap/thrombus	Continuous impairment of blood flow
Re-entry Tears	Secondary tears allow blood to re-enter the true lumen, altering flow dynamics	Unstable hemodynamics
Thrombus Formation	Thrombus forms within false lumen, extending into branch vessels	Ischemia of organs/tissues supplied by affected vessels



Kaji S. Acute medical management of aortic dissection. Gen Thorac Cardiovasc Surg. 2019;67(2):203-7.



Kaji S. Acute medical management of aortic dissection. Gen Thorac Cardiovasc Surg. 2019;67(2):203-7.

Proper management

- Endovascular Techniques: Stenting, fenestration
- Surgical Techniques: Bypass, reimplantation of branch vessels
- Hybrid Techniques: Combination of surgical and endovascular approaches

Coronary Malperfusion

- Diagnosis can be made if one or more of the following items occur:

1. electrocardiography showing ST-segment elevation;

2. echocardiography revealing motion abnormalities of the ventricular wall;

3. laboratory examination indicating myocardial ischemia (CK-MB, troponin);

4. imaging of the aortic CTA indicating no/low contrast filling in the coronary artery.

- PCI, CABG, root reimplantation

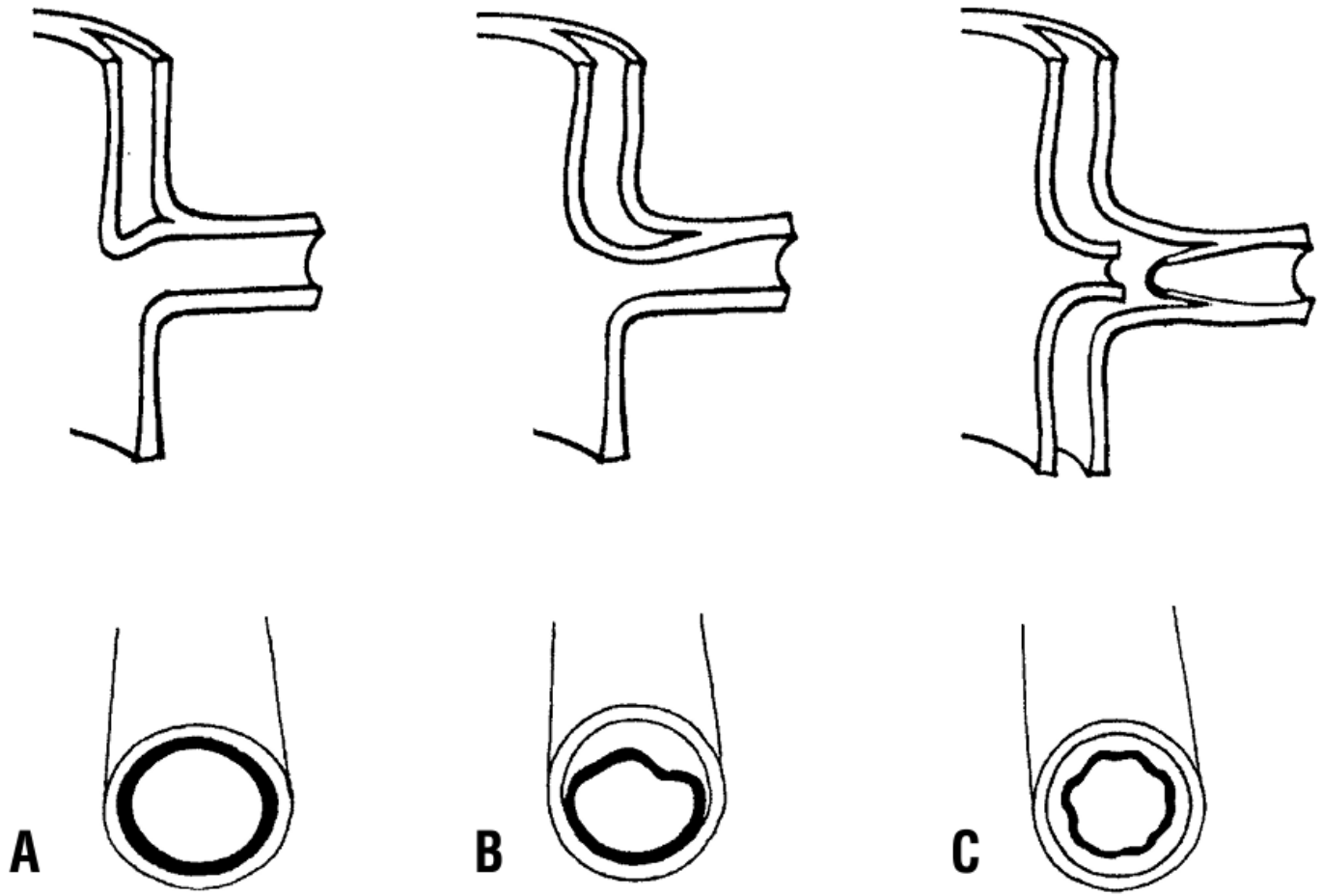


Fig 1. Three main types of coronary lesion due to proximal dissection: type A, ostial dissection **(A);** type B, dissection with a coronary false channel **(B);** type C, circumferential detachment with an inner cylinder intussusception **(C).**

Neri E, Toscano T, Papalia U, Frati G, Massetti M, Capannini G, et al. Proximal aortic dissection with coronary malperfusion: Presentation, management, and outcome. The Journal of Thoracic and Cardiovascular Surgery. 2001;121(3):552-60.

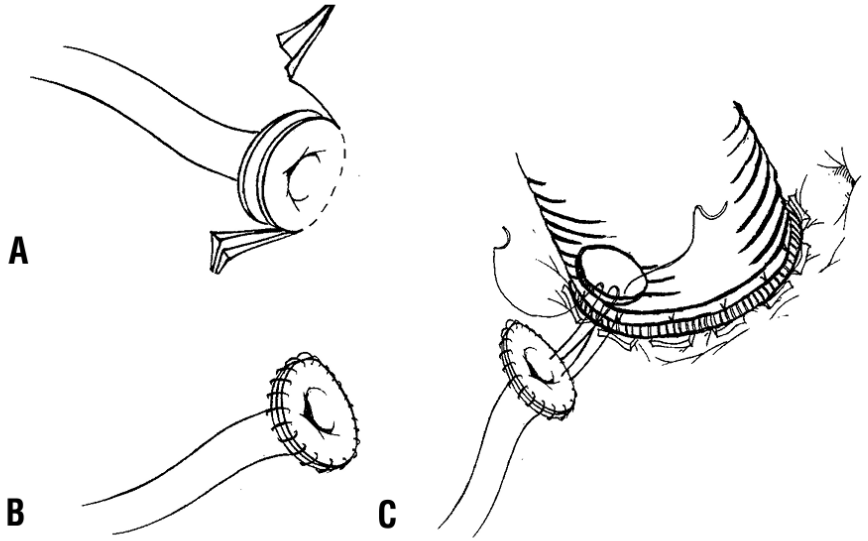


Fig 2. When the dissection reaches the ostium, without disrupting the coronary vessel (type A), the coronary ostium is excised in button form, with a 4-mm margin of the surrounding aortic wall **(A).** The dissected layers around the ostium are then conjoined with gelatin-resorcin-formalin glue and an over-and-over 6-0 suture **(B).** The ostial button then is anastomosed to the tube graft without torsion or tension **(C).**

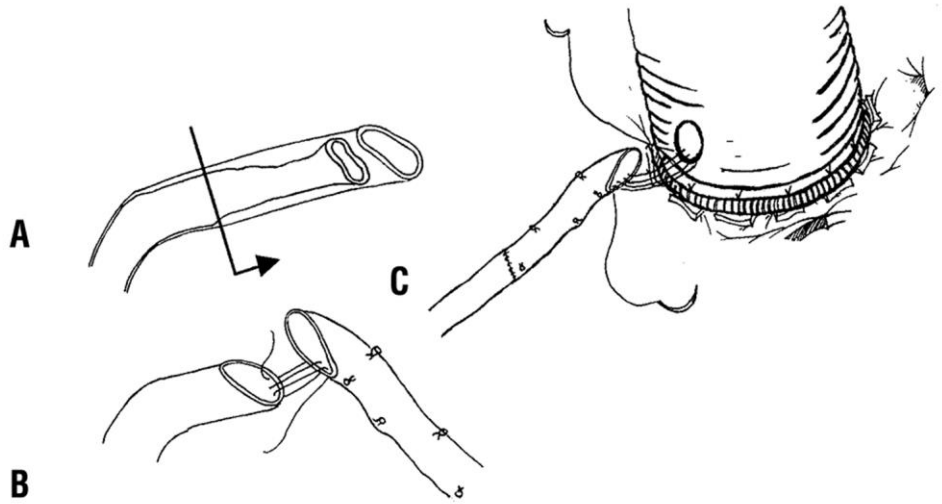


Fig 4. In the presence of coronary intussusception (type C), the coronary artery is transected in a nondiseased zone **(A)** and saphenous vein reconstruction of the vessel is performed with an end-to-end anastomosis **(B).** The repaired artery is then anastomosed to the aortic graft **(C).**

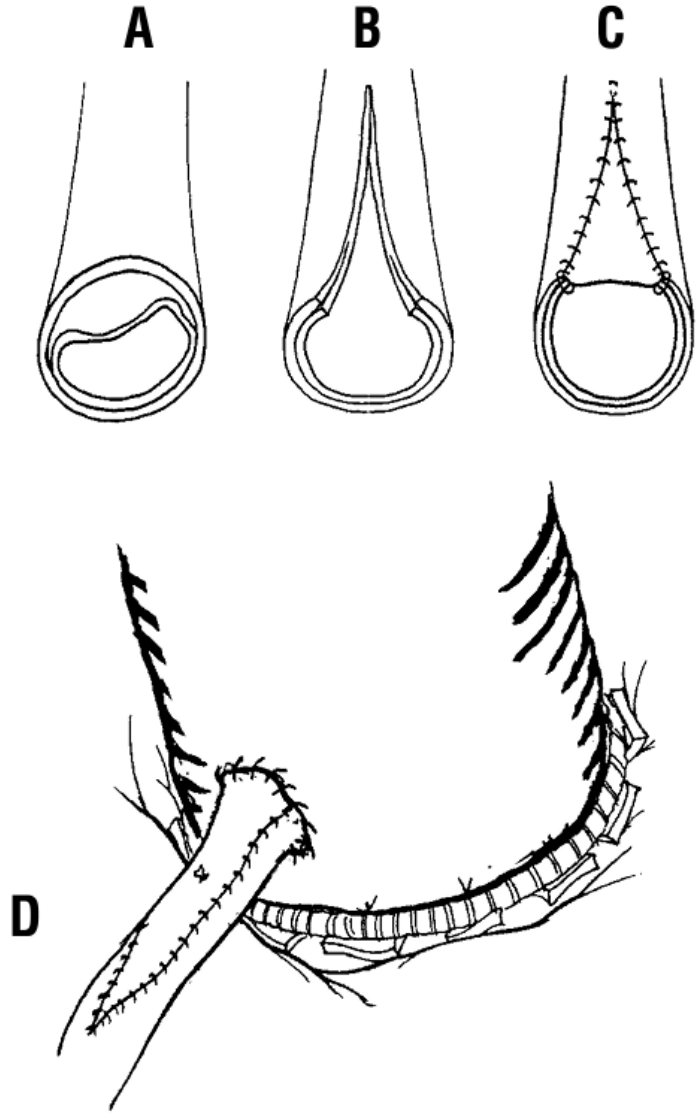


Fig 3. In the event of type B lesions **(A),** the coronary artery is incised longitudinally **(B)** and patch repair is performed with a continuous 7-0 polypropylene suture conjoining the dissected arterial layers and the patch **(C).** The repaired artery is then anastomosed to the aortic graft **(D).**

PCI role in type A AD

European Journal of Cardio-Thoracic Surgery 44 (2013) 419–425
doi:10.1093/ejcts/ezt060 Advance Access publication 15 March 2013

ORIGINAL ARTICLE

Risk analysis and improvement of strategies in patients who have acute type A aortic dissection with coronary artery dissection†

Kiyotaka Imoto[a,*], Keiji Uchida[a], Norihisa Karube[a], Toru Yasutsune[a], Tonoki Cho[a], Kazuo Kimura[b], Munetaka Masuda[c] and Satoshi Morita[d]

- LCA dissection with ischemia – consider PCI (high mortality of LCA dissection with ischemia)

artery reconstruction
OS in patients with

Procedure	Postoperative LOS	*P*-value[a]
Coronary artery stent	1/7 (14.3)	0.042
CABG	13/23 (61.9)	
Biological glue	3/13 (23.1)	
Aortic-root reconstruction	3/5 (60.0)	

Values are number of patients (%). LOS: low cardiac output syndrome; CABG: coronary artery bypass grafting.
[a]Fisher's exact test.

Cerebral Malperfusion

- Diagnosis can be made if one of the following items occurs:

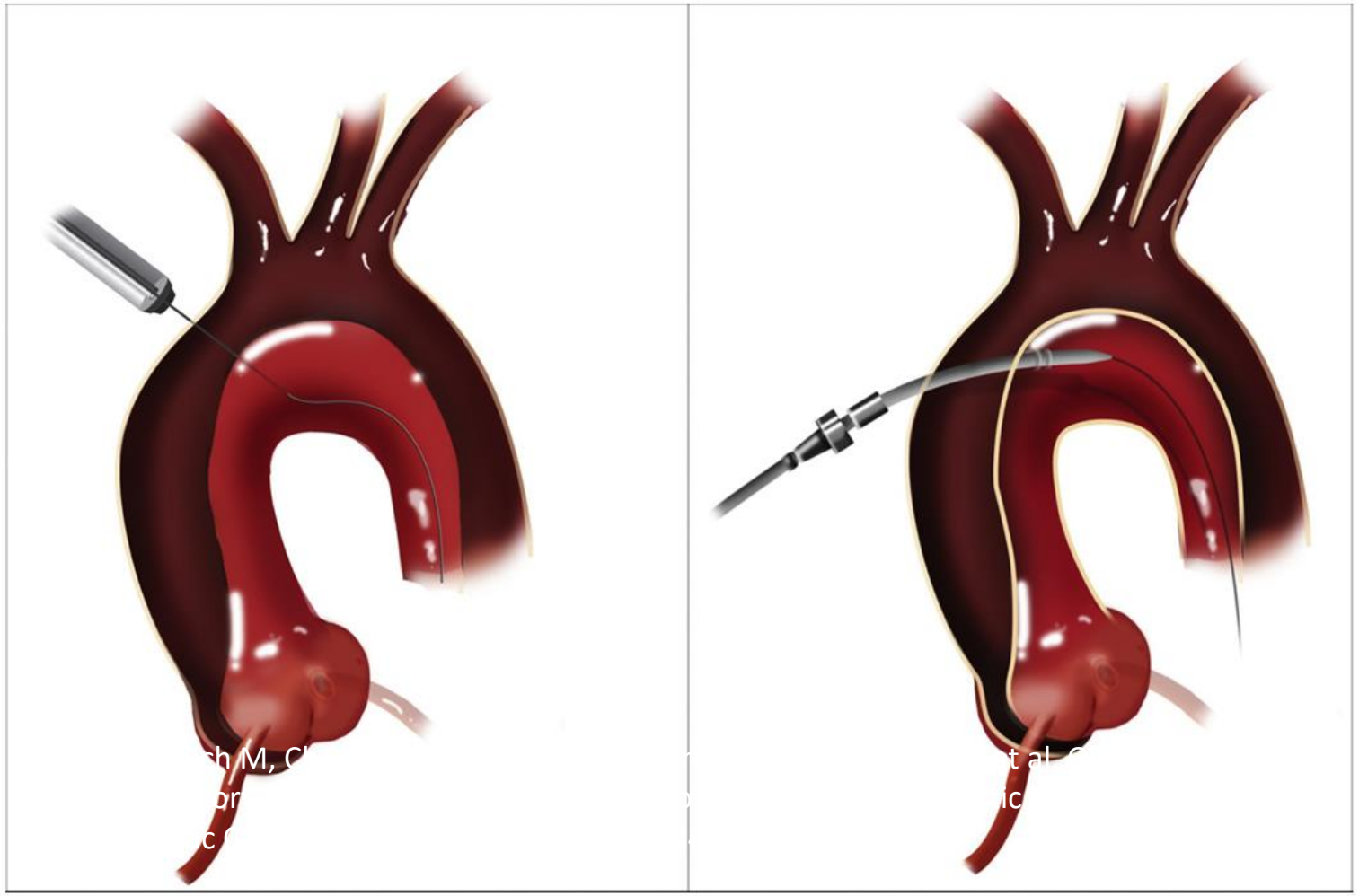
1. somnolence, coma, disorders of consciousness, other symptoms, or physical examination indicating hemiplegia or other positive signs;

2. aortic CTA indicating no/low contrast filling in the left common carotid artery or innominate artery

- Interventions: Carotid stenting, fast reperfusion, aortic arch repair

Outcome after aortic, axillary, or femoral cannulation for acute type A aortic dissection

M
C
W



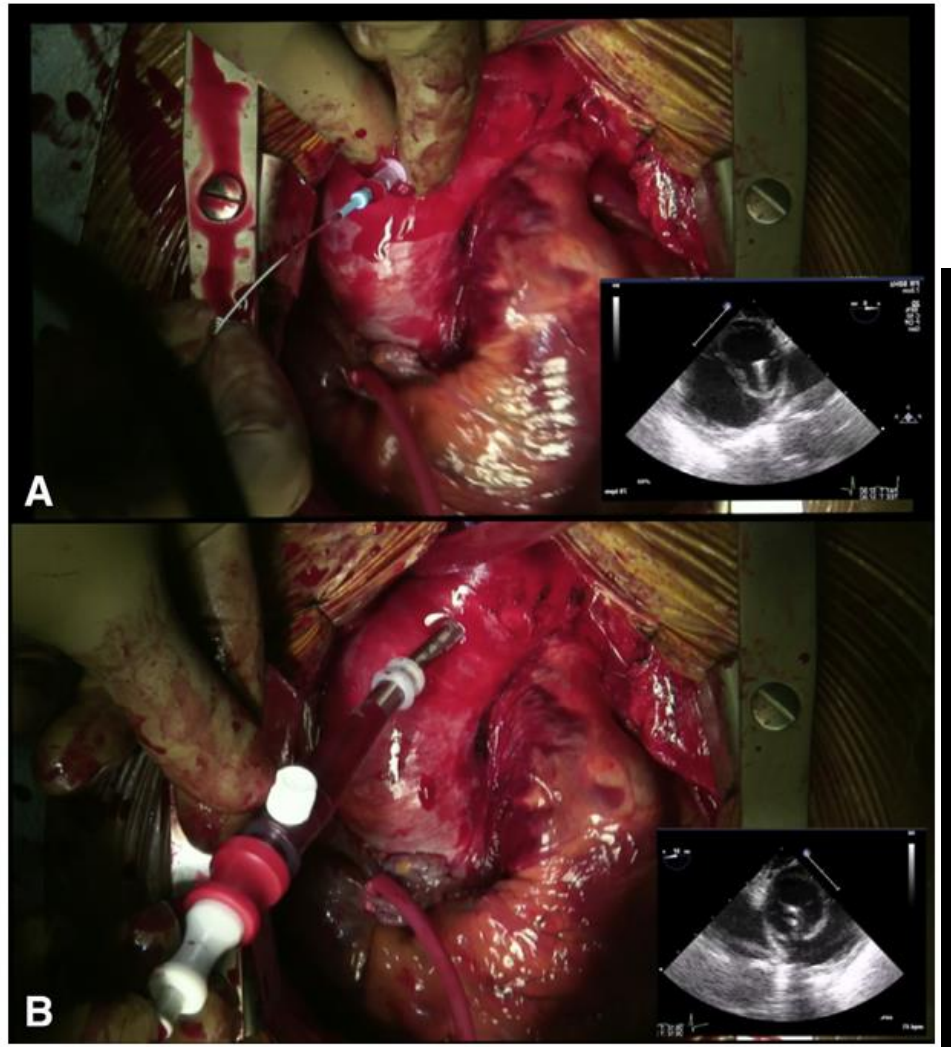


TABLE 3. Operative details of the study population after inverse probability weighting

	Cannulation group			
	Aortic ESS = 346	**Axillary ESS = 94.68**	**Femoral ESS = 119.7**	***P* value**
Operative times				
Skin incision time, minutes	316 (264-378)	379 (310-460)	323 (283-403)	**<.001**
Operative non-CPB time, minutes*	116 (88-150)	173 (137-218)	116 (90-156)	**<.001**
CPB, minutes	198 (167-238)	212 (176-252)	212 (181-254)	**.022**
CX, minutes	125 (103-160)	131 (105-173)	148 (112-179)	**.021**
HCA time, minutes	32 (25-42)	36 (27-49)	35 (28-55)	**.0497**
With RCP	414 (74)	151 (29)	473 (90)	**<.001**
With ACP	100 (18)	328 (62)	17 (3)	**<.001**
With both RCP and ACP	38 (7)	48 (9)	29 (6)	.493
Proximal repair				
Aortic valve resuspension†	466 (83)	425 (81)	424 (81)	.810
Aortic root replacement	72 (13)	76 (14)	77 (15)	.870
Wheat procedure‡	12 (2)	22 (4)	9 (2)	.405
V-SARR	10 (2)	4 (1)	13 (3)	.471
Distal repair				
Isolated ascending replacement	6 (1)	5 (1)	8 (2)	.801
Hemiarch replacement	502 (90)	362 (69)	481 (92)	**<.001**
Total arch replacement	52 (9)	161 (31)	34 (6)	**<.001**

European Journal of Cardio-Thoracic Surgery 49 (2016) 1282–1284
doi:10.1093/ejcts/ezv175 Advance Access publication 23 May 2015

CASE REPORT

Cite this article as: Okita Y, Matsumori M, Kano H. Direct reperfusion of the right common carotid artery prior to cardiopulmonary bypass in patients with brain malperfusion complicated with acute aortic dissection. Eur J Cardiothorac Surg 2016;49:1282–4.

Direct reperfusion of the right common carotid artery prior to cardiopulmonary bypass in patients with brain malperfusion complicated with acute aortic dissection

Yutaka Okita*, Masamichi Matsumori and Hiroya Kano

Table 1: Patient list

No.	Age	Sex	Glasgow coma scale	Onset (h)	Neurological Sx	Rt ICA echo	Site	Flow (ml/min)	Surgery	Brain protection	Outcome	Neuro. Cx
1	72	Female	6/15	20	lt hemiplegia	Stenosis	ER	90	Hemiarch	ACP	Survived	Hemiparesis
2	64	Female	5/15	5	lt hemiplegia	Occlusion	ICU	90	Hemiarch	ACP	Survived	Normal
3	69	Male	5/15	5	lt hemiplegia	Stenosis	OR	80	Hemiarch	ACP	Survived	Normal

ACP: antegrade cerebral perfusion; ER: emergency room; ICA: internal carotid artery; ICU: intensive care unit; lt: left; Neuro. Cx: neurological complications; OR: operating room; rt: right; Sx: signs.

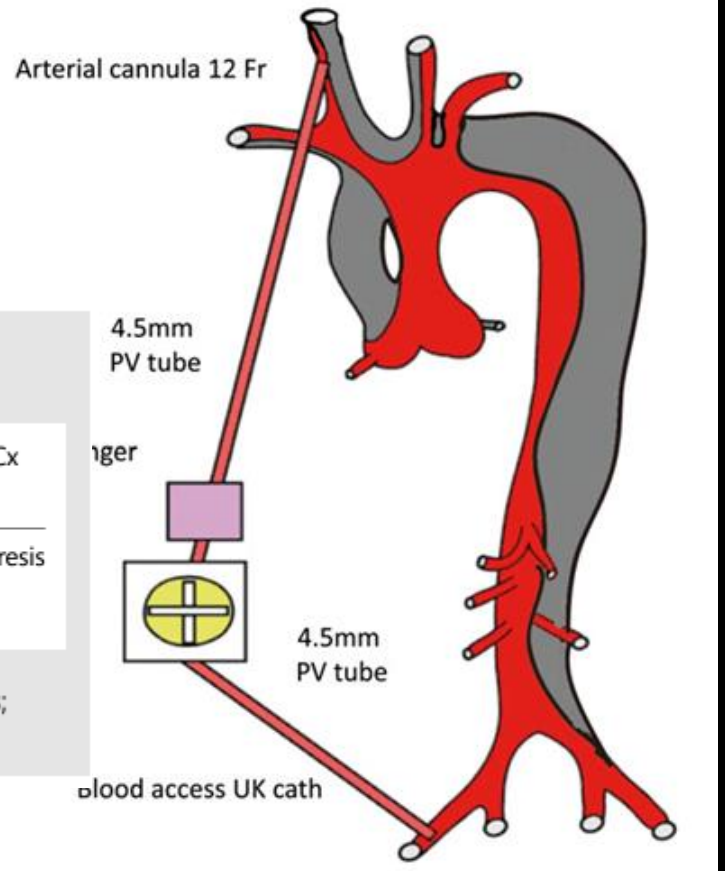


Figure 1: The circuit from the right femoral artery to the right common carotid artery.

Does Coma Is Contraindication For Surgery?

Patients with type A acute aortic dissection presenting with major brain injury: Should we operate on them?

Marco Di Eusanio, MD, PhD,[a] Himanshu J. Patel, MD,[b] Christoph A. Nienaber, MD, FACC, FESC,[c] Daniel M. Montgomery, BS,[b] Amit Korach, MD,[d] Thoralf M. Sundt, MD,[e] Carlo DeVincentiis, MD,[f] Matthias Voehringer, MD,[g] Mark D. Peterson, MD, PhD,[h] Truls Myrmel, MD, PhD,[i] Gianluca Folesani, MD,[a] Magnus Larsen, MD,[i] Nimesh D. Desai, MD,[j] Joseph E. Bavaria, MD,[j] Jehangir J. Appoo, MD,[k] Teresa M. Kieser, MD,[k] Rossella Fattori, MD,[a] Kim Eagle, MD,[b] Roberto Di Bartolomeo, MD,[a] and Santi Trimarchi, MD[f]

TABLE 5. Overall in-hospital mortality and complications for patients with type A acute dissection patients with and without major brain injury

Result	No brain injury	CVA	Coma	*P* value
Discharged home	1141 (74.8%)	38 (54.3%)	17 (39.5%)	<.001
Mortality	394 (22.7%)	35 (40.2%)	34 (63.0%)	<.001
CVA	177 (8.1%)	16 (26.7%)	3 (9.4%)	<.001
Coma	44 (3.0%)	3 (5.0%)	7 (21.9%)	<.001
Spinal cord injury	55 (3.4%)	4 (5.4%)	2 (4.1%)	.479
Myocardial infarction/ ischemia	231 (13.9%)	14 (17.7%)	17 (32.1%)	.001
Acute renal failure	362 (21.9%)	19 (24.1%)	17 (32.7%)	.168
Limb ischemia	166 (10.1%)	15 (19.0%)	10 (19.2%)	.006
Cardiac tamponade	289 (17.5%)	16 (20.3%)	14 (26.9%)	.189

Data presented as n (%). *CVA*, Cerebrovascular accident.

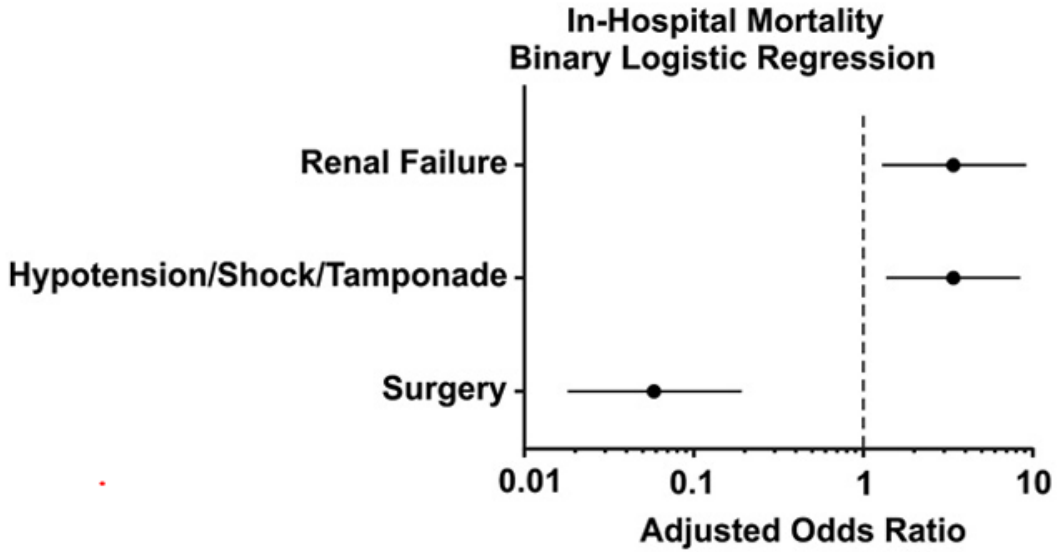


FIGURE 1. On binary logistic regression analysis, surgery was protective against mortality in patients with preoperative brain injury (cerebrovascular accident or coma; odds ratio, 0.058; 95% confidence interval, 0.018-0.192; $P < .001$), but hypotension/shock/tamponade (odds ratio, 3.4; 95% confidence interval, 1.365-8.415; $P = .009$) and renal failure (odds ratio, 3.4; 95% confidence interval, 1.292-9.159; $P = .013$) were independent risk factors for reduced hospital survival.

Management

- Fast time to CPB
- Restoring cerebral perfusion : central cannulation, carotid stenting
- Aggressive replacement for dissected arteries over aortic arch
- Continuous perfusion to cerebral arteries
- Do Not Hesitate to Perform Surgery in Patients with CVA

Spinal Cord Malperfusion

- Spinal cord injury can be diagnosed if the patient presents with paraplegia or paresis.

- CSF drainage

Spinal Cord Ischemia Secondary to Aortic Dissection: Case Report with Literature Review for Different Clinical Presentations, Risk Factors, Radiological Findings, Therapeutic Modalities, and Outcome

Table 5. Outcome of the cases in relation to clinical presentation, radiological findings and therapeutic modality

Parameters	The studied patients $N = 67$			p value
	walk $N = 34$	plegic $N = 11$	death $N = 21$	
Bladder, n (%)				0.89
N/A	2 (5.88)	0 (0.0)	1 (9.5)	
Yes	8 (23.52)	3 (27.3)	6 (23.8)	
No	24 (70.58)	8 (72.7)	14 (66.7)	
Symmetry, n (%)				0.09
Symmetrical	25 (73.5)	10 (90.9)	20 (95.2)	
Asymmetrical	9 (26.5)	1 (9.1)	1 (4.8)	
Affected artery, n (%)				0.40
N/A	19 (55.8)	4 (36.4)	12 (57.1)	
Anterior spinal	2 (5.8)	0 (0.0)	5 (23.8)	
Adamkiewicz	6 (17.6)	5 (45.5)	3 (14.3)	
Anterior and posterior spinal	2 (5.8)	0 (0.0)	1 (4.8)	
Femoral arteries	1 (2.9)	1 (9.1)	0 (0.0)	
Iliac arteries	1 (2.9)	0 (0.0)	0 (0.0)	
Sulcal arteries	1 (2.9)	0 (0.0)	0 (0.0)	
Feeding arteries of cauda equine	1 (2.9)	0 (0.0)	0 (0.0)	
Renal and iliac arteries	1 (2.9)	1 (9.1)	0 (0.0)	
Stanford AD type, n (%)				0.70
N/A	2 (5.8)	1 (9.1)	1 (4.8)	
A	13 (38.2)	6 (54.5)	12 (57.1)	
B	19 (53)	4 (36.4)	8 (38.1)	
Duration, n (%)				0.40
Transient	5 (14.7)	0 (0.0)	2 (9.5)	
Permanent	29 (85.3)	11 (100)	19 (90.5)	

Elshony H, Idris A, Ahmed A, Almaghrabi M, Ahmed V
S. Spinal Cord Ischemia Secondary to Aortic Dissectio
Report with Literature Review for Different Clinical
Presentations, Risk Factors, Radiological Findings, Th
Modalities, and Outcome. Case Rep Neurol. 2021;13(3):634-55.

Mesentery Malperfusion

- Diagnosis can be made if one of the first two of the following items occur, with or without the last two items:

1. aortic CTA indicating intestinal dilatation or mesenteric exudation;
2. aortic CTA indicating filling with no/low contrast in the superior mesenteric artery;
3. abdominal pain, abdominal distension, bloody stools, or other symptoms, or physical examination indicating abdominal tenderness, plate-shaped abdomen, and other positive signs;
4. laboratory examinations indicating hyperlactatemia

- Mesenteric revascularization, stenting

Clinical presentation, management, and short-term outcome of patients with type A acute dissection complicated by mesenteric malperfusion: Observations from the International Registry of Acute Aortic Dissection

Marco Di Eusanio, MD, PhD,[a] Santi Trimarchi, MD,[b] Himanshu J. Patel, MD,[c]

Di Eusanio M, Trimarchi S, Patel HJ, Hutchison S, Suzuki T, Peterson MD, et al. Clinical presentation, management, and short-term outcome of patients with type A acute dissection complicated by mesenteric malperfusion: Observations from the International Registry of Acute Aortic Dissection. The Journal of Thoracic and Cardiovascular Surgery. 2013;145(2):385-90.e1.

TABLE 1. Demographics and history of patients with and without mesenteric malperfusion

Variable	Mesenteric malperfusion (n = 68)	No mesenteric malperfusion (n = 1741)	*P* value
Age, mean (±SD), y	61.8 ± 14.4	57.9 ± 14.4	.028
Male (%)	47/68 (69.1)	1171/1741 (67.3)	.749
White (%)	54/62 (87.1)	1461/1629 (89.7)	.512
Atherosclerosis (%)	16/66 (24.2)	377/1676 (22.5)	.739
Diabetes (%)	3/66 (4.5)	96/1669 (5.8)	.796
Hypertension (%)	47/66 (71.2)	1208/1693 (71.4)	.980
Aortic valve disease (AS + AR) (%)	8/65 (12.3)	63/1672 (12.1)	.956
Bicuspid aortic valve (%)	3/53 (5.7)	202/1669 (12.1)	.668
Marfan (%)	2/66 (3.0)	74/1687 (4.4)	.767
Peripartum (%)	—	4/1653 (0.2)	1.000
Cocaine abuse (%)	—	19/1656 (1.1)	.643
Known aortic aneurysm (%)	5/66 (7.6)	210/1683 (12.5)	.260
Prior aortic dissection (%)	—	72/1684 (4.3)	.110
Iatrogenic dissection (%)	2/65 (3.1)	55/1665 (3.3)	1.000
Prior cardiac surgery (%)	15/65 (23.1)	245/1660 (14.8)	.066
History of catheterization/angiography	9/53 (17.0)	155/1390 (11.2)	.189

SD, Standard deviation; *AS*, aortic stenosis; *AR*, aortic regurgitation.

TABLE 4. Therapeutic strategies for patients with and without mesenteric malperfusion

Therapeutic strategies	Mesenteric malperfusion (n = 68)	No mesenteric malperfusion (n = 1741)	*P* value
Surgical/Hybrid (%)	36/68 (52.9)	1531/1741 (87.9)	<.001
Open surgery + aortic fenestration (%)	0/4 (0.0)	1/14 (7.1)	1.000
Open surgery + aortic stenting (%)	2/4 (50.0)	12/14 (85.7)	.197
Open surgery + aortic stenting and fenestration	2/4 (50.0)	1/14 (7.1)	.108
Endovascular (%)	11/68 (16.2)	8/1741 (0.5)	<.001
Aortic fenestration (%)	2/11 (18.2)	2/8 (25.0)	1.000
Aortic stenting (%)	2/11 (18.2)	2/8 (25.0)	1.000
Aortic stenting and fenestration (%)	7/11 (63.6)	4/8 (50.0)	.658
Exclusively medical (%)	21/68 (30.9)	202/1741 (11.6)	<.001

TABLE 5. In-hospital mortality and complications for patients with type A acute dissection with and without mesenteric malperfusion

	Mesenteric malperfusion (n = 68)	No mesenteric malperfusion (n = 1741)	*P* value
Mortality (%)	43/68 (63.2)	414/1741 (23.8)	<.001
Major brain injury (coma + stroke) (%)	5/42 (11.9)	129/1532 (8.4)	.575
Spinal cord injury (%)	1/45 (2.2)	13/1551 (0.8)	.331
Myocardial infarction/ischemia (%)	4/59 (6.8)	96/1689 (5.7)	.772
Acute renal failure (%)	20/45 (44.4)	286/1701 (16.8)	<.001
Limb ischemia (%)	5/52 (9.6)	52/1695 (3.1)	.025
Cardiac tamponade (%)	5/57 (8.8)	91/1659 (5.5)	.370

Surgical/hybridmanagement (OR,0.1;95%CI,0.028-0.539;P=.005)

Limb Malperfusion

- Diagnosis can be made if the first item occurs, with or without the addition of the last items:

1. clinical manifestations: unilateral or bilateral lower extremity paresthesia, weakness accompanied by the corresponding lateral extremity pulseless, pallor, low skin temperature;

2. laboratory tests suggested myoglobin was elevated; 3. imaging for aortic CTA: no/low contrast filling in the lumen of iliac artery or external iliac artery or femoral artery

- Vascular surgery, intervention

Lower-extremity malperfusion syndrome in patients undergoing proximal aortic surgery for acute type A aortic dissection

Irs nhui Zhu, MS, PhD,[b]
Jos

Lower Extremity Malperfusion Syndrome in Patients Undergoing Proximal Aortic Surgery for Acute Type A Aortic Dissection (TAAD)

January 2007 to December 2021

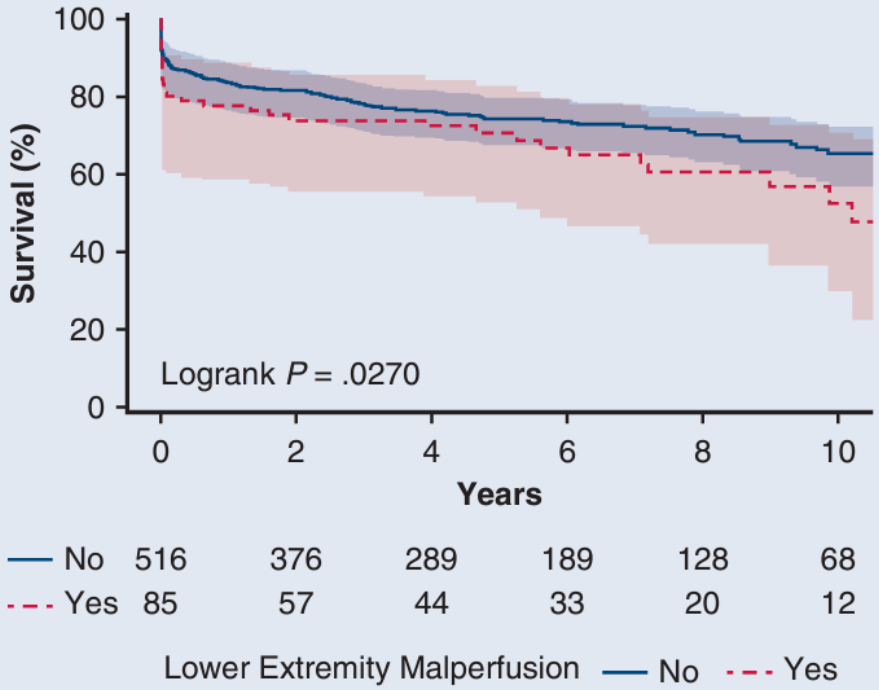
601 patients undergoing proximal TAAD repair

No lower extremity malperfusion, n = 516

Lower extremity malperfusion, n = 85

No revascularization, n = 70

Revascularization, n = 15

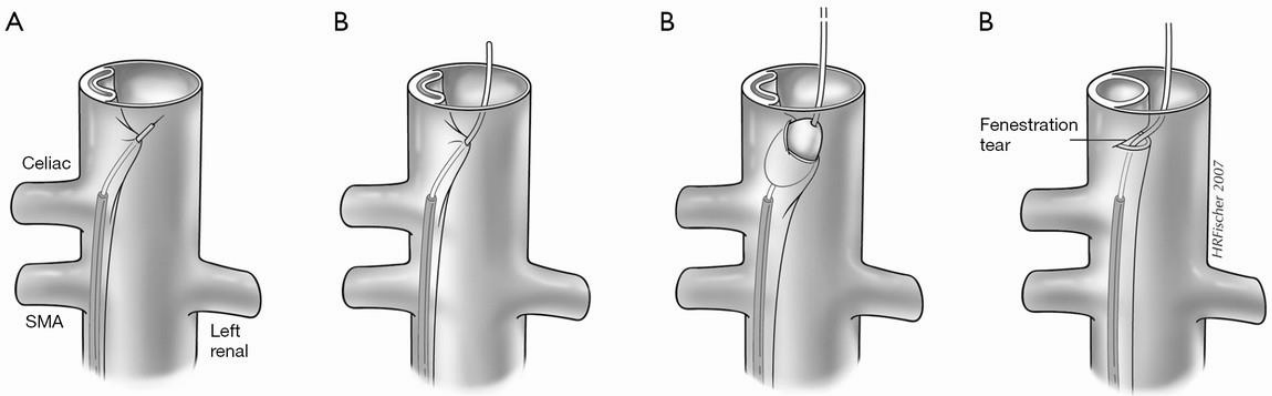


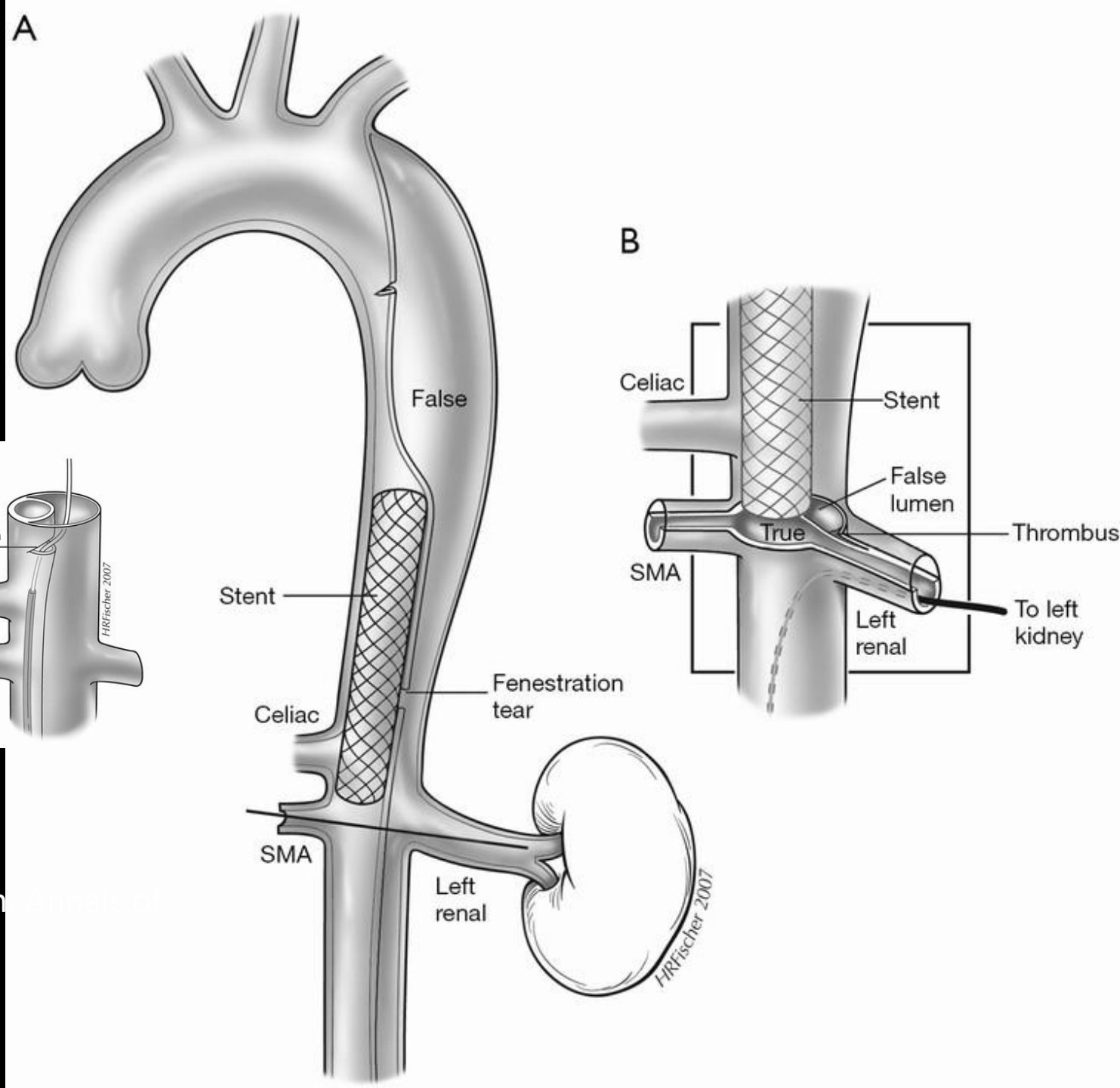
Kaplan-Meier estimates of survival

- TAAD with lower extremity malperfusion have worse survival compared to no malperfusion
- Careful patient selection for revascularization can lead to limb salvage without additional amputation rates

Hasan I, Brown JA, Serna-Gallegos D, Zhu J, Garvey J, Yousef S, et al. Lower-extremity malperfusion syndrome in patients undergoing proximal aortic surgery for acute type A aortic dissection. JTCVS Open. 2023;15:1-13.

Interventional treatment





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ORIGINAL RESEARCH ARTICLE

Endovascular Fenestration/Stenting First Followed by Delayed Open Aortic Repair for Acute Type A Aortic Dissection With Malperfusion Syndrome

Editorial, see p 2104

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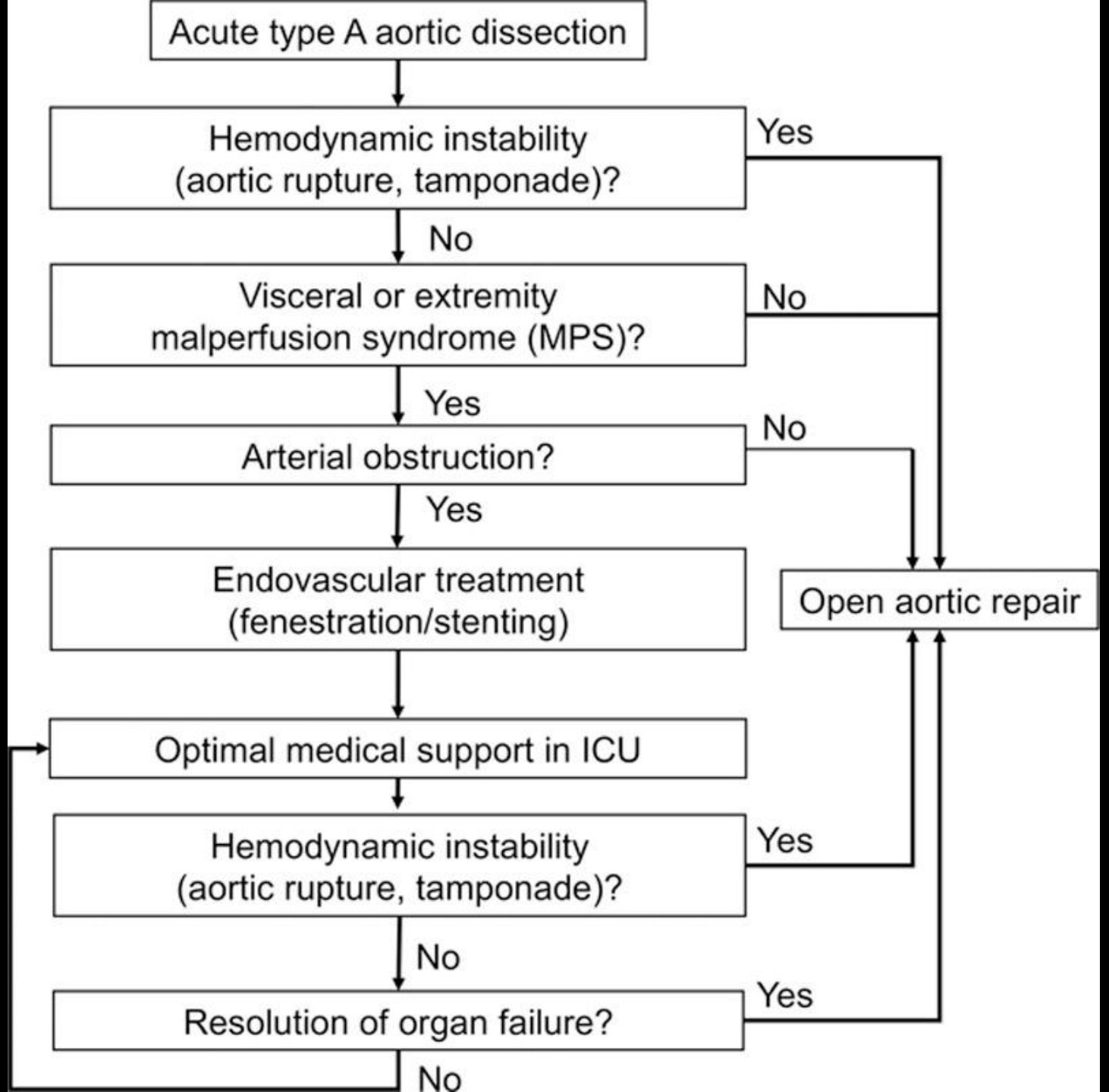

Acute type A aortic dissection
Hemodynamic instability (aortic rupture, tamponade)?
Yes
No
Visceral or extremity malperfusion syndrome (MPS)?
No
Yes
Arterial obstruction?
No
Yes
Endovascular treatment (fenestration/stenting)
Open aortic repair
Optimal medical support in ICU
Hemodynamic instability (aortic rupture, tamponade)?
Yes
No
Resolution of organ failure?
Yes
No

Table. General Differences and Initial Management of All Patients

Variable	Both Decades (n=597)	First Decade (n=243)	Second Decade (n=354)	*P* Value (First vs Second Decade)
Patients with acute type A aortic dissection/y	26 (range: 12–59)	17 (range: 12–46)	41 (range: 26–59)	0.004
All patients with malperfusion syndrome, any type	178 (30)	93 (38)	85 (24)	<0.001
Type of malperfusion syndrome				0.003
Coronary	17 (2.8)	5 (2.1)	12 (3.4)	
Cerebral	31 (5.2)	9 (3.7)	22 (6.2)	
Spinal	15 (2.5)	7 (2.9)	8 (2.3)	
Celiac/hepatic	16 (2.7)	11 (4.5)	5 (1.4)	
Mesenteric	82 (14)	52 (21)	30 (8.5)	
Renal	74 (12)	47 (19)	27 (7.6)	
Lower extremity	78 (13)	48 (20)	30 (8.5)	
Upper extremity	1 (0.2)	0 (0)	1 (0.3)	
Interventional radiology–amenable malperfusion syndrome	135 (23)	86 (35)	49 (14)	<0.001

Type of interventional radiology–amenable malperfusion syndrome				0.94
Celiac/hepatic	16 (12)	11 (13)	5 (10)	
Mesenteric	82 (61)	52 (60)	30 (61)	
Renal	74 (55)	47 (55)	27 (55)	
Extremity	79 (59)	48 (56)	31 (63)	
Patients who underwent interventional radiology	135 (23)	86 (35)	49 (14)	<0.001
Therapeutic	112 (83)	67 (78)	45 (92)	0.055
Nontherapeutic	23 (17)	19 (22)	4 (8.2)	
Time from interventional radiology to aortic rupture, d	2 (1–4)	2.5 (2–4)	0 (0–0)	0.03
Time from interventional radiology to open repair, d	3 (1–12)	4 (1–15.5)	2 (1–6.5)	0.19
Interventional radiology or open repair				<0.001
Interventional radiology only	52 (8.7)	30 (12)	22 (6.2)	
Both	83 (14)	56 (23)	27 (7.6)	
Open repair only	462 (77)	157 (65)	305 (86)	
Patients who underwent open repair	545 (91)	213 (88)	332 (94)	0.01

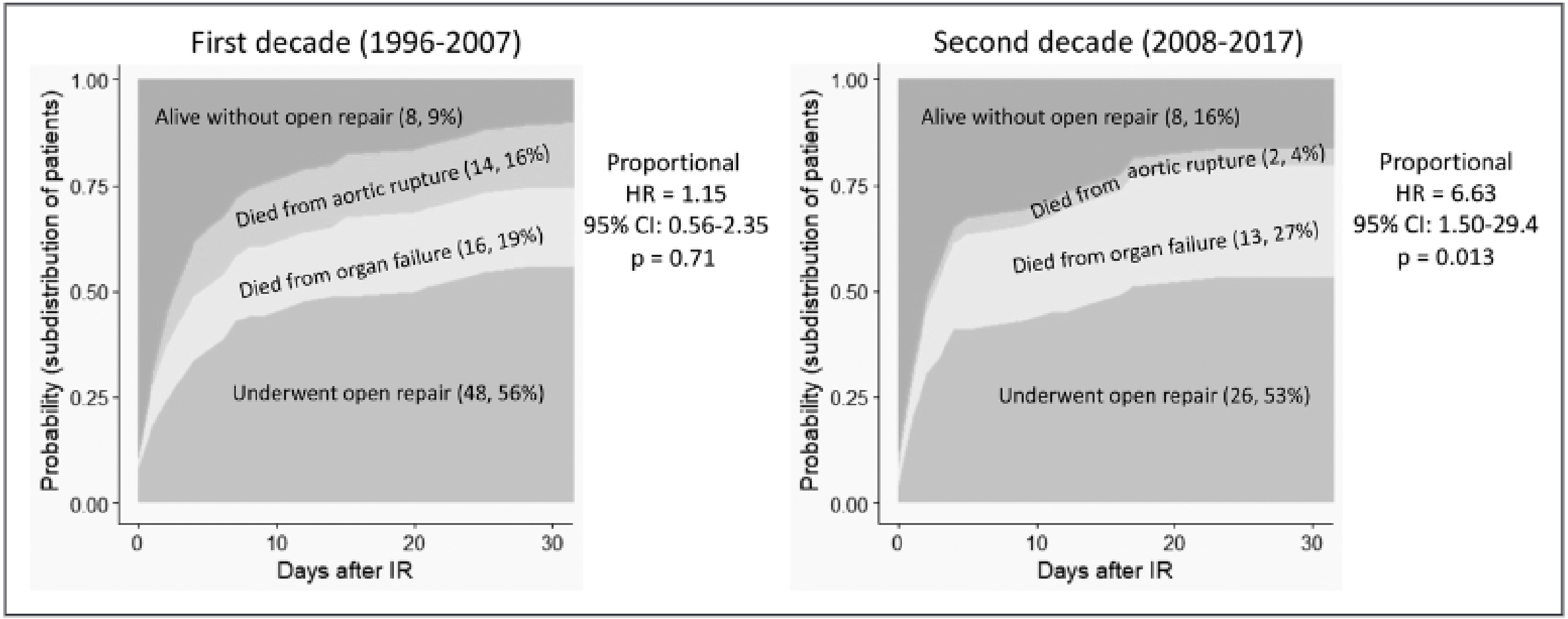
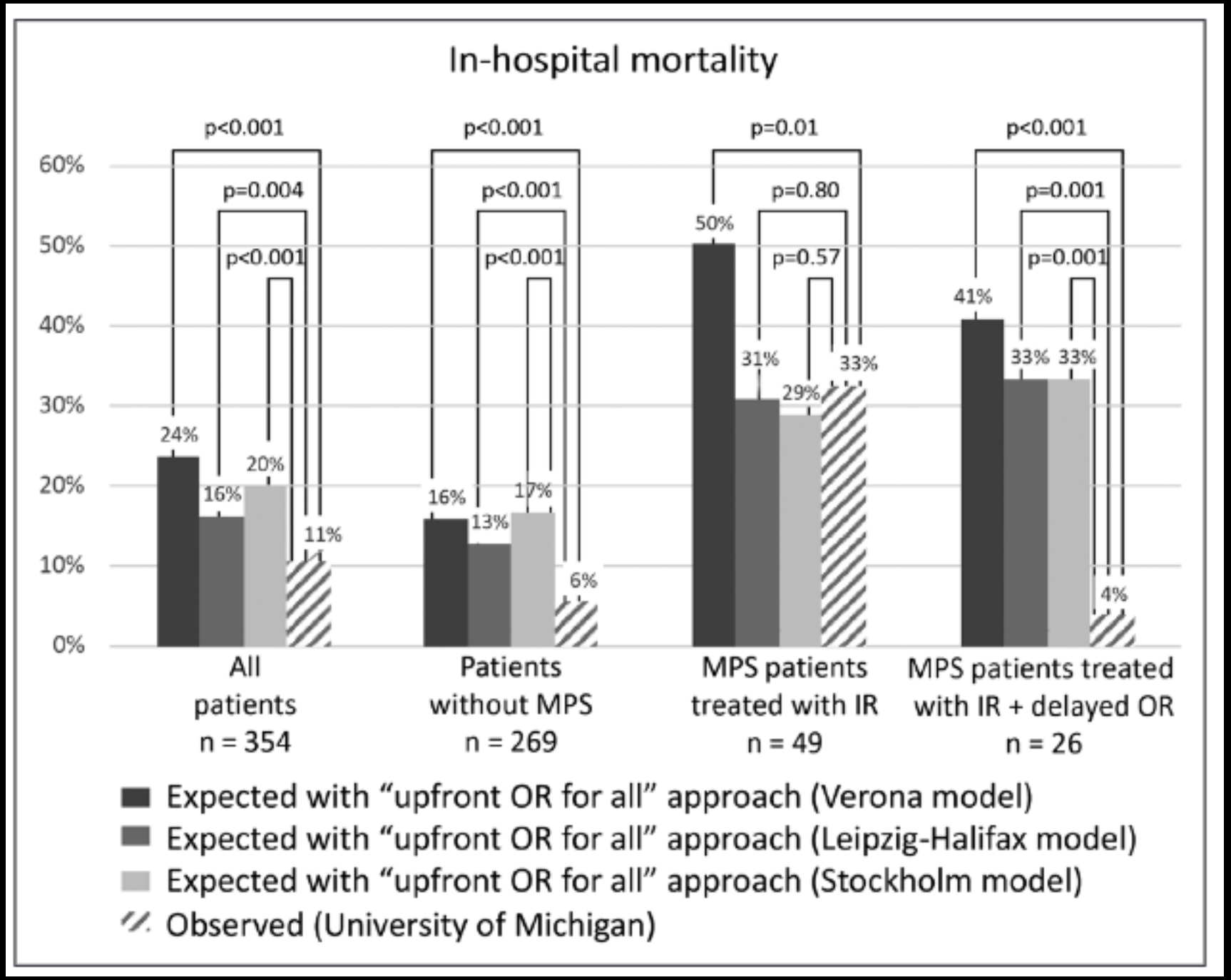


Figure 4. Thirty-day outcomes after endovascular treatment by IR.

The risk of death between IR and open aortic repair from organ failure versus aortic rupture was similar in the first decade, with proportional HR of 1.15; however, risk significantly increased in the second decade, with proportional HR of 6.63 (P=0.013). Proportional hazard assumption was satisfied in both decades (Schoenfeld residuals test: P=0.52 in the first decade and P=0.12 in the second decade, respectively). Data are expressed as (number, percentage). CI indicates confidence interval; HR, cause-specific hazard ratio of death from organ failure/death from aortic rupture; and IR, interventional radiology.


In-hospital mortality
p<0.001
p=0.004
p<0.001
p<0.001
p<0.001
p=0.01
p=0.80
p=0.57
p<0.001
p=0.001
p=0.001
60%
50%
40%
30%
20%
10%
0%
24%
16%
20%
11%
16%
13%
17%
6%
50%
31%
29%
33%
41%
33%
33%
4%
All patients n = 354
Patients without MPS n = 269
MPS patients treated with IR n = 49
MPS patients treated with IR + delayed OR n = 26
Expected with "upfront OR for all" approach (Verona model)
Expected with "upfront OR for all" approach (Leipzig-Halifax model)
Expected with "upfront OR for all" approach (Stockholm model)
Observed (University of Michigan)

Summary

- Malperfusion syndrome following type A AD is frequent
- Significant malperfusion syndrome should be carefully investigated for proper treatment.
- A hybrid approach may be a promising method to reduce mortality and morbidity from malperfusion syndrome.

경청해주셔서 감사합니다.