Fate of aortic root after aortic repair for acute aortic dissection in the late phase

Aortic root events after aortic dissection repair

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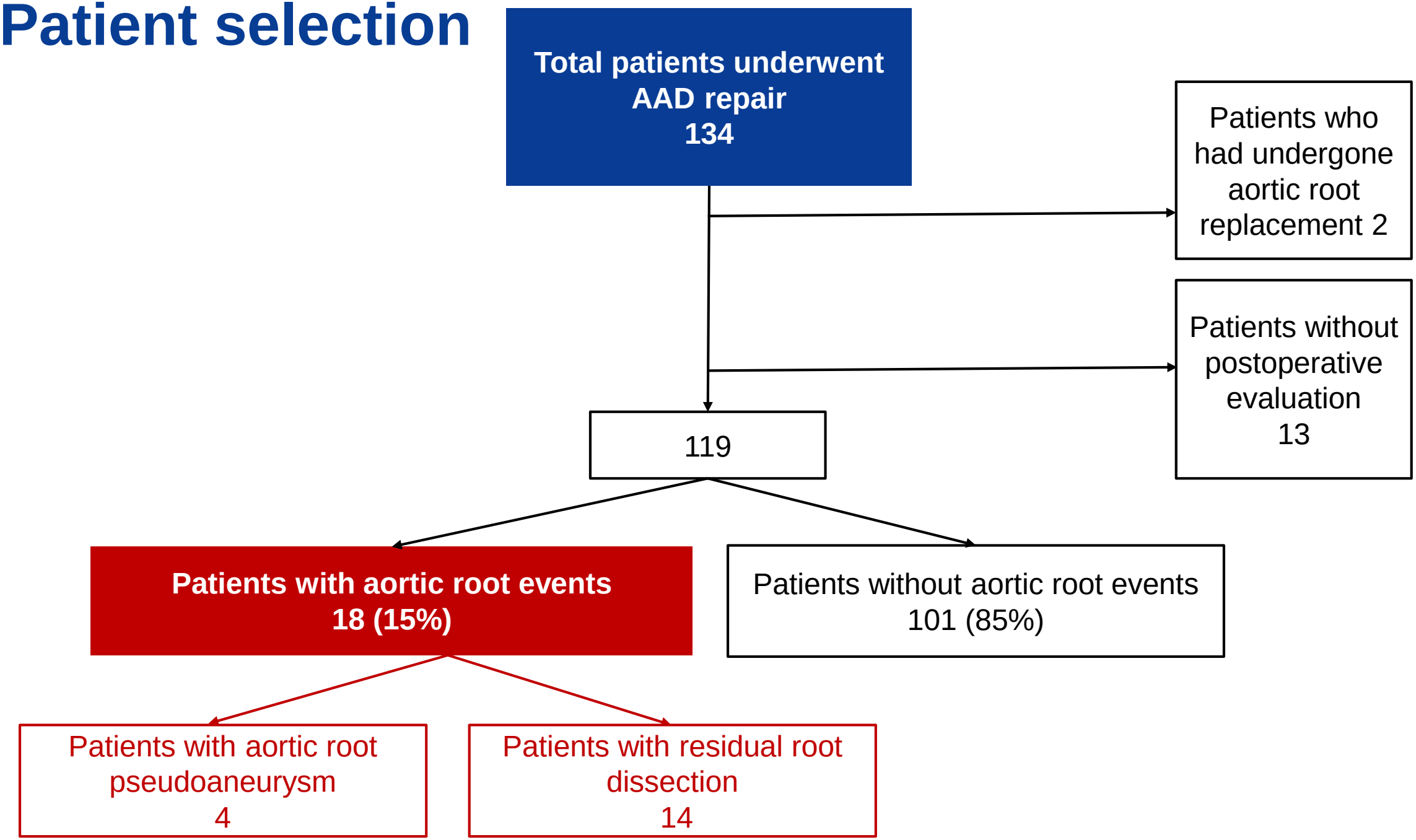
Background and Objective

- ✓ Fate of aortic root after primary repair for acute type A aortic dissection remain unknown.
- ✓ Although **bovine serum albumin-glutaraldehyde glue** has been successfully used as a hemostatic adjunct in aortic surgical procedures, there are reports that it may lead to **anastomotic pseudoaneurysm** formation.
- ✓ To evaluate the fate of the aortic root after surgery for acute aortic dissection and clarify the events of the aortic root after aortic repair for acute aortic dissection.

Methods

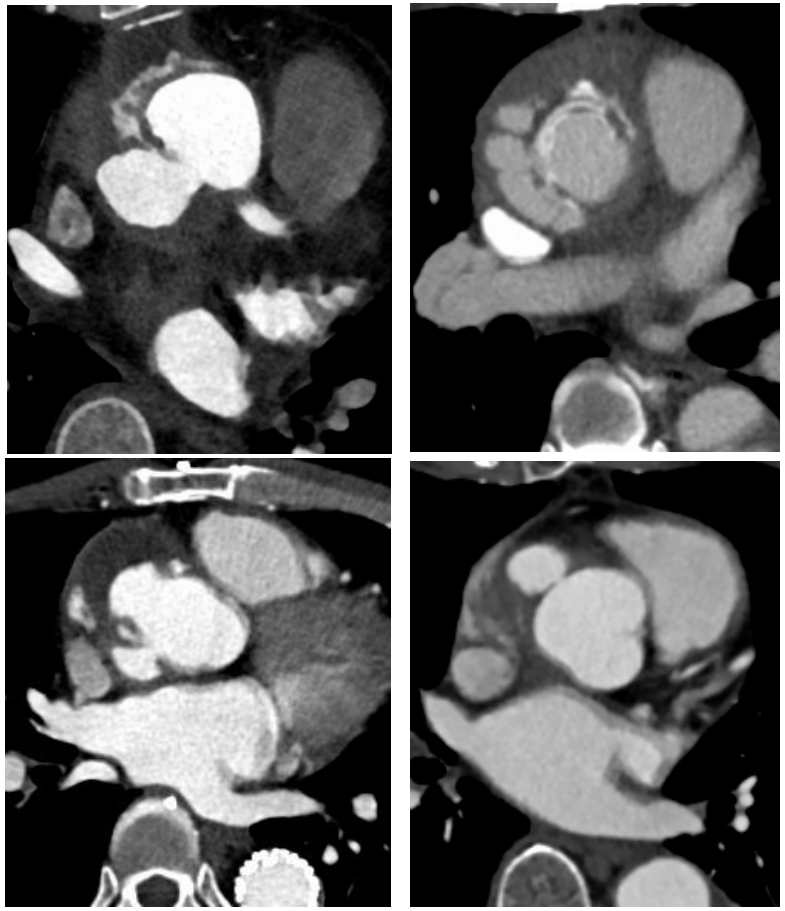
- ✓We studied 119 of 134 consecutive patients with Stanford type A aortic dissection who underwent emergency surgery at our hospital.
- ✓All patients underwent proximal anastomosis with **felt strips** and **biologic glue reinforcement**.
- ✓The primary endpoint is all-cause mortality, and the second endpoint is open aortic reintervention.

Patient selection

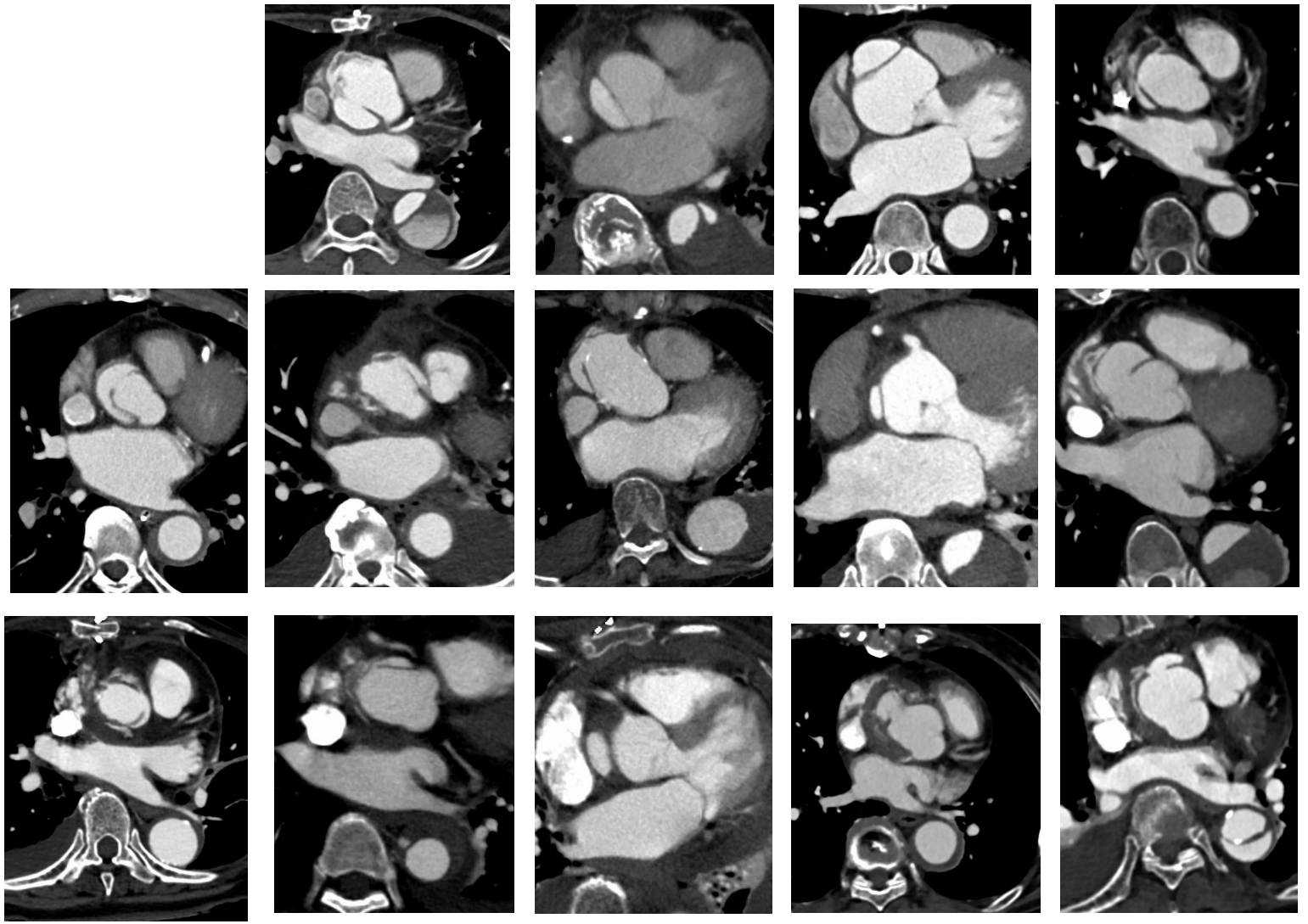


Imaging of aortic root events

Patients with aortic root pseudoaneurysm
4



Patients with residual root dissection
14



Patient characteristics

	Total n =119	Patients with aortic root events n =18	Patients without aortic root events n =101	P value
Age	69 (39-88)	69 (41-88)	69 (39-88)	0.90
Sex (male, %)	70 (59)	8 (44)	62 (61)	0.18
Previous cardiac surgery (%)	4 (3)	1 (6)	3 (3)	0.58
Organ malperfusion (%)	39 (33)	4 (22)	35 (35)	0.30
Hypertension (%)	95 (80)	16 (89)	79 (78)	0.30
Chronic respiratory disease (%)	12 (10)	3 (17)	9 (9)	0.31
Chronic kidney disease (%)	8 (7)	3 (17)	5 (5)	0.067
Hemodialysis (%)	2 (2)	0	2 (2)	0.55
Coronary artery disease (%)	6 (5)	2 (11)	4 (4)	0.20
Cerebrovascular disease (%)	12 (10)	3 (17)	9 (9)	0.31
Family history (%)	5 (4)	0	5 (5)	0.33
GERAADA score	13.5 (5.6-65.0)	15.5 (9.1-21.8)	13.4 (5.6-65.0)	0.73

GERAADA: German Registry for Acute Aortic Dissection Type A

Results

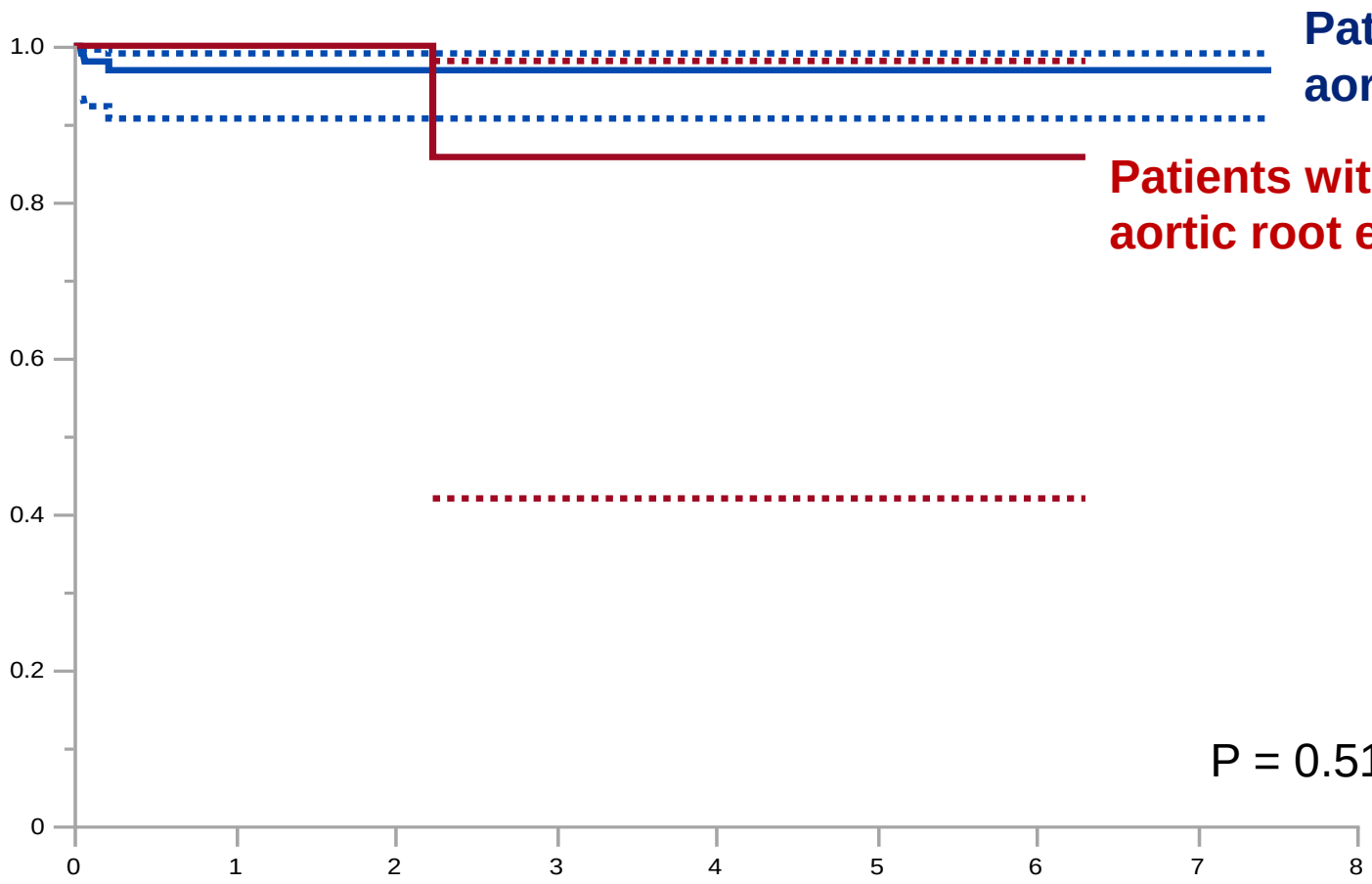
- ✓ In total, four patients died and nine patients required open aortic reintervention during follow-up.
- ✓ Cases with residual root dissection were detected from postoperative computed tomography, within one week postoperatively; however, all cases were followed conservatively.
- ✓ All cases of pseudoaneurysm, which were detected between 45 to 792 days postoperatively, underwent redo surgery with patch repair to the pseudoaneurysm. At reopening, the anastomosis appeared completely detached and almost ruptured in all cases. In one case, pathologically complete necrosis of the aortic wall was detected and this may have been caused by the biologic glue.
- ✓ There was no significant difference in all-cause mortality ($p = 0.51$) between the 18 cases with aortic root events and 101 cases without; however, there was a significant difference ($p = 0.0015$) in open aortic reintervention in these groups.

Results: Operative procedures and outcomes

	Total n =119	Patients with aortic root events n =18	Patients without aortic root events n =101	P value
Operation time (minutes)	394 (241-795)	406 (254-706)	391 (241-795)	0.88
CPB (minutes)	206 (125-552)	219 (142-442)	197 (125-552)	0.33
ACC (minutes)	122 (82-362)	141 (85-260)	117 (82-362)	0.071
ICU stay (days)	3 (1-26)	3 (2-21)	3 (1-26)	0.59
Hospitalization (days)	19 (9-69)	20 (9-40)	18 (9-69)	0.97
Cardiac event (%)	4 (3)	0	4 (4)	0.39
Neurological outcomes (%)	9 (8)	1 (6)	8 (8)	0.73
Tracheostomy (%)	3 (3)	1 (6)	2 (2)	0.37
30-day mortality (%)	3 (3)	0	2 (2)	0.55
Late mortality (%)	4 (3)	1 (6)	3 (3)	0.58
open aortic reintervention (%)	9 (8)	5 (28)	4 (4)	0.0004

ACC: aortic cross clamp; CPB: cardiopulmonary bypass time; ICU: intensive care unit

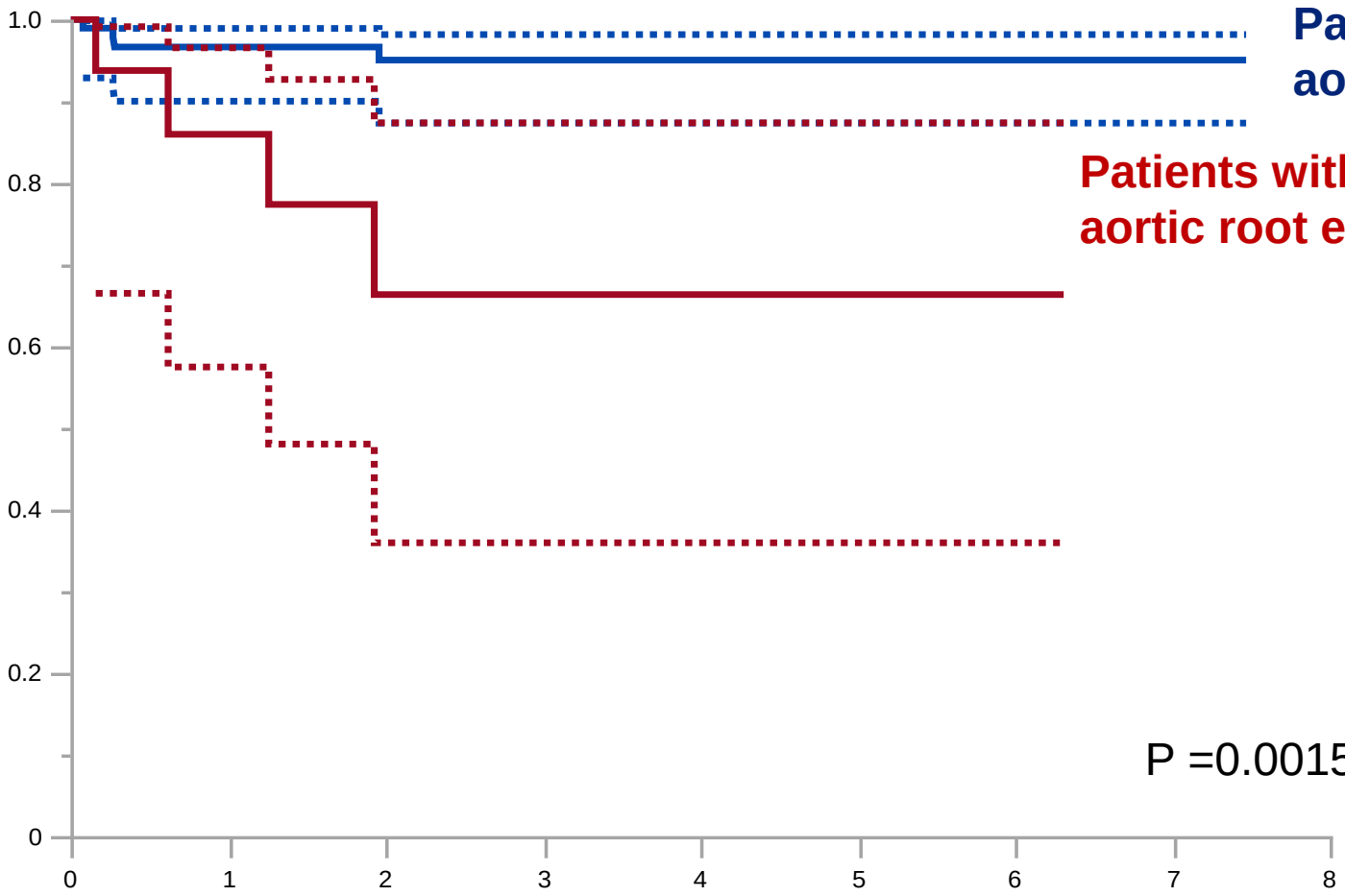
Results: Freedom from mortality



No. at risk

Patients with aortic root events	18	13	8	6	3	3	2	1
Patients without aortic root events	101	74	62	50	33	19	8	4

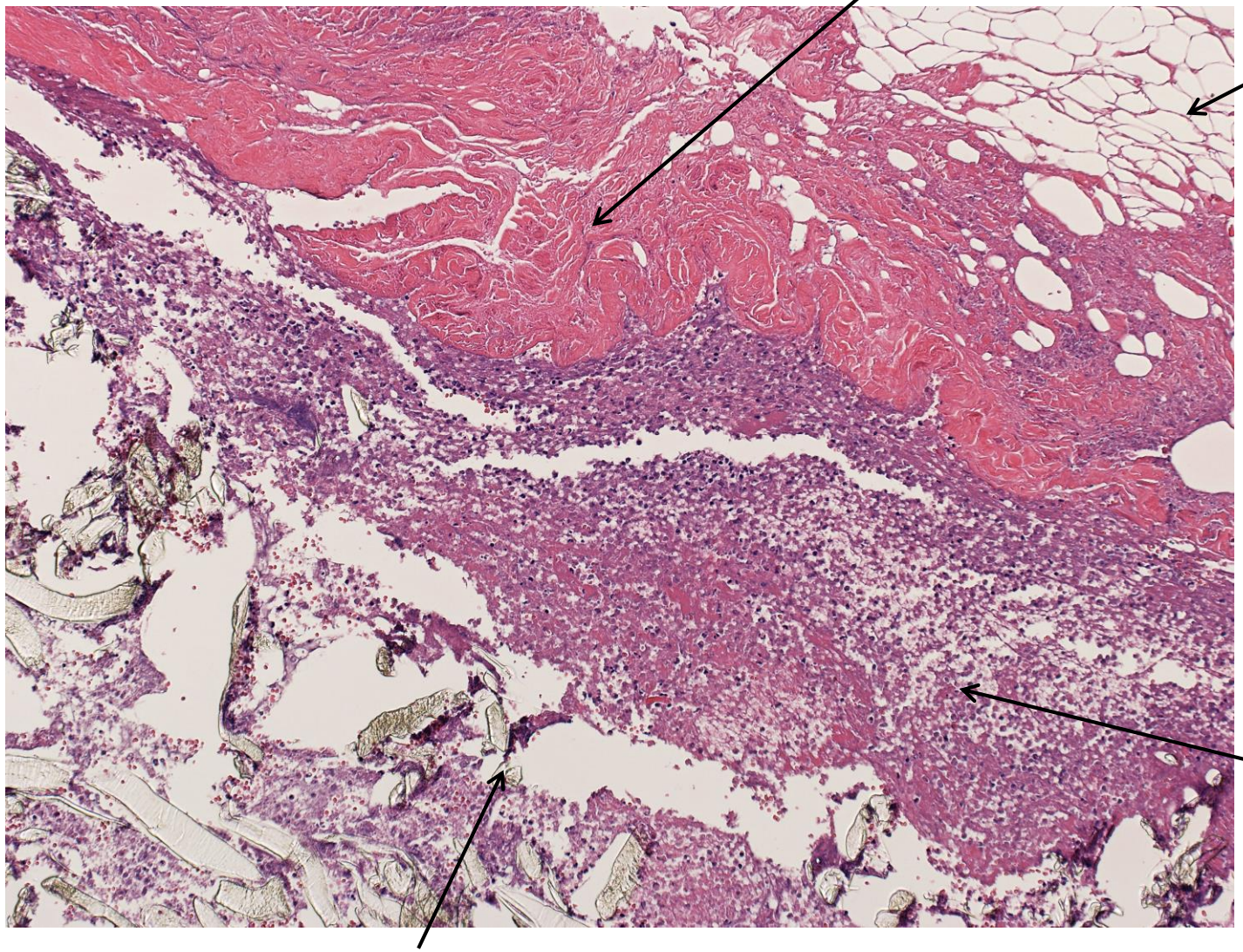
Results: Freedom from open aortic intervention



No. at risk

Patients with aortic root events	18	12	7	5	3	3	2	1
Patients without aortic root events	101	71	59	47	31	17	8	4

Pathological results of pseudoaneurysm in the aortic root



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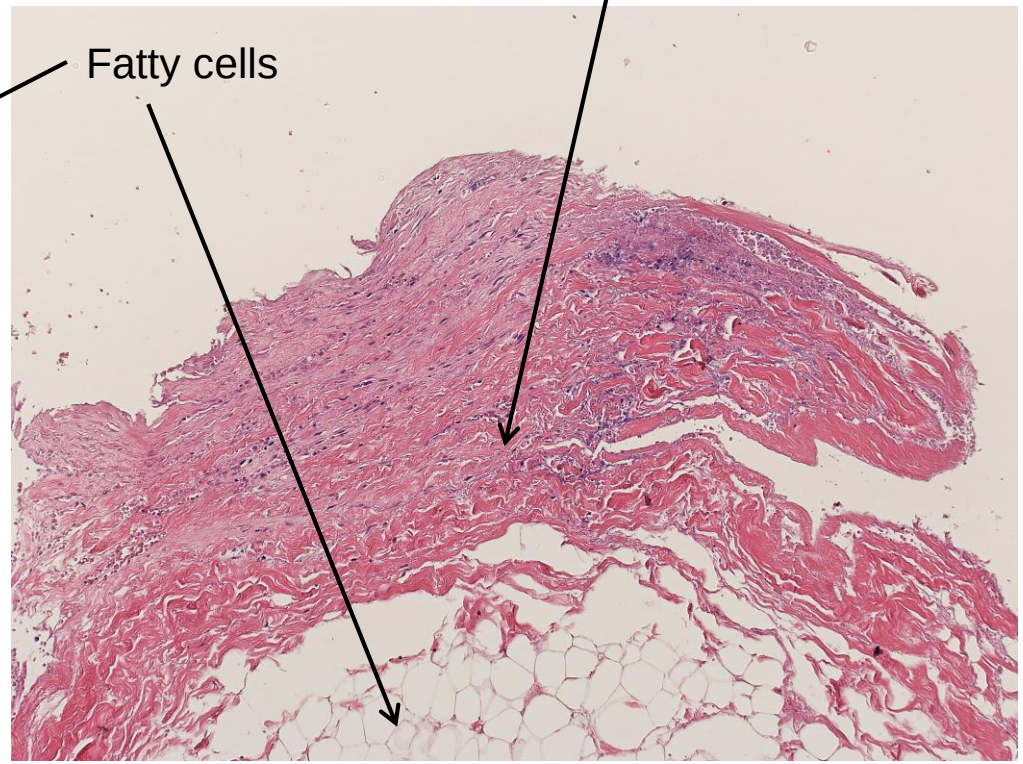

X100

Hematoxylin and eosin stain, original magnification x100

Conclusions

- ✓Although the residual aortic root dissections may have been due to inadequate repair of the proximal anastomoses, these can be followed conservatively without any aortic root reintervention.
- ✓Alternatively, in cases with aortic root pseudoaneurysms due to necrosis of the aortic wall, prompt surgical intervention is recommended.
- ✓Although felt strips and biologic glue are useful in controlling anastomotic bleeding in aortic dissection, they should be used appropriately.