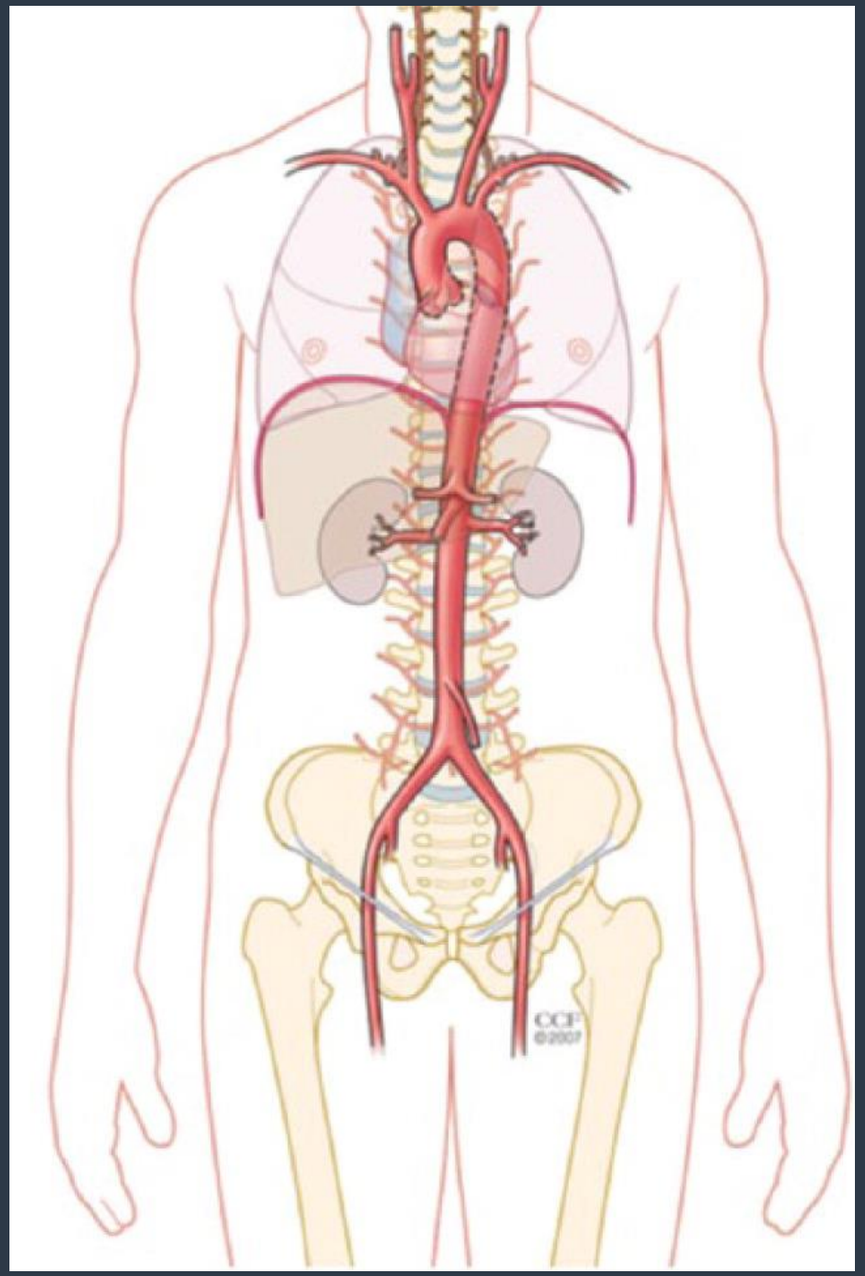
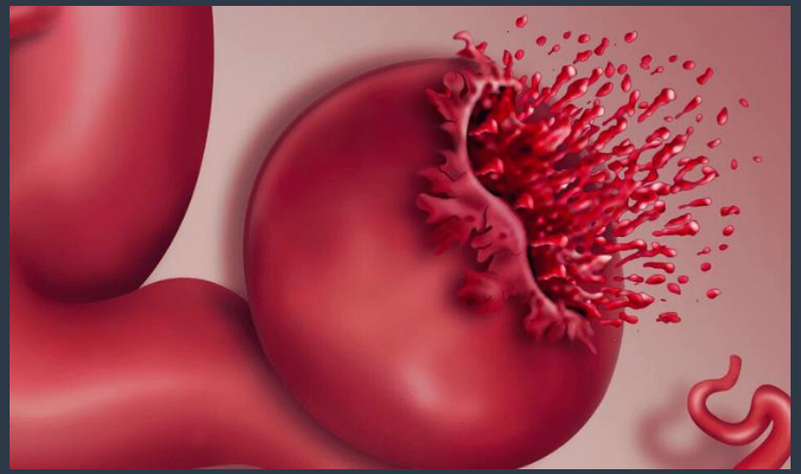
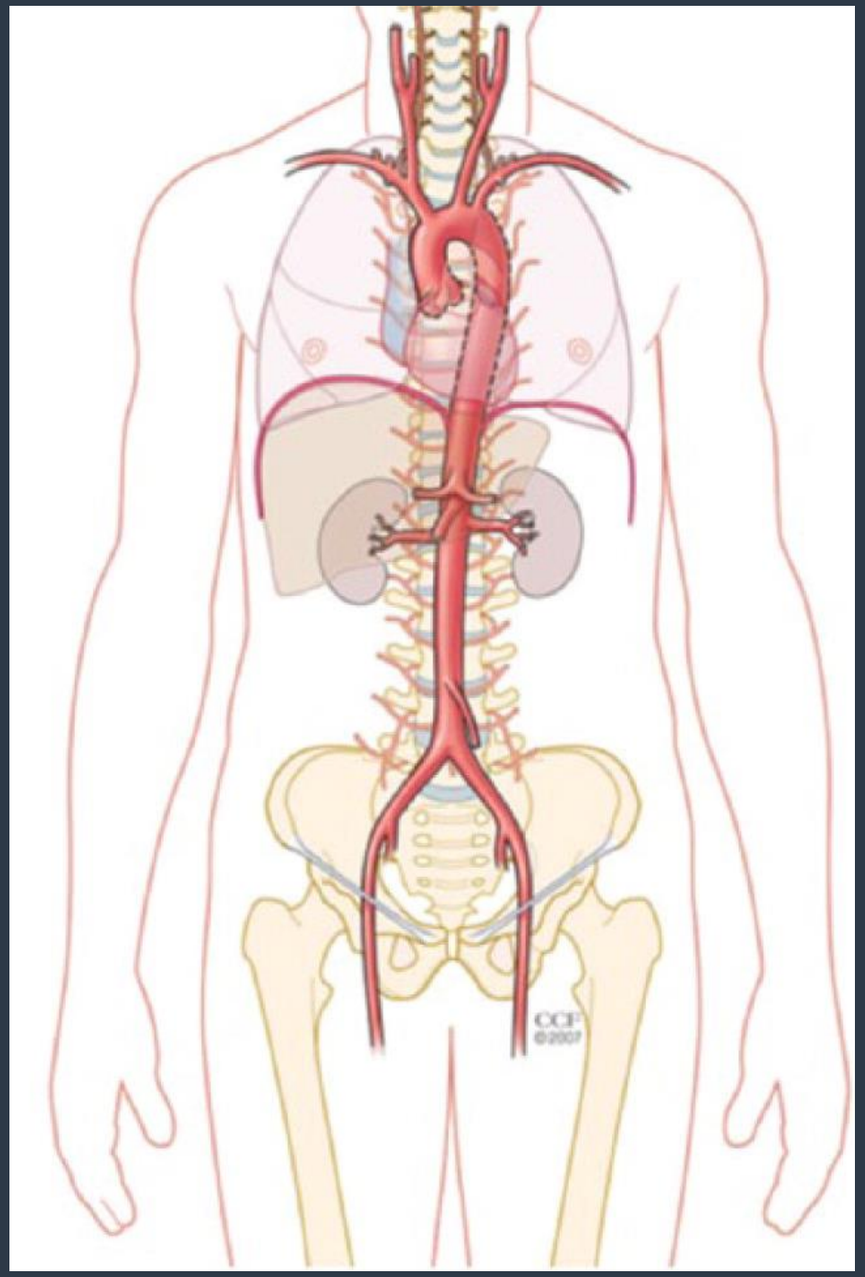
Postoperative Management for Aortic Disease

한양 대학교 병원
심장 혈관 흉부외과
김완기






So Simple



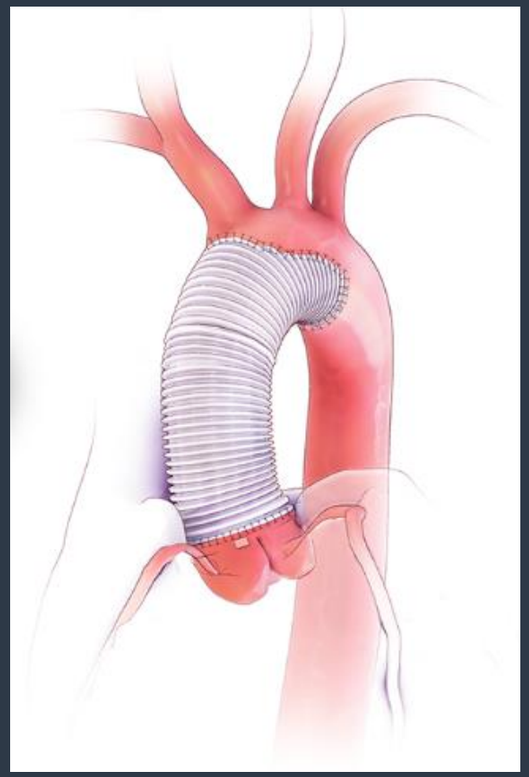
Ant. Approach (sternotomy)

- Arch surgery
  - Hemi-arch (ascending aorta replacement)
  - Partial arch
  - Total arch
- Root surgery
  - Root replacement with aortic valve (Bentall)
  - Valve sparing root reimplantation (VSRR)

Lat. Approach (thoracotomy)

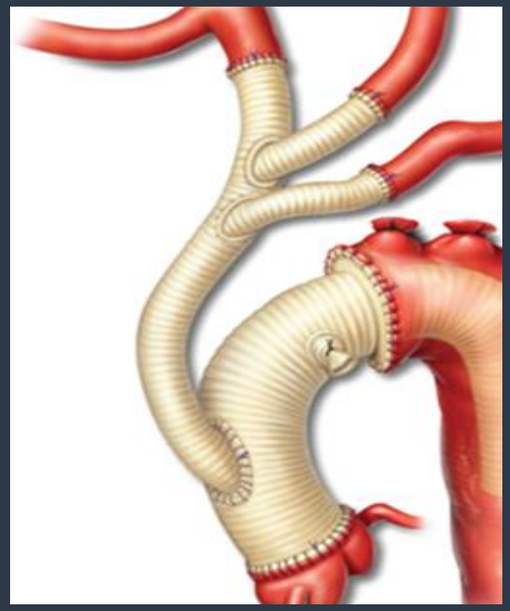
- Descending thoracic aorta replacement
- Thoracoabdominal aorta replacement
  - Crawford extent I to V

Anterior Approach

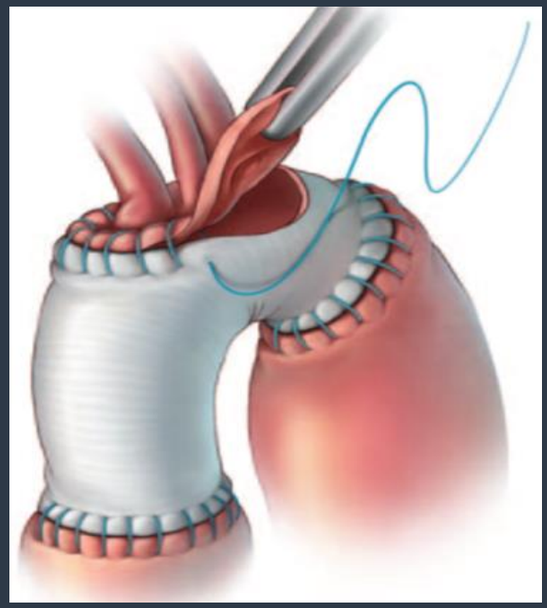


Hemi-arch Replacement (HAR)

4-branch graft



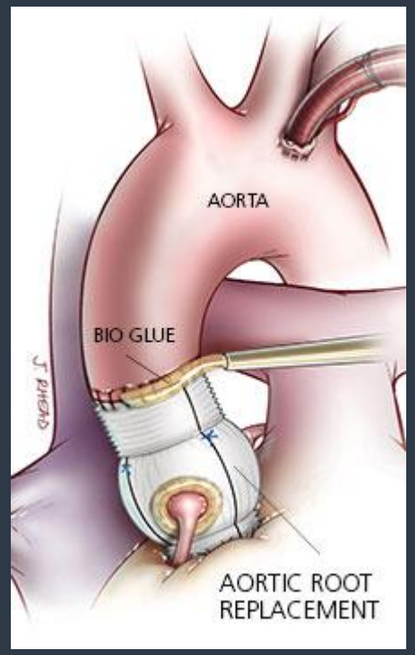
Trifurcated graft or Spielvogel

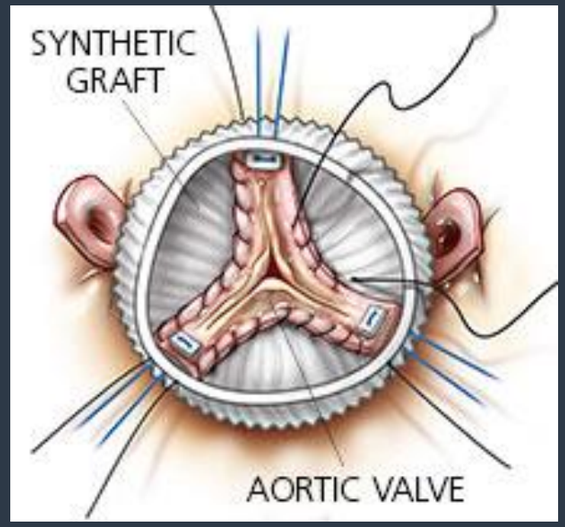


Island technique

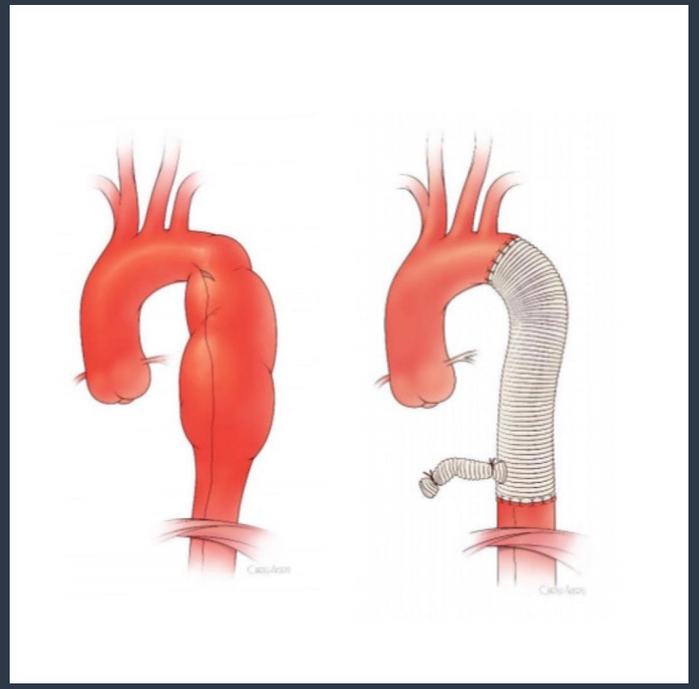
Total arch replacement (TAR)

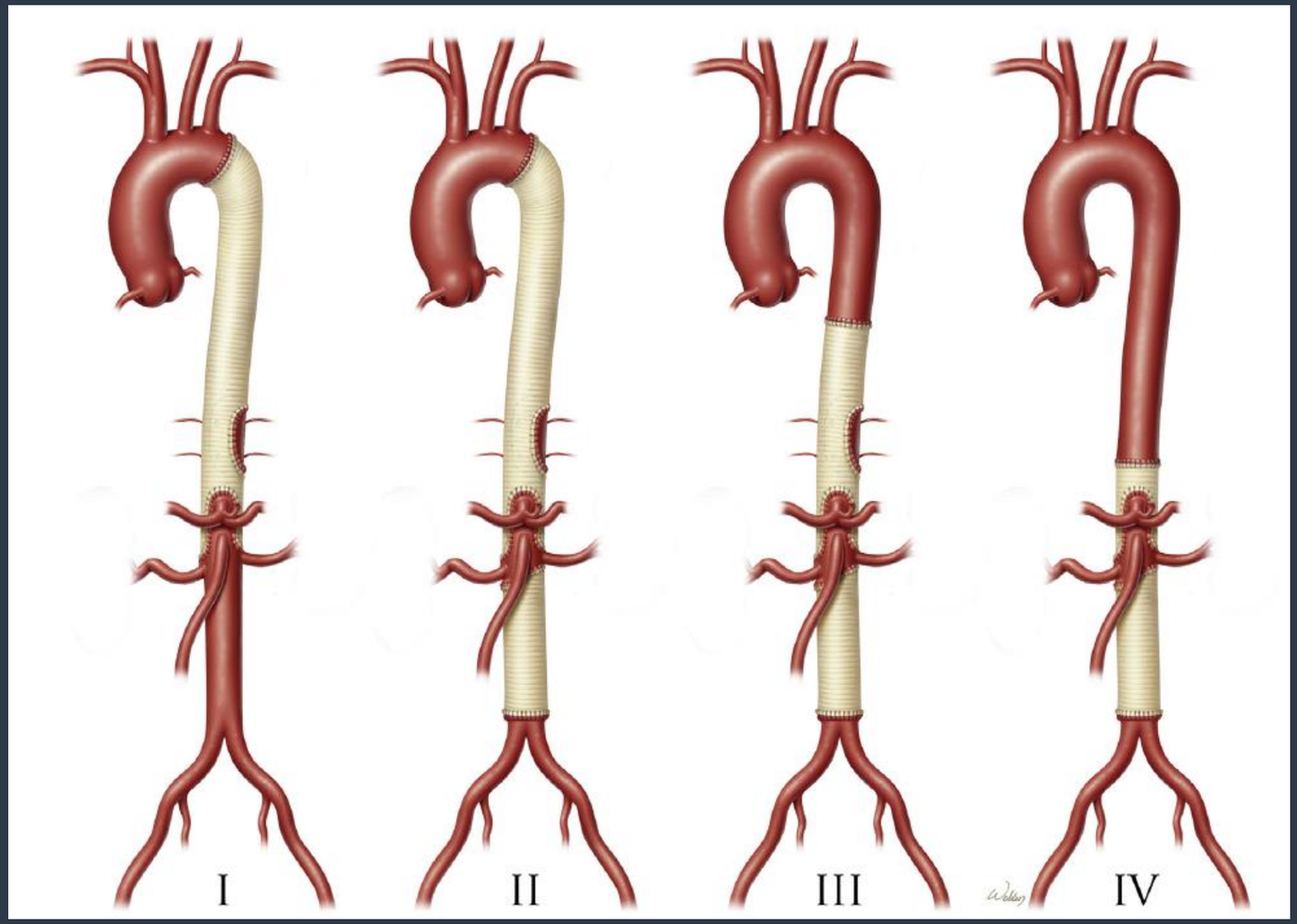
Aortic Root Surgery

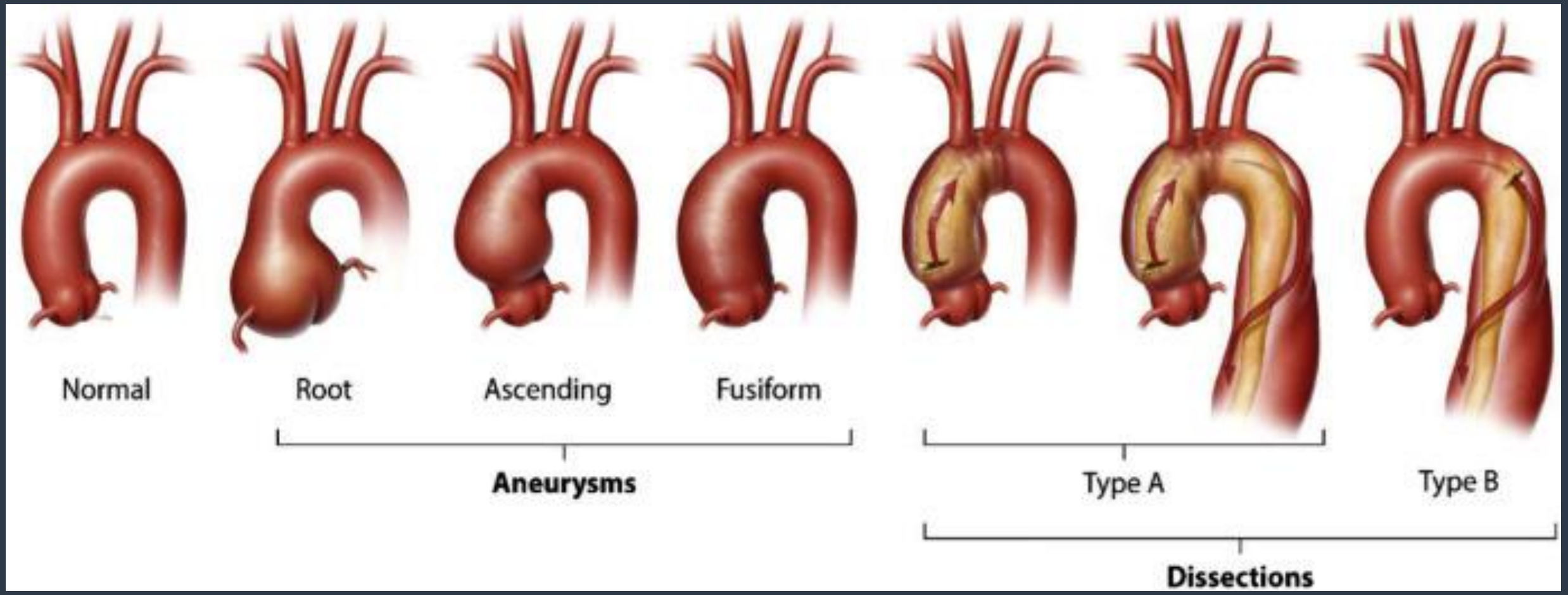


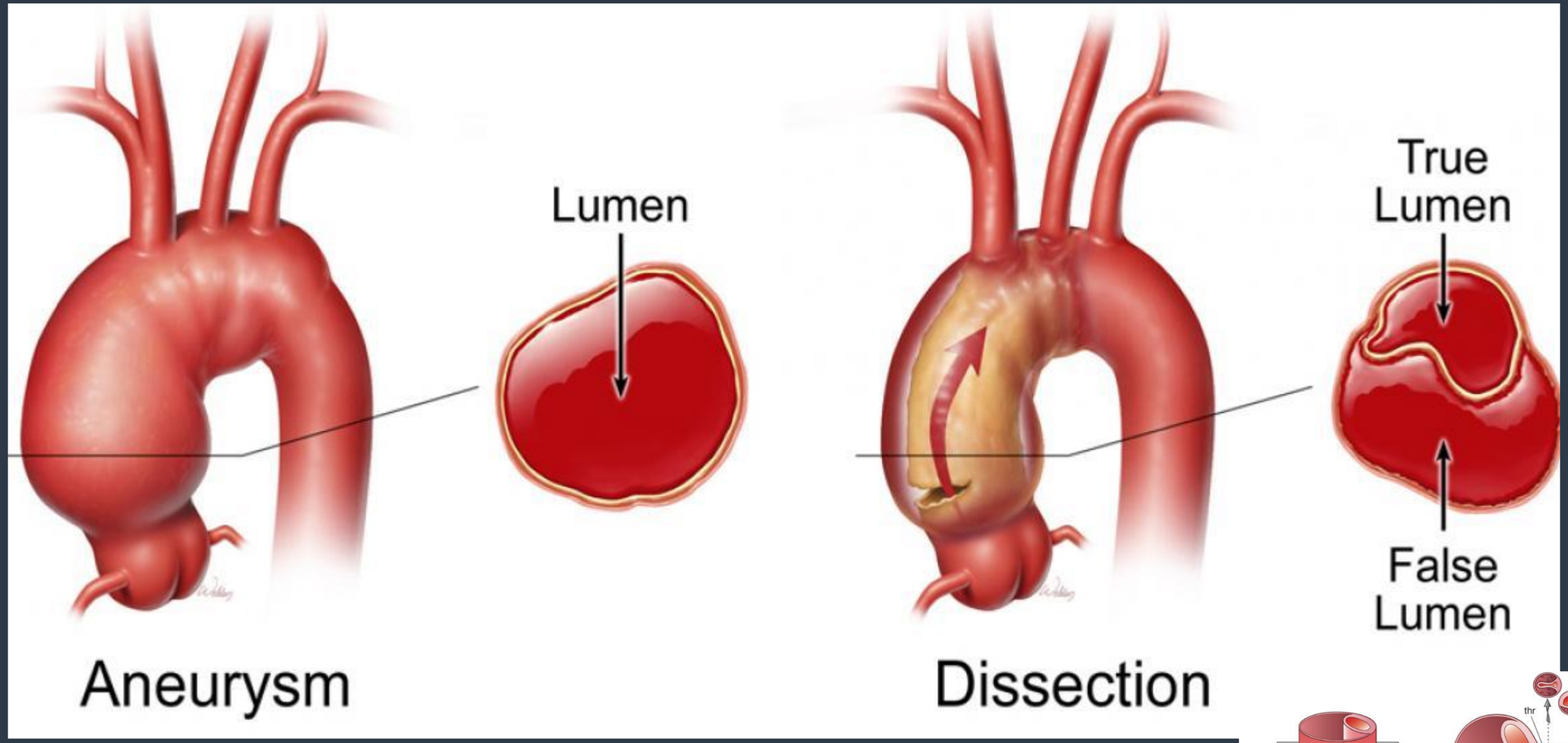


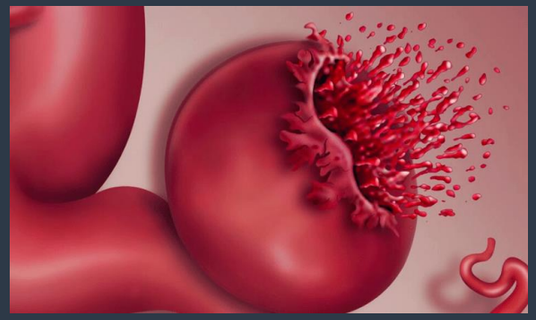
Lateral Approach

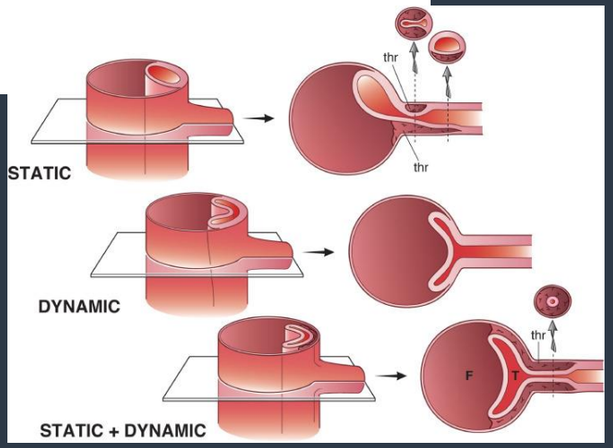





Normal
Root
Ascending
Fusiform
Aneurysms
Type A
Type B
Dissections


Lumen
True
Lumen
False
Lumen
Aneurysm
Dissection

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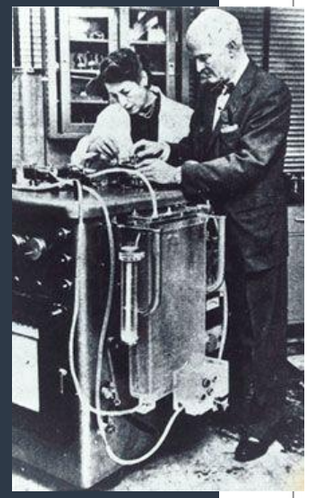
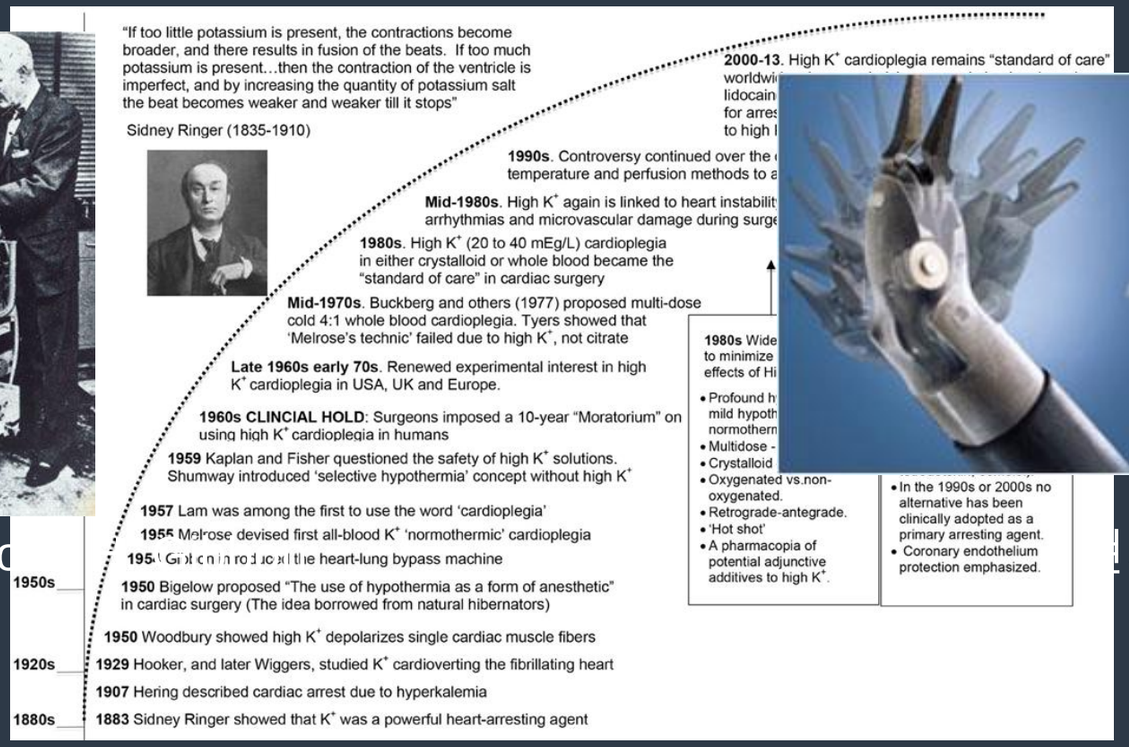
Acute Type A Aortic Dissection

Developments In Cardiac Surgery



1953년 Jo



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Acute Type A Aortic Dissection Repair?

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Presentation, Diagnosis, and Outcomes of Acute Aortic D

At 2015

17-Year Trends From the International Registry of Acute Aortic Dissecti

Early mortality: 25%→ 18%

Linda A. Pape, MD,* Mazen Awais, M
D,§ Santi Trimarchi, MD, PHD,‖ Arturo Evangelista, MD,¶ Truls Myrmel, MD, PHD,# Magnus Larsen, MD,# Kevin M. Harris, MD,** Kevin Greason, MD,†† Marco Di Eusanio, MD, PHD,‡‡ Eduardo Bossone, MD, PHD,§§ Daniel G. Montgomery, BS,† Kim A. Eagle, MD,† Christoph A. Nienabe
rick O'Gara, MD##

ABSTRACT

BACKGROUND Diagnosis, treatment, and
are changing.

OBJECTIVES This study examined 17-yea
l hospital outcomes of AAD from the International Registry of Acute Aortic D

METHODS Data from 4,428 patients enrolle
1995, and February 6, 2013, were analyzed. Patients were divided according to e
type: A (n = 2,952) or B (n = 1,476).

RESULTS There was no change in the pre
pain for type A and type B AAD (93% and 94%, respectively), nor in the in
ectively). Use of computed tomography (CT) for diagnosis of type A incr
ical management for type A increased from 79% to 90% ($p < 0.001$).
sed from 7% to 31% ($p < 0.001$). Type A in-hospital mortality decreased sig
gical mortality (25% to 18%; $p = 0.003$). There was no significant trend
% to 14%).

CONCLUSIONS Presenting symptoms an
d significantly. Use of chest CT increased for type A. More patients in both
procedures: surgery in type A and endovascular therapy in type B. A signif
ty was seen for type A but not for type B. (J Am Coll Cardiol 2015;66:350–8)
ology Foundation.

Factors associated with acute stroke after type A aortic dissection repair: An analysis of the Society of Thoracic Surgeons National Adult Cardiac Surgery Database

At 2019

Mehrdad Ghoreishi, MD,[a] Thoralf M. Su
n, MD,[b] Sari D. Holmes, PhD,[a] Eric E. Roselli, MD,[c] Chetan Pasrija, MD, James S. Gammie, MD,[1] Himanshu J. Patel, MD,[d] Joseph E. Bavaria, MD,[e] Lars G.
D[a]

Early mortality: 17%

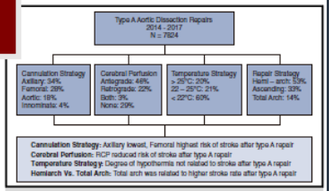
ABSTRACT

Objectives: Data from the Society of
Database was used to examine the incidence and factors associated with acute stroke following type A repair.

Methods: Acute type A aortic dissection
were identified from the Society of Thor
Database. The effect of cannulation stra
innominate), lowest temperature, cerebral
bral profusion, retrograde cerebral perfusio
institutional volume on postoperative stro

Results: Acute type A repair was perform
which 7353 met inclusion criteria. Operat
of postoperative stroke was 13%. Axillary
risk of stroke versus femoral (odds ratio,
perfusion was associated with reduced risk
perfusion (odds ratio, 0.75; $P = .008$) or ar
0.75; $P = .007$). Total arch replacement wa
versus hemiarch technique (odds ratio, 1.3
time, cerebral perfusion time, and cardiop
to higher risk of postoperative stroke.

Conclusions: Stroke is a common complica
lation was associated with lower incidence
significantly increased the risk of stroke rega
or the degree of hypothermia. Retrograde
reduced risk for postoperative stroke. Deg
were not related to stroke incidence. (J Thorac Cardiovasc Surg 2019;■:1-12)



Take-home message: Surgical variables associated with stroke after type A repair.

Central Message

Axillary cannulation is associated with the lowest and femoral with the highest stroke rate. RCP was found to have reduced risk for stroke, whereas the degree of hypothermia was not related to stroke.

Perspective

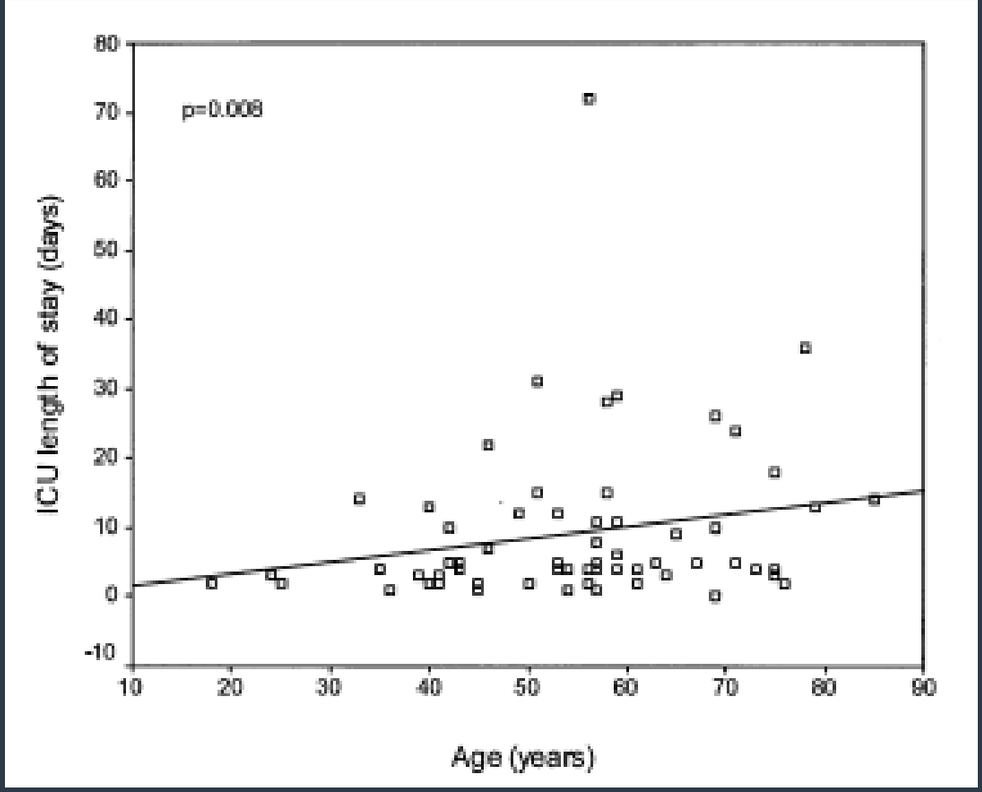
There is no prospective randomized data to guide surgical strategies for acute type A repair to decrease stroke rate. The choice of arterial cannulation, temperature management on CPB, brain protection strategies during circulatory arrest, extension of the resection in acute type A, and center volume on neurologic outcomes after type A repair are analyzed in this study.

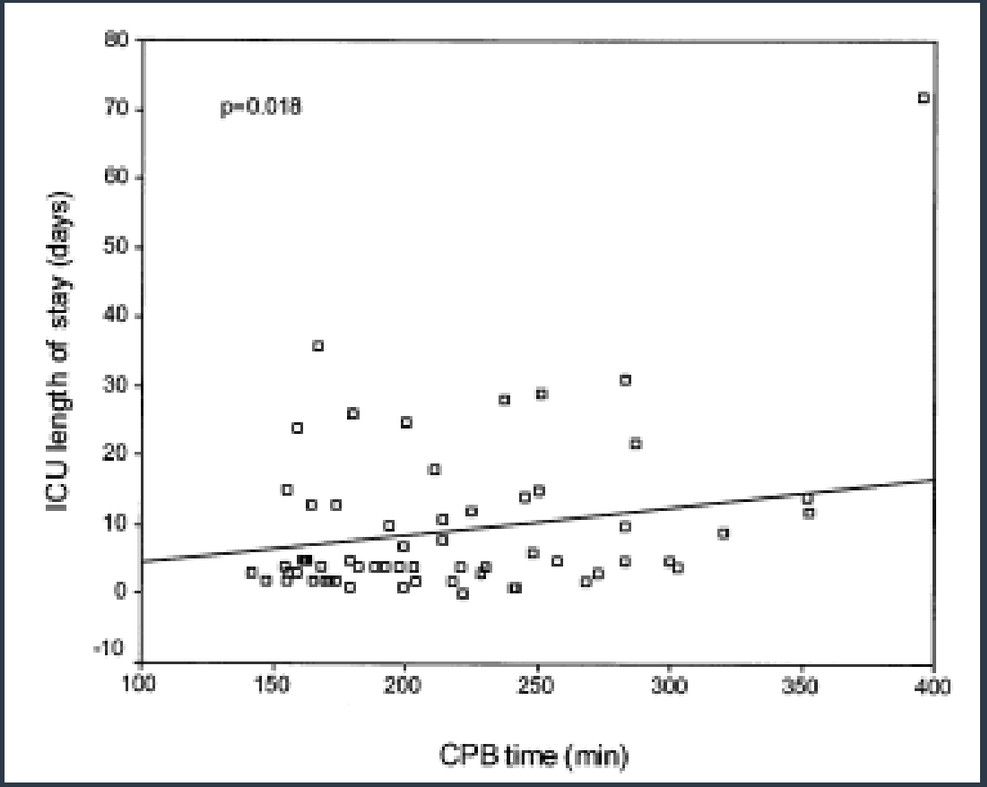
See Commentary on page XXX.

Factors Influencing Intensive Care Unit Length of Stay After Surgery for Acute Aortic Dissection Type A

Daniel Hoefer, MD, Elfriede Ruttmann, MD, Markus Riha, MD, Wolfgang Schobersberger, MD, Andreas Mayr, MD, Guenther Laufer, MD, and Johannes Bonatti, MD

Department of Cardiac Surgery, Division for General and Surgical Intensive Care Medicine, Innsbruck University Hospital, Innsbruck, Austria





frontiers in Cardiovascular Medicine

ORIGINAL RESEARCH
published: 12 July 2021
doi: 10.3389/fcvm.2021.675431

Predicting Intensive Care Unit Length of Stay After Acute Type A Aortic Dissection Surgery Using Machine Learning

Qiuying Chen [1,2†], Bin Zhang [1,2†], Jue Yang [3†], Xiaokai Mo [1], Lu Zhang [1,2], Minmin Li [1,2], Zhuozhi Chen [1,2], Jin Fang [1], Fei Wang [1], Wenhui Huang [1], Ruixin Fan [3] and Shuixing Zhang [1,2*]*

[1] Department of Radiology, the First Affiliated Hospital, Jinan University, Guangzhou, China, [2] Graduate College, Jinan University, Guangzhou, China, [3] Department of Cardiac Surgery, Guangdong Cardiovascular Institute, Guangdong Provincial People's Hospital, Guangdong Academy of Medical Sciences, Guangzhou, China

OPEN ACCESS

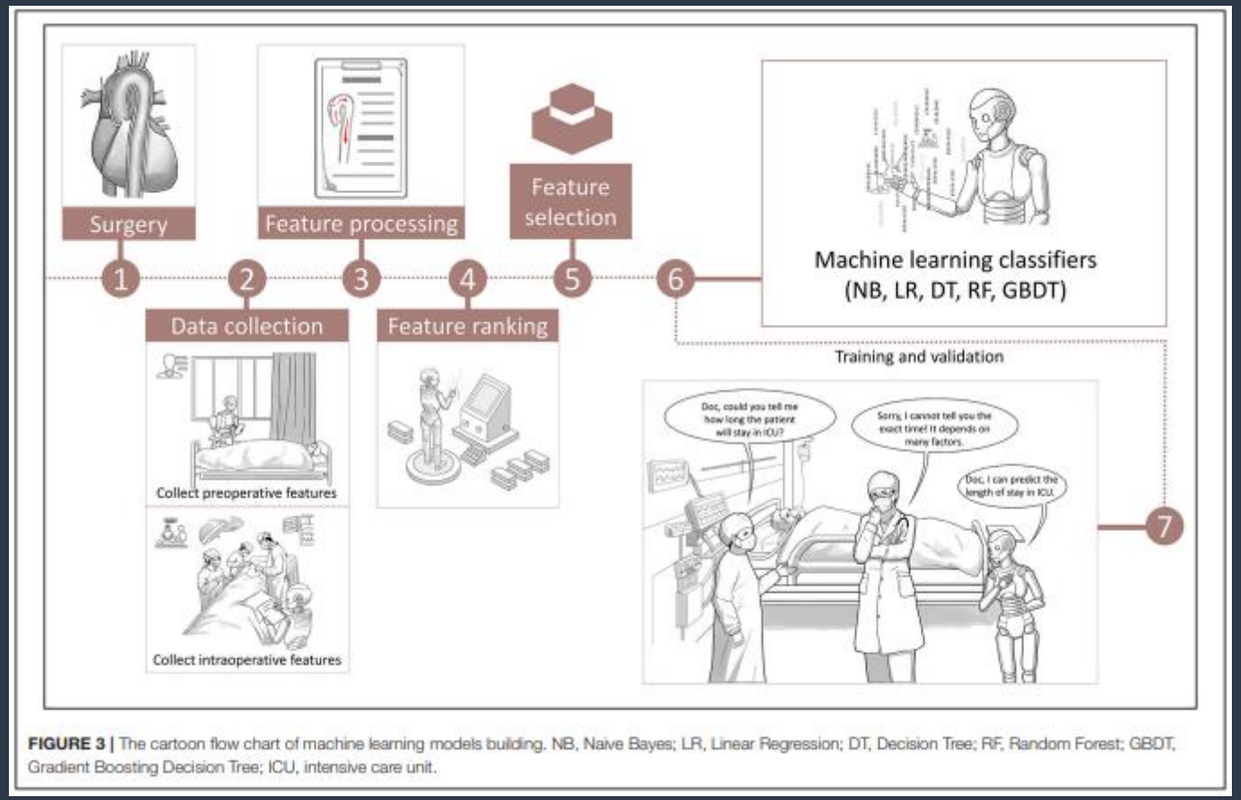


FIGURE 3 | The cartoon flow chart of machine learning models building. NB, Naive Bayes; LR, Linear Regression; DT, Decision Tree; RF, Random Forest; GBDT, Gradient Boosting Decision Tree; ICU, intensive care unit.

frontiers in Cardiovascular Medicine

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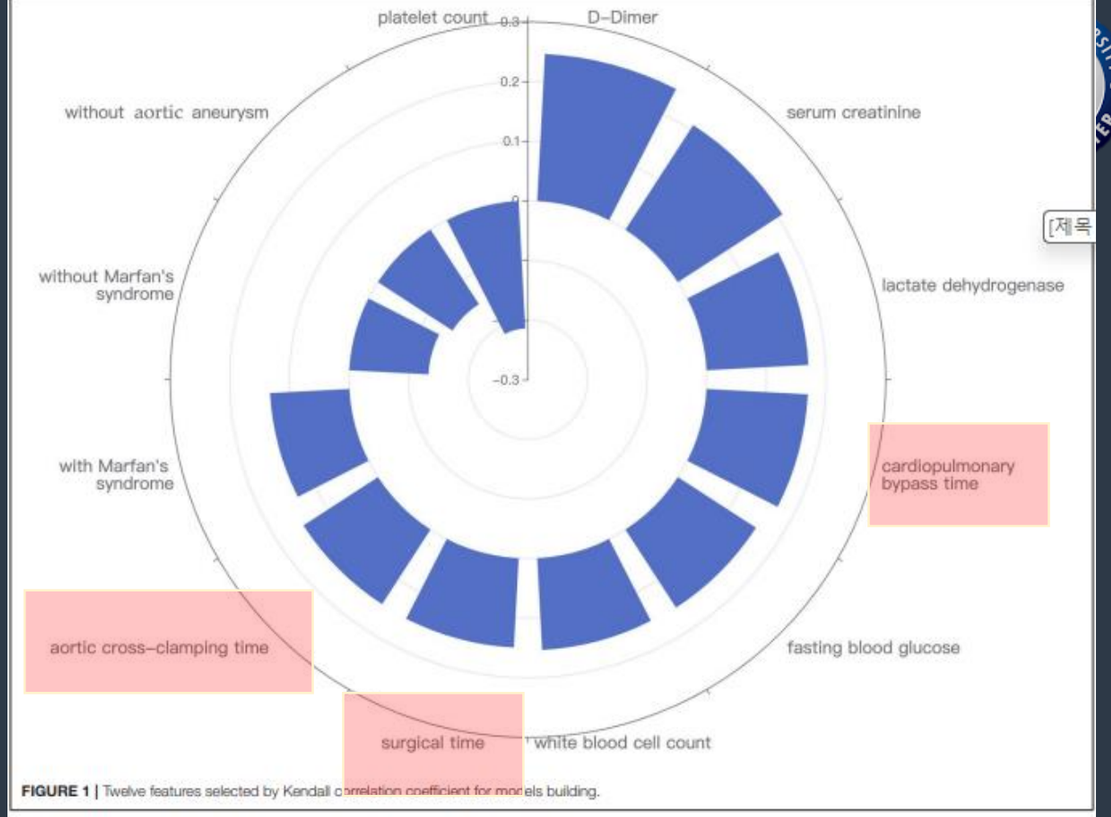


FIGURE 1 | Twelve features selected by Kendall correlation coefficient for models building.

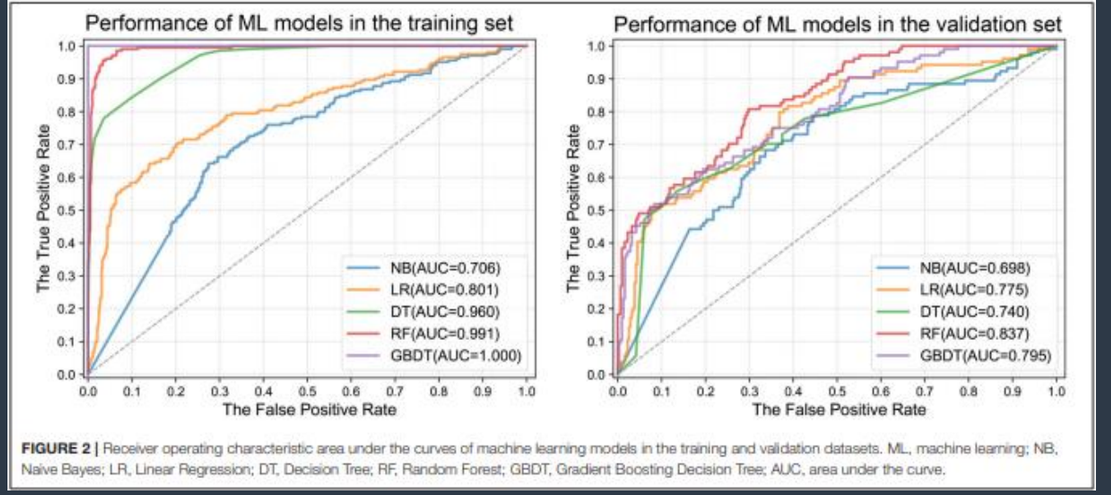
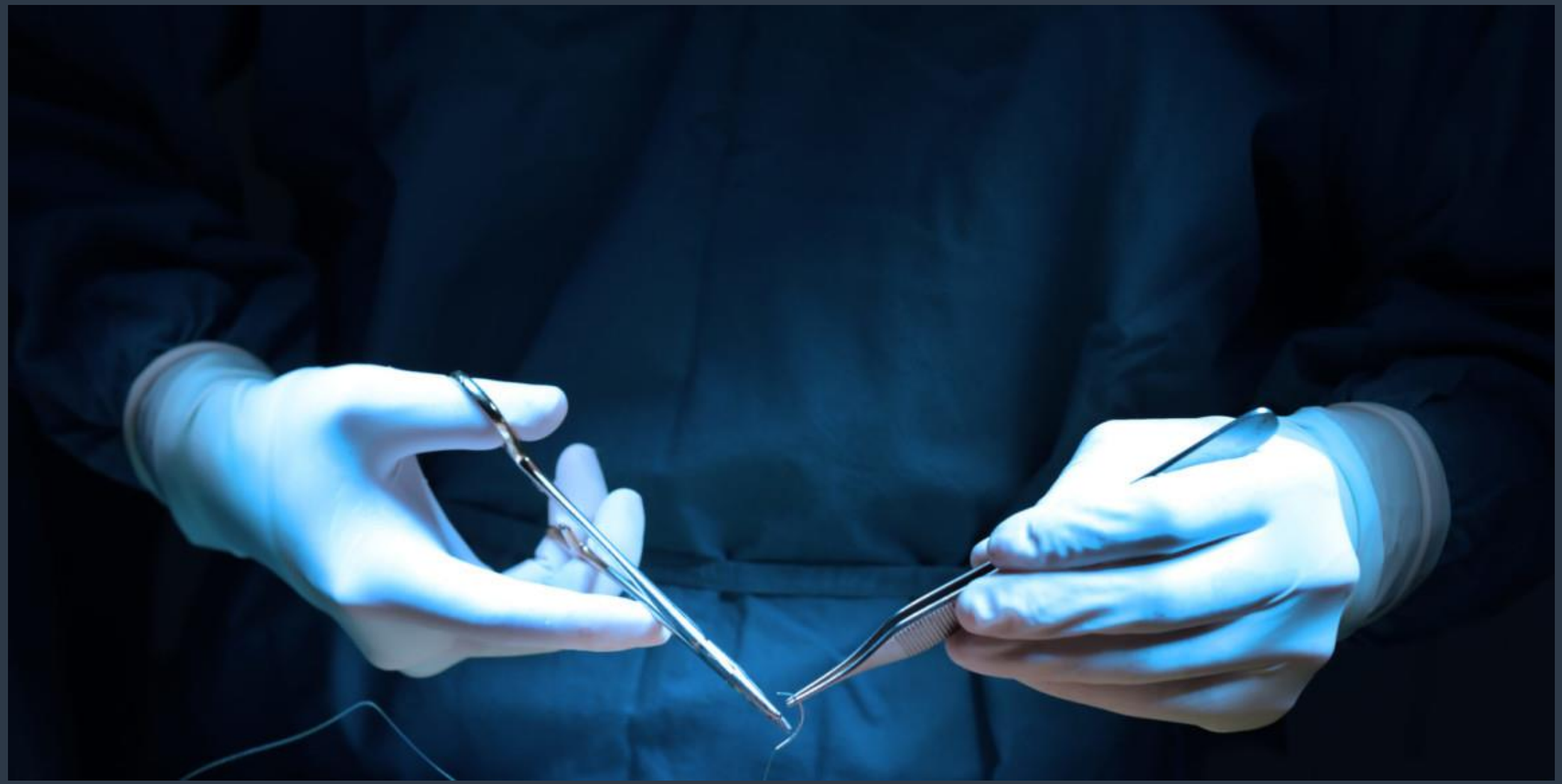


FIGURE 2 | Receiver operating characteristic area under the curves of machine learning models in the training and validation datasets. ML, machine learning; NB, Naive Bayes; LR, Linear Regression; DT, Decision Tree; RF, Random Forest; GBDT, Gradient Boosting Decision Tree; AUC, area under the curve.

뭣이중헌디?



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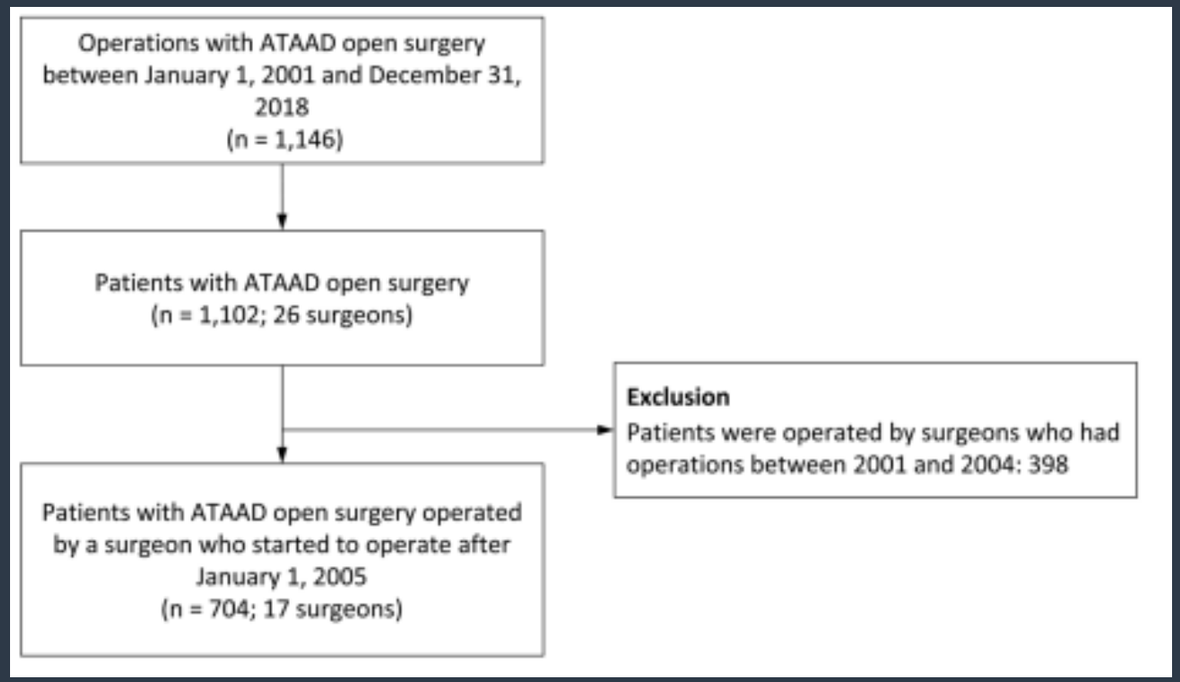
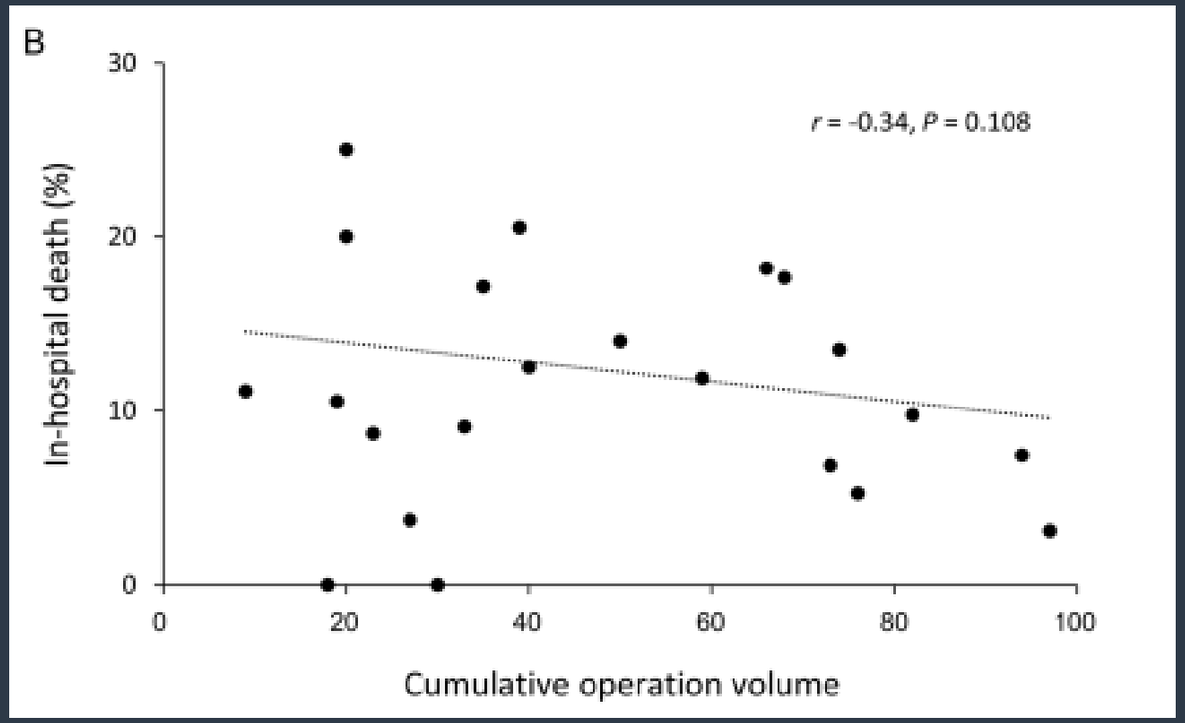
Learning curve for open surgical repair of acute type A aortic dissection

Bo-Cheng Hou[1,6,7], Yu-Tung Huang[3,7], Fu-Chih Hsiao[2], Chien-Chia Wu[4], Yu-Ting Cheng[2], Kuo-Sheng Liu[2,3], Shang-Hung Chang[3,4], Pao-Hsien Chu[4], An-Hsun Chou[5] & Shao-Wei Chen[2,3]✉





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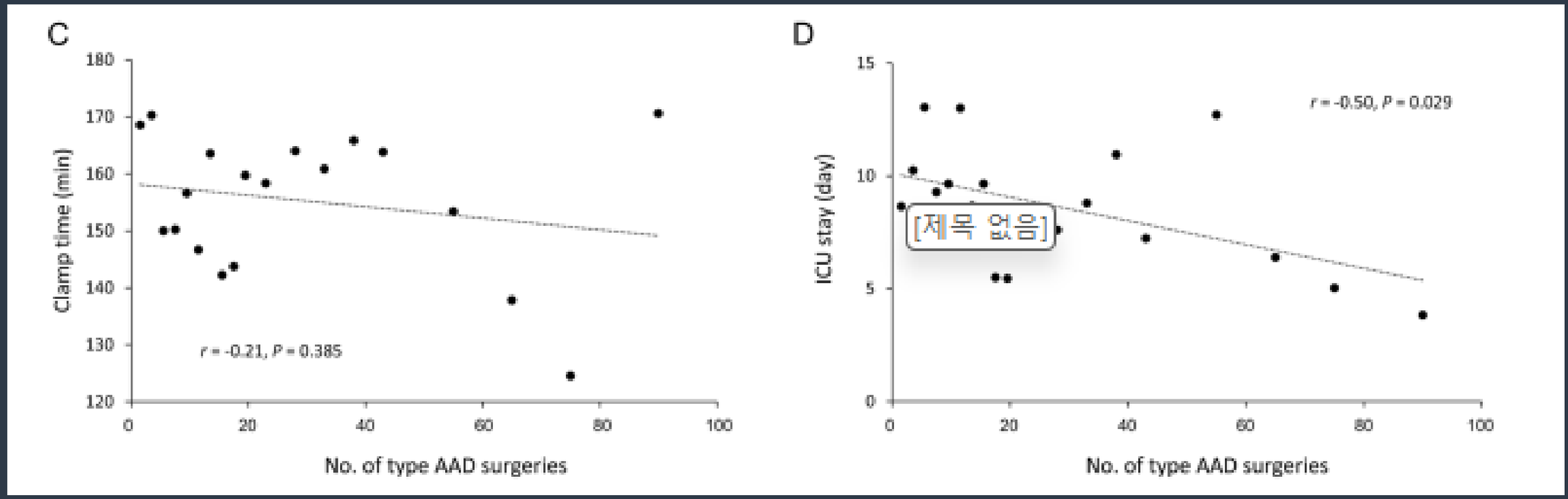

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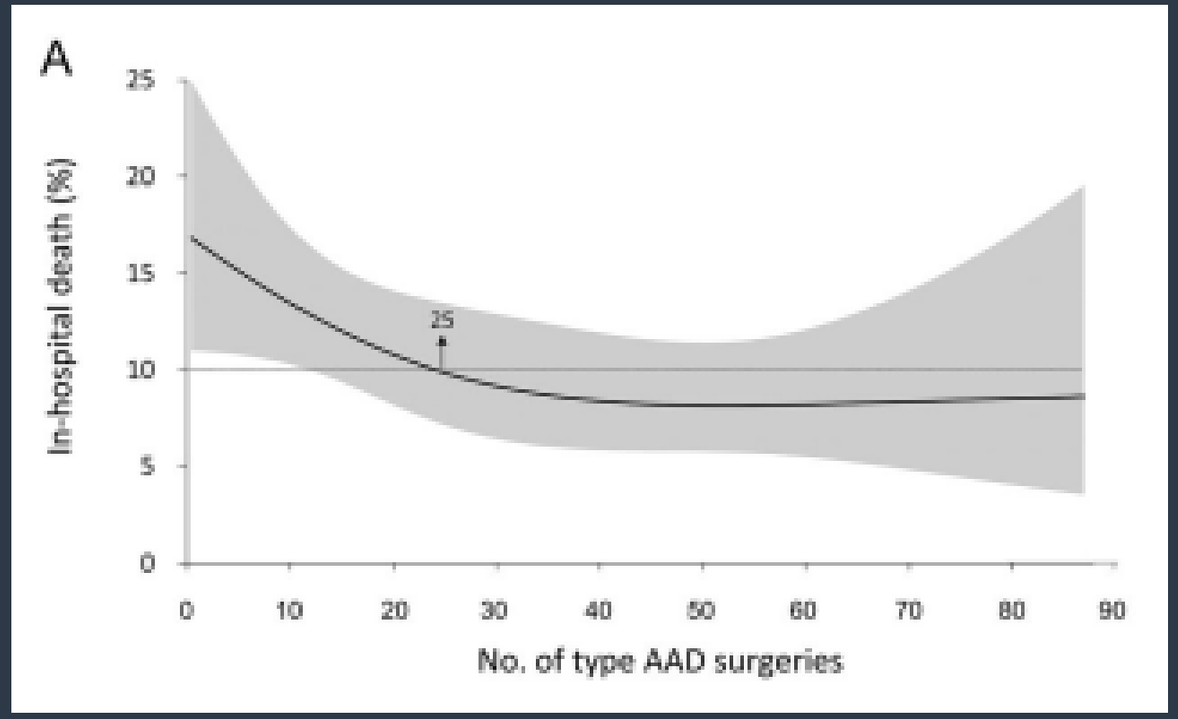


Guideline for Thoracic Aortic Disease

Recommendations	Class	LOC
1. Urgent surgical consultation should be obtained for all patients diagnosed with thoracic aortic dissection regardless of the anatomic location.	Class I	C
2. Acute thoracic aortic dissection involving the ascending aorta should be urgently evaluated for emergent surgical repair.[5]	Class I	B
3. Acute thoracic aortic dissection involving the descending aorta should be managed medically unless life-threatening complications.[6-11]	Class I	B
4. For patients with ascending aortic dissection, the entire aneurysmal aorta and the proximal extent of the dissection should be resected. A partially dissected aortic root may be repaired with aortic valve resuspension. Extensive dissection of the aortic root should be treated with aortic root replacement with a composite graft or with a valve sparing root replacement. If a DeBakey Type II dissection is present, the entire dissected aorta should be replaced.	Class I	C
5. Replacement of the entire aortic arch is reasonable for acute dissection when the arch is aneurysmal or there is extensive aortic arch destruction and leakage.[12,13]	Class IIa	B
6. It is reasonable to treat intramural hematoma similar to aortic dissection in the corresponding segment of the aorta	Class IIa	C

Extended Arch Procedures for Acute Type A Aortic Dissection: A Downstream Problem?

Steven L. Lansman, MD, PhD,[*,†] *Joshua B. Goldberg, MD,*[*,†] *Masashi Kai,*[*,†] *Ramin Malekan, MD,*[*,†] *and David Spielvogel, MD*[*,†]

Current discussion regarding the management of acute type A aortic dissection is focused on whether to perform a standard hemiarch resection or perform an extended repair, in hopes of improving long-term outcomes by avoiding late, distal aortic sequelae. Critical to this discussion is an estimation of the short-term risks of an extended procedure and the magnitude of the late "downstream problem." Extension of the hemiarch to a total arch plus frozen elephant trunk does not improve survival; carries some increased perioperative risk, not the least of which is paraplegia; but decreases late aortic events, the most common of which is reoperation on the distal aorta. However, these reoperations are low frequency, primarily elective, low-risk events and it should be noted that extended index repairs do not eliminate or necessarily decrease the incidence of late reoperations. Routine extension of the index procedure puts 100% of patients at risk in order to protect a minority that may benefit. Therefore, it is important to select patients at high risk for reoperation if an extended repair is to be performed. Predictors that may identify this high-risk group include the size and location of the entry tear, aortic and luminal dimensions, degree of luminal flow and thrombosis, and the presence of a connective tissue disorder. Timing may also be important and, in patients at high risk for late events, early complications may be minimized by strategies that delay an extension of the proximal repair until the subacute period.

Semin Thoracic Surg 31:17–20

Keywords: Aorta, Arch, Frozen elephant trunk, Type A dissection

Dr Steven L. Lansman.

Central Message

Distal aortic reoperation after a hemiarch repair for type A dissection is a low frequency, primarily elective, low-risk event. Only patients at high risk for late events need extended index repairs.

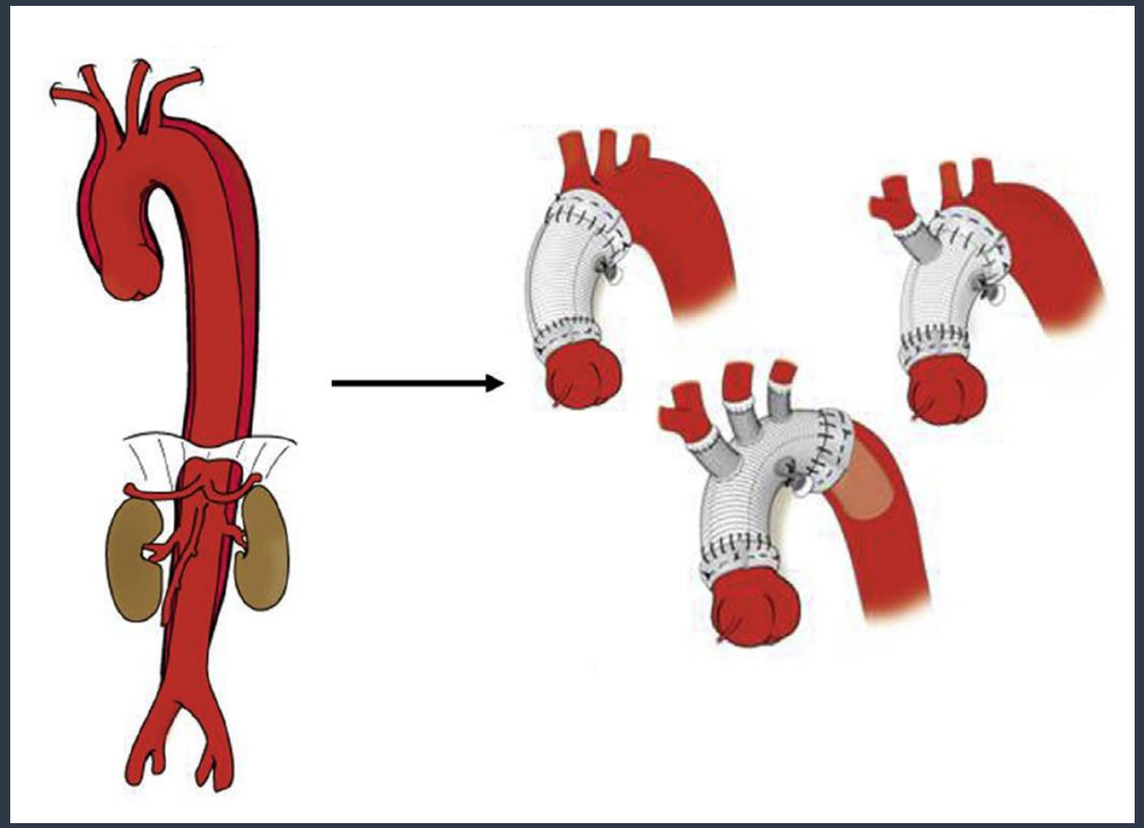
Perspective Statement

Current discussion regarding the management of acute type A aortic dissection is focused on whether to perform a standard hemiarch resection or an extended repair, in hopes of improving long- term outcomes by avoiding late, distal aortic sequelae. Critical to this discussion is an estimation of the short-term risks of an extended procedure and the magnitude of the late "downstream problem."

INTRODUCTION

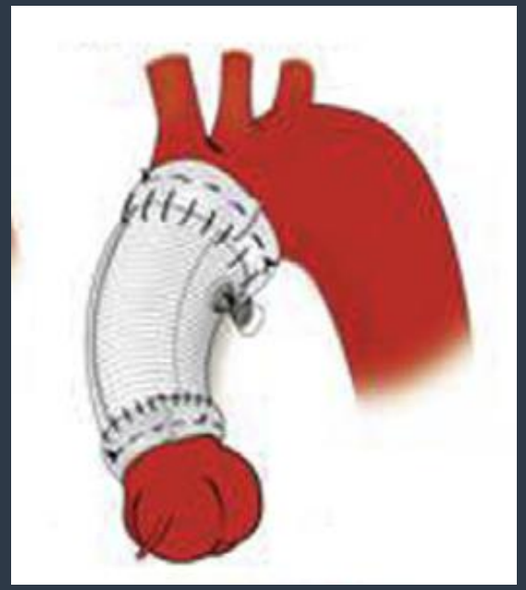
Current discussion regarding the management of acute type A aortic dissection (ATAAD) is focused on whether to perform a proximal repair, such as a hemiarch resection, or an extended repair, such as a total arch replacement, possibly including an elephant trunk or fixed elephant trunk, in hopes of improving long-term outcomes. Suggested indications for performing an

Surgical Extents



Omura et al. J Thorac Cardiovasc Surg 2016

Hemiarch Replacement



Life salvaging aim

Shorter procedural times

Maybe safer, generalizable

Deferred distal repair: maybe safe

Total-arch Replacements

Protective against arch-vessel malperfusion

Late distal events: maybe lower

Neverending Debates

Long-Term
Aortic Dis
Patency

Khalil Fattouch, M
Marco Caruso, MI
Giuseppe Speziale
Department of Cardiac Su

Background. Late sur
ment on the descending
ing aortic repair for
(TAAD).
Methods. Between M
TAAD patients (mea
years) were included;
lumen, and 49 had Ma
aorta was evaluated po
mography (CT). Late c
regression analysis and
from retreatment by th
follow-up was 88 ± 44
Results. There were 3
survival was 89.8% ± 2.
false lumen and 59.8% ±
false lumen ($p = 0.001$),

Reoperation
for acute ty

Naoyuki Kimura
Harunobu Matsu

Objective:
false lume
Methods:
dissection
survivors
Risk-adj
distal re
Results:
(94%)
$P = .0$
1.07; P
$P < .0$
(HR, 1
desce
with
thron
20%
Conclusions:
Outcomes of
the late outcor
with early morbidity
for improving short- and long-term
warrants study. (J Thorac Cardiovas

Aortic Dissection

CONCLUSIONS: The proximal
dissection. The large proximal descending aort
procedures combined with aortic replacement are

Keywords: Aortic dissection • Aortic aneurysm

ORIGINAL ARTICLE

lse-lumen area ratio on Type B aortic dissection prog-

lumen area ratio on
gnosis†

ri Sato[b] and Wahei Mihara[a]

nami-cho, Chuo-ku, Chiba 260-0842, Japan.

B aortic dissection (ATBAD). Although endovascular
ould undergo endovascular intervention. We aimed
factors for major adverse events.

initial treatment for uncomplicated ATBAD between
months. We evaluated the incidence of major adverse
d the predictors of major adverse events using multi-

s had major adverse events. The 1-, 3-, and 5-year rates
The independent risk factors for major adverse events
.888–7.390; P < 0.001) and false-lumen diameter > true-
4).

lumen diameter are predictors of major adverse events
y endovascular intervention.

open-bin/ctr_e/ctr_view.cgi?recptno=R000029229.

Clinical registration number: UMIN 000025

Keywords: Uncomplicated • Acute Type B aortic dissection • Adverse events • Predictors

Systematic Review

Hemiarch versus total aortic arch replacement in acute type A dissection: a systematic review and meta-analysis

Shi Sum Poon, Thomas Theologou, Deborah Harrington, Manoj Kuduvalli, Aung Oo, Mark Field

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Background: Despite recent advances in aortic surgery, acute type A aortic dissection remains a surgical emergency associated with high mortality and morbidity. Appropriate management is crucial to achieve satisfactory outcomes but the optimal surgical approach is controversial. The present systematic review and meta-analysis sought to access cumulative data from comparative studies between hemiarch and total aortic arch replacement in patients with acute type A aortic dissection.

Methods: A systematic review of the literature using six databases. Eligible studies include comparative studies on hemiarch versus total arch replacement reporting short, medium and long term outcomes. A meta-analysis was performed on eligible studies reporting outcome of interest to quantify the effects of hemiarch replacement on mortality and morbidity risk compared to total arch replacement.

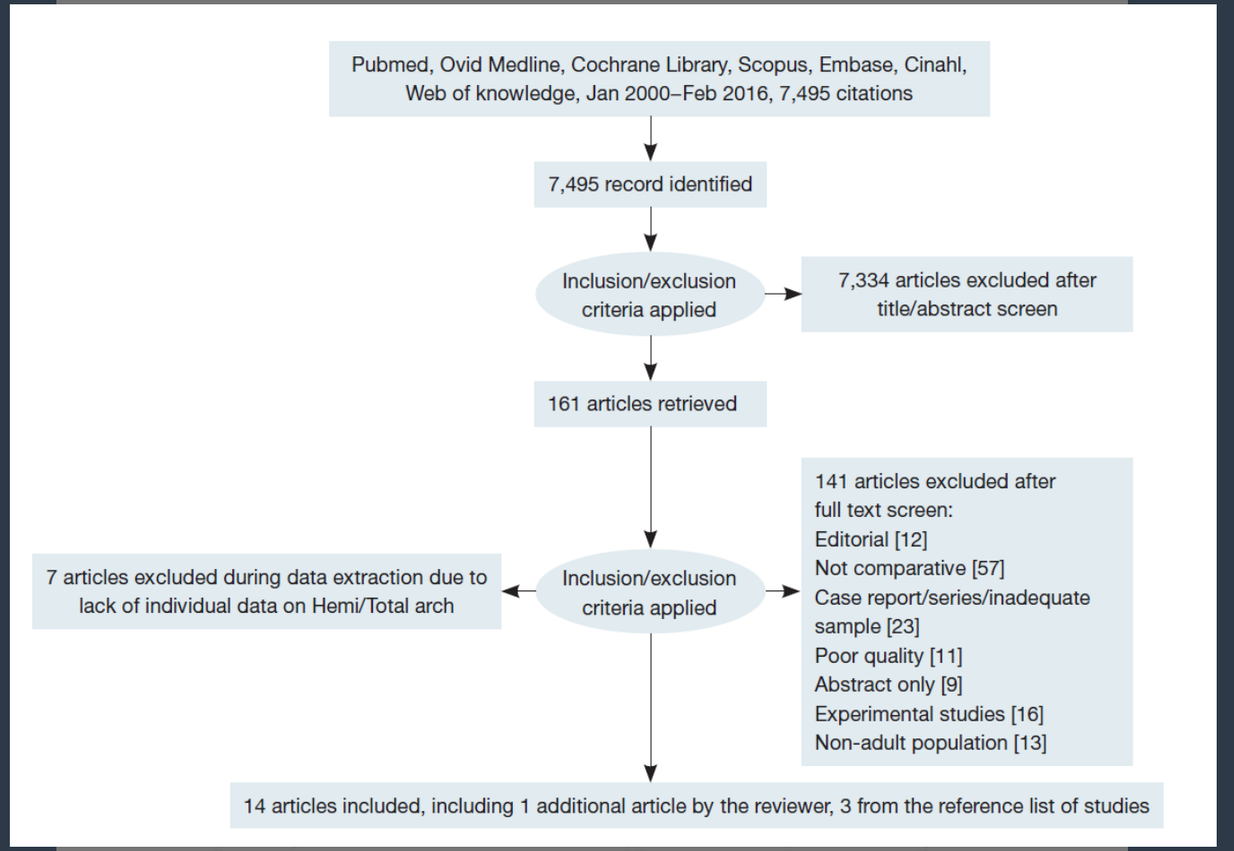
Result: Fourteen retrospective studies met the inclusion criteria and 2,221 patients were included in the final analysis. Pooled analysis showed that hemiarch replacement was associated with a lower risk of post-operative renal dialysis [risk ratio (RR) =0.72; 95% confidence interval (CI): 0.56–0.94; P=0.02; I^2=0%]. There was no significant difference in terms of in-hospital mortality between the two groups (RR =0.84; 95% CI: 0.65–1.09; P=0.20; I^2=0%). Cardiopulmonary bypass, aortic cross clamp and circulatory arrest times were significantly longer in total arch replacement. During follow up, no significant difference was reported from current studies between the two operative approaches in terms of aortic re-intervention and freedom from aortic reoperation.

Conclusions: Within the context of publication bias by high volume aortic centres and non-randomized data sets, there was no difference in mortality outcomes between the two groups. This analysis serves to demonstrate that for those centers doing sufficient total aortic arch activity to allow for publication, excellent and equivalent outcomes are achievable. Conclusions on differences in longer term outcome data are required. We do not, however, advocate total arch as a primary approach by all centers and surgeons irrespective of patient characteristics, but rather, a tailored approach based on surgeon and center experience and patient presentation.

Keywords: Hemiarch replacement; total arch replacement; acute type A dissection; meta-analysis

Systematic Review

Hemiarch versus total aortic arch replacement in acute type A



and patient presentation.

Keywords: Hemiarch replacement; total arch replacement; acute type A dissection; meta-analysis

Systematic Review

Hemiarch versus total aortic arch replacement in

Mortality

Study or Subgroup	Hemiarch Events	Hemiarch Total	Total arch Events	Total arch Total	Weight	Risk Ratio IV, Fixed, 95% CI
A Omura 2016	16	109	9	88	11.4%	1.44 [0.67, 3.09]
B Rylski 2014	8	37	4	14	6.3%	0.76 [0.27, 2.12]
D Eusanio 2015	45	187	12	53	21.5%	1.06 [0.61, 1.86]
Enyi Shi 2014	3	71	5	84	3.4%	0.71 [0.18, 2.87]
H Zhang 2014	4	74	5	88	4.1%	0.95 [0.27, 3.41]
JB Kim 2011	14	144	6	44	8.4%	0.71 [0.29, 1.74]
LZ Sun 2014	4	66	7	148	4.7%	1.28 [0.39, 4.23]
M Shiono 2006	7	105	2	29	2.9%	0.97 [0.21, 4.41]
MH Tan 2003	9	53	4	17	6.2%	0.72 [0.25, 2.05]
N Uchida 2009	2	55	3	65	2.2%	0.79 [0.14, 4.55]
P Vallabhajosyula 2015	4	30	8	31	5.6%	0.52 [0.17, 1.54]
R Rice 2015	57	440	10	49	18.4%	0.63 [0.35, 1.16]
S Ohtsubo 2002	2	23	6	24	3.0%	0.35 [0.08, 1.55]
XF Dai 2015	2	41	2	52	1.8%	1.27 [0.19, 8.62]
Total (95% CI)		**1435**		**786**	**100.0%**	**0.84 [0.65, 1.09]**
Total events	177		83			

Heterogeneity: Chi² = 6.52, df = 13 (P = 0.93); I² = 0%

Test for overall effect: Z = 1.27 (P = 0.20)

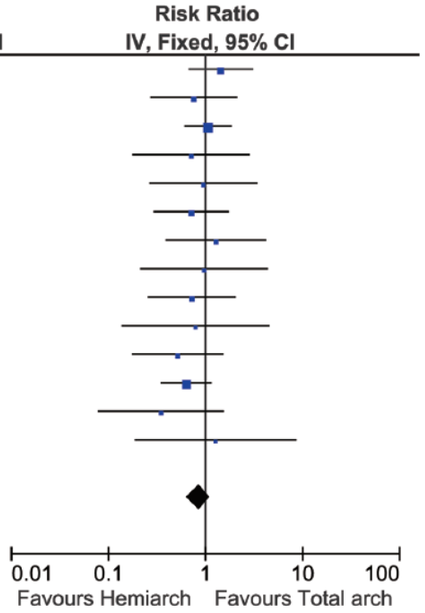


Figure 2 In-hospital mortality. RR =0.84 (95% CI: 0.65–1.09), P=0.20, I^2=0%. RR, risk ratio; CI, confidence interval.

excellent and equivalent outcomes are achievable. Conclusions on differences in longer term outcome data are required. We do not, however, advocate total arch as a primary approach by all centers and surgeons irrespective of patient characteristics, but rather, a tailored approach based on surgeon and center experience and patient presentation.

Keywords: Hemiarch replacement; total arch replacement; acute type A dissection; meta-analysis

Systematic Review

Hemiarch versus total aortic arch replacement in
dissection: a systematic review and meta-analysis

Neurology

Study or Subgroup	Hemiarch Events	Hemiarch Total	Total arch Events	Total arch Total	Weight	Risk Ratio IV, Random, 95% CI
A Omura 2016	5	109	2	88	7.3%	2.02 [0.40, 10.15]
B Rylski 2014	2	37	1	14	3.8%	0.76 [0.07, 7.70]
D Eusanio 2015	17	187	4	53	15.2%	1.20 [0.42, 3.43]
Enyi Shi 2014	0	71	0	84		Not estimable
H Zhang 2014	1	74	2	88	3.6%	0.59 [0.06, 6.43]
JB Kim 2011	9	144	10	44	21.1%	0.28 [0.12, 0.63]
LZ Sun 2014	2	66	7	148	8.0%	0.64 [0.14, 3.00]
M Shiono 2006	8	105	3	29	11.2%	0.74 [0.21, 2.60]
P Vallabhajosyula 2015	2	30	2	31	5.5%	1.03 [0.16, 6.87]
R Rice 2015	46	440	4	49	16.8%	1.28 [0.48, 3.41]
S Ohtsubo 2002	4	23	2	24	7.5%	2.09 [0.42, 10.32]
Total (95% CI)		**1286**		**652**	**100.0%**	**0.82 [0.52, 1.31]**
Total events	96		37			

Heterogeneity: Tau² = 0.08; Chi² = 10.63, df = 9 (P = 0.30); I² = 15%
Test for overall effect: Z = 0.81 (P = 0.42)

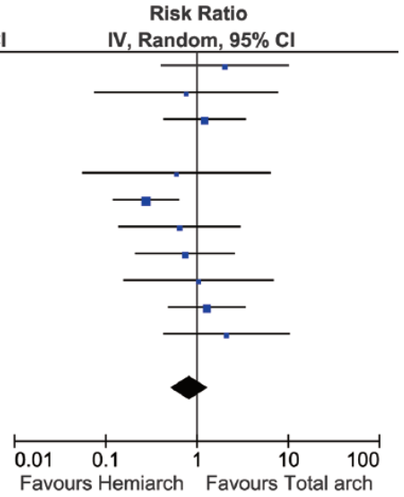


Figure 5 Permanent neurological dysfunction. RR =0.82 (95% CI: 0.52–1.31), P=0.42, I^2=15%. RR, risk ratio; CI, confidence interval.

Conclusions: Within the context of publication bias by high volume aortic centres and non-randomized data sets, there was no difference in mortality outcomes between the two groups. This analysis serves to demonstrate that for those centers doing sufficient total aortic arch activity to allow for publication, excellent and equivalent outcomes are achievable. Conclusions on differences in longer term outcome data are required. We do not, however, advocate total arch as a primary approach by all centers and surgeons irrespective of patient characteristics, but rather, a tailored approach based on surgeon and center experience and patient presentation.

Keywords: Hemiarch replacement; total arch replacement; acute type A dissection; meta-analysis

Systematic Review

Hemiarch versus total aortic arch replacement in [illegible] dissection: a systematic review and meta-analysis

Dialysis

Study or Subgroup	Hemiarch Events	Hemiarch Total	Total arch Events	Total arch Total	Weight	Risk Ratio IV, Fixed, 95% CI
A Omura 2016	9	109	7	88	7.7%	1.04 [0.40, 2.68]
D Eusanio 2015	35	187	13	53	22.1%	0.76 [0.44, 1.33]
Enyi Shi 2014	4	74	7	84	4.9%	0.65 [0.20, 2.13]
H Zhang 2014	1	74	2	88	1.2%	0.59 [0.06, 6.43]
JB Kim 2011	31	144	13	44	22.6%	0.73 [0.42, 1.27]
LZ Sun 2014	2	66	1	148	1.2%	4.48 [0.41, 48.60]
M Shiono 2006	13	105	5	29	7.7%	0.72 [0.28, 1.85]
N Uchida 2009	1	55	3	65	1.4%	0.39 [0.04, 3.68]
P Vallabhajosyula 2015	3	30	7	31	4.4%	0.44 [0.13, 1.55]
R Rice 2015	76	432	13	49	26.7%	0.66 [0.40, 1.10]
Total (95% CI)		**1276**		**679**	**100.0%**	**0.72 [0.56, 0.94]**
Total events	175		71			

Heterogeneity: Chi² = 3.89, df = 9 (P = 0.92); I² = 0%
Test for overall effect: Z = 2.40 (P = 0.02)

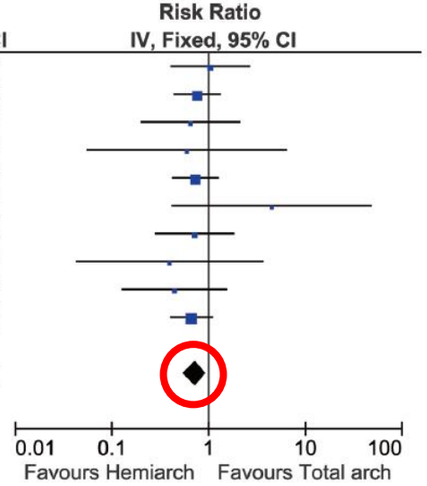


Figure 6 Renal dialysis. RR =0.72 (95% CI: 0.56–0.94), P=0.02, I^2=0%. RR, risk ratio; CI, confidence interval.

Conclusions: Within the context of publication bias by high volume aortic centres and non-randomized data sets, there was no difference in mortality outcomes between the two groups. This analysis serves to demonstrate that for those centers doing sufficient total aortic arch activity to allow for publication, excellent and equivalent outcomes are achievable. Conclusions on differences in longer term outcome data are required. We do not, however, advocate total arch as a primary approach by all centers and surgeons irrespective of patient characteristics, but rather, a tailored approach based on surgeon and center experience and patient presentation.

Keywords: Hemiarch replacement; total arch replacement; acute type A dissection; meta-analysis

Systematic Review

Hemiarch versus total aortic arch replaceme
dissection: a systematic review and meta-analysis

Distal reoperation

Study or Subgroup	Hemiarch Events	Hemiarch Total	Total arch Events	Total arch Total	Weight	Risk Ratio IV, Fixed, 95% CI
A Omura 2016	9	109	3	88	12.4%	2.42 [0.68, 8.68]
B Rylski 2014	2	37	0	14	2.3%	1.97 [0.10, 38.74]
D Eusanio 2015	17	187	6	53	26.2%	0.80 [0.33, 1.93]
Enyi Shi 2014	0	71	0	84		Not estimable
H Zhang 2014	11	65	4	74	16.9%	3.13 [1.05, 9.36]
JB Kim 2011	5	144	2	44	7.9%	0.76 [0.15, 3.80]
LZ Sun 2014	4	66	1	148	4.3%	8.97 [1.02, 78.72]
M Shiono 2006	8	105	4	29	15.9%	0.55 [0.18, 1.71]
MH Tan 2003	7	53	0	17	2.6%	5.00 [0.30, 83.26]
N Uchida 2009	3	55	2	65	6.6%	1.77 [0.31, 10.23]
P Vallabhajosyula 2015	1	30	1	31	2.7%	1.03 [0.07, 15.78]
XF Dai 2015	3	34	0	48	2.4%	9.80 [0.52, 183.76]
Total (95% CI)		**956**		**695**	**100.0%**	**1.45 [0.93, 2.28]**
Total events	70		23			

Heterogeneity: Chi² = 12.91, df = 10 (P = 0.23); I² = 23%
Test for overall effect: Z = 1.62 (P = 0.10)

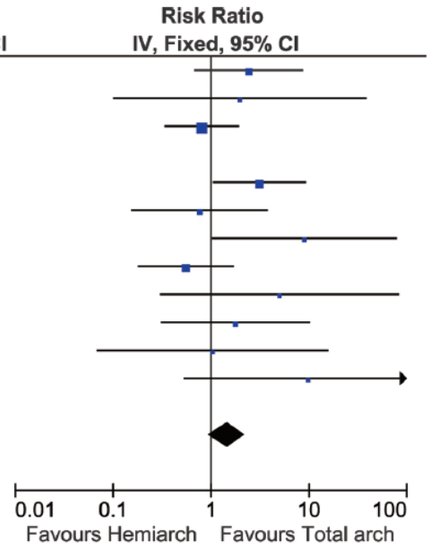
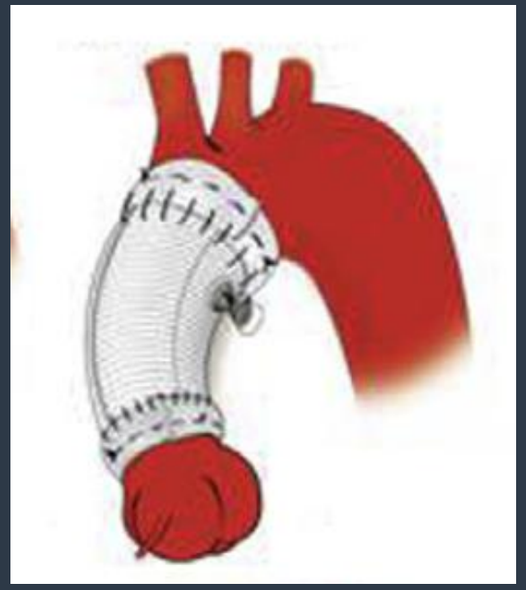


Figure 7 Aortic re-operation. RR =1.45 (95% CI: 0.93–2.28), P=0.10, I^2=23%. RR, risk ratio; CI, confidence interval.

data sets, there was no difference in mortality outcomes between the two groups. This analysis serves to demonstrate that for those centers doing sufficient total aortic arch activity to allow for publication, excellent and equivalent outcomes are achievable. Conclusions on differences in longer term outcome data are required. We do not, however, advocate total arch as a primary approach by all centers and surgeons irrespective of patient characteristics, but rather, a tailored approach based on surgeon and center experience and patient presentation.

Keywords: Hemiarch replacement; total arch replacement; acute type A dissection; meta-analysis

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Regional and Temporal Trends in the Outcomes of Repairs for Acute Type A Aortic Dissections

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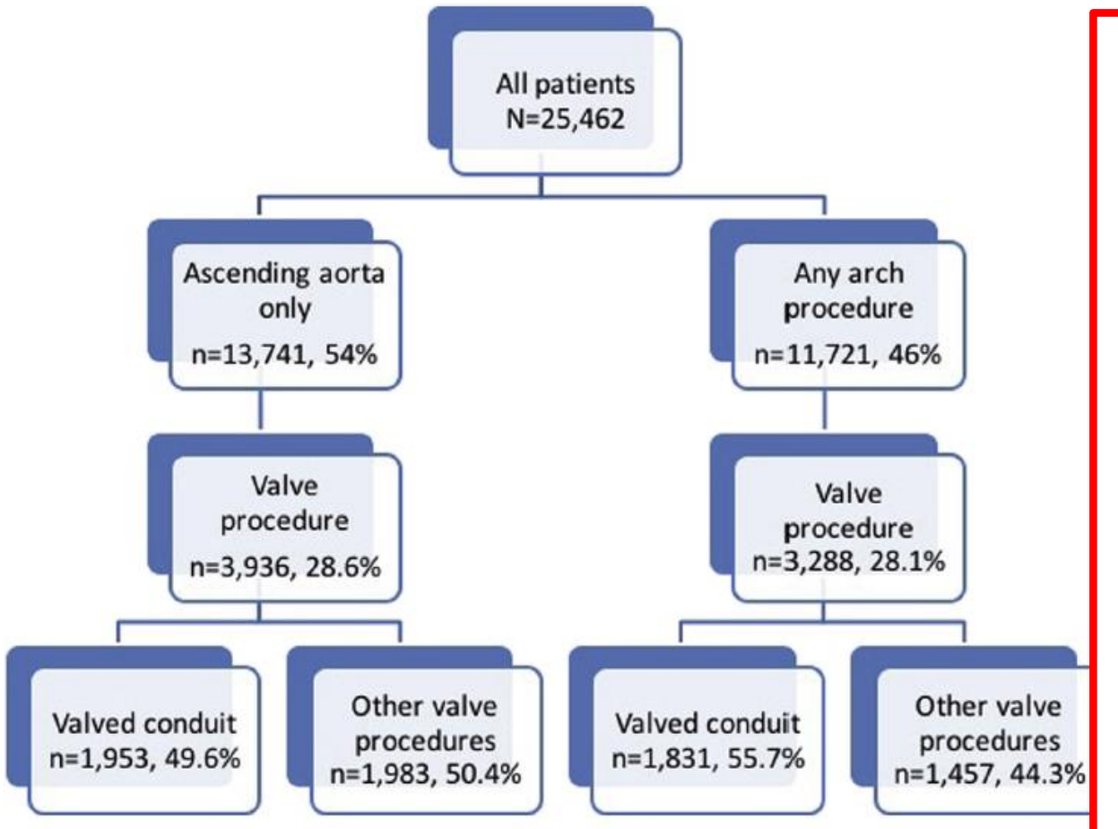
Background. Little information exists regarding the use of arch operations for repair of acute type A aortic dissections (AADs) despite increasing interest in this strategy and its potential impact on outcomes. We aimed to determine the relationship between extent of aortic repair, US geographic regions, and outcome.

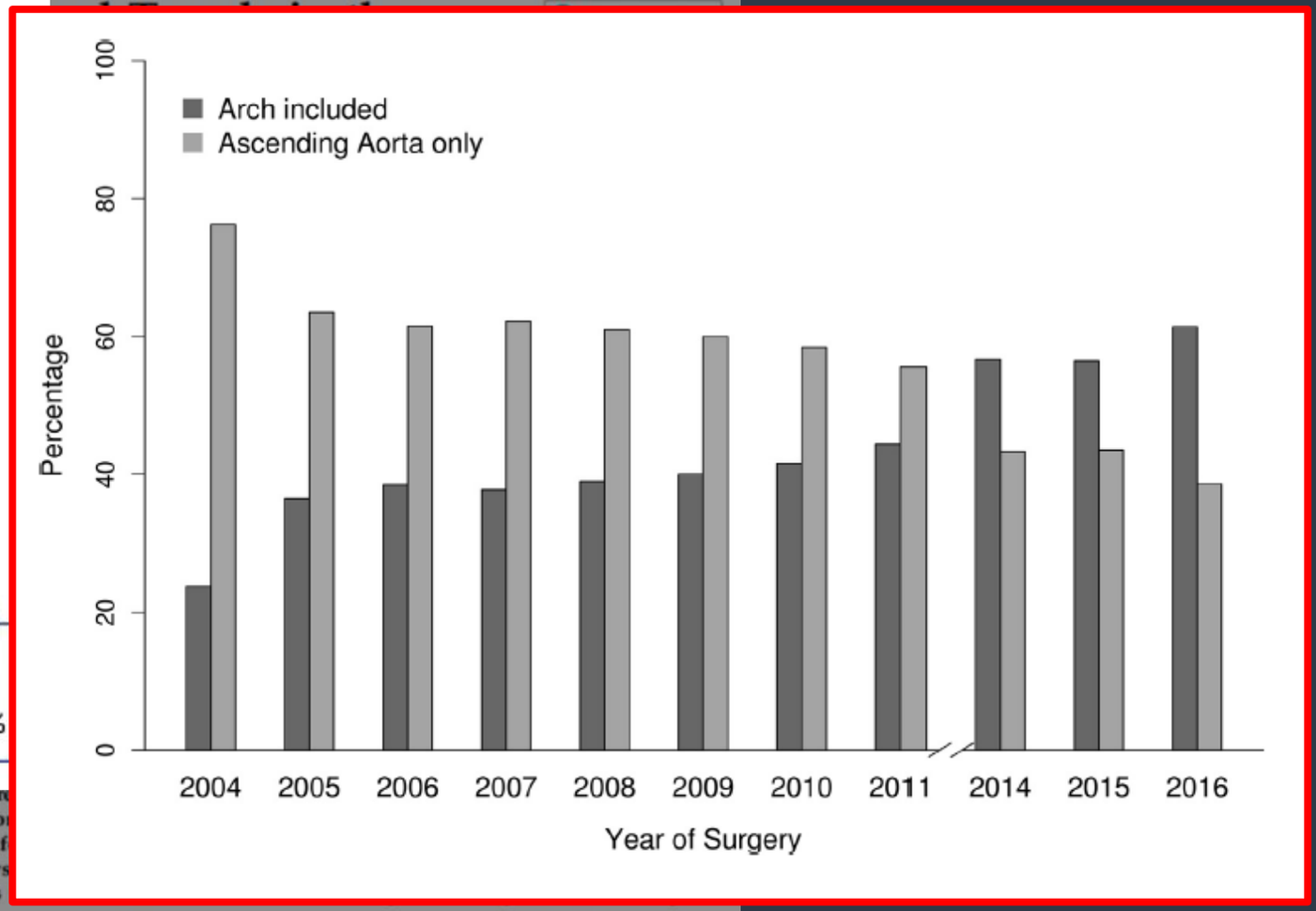
Methods. We queried The Society of Thoracic Surgeons database for patients who underwent AAD repair from January 1, 2004 to December 31, 2016 and grouped patients by ascending-only operations and operations involving the arch.

Results. We identified 25,462 patients (mean age, 59.8 ± 14.2; 66.7% men) who underwent AAD repair. Operations involving the ascending aorta only were performed in 54% of patients; 46% had repair additionally involving the arch. The 30-day mortality was 18.9% for patients who underwent ascending-only operations vs 19.8% for patients who underwent arch operations ($P = .09$). In multivariable analysis older age ($P < .001$), earlier year of operation ($P < .001$), diabetes mellitus ($P < .001$), severe chronic lung disease ($P < .001$), prior cerebrovascular disease ($P < .001$), and longer bypass time ($P < .001$) were independently associated with 30-day mortality. There was regional variation in 30-day mortality ($P < .001$), and incidence of arch repair varied from 38.6% to 52.6% in 9 geographic regions ($P < .001$).

Conclusions. In this analysis of cardiac surgical practice in the United States, repair of AADs included a portion of the aortic arch in 46% of patients. Early mortality remained high throughout the current era regardless of extent of aortic resection. Regional variation in perioperative mortality may signal an opportunity for practice improvement.

(Ann Thorac Surg 2020;109:26-35)


All patients
N=25,462
Ascending aorta only
n=13,741, 54%
Any arch procedure
n=11,721, 46%
Valve procedure
n=3,936, 28.6%
Valve procedure
n=3,288, 28.1%
Valved conduit
n=1,953, 49.6%
Other valve procedures
n=1,983, 50.4%
Valved conduit
n=1,831, 55.7%
Other valve procedures
n=1,457, 44.3%


Arch included
Ascending Aorta only
Percentage
0
20
40
60
80
100
2004
2005
2006
2007
2008
2009
2010
2011
2014
2015
2016
Year of Surgery

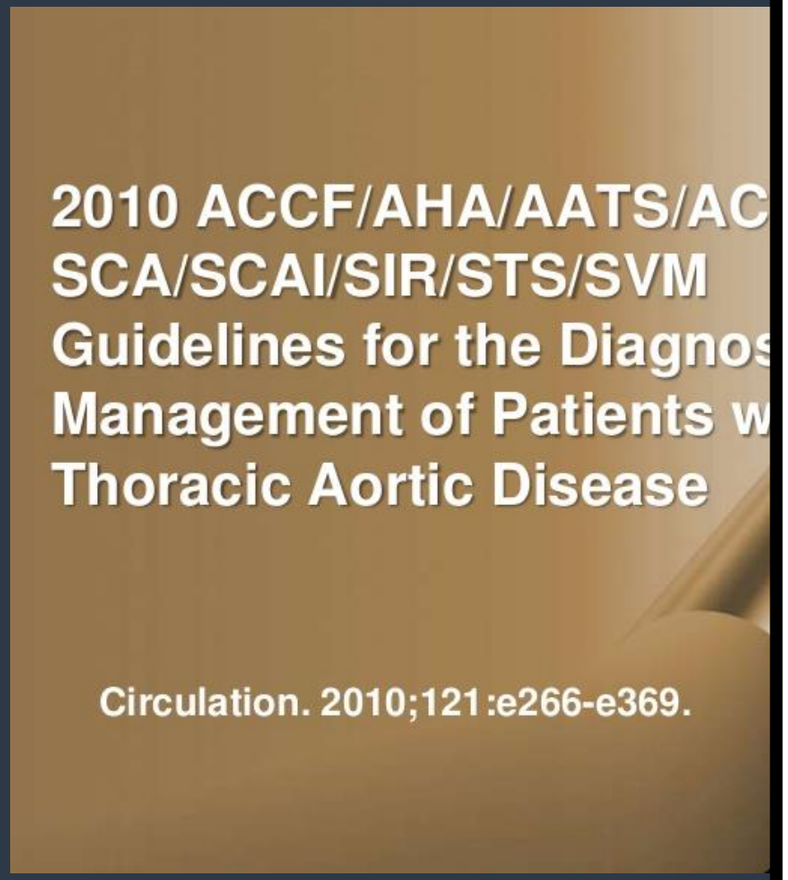
The Fall of Inca


Edward Jenner, M.D.


100 DOSES
℞ only
Smallpox Vaccine
Dried, Calf Lymph Type
Dryvax®
Dose: Approx. 2.5 µL
WYETH LABORATORIES
Marietta, PA 17547 U.S.A.
U.S. Govt. License No. 3
0346-02-2

Chronic Type A Aortic Dissection

No Guideline for Chronic Dissection??



Class I

1. Asymptomatic patients with degenerative thoracic aneurysm, chronic aortic dissection, intramural hematoma, penetrating atherosclerotic ulcer, mycotic aneurysm, or pseudoaneurysm, who are otherwise suitable candidates and for whom the ascending aorta or aortic sinus diameter is 5.5 cm or greater, should be evaluated for surgical repair.[371] (*Level of Evidence: C*)
2. Patients with Marfan syndrome or other genetically mediated disorders (vascular Ehlers-Danlos syndrome, Turner syndrome, bicuspid aortic valve, or familial thoracic aortic aneurysm and dissection) should undergo elective operation at smaller diameters (4.0 to 5.0 cm depending on the condition; see Section 5) to avoid acute dissection or rupture.[81,114,143,371,436–439] (*Level of Evidence: C*)
3. Patients with a growth rate of more than 0.5 cm/y in an aorta that is less than 5.5 cm in diameter should be considered for operation. (*Level of Evidence: C*)
4. Patients undergoing aortic valve repair or replacement and who have an ascending aorta or aortic root of greater than 4.5 cm should be considered for concomitant repair of the aortic root or replacement of the ascending aorta. (*Level of Evidence: C*)

E OF CONTENTS

The fate of unrepaired chronic type A aortic dissection

Wan Kee Kim, MD, Sung Jun Park, MD, Ho Jin Kim, MD, Hee Jung Kim, MD, Suk Jung Choo, MD, PhD, and Joon Bum Kim, MD, PhD

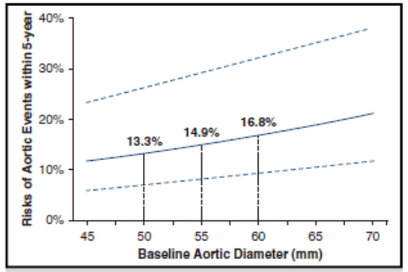
ABSTRACT

Objectives: The current guidelines do not consider chronic type A aortic dissection as one of the triggers for prophylactic aortic repair, and an aortic diameter of 55 mm is considered the threshold for surgery.

Methods: From the institutional database, we retrieved 82 patients who were diagnosed as having chronic type A aortic dissection but did not undergo immediate surgical repair from 1997 to 2016. The primary outcome was a composite of adverse aortic events defined as aortic rupture and sudden death. Conversion to elective surgery during follow-up was regarded as competing risk for adverse events.

Results: The median value of the maximal aortic diameter at baseline was 55.2 mm. During a median follow-up of 77.1 months, 19 adverse events occurred while 9 patients received elective aortic repair. On multivariable competing risk analyses, baseline aortic diameter and age emerged as significant and independent factors associated with aortic events. The estimated rates of aortic event within 5 years were 12.0%, 19.4%, and 29.7% for aortic diameters of 50, 60, and 70 mm, respectively, with escalating risk rates as age increased for the given aortic diameters.

Conclusions: In unrepaired chronic type A aortic dissection, aortic events were not infrequent even for patients with an aortic diameter of less than 55 mm. This finding indicates that there may be a need to lower the surgical threshold for chronic type A aortic dissection. (J Thorac Cardiovasc Surg 2019;158:996-1004)



Predicted aortic event rates within 5 years depending on the baseline aortic diameter.

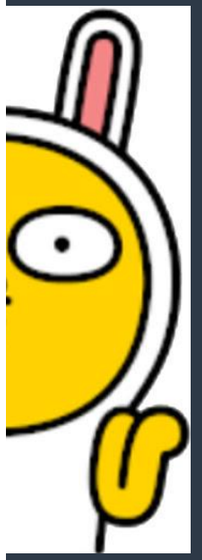
Central Message

The risk of rupture is substantial even in a moderately sized ascending aorta (50 mm) with chronic dissection. The surgical threshold for chronic ascending AD needs to be reevaluated.

Perspective

The risk for aortic rupture or sudden death in chronic type A AD is significantly associated with advancing age and baseline aortic diameter. This risk is substantial even with a moderately dilated ascending aorta (50 mm). Further evaluations in larger studies and discussions on the optimal surgical threshold are necessary.

See Commentary on page 1005.



Subject Patients

JAN 1997 to DEC 2016

Type A Aortic Dissection, n=765

Exclusion:
Acute aortic dissection
Inflammatory aortopathy
Traumatic aortic dissection

Chronic Type A AD, n=142

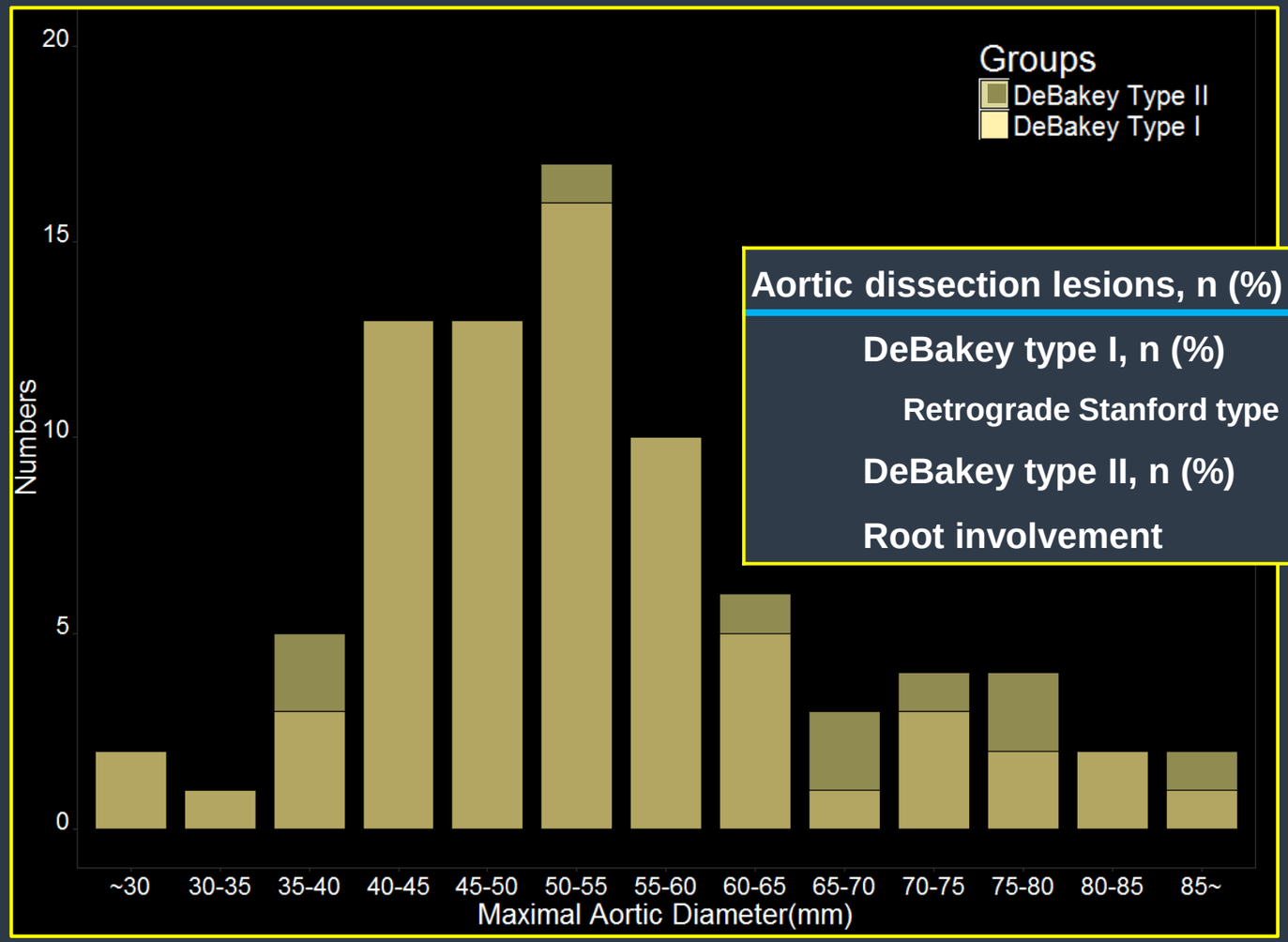
No Immediate Surgical Repair, n=82

***As intention to treat method**

Baseline Characteristics

Characteristics	n=82
Age, year	62.1 ± 13.3
Female gender, n (%)	47 (57.3)
BMI	23.7 ± 3.2
BSA	1.6 ± 0.2
Diabetes mellitus, n (%)	7 (8.5)
Hypertension, n (%)	51 (62.2)

Profiles of the Ascending Aorta



Aortic dissection lesions, n (%)	n=82
DeBakey type I, n (%)	72 (87.7)
Retrograde Stanford type A, n (%)	23 (28)
DeBakey type II, n (%)	10 (12.2)
Root involvement	17 (20.7)

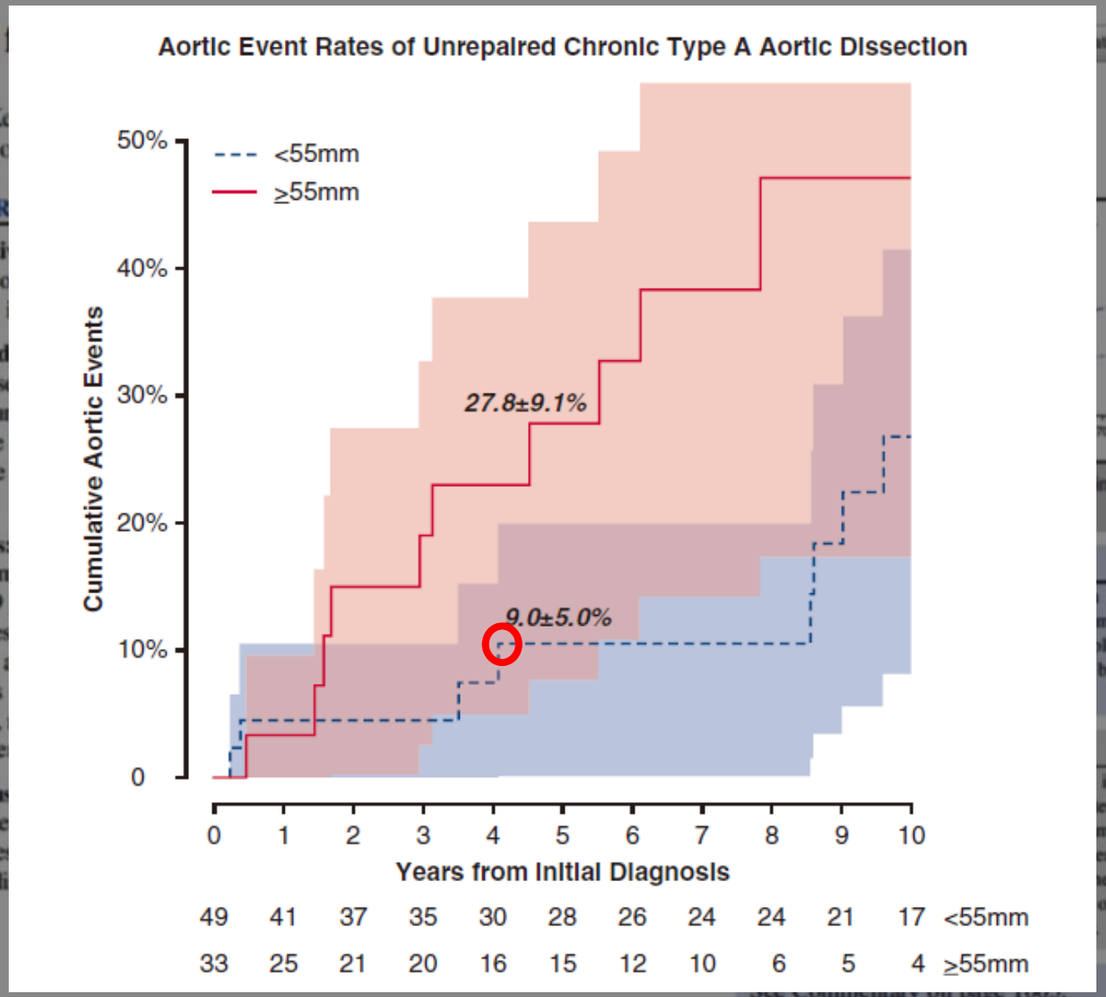
The fate of unrepaired chronic type A aortic dissection

Check for updates

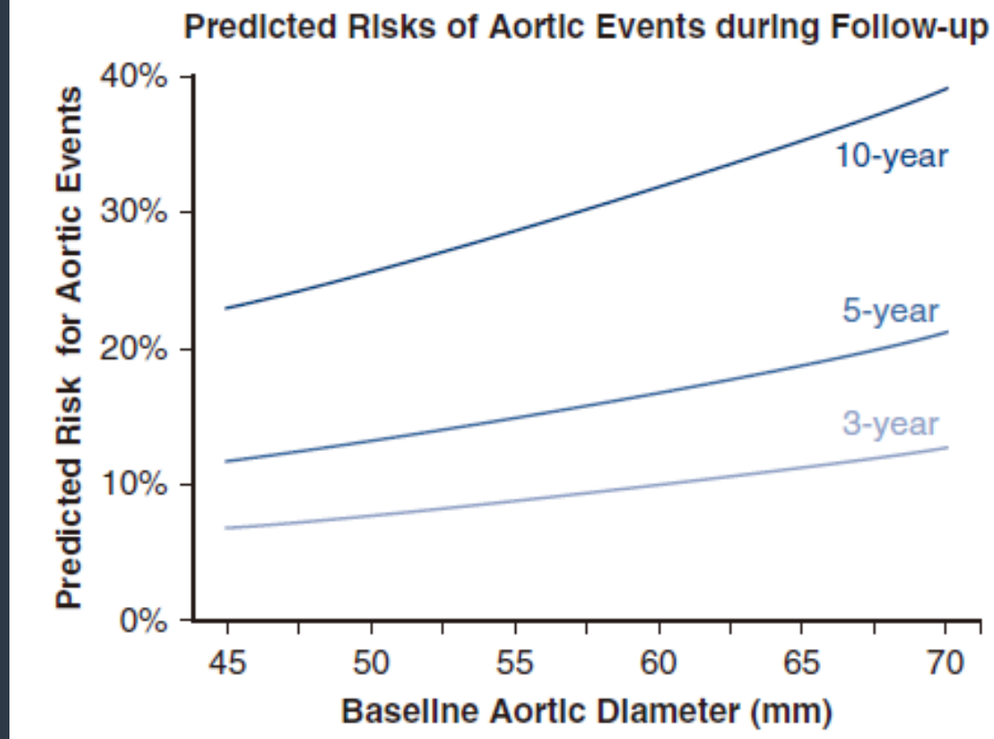
TABLE 2. Adverse aortic events in patients with unrepaired chronic type A aortic dissection

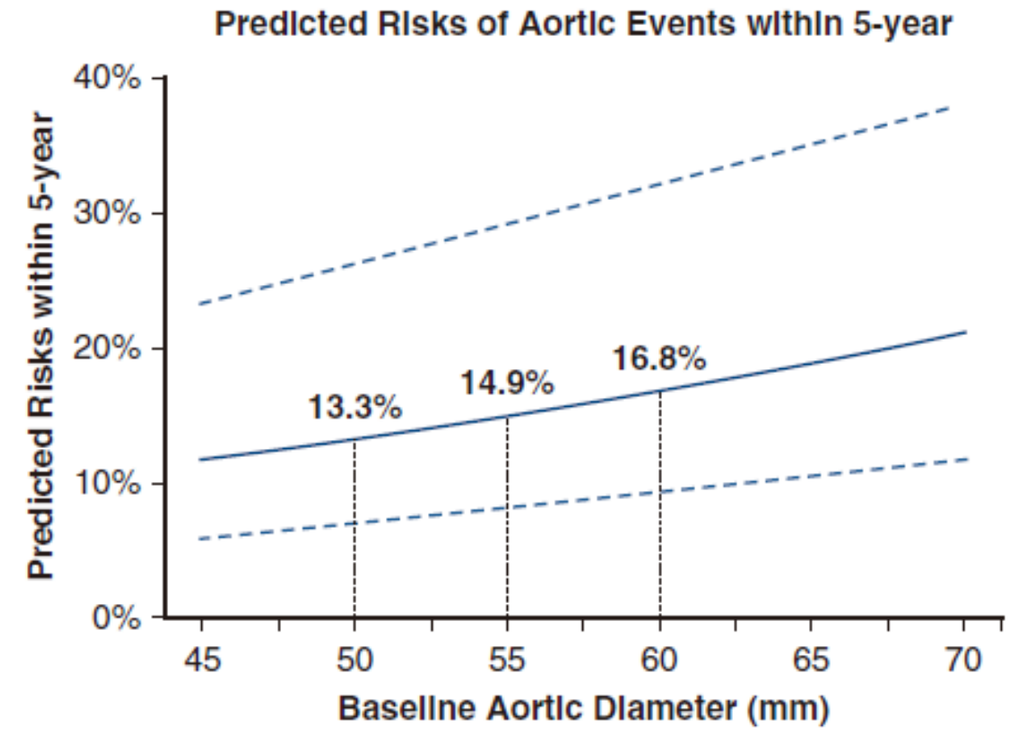
Total n = 82	N (%/PY)
Aortic events	19 (3.48)
Aortic rupture documented on CT	7 (1.28)
Death	4 (0.73)
Exigent operation	3 (0.55)
Sudden death	12 (2.20)
Competing events for aortic events	16 (3.38)
Planned elective aortic repair	6 (1.13)
Unknown deaths	10 (1.88)
Aorta-unrelated death	13 (1.77)

PY, Person-year; *CT*, computed tomography.


Aortic Event Rates of Unrepaired Chronic Type A Aortic Dissection
<55mm
≥55mm
27.8±9.1%
9.0±5.0%
Cumulative Aortic Events
50%
40%
30%
20%
10%
0
0 1 2 3 4 5 6 7 8 9 10
Years from Initial Diagnosis
49 41 37 35 30 28 26 24 24 21 17 <55mm
33 25 21 20 16 15 12 10 6 5 4 ≥55mm

The fate of unrepaired chronic type A aortic dissection



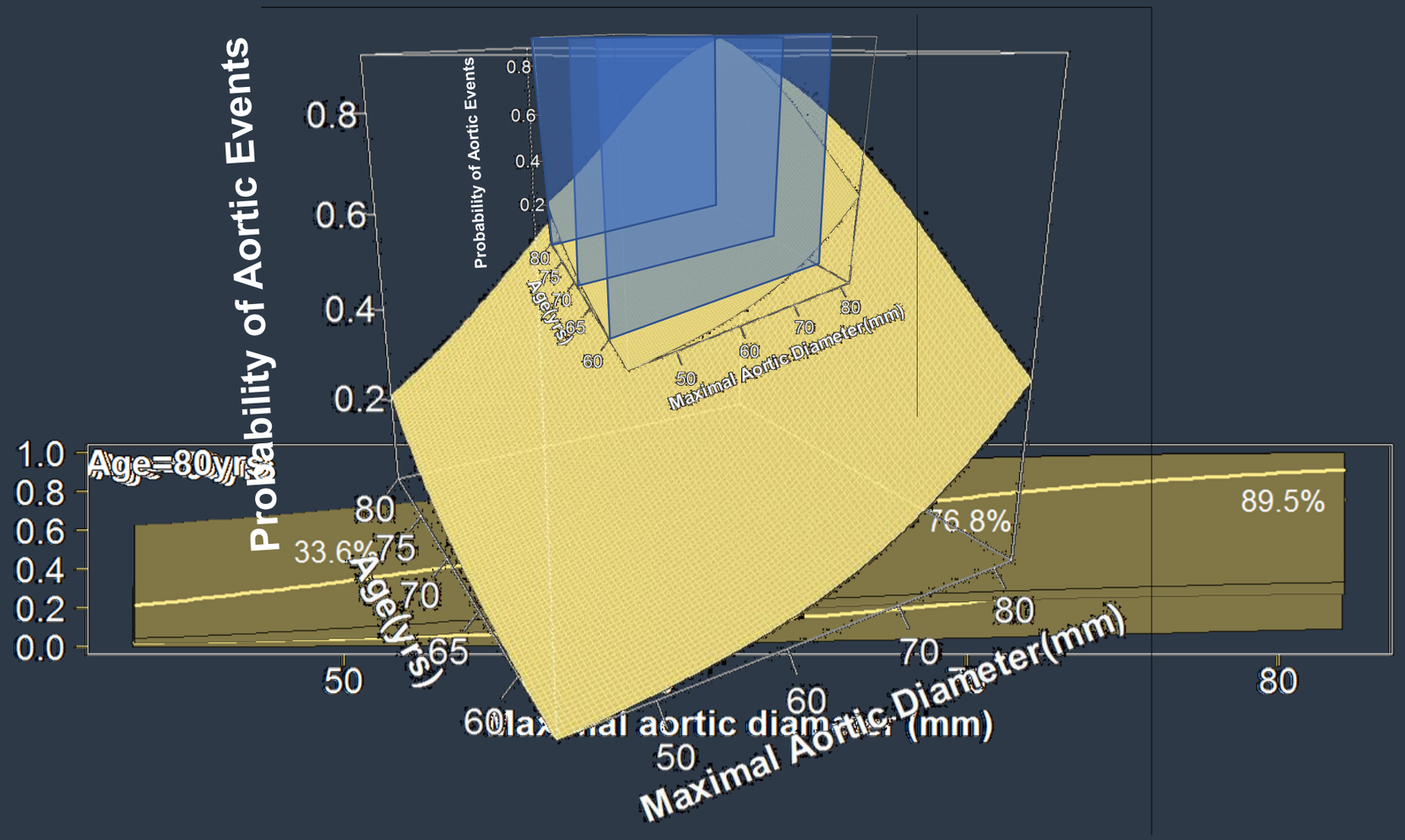


See Commentary on page 1005.

Risks for Adverse Events within 5 year

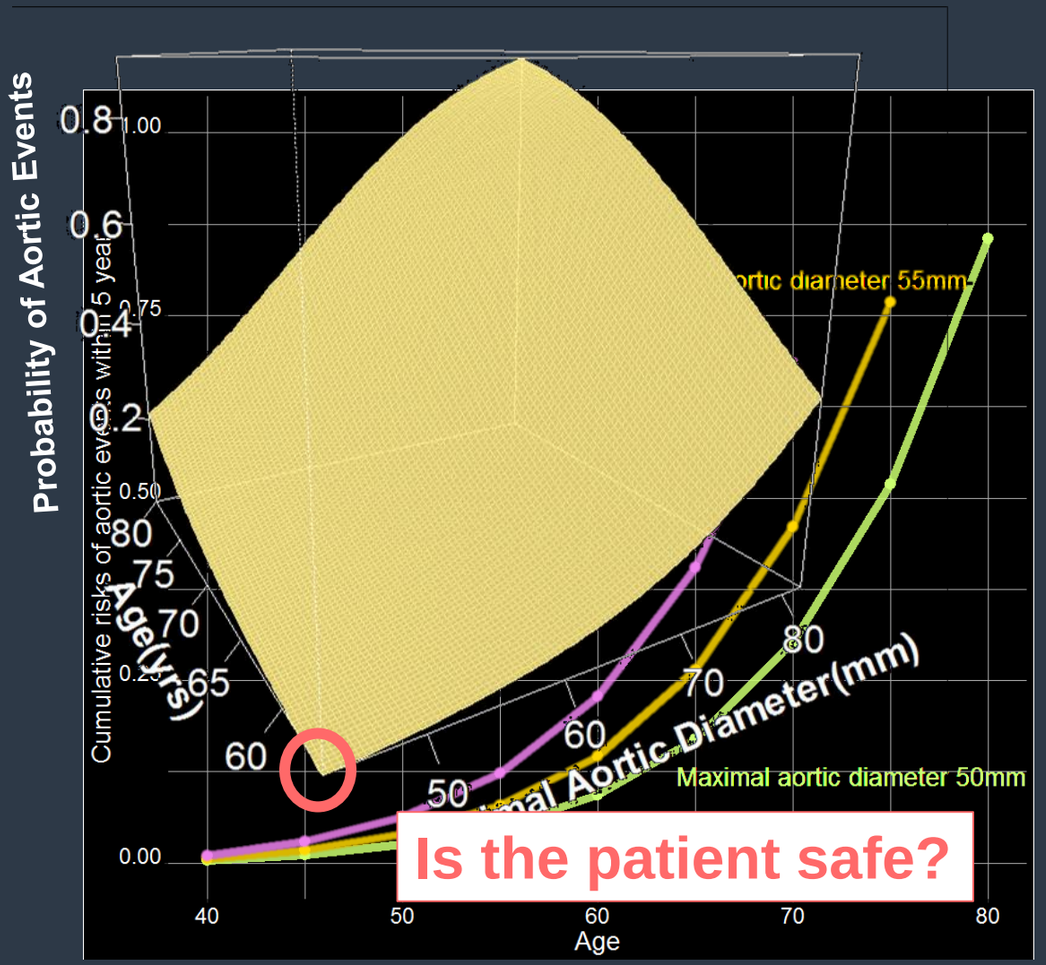
Risk for Events	Univariable			Multivariable		
	HR	95% CI	P val	HR	95% CI	P val
Age	1.04	1.01-1.08	0.03	1.04	1.00-1.10	0.04
DM	2.86	0.64-12.8	0.17			
Prev. operation	5.59	3.02-10.3	<0.01			
Max. aortic size	1.03	1.01 -1.05	0.003	1.03	1.01-1.06	0.01

Probability of Aortic Events according to the Risks



Cumulative Risks for Adverse Events

- Cumulative risk of events in a non-surgically treated 40 year old patient



Surgical Outcomes

Chronic Type A AD, n=142

No Surgery, n=82

- Estimated aortic event rates within 5 yrs
  - Aortic diameter at 50mm: 15.7%
  - Aortic diameter at 60mm: 28.3%
  - Aortic diameter at 70mm: 45.5%

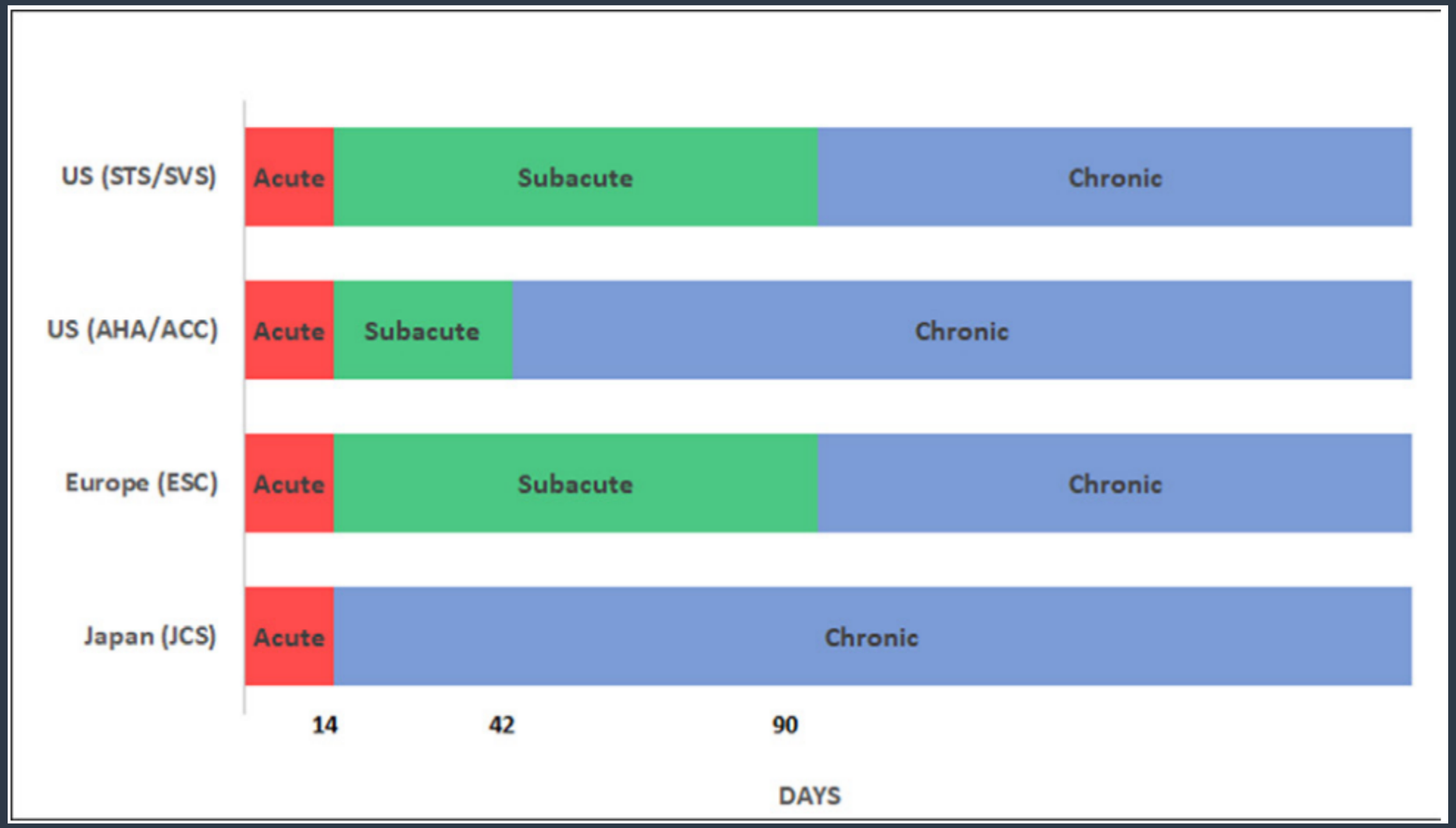
Surgery, n=60

- Adverse events after surgery: 6.6%
  - Surgical mortality: 3.3% (n=2)
  - Permanent neurologic injury: 3.3% (n=2)

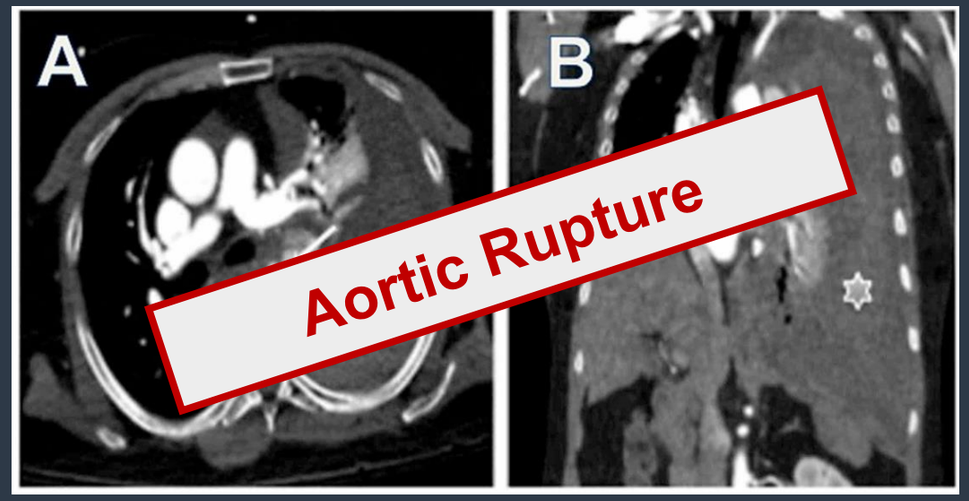
Type B Aortic Dissection

When? How?

- Acute
- Subacute
- Chronic



Worst Scenarios in ATBAD

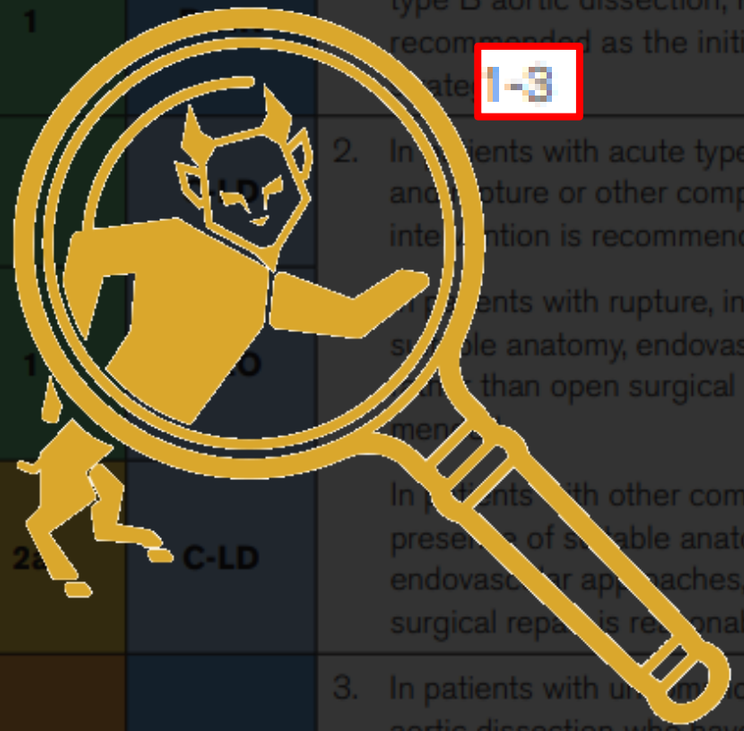


Stephen W. English, James P. Klaas, in Handbook of Clinical Neurology, 2021

7.4.2. Management of Acute Type B Aortic Dissection

Recommendations for the Management of Acute Type B Aortic Dissection
Referenced studies that support the recommendations are summarized in the Online Data Supplement.

COR	LOE	Recommendations
1		1. In all patients with uncomplicated acute type B aortic dissection, medical therapy is recommended as the initial management [illegible] 1-3
[illegible]	[illegible]	2. In [illegible]ients with acute type B aortic dissection and [illegible]pture or other compli[illegible]Table 27), inte[illegible]ntion is recommende[illegible] 4-6
1	[illegible]O	[illegible]ents with rupture, in the presence of s[illegible]le anatomy, endovascular stent grafting, [illegible] than open surgical repair, is recom-men[illegible]
2a	C-LD	In p[illegible]nts [illegible]th other complications, in the presen[illegible] of s[illegible]able anatomy, the use of endovas[illegible]ar app[illegible]aches, rather than open surgical repa[illegible] is re[illegible]onable.[4-6,7]
2b	B-R	3. In patients with u[illegible]m[illegible]cated acute type B aortic dissection who have high-risk anatomic features (Table 28), endovascular manage-ment may be considered.[8,9]

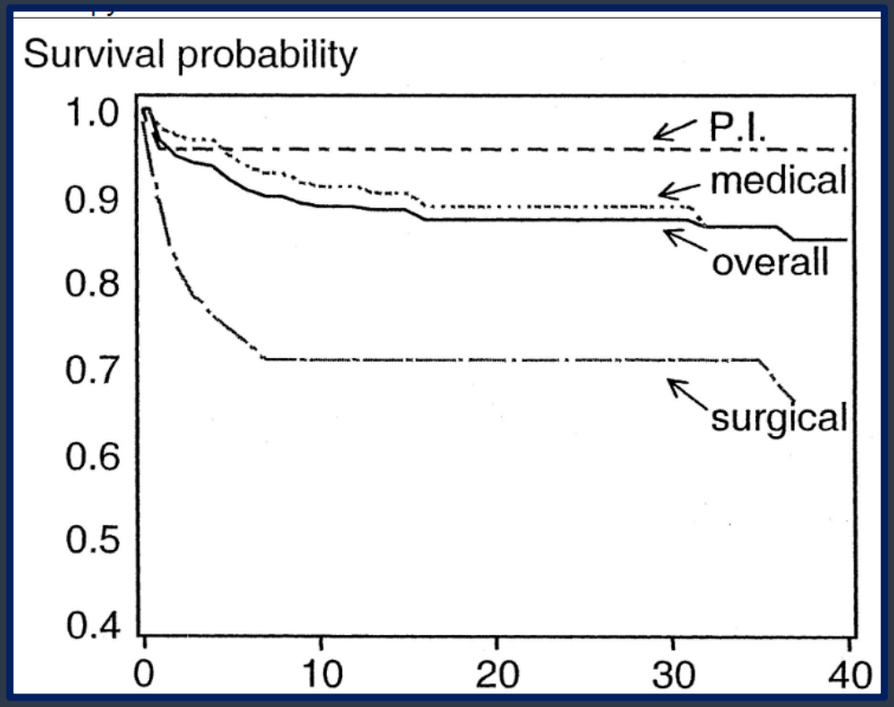


Clinical Profiles and Outcomes of Acute Type B Aortic Dissection in the Current Era: Lessons From the Internat

Toru Suzuki,
Yasunari Sak
MD, Santi Tr
Isselbacher,

Variable	Overall	Survived	Died	*P*-value
Definitive Management				
Surgery (%)	56 (15)	38 (67.9)	18 (32.1)	*<0.0001
Medical Rx (%)	282 (73)	255 (90.4)	27 (9.6)	
Percutaneous Intervention (stent, fenestration) (%)	46 (12)	43 (93.5)	3 (6.5)	

ABSTRACT:
aortic dissection have not been evaluated in the current era.***Methods and Results***—Accordingly, we analyzed 384 patients (65±13 years, males 71%) with acute type B aortic dissection enrolled in the International Registry of Acute Aortic Dissection (IRAD). A majority of patients had hypertension and presented with acute chest/back pain. Only one-half showed abnormal findings on chest radiograph, and almost all patients had computerized tomography (CT), transesophageal echocardiography, magnetic resonance imaging (MRI), and/or aortogram to confirm the diagnosis. In-hospital mortality was 13% with most deaths occurring within the first week. Factors associated with increased in-hospital mortality on univariate analysis were hypotension/shock, widened mediastinum, periaortic hematoma, excessively dilated aorta (≥6 cm), in-hospital complications of coma/altered consciousness, mesenteric/limb ischemia, acute renal failure, and surgical management (all $P<0.05$). A risk prediction model with control for age and gender showed hypotension/shock (odds ratio [OR] 23.8, $P<0.0001$), absence of chest/back pain on presentation (OR 3.5, $P=0.01$), and branch vessel involvement (OR 2.9, $P=0.02$), collectively named 'the deadly triad' to be independent predictors of in-hospital death.***Conclusions***—Our study provides insight into current-day profiles and outcomes of acute type B aortic dissection. Factors associated with increased in-hospital mortality ("the deadly triad") should be identified and taken into consideration for risk stratification and decision-making.



Outcomes of Medical Management of Acute Type B Aortic Dissection

Anthony L. Estrera, MD, Charles C. Miller, III, PhD, Hazim J. Safi, MD, Jennifer S. Goodrick, MS, RN, Arash Keyhani, MD, Eyal E. Porat, MD, Paul E. Achouh, MD, Riad Meada, MD, Ali Azizzadeh, MD, Jayesh Dhareshwar, MD, and Adnan Allaham, MD

ABSTRACT: ***Background***— Currently, the optimal treatment of acute type B aortic dissection remains controversial. The purpose of this study was to report early clinical outcomes of medical management for acute type B aortic dissection.***Methods and Results*** — Between January 2001 and March 2005, 129 consecutive patients with the confirmed diagnosis of acute type B aortic dissection were studied. Mean age was 61 years (range, 29 to 94), with 33.3% (43/129) female. Acute type B aortic dissection protocol was instituted with the intent to manage all patients medically. Indications for surgical intervention included rupture, aortic expansion, malperfusion, and intractable pain. All patients were followed-up after discharge. Hospital mortality was 10.1% (13/129), 19% (4/21) when vascular intervention was required, and 8.3% (9/108) when medical management was maintained. Early intervention was required in 21 cases (16.2%), 19 (14.7%) open vascular/aortic cases and 2 cases (1.6%) of percutaneous aortic interventions. Morbidity included rupture (4.7%), stroke (4.7%), paraplegia (8.5%), bowel ischemia (7%), acute renal failure (21%), dialysis requirement (13%), and peripheral ischemia (4.7%). Late vascular-related procedures were performed in 5.2% (6/116) of cases. Univariate risk factors for early mortality were rupture ($P<0.0001$), need for laparotomy ($P<0.008$), acute renal failure ($P<0.0001$), need for dialysis ($P<0.0001$), and lower extremity ischemia ($P<0.0004$). The only independent risk factors for hospital mortality by multiple logistic regression was rupture ($P<0.0009$), and independent risk factors for midterm death were history of chronic obstructive pulmonary disease ($P<0.002$) and low glomerular filtration rate (<57 mL/min; $P<0.0001$).***Conclusions***— Medical management for acute type B aortic dissection is associated acceptable outcomes. Outcomes of other management strategies, eg, endovascular stenting, for acute type B aortic dissection need to be compared with these results.

Is medical therapy still the optimal treatment strategy for patients with acute type B aortic dissections?

Methods: A 36-year clinical experience of medical and surgical treatments in 189 patients was retrospectively analyzed (multivariable Cox proportional hazards model) with respect to three outcome end points: all deaths, freedom from reoperation, and freedom from late aortic complications or death. Propensity score analysis identified 2 quintiles (quintiles I and II, consisting of 142 comparable patients) for further comparison of the effects of surgical versus medical treatment.

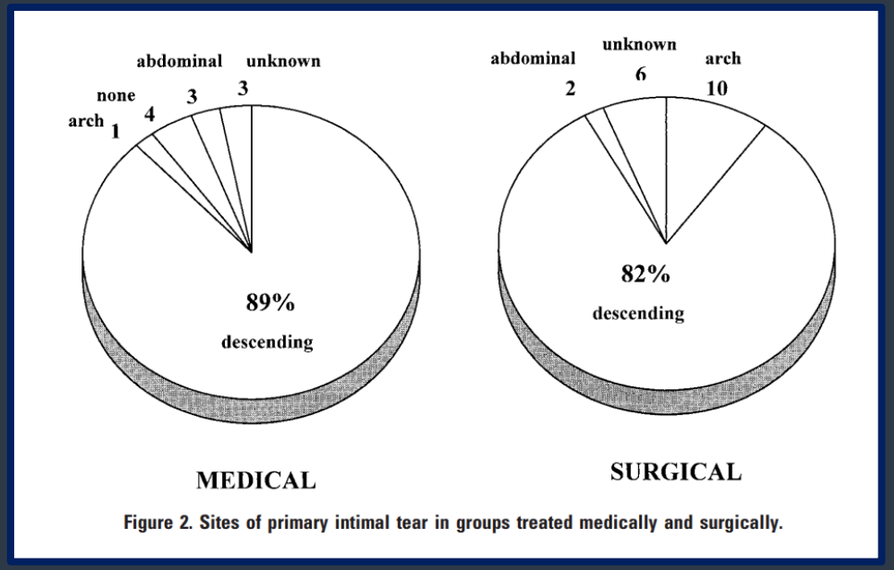


Figure 2. Sites of primary intimal tear in groups treated medically and surgically.

CLINICAL RESEARCH STUDIES

From the Society for Vascular Surgery

Multicenter clinical trial of the conformable stent graft for the treatment of acute, [illegible] dissection

Richard P. Cambria, MD,[a] Mark F. Conrad, MD,[a] Alan H. Matsu
Alberto Pochettino, MD,[d] Stephanie Carvalho, BA,[a] Virendra Pate
Boston, Mass; Charlottesville, Va; Lebanon, NH; Philadelphia, Pa; and

Objective: The treatment of acute, complicated type B aortic dissection has
endovascular aortic repair when anatomy is suitable, has been regarded as
entry tear, redirect and re-establish adequate true lumen flow, and thereby
designed to determine the safety and efficacy of a conformable thoracic en
complicated type B aortic dissection, defined as malperfusion or rupture or
Methods: Between January 2010 and January 2012, 50 patients with complic
the United States were included in this prospective, multicenter, nonrando
end point was all-cause mortality through 30 days after treatment, and the p
primary entry tear (Core Laboratory adjudicated) at 1-month follow-up.
thrombosis, dissection-based reintervention rate, and aortic rupture.
Results: All device implants were successfully completed. Six patients (12
≤1 year from the index procedure. There was no conversion to open repair
at 30 days occurred in 97.5% of patients. All-cause mortality through 30 day
at 2 years. At 1 year after treatment, 35.1% of patients had experienced a d
treated segment of the aorta. From pretreatment to the 36-month follow
increased by 206.3 mm^2, and the average maximum false lumen area decreas
18%; none were fatal, and one permanent deficit occurred. Four patients (
severity but without any permanent or significant deficits. New aortic dissect
patients (10%). The secondary intervention rate was 18%.
Conclusions: Treatment with the conformable thoracic endovascular aortic re
and intermediate level clinical and anatomic outcomes. In particular, an
comparable to that noted in a Society for Vascular Surgery objective perform
cohort compares favorably with historical data referable to complicated type

Mid-term Outcomes and Aortic Remodelling After Thoracic Endovascular Repair for Acute, Subacute, and Chronic Aortic Dissection: The VIRTUE Registry

The VIRTUE Registry Investigators *

WHAT THIS PAPER ADDS

The VIRTUE Registry, describes the mid-term clinical and morphologi
patients with type B aortic dissection. Analysis of aortic morpho
dissection demonstrated a similar degree of aortic remodelling to
aortic plasticity in the subacute group lengthens the therapeutic w
type B dissection.

Objective: The VIRTUE Registry describes the mid-term clinical and
endovascular repair (TEVR) in patients with type B aortic dissectio
Methods: This was a prospective cohort study. The VIRTUE Registry i
enrolled patients with complicated acute (<15 days), subacute (15
aortic dissections treated with the Valiant endograft. One hundred
outcomes described at the 3-year follow-up. Analysis of the aortic ar
the morphological response to TEVR in the three clinical groups.
Results: Three-year all-cause mortality (18%, 4%, and 24%), dissectio
rupture (2%, 0%, and 4%), retrograde type A dissection (5%, 0%, a
(20%, 22%, and 39%) were, respectively, defined for patients with ac
(n = 26) dissections. Analysis of aortic morphology observed that f
demonstrated a similar degree of aortic remodelling to patients wi
subacute dissection exhibited greater aortic plasticity than patients
related death in the mid-term, but with a high rate of aortic reinte
suggested that aortic remodelling in subacute patients is similar to t
in the subacute group lengthens the therapeutic window for the tre
Conclusions: The principle clinical findings suggest that TEVR is abl

Article history: Received 31 December 2013, Accepted 6 May 2014
Keywords: Aortic dissection, Endovascular, Type B

Management of acute type B aortic dissection with malperfusion via endovascular fenestration/stenting

Elizabeth L. Norton, MS,[a] David M. Williams, MD,[b] Karen M. Kim, MD,[c] Minhaj S. Khaja, MD, MBA,[b]
Xiaoting Wu, PhD,[c] Himanshu J. Patel, MD,[c] G. Michael Deeb, MD,[c] and Bo Yang, MD, PhD[c]

A, Aortic flap balloon fenestration. B, Thoracic aortic true lumen. C, SMA stenting.

Central Message

Endovascular fenestration/stenting can effectively resolve dynamic and static malperfusion in ATBAD with favorable short- and long-term outcomes (survival and reoperation).

Perspective

Endovascular fenestration/stenting effectively and timely resolves dynamic and static malperfusion in ATBAD with minimal risk of paraplegia and retrograde type A dissection, and excellent in-hospital mortality, cumulative incidence of reintervention, and long-term survival in this patient population as combined with TEVAR or open repair when indicated.

See Commentaries on pages 1162 and 1164.

ABSTRACT

Objective: The study objective was to evaluate the management of malperfusion in acute type B aortic dissection with endovascular fenestration/stenting.

Methods: From 1996 to 2018, 182 patients with an acute type B aortic dissection underwent fenestration/stenting for suspected malperfusion based on imaging, clinical manifestations, and laboratory findings. Data were obtained from medical record review and the National Death Index database.

Results: The median age of patients was 55 years. Signs of malperfusion included abdominal pain (61%), lower-extremity weakness (27%), nonpalpable lower-extremity pulses (24%), and abnormal lactate, creatinine, liver enzymes, and creatine kinase levels. Confirmed hemodynamically significant malperfusion affected the spinal cord (2.7%), celiac (24%), superior mesenteric (40%), renal (51%), and iliofemoral (43%) arterial distributions. Of the 182 patients, 99 (54%) underwent aortic fenestration/stenting, 108 (59%) had 1 or multi-branch vessel fenestration/stenting, 5 (2.7%) had concomitant thoracic endovascular aortic repair, 17 (9.3%) had additional thrombolysis or thromboembolectomy, (13%) required additional procedures for necrotic bowel or limb and 9 patients (4.9%) had subsequent aortic repair (thoracic endovascular aortic repair, open repair) before discharge. The new-onset paraplegia was 0%. The in-hospital mortality was 7.7% over 20+ years and 0% in the last 8 years. The 5- and 10-year survivals were 72% and 49%, respectively. The significant risk factors for late mortality were age and acute paralysis (hazard ratio, 3.5; both $P < .0001$). Given death as a competing factor, the 5- and 10-year cumulative incidence of reintervention was 21% and 31% for distal aortic pathology, respectively.

Conclusions: Patients with acute type B aortic dissection with malperfusion can be managed with endovascular fenestration/stenting with excellent short- and long-term outcomes. This approach is particularly helpful to patients with static malperfusion of aortic branch vessels. (J Thorac Cardiovasc Surg 2020;160:1151-61)

Long-Term Survival in Patients Presenting With Type B Acute Aortic Dissection

Insights From the International Registry of Acute Aortic Dissection

Thomas T. Tsai, MD; Rossella Fattori, MD; Santi Trimarchi, MD; Eric Isselbacher, MD; Truls Myrmel, MD; Arturo Evangelista, MD; Stuart Hutchison, MD; Udo Sechtem, MD; Jeanna V. Cooper, MS; Dean E. Smith, PhD; Linda Pape, MD; James Froehlich, MD; Arun Raghupathy, MD; James L. Januzzi, MD; Kim A. Eagle, MD; Christoph A. Nienaber, MD; on behalf of the International Registry of Acute Aortic Dissection (IRAD)

Background—Follow-up survival studies in patients with acute type B aortic dissection have been restricted to a small number of patients in single centers. We used data from a contemporary registry of acute type B aortic dissection to better understand factors associated with adverse long-term survival.

Methods and Results—We examined 242 consecutive patients discharged alive with acute type B aortic dissection enrolled in the International Registry of Acute Aortic Dissection (IRAD) between 1996 and 2003. Kaplan-Meier survival curves were constructed, and Cox proportional hazards analysis was performed to identify independent predictors of follow-up mortality. Three-year survival for patients treated medically, surgically, or with endovascular therapy was 77.6±6.6%, 82.8±18.9%, and 76.2±25.2%, respectively (median follow-up 2.3 years, log-rank $P=0.61$). Independent predictors of follow-up mortality included female gender (hazard ratio [HR] ,1.99; 95% confidence interval [CI], 1.07 to 3.71; $P=0.03$), a history of prior aortic aneurysm (HR, 2.17; 95% CI, 1.03 to 4.59; $P=0.04$), a history of atherosclerosis (HR, 2.48; 95% CI, 1.32 to 4.66; $P<0.01$), in-hospital renal failure (HR, 2.55; 95% CI, 1.15 to 5.63; $P=0.02$), pleural effusion on chest radiograph (HR, 2.56; 95% CI, 1.18 to 5.58; $P=0.02$), and in-hospital hypotension/shock (HR, 12.5; 95% CI, 3.24 to 48.21; $P<0.01$).

Conclusions—Contemporary follow-up mortality in patients who survive to hospital discharge with acute type B aortic dissection is high, approaching 1 in every 4 patients at 3 years. Current treatment and follow-up surveillance require further study to better understand and optimize care for patients with this complex disease. (***Circulation*. 2006;114: 2226-2231.**)

Circulation
Volume 120, Issue 25, 22 December 2009; Pages 2519-2528
https://doi.org/10.1161/CIRCULATIONAHA.109.886408

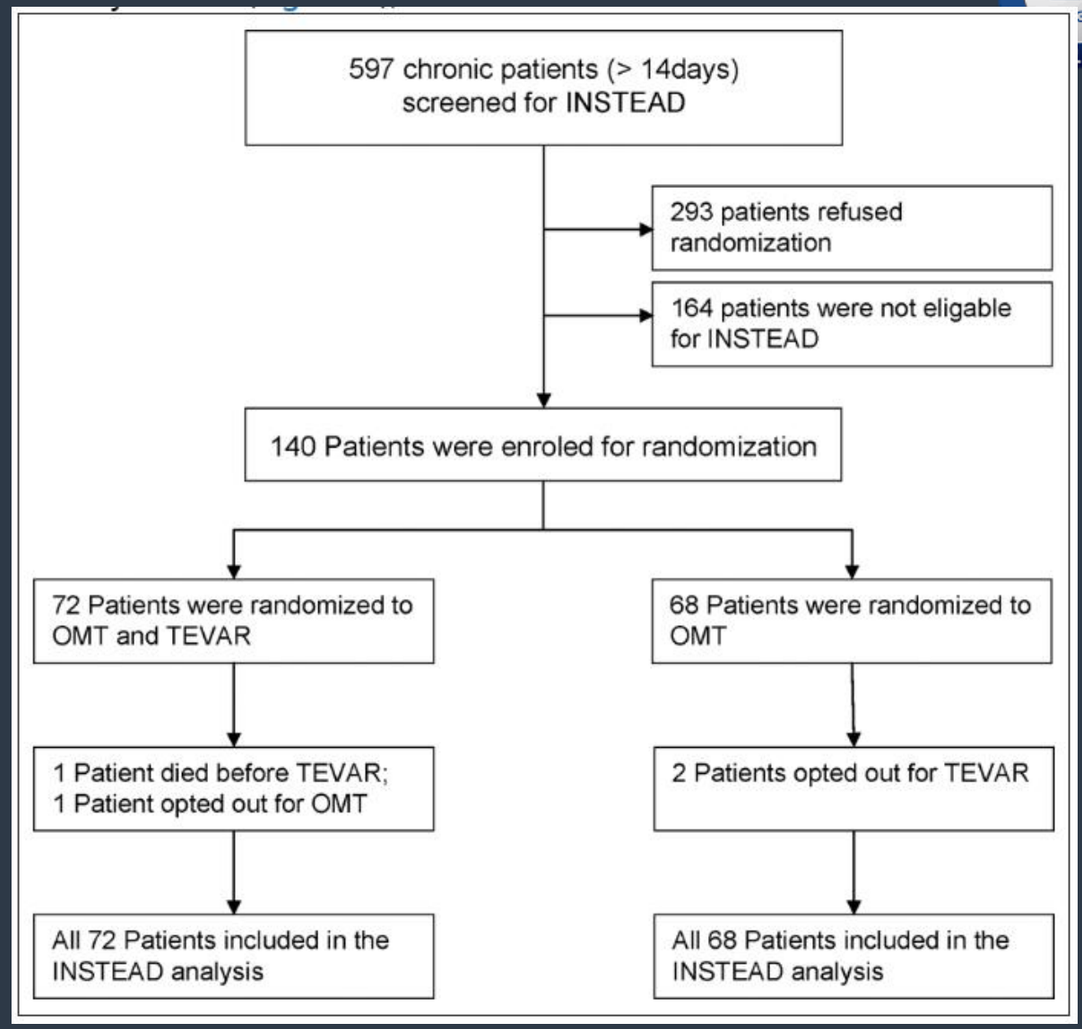
CARDIOVASCULAR SURGERY

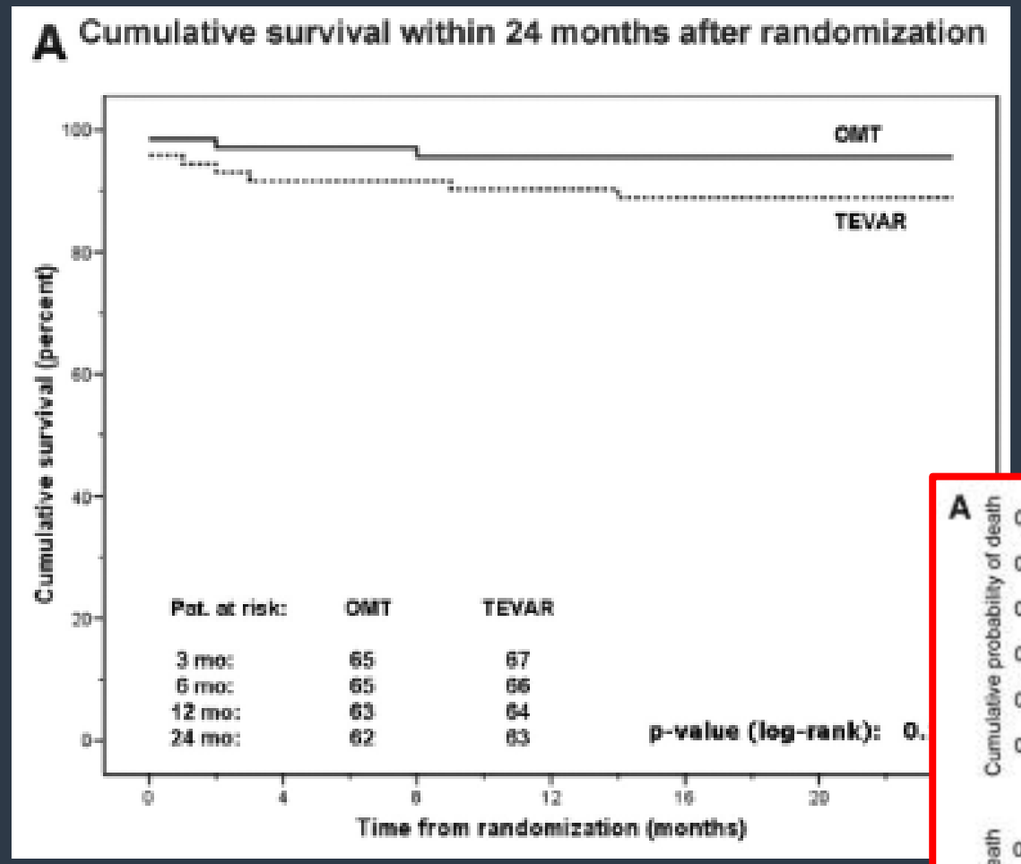
Randomized Comparison of Strategies for Type B Aortic Dissection

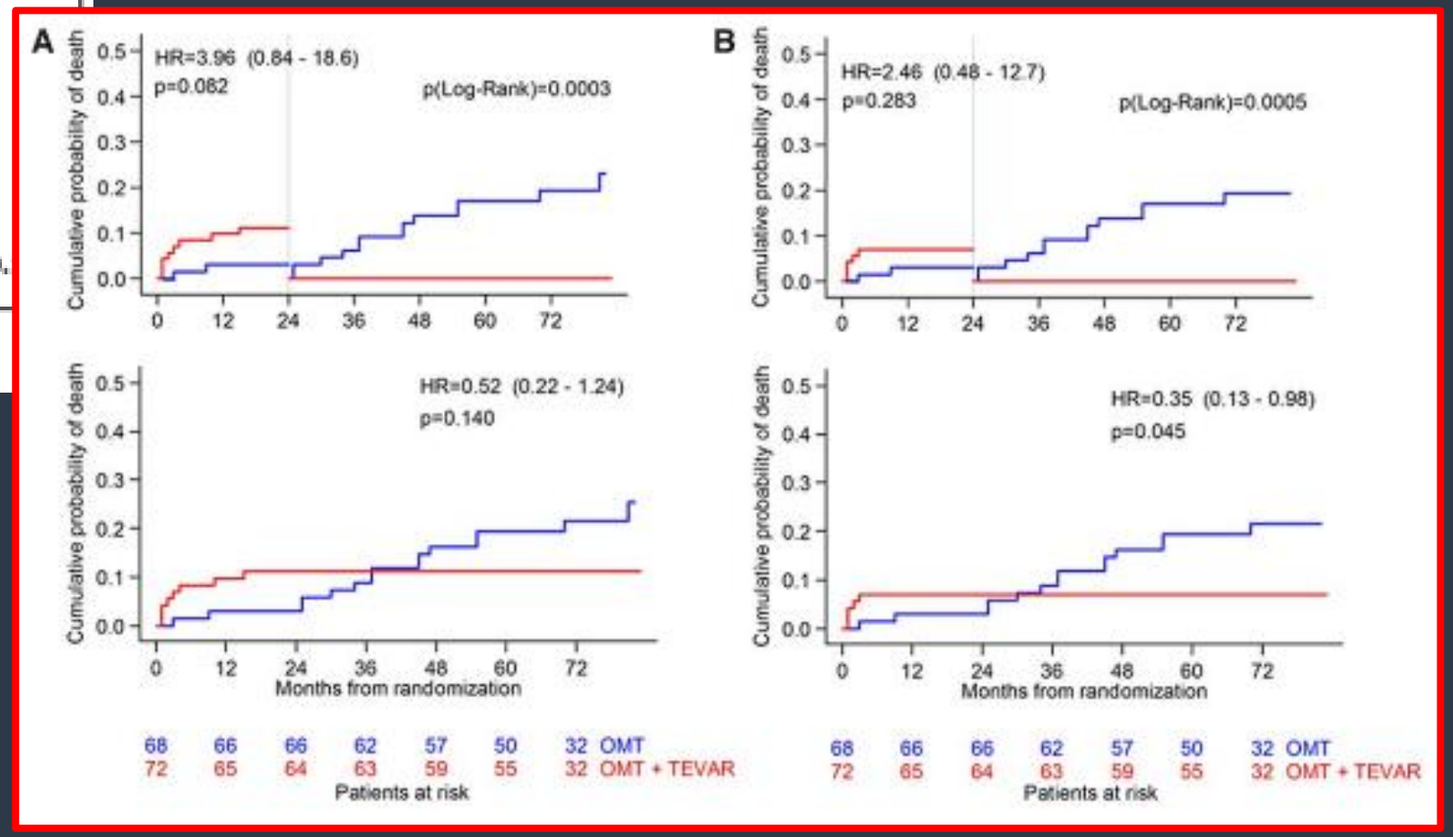
The INvestigation of STEnt Grafts in Aortic Dissection (INSTEAD) Trial

Editorial see p 2513

Christoph A. Nienaber, MD, PhD, Hervé Rousseau, MD, PhD, Holger Eggebrecht, MD, Stephan Kische, MD, Rossella Fattori, MD, PhD, Tim C. Rehders, MD, Günther Kundt, PhD, Dierk Scheinert, MD, PhD, Martin Czerny, MD, PhD, Tilo Kleinfeldt, MD, Burkhart Zipfel, MD, Louis Labrousse, MD, PhD, Hüseyin Ince, MD, PhD, and for the INSTEAD Trial




A Cumulative survival within 24 months after randomization
Cumulative survival (percent)
100
80
60
40
20
0
OMT
TEVAR
Pat. at risk:
OMT
TEVAR
3 mo:
65
67
6 mo:
65
66
12 mo:
63
64
24 mo:
62
63
p-value (log-rank):
0.
0
4
8
12
16
20
Time from randomization (months)


A
Cumulative probability of death
HR=3.96 (0.84 - 18.6)
p=0.082
p(Log-Rank)=0.0003
HR=0.52 (0.22 - 1.24)
p=0.140
0.5
0.4
0.3
0.2
0.1
0.0
0
12
24
36
48
60
72
Months from randomization
68 66 66 62 57 50 32 OMT
72 65 64 63 59 55 32 OMT + TEVAR
Patients at risk
B
Cumulative probability of death
HR=2.46 (0.48 - 12.7)
p=0.283
p(Log-Rank)=0.0005
HR=0.35 (0.13 - 0.98)
p=0.045
Months from randomization
68 66 66 62 57 50 32 OMT
72 65 64 63 59 55 32 OMT + TEVAR
Patients at risk

Optimal Treatment of Uncomplicated Type B Aortic Dissection

JACC Review Topic of the Week

Rami O. Tadros, MD,[a] Gilbert H.L. Tang, MD, MSc, MBA,[b] Hanna J. Barnes, BA,[a] Idine Mousavi, BA,[a] Jason C. Kovacic, MD, PhD,[c] Peter Faries, MD,[a] Jeffrey W. Olin, DO,[c] Michael L. Marin, MD,[a] David H. Adams, MD[b]

TABLE 2 Features That Predict Risk of Late Aorta-Related Complications

Feature	First Author, Year (Ref. #)	N	p Value	Hazard Ratio
Increased risk				
Primary ET diameter >10 mm	Schwartz et al., 2018 (27)	254	0.02*	2.1
Initial total AD ≥40mm			0.01*	2.2
FL diameter ≥22 mm	Song et al., 2007 (35)	100	<0.001†	–
Patent FL (vs. fully thrombosed)	Kunishige et al., 2006 (38)	131	0.016†	1.87
Partially thrombosed FL	Tsai et al., 2007 (37)	201	0.002‡	2.69
Decreased risk				
FL located at outer aortic curvature	Tolenaar et al., 2013 (42)	62	0.019§	–
Multiple entry tears			0.05§	–
Circular shape of TL			0.027§	–

Aortic Aneurysm

SOCIETAL STATEMENT

2022 Aortic Disease Guideline-at-a-Glance

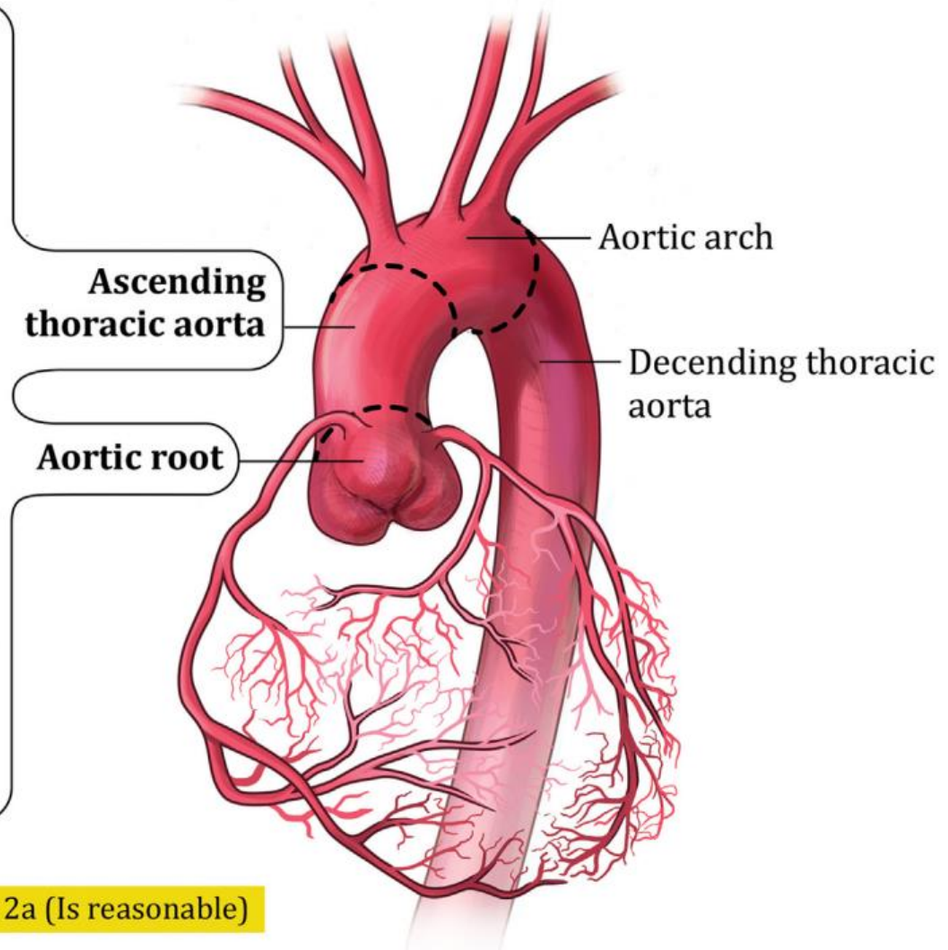
Surgical intervention thresholds for aortic root & ascending aorta in patients with…

Sporadic and BAV aneurysms*:

5.5 cm (COR 1)
5.0 cm by experienced surgeons in a Multidisciplinary Aortic Team (COR 2a)

Marfan syndrome#:

5.0 cm (COR 1)
≥4.5 cm in those with an increased risk of aortic dissection when performed by experienced surgeons in a Multidisciplinary Aortic Team (COR 2a)



COR 1 (Is recommended) COR 2a (Is reasonable)

TOP 10 TAKE-HOME MESSAGES

- Because outcomes for patients with aortic disease are enhanced at programs with higher volumes, experienced practitioners, and extensive management capabilities, Multidisciplinary Aortic Team care is considered in determining the appropriate timing of intervention.
- Shared decision-making involving the patient and a multidisciplinary team is highly encouraged to determine the optimal medical, endovascular, and open surgical therapies. In patients with aortic disease who are contemplating pregnancy or who are pregnant, shared decision-making is especially important when considering the cardiovascular risks of pregnancy, the diameter thresholds for prophylactic aortic surgery, and the mode of delivery.
- Computed tomography, magnetic resonance imaging, and echocardiographic imaging of patients with aortic disease should follow recommended approaches for image acquisition, measurement and reporting of relevant aortic dimensions, and the frequency of surveillance before and after intervention,

TOP 10 TAKE-HOME MESSAGES

- At centers with Multidisciplinary Aortic Teams and experienced surgeons, the threshold for surgical intervention for sporadic aortic root and ascending aortic aneurysms has been lowered from 5.5 cm to 5.0 cm in selected patients, and even lower in specific scenarios among patients with heritable thoracic aortic aneurysms.
- In patients who are significantly smaller or taller than average, surgical thresholds may incorporate indexing of the aortic root or ascending aortic diameter to either patient body surface area or height, or aortic cross-sectional area to patient height.
- Rapid aortic root growth or ascending aortic aneurysm growth, an indication for intervention, is defined as ≥0.5 cm in 1 year or ≥0.3 cm per year in 2 consecutive years for those with sporadic aneurysms and ≥0.3 cm in 1 year for those with heritable thoracic aortic disease or bicuspid aortic valve.

TOP 10 TAKE-HOME MESSAGES

- In patients undergoing aortic root replacement surgery, valve-sparing aortic root replacement is reasonable if the valve is suitable for repair and when performed by experienced surgeons in a Multidisciplinary Aortic Team.
- Patients with acute type A aortic dissection, if clinically stable, should be considered for transfer to a high-volume aortic center to improve survival. The operative repair of type A aortic dissection should entail at least an open distal anastomosis rather than just a simple supracoronary interposition graft.
- There is an increasing role for thoracic endovascular aortic repair in the management of uncomplicated type B aortic dissection. Clinical trials of repair of thoracoabdominal aortic aneurysms with endografts are reporting results that suggest endovascular repair is an option for patients with suitable anatomy.
- In patients with aneurysms of the aortic root or ascending aorta, or those with aortic dissection, screening of first-degree relatives with aortic imaging is recommended.

Summary