

Optimal Management of Static Type Mesenteric Malperfusion in Type A Acute Aortic Dissection

The department of cardiovascular surgery, Sapporo Medical University

Kei Mukawa, Junji Nakazawa, Yutaka Iba, Tomohiro Nakajima,
Tsuyoshi Shibata, Shuhei Miura, Ayaka Arihara,
Keitaro Nakanishi, Takakimi Mizuno, Nobuyoshi Kawaharada



Background

- ✓ Mesenteric malperfusion in type A acute aortic dissection (TAAAD) is

one of the lethal complications. *Yang et al, J Thorac Cardiovasc Surg.2019*

- ✓ **Image evidence malperfusion** does **not always lead to end-organ ischemia,**

which is often referred to as **malperfusion syndrome.**

2022 ACC/AHA Guideline for the Diagnosis and Management of Aortic Disease

Therefore, the necessity of intervention for abdominal organs is **unclear.**

- ✓ Furthermore, the management of **static type** malperfusion in TAAAD

remains unstandardized.



Objective

- ✓ This study aimed to examine **the optimal management** by evaluating our strategy for static type mesenteric malperfusion in TAAAD.

Especially evaluated these two points.

- 1. The rate of abdominal intervention after primary central repair**
- 2. The characteristics of abdominal intervention cases**



Methods

- ▶ Design Retrospective, Single-arm, Single-center
- ▶ Term April, 2009 – April, 2023
- ▶ Definition of mesenteric malperfusion

static obstruction of Celiac artery or SMA (Superior mesenteric artery)

by **preoperative CT (computed tomography) angiography**



Patients

Surgical cases of TAAAD between 2009 and 2023 at our hospital (n=215)



TAAAD with static type mesenteric malperfusion (n=16)

Exclusion cases

- ▶ Not proceeding central repair in the acute phase (n=1)
- ▶ Death within 48 h after admission (n=2)

Primary central repair (n=13)

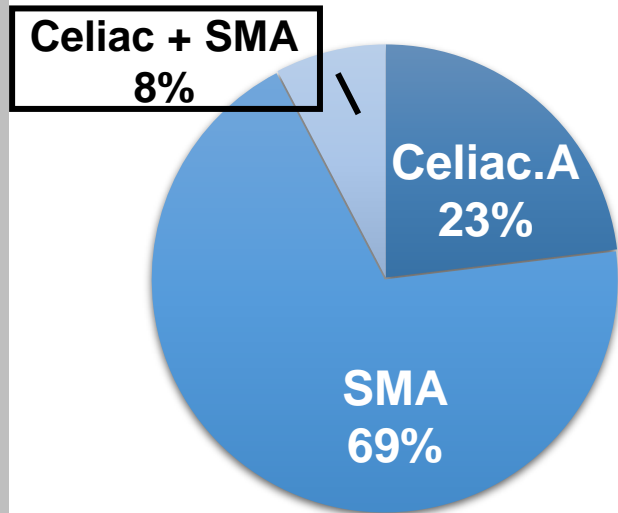
The intervention for abdominal organs was considered when abdominal organ failure was suspected.

Results - patients' characteristics -

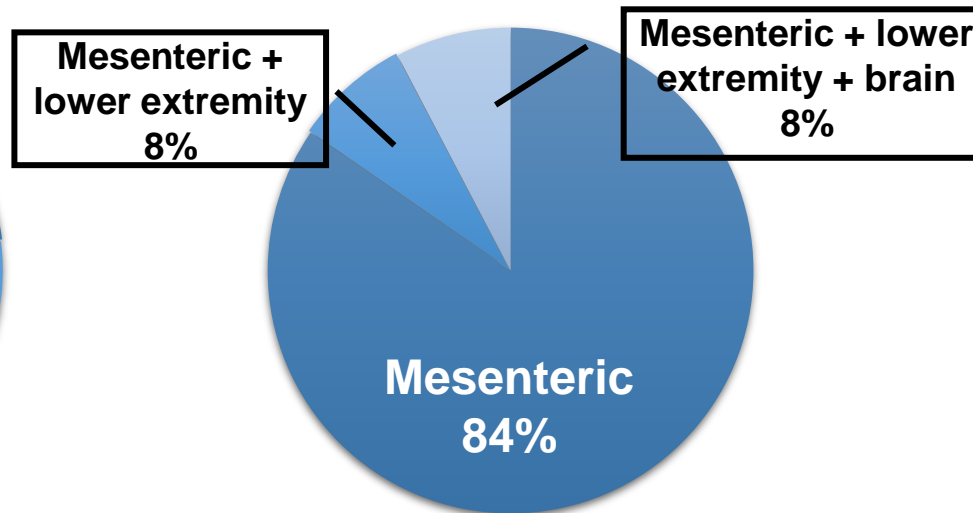
Male (%)	7 (53)
Age (y)	60 ± 12
Abdominal pain (%)	3 (23)

DeBekey I (%)	12 (93)
DeBakey III b retro (%)	1 (7)

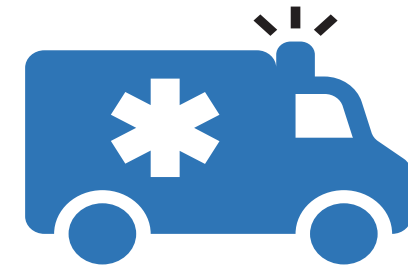
Malperfusion site ①



Malperfusion site ②

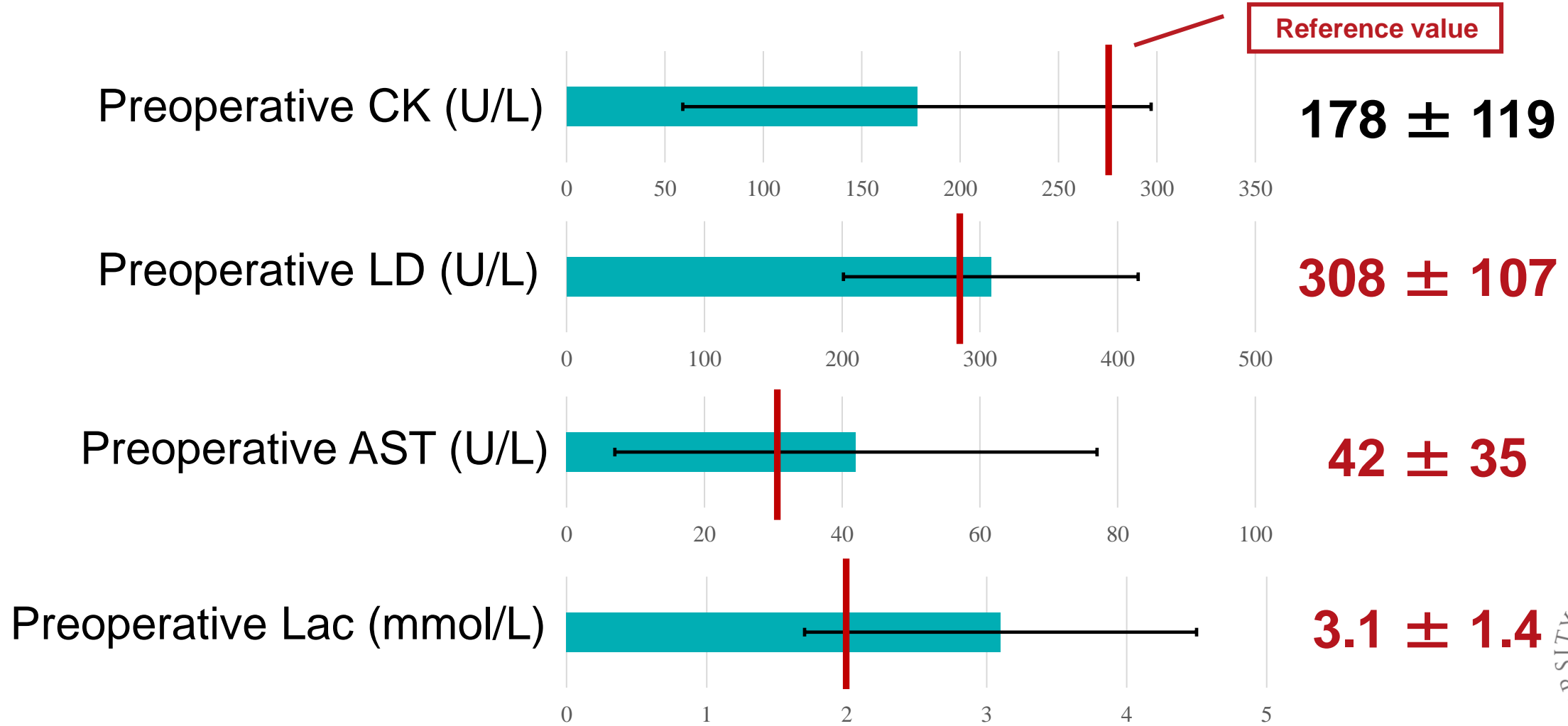


Time from onset to surgery



5.4 ± 1.8 h

Results - preoperative blood test -



Results - operative data and outcomes -

Hemi arch replacement (%)	4 (30)	CPB time (min)	246 ± 66
Total arch replacement (%)	8 (61)	Circulatory arrest time (min)	69 ± 22
ET or FET (%)	7 (54)		

※ET : elephant trunk, FET : frozen elephant trunk, CPB : cardiopulmonary bypass

Reperfusion of mesenteric artery by postoperative CT (%) 10 (77)

Intervention for abdominal organs (%) 4 (30)

- ▶ **intestinal resection (%)** 2 (15)
- ▶ **cholecystectomy (%)** 1 (7)
- ▶ **cholecystectomy + bypass grafting (%)** 1 (7)

hospital stay (day) 37 ± 23

In-hospital death (%) 0 (0)

Results - abdominal intervention cases -

	intervention	occluded artery	abdominal pain	pre CK (U/L)	pre LD (U/L)	pre AST (U/L)	Pre Lactate (mmol/L)	Time from onset to surgery (h)	postoperative reperfusion
case 1	intestinal resection	SMA	+	203	303	25	2.4	6	+
case 2	intestinal resection	SMA	-	203	463	35	2.1	6	-
case 3	cholecystectomy	SMA	-	80	367	49	5.6	8.5	+
case 4	Cholecystectomy + bypass grafting	Celiac + SMA	-	306	509	151	4.9	6.5	-

- ✓ Only Case 1 presented with abdominal pain on arrival among these intervention cases.
- ✓ Abdominal intervention was not needed for patients with symptom onset within 6 hours.
- ✓ Postoperative reperfusion failure did not lead to the abdominal intervention.



Discussion 1

✓ International registry of acute aortic dissection data showed that **abdominal pain did not occur in more than 40% of patients with mesenteric ischemia**, whereas about 20% of patients without mesenteric ischemia had pain. *Paolo Berretta, J Vis Surg 2018*

- This study also indicated that **the intervention for abdominal organs was unpredictable** from abdominal symptoms or preoperative data.

✓ In this study, abdominal intervention did not need for 85% of patients with image evidence malperfusion.



There is a gap between image evidence malperfusion and malperfusion syndrome.

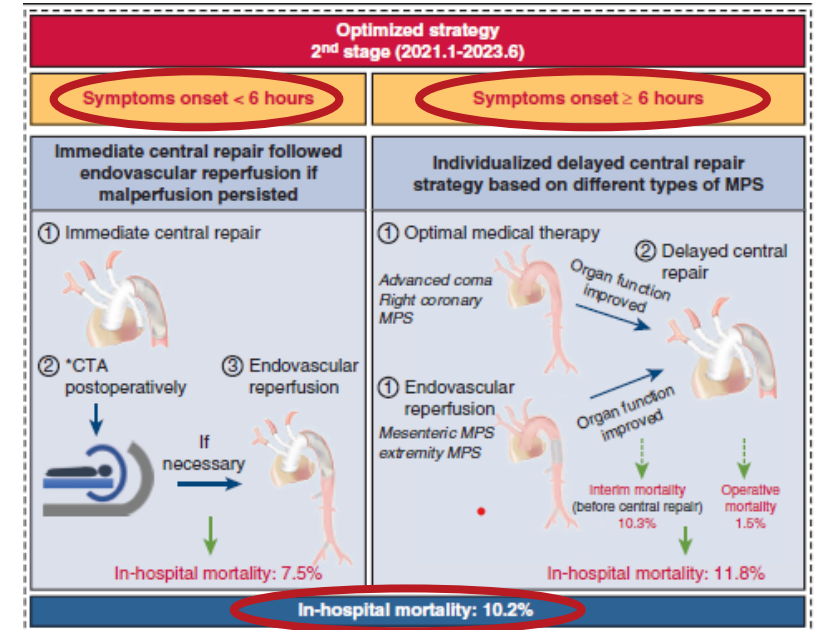


Discussion 2

✓ Recent study reported that an optimized strategy based on the duration of symptom significantly improved the outcomes of malperfusion syndrome.

Chen et al. J Thorac Cardiovasc Surg 2024. IN PRESS

- This results indicated that TAAAD with **symptom onset beyond 6 hours** showed more clearly the symptoms of end-organ ischemia.



The necessity of intervention for malperfusion could be judged

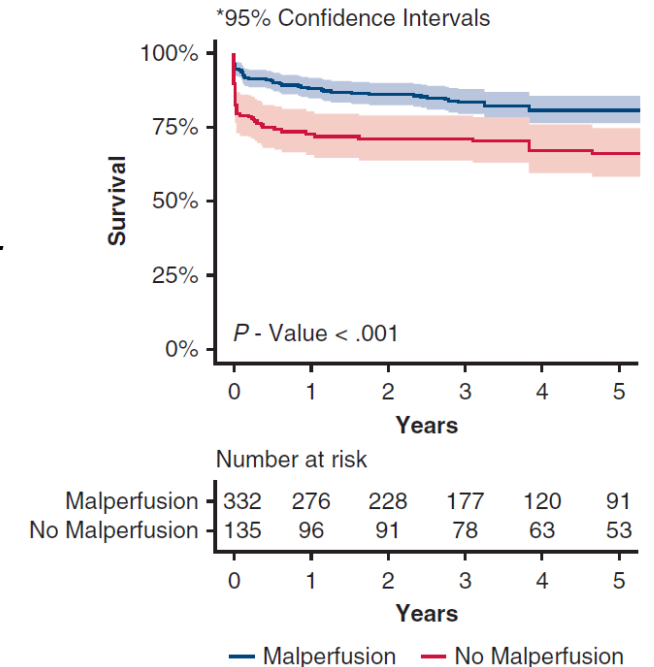
precisely over time.

Discussion 3

- ✓ Another study reported that **immediate primary central repair** to restore true lumen perfusion could be effective for TAAAD with malperfusion syndrome. *Brown et al. J Thorac Cardiovasc Surg 2024.*
- ✓ In this study, static type mesenteric malperfusion cases with symptom onset within 6 hours was not needed for intervention.



Prompt primary central repair could be effective.



Conclusion

- ✓ Immediate primary central repair could be an effective strategy for static type mesenteric malperfusion in TAAAD .
 - Surgical management based on the duration of symptoms is considered.