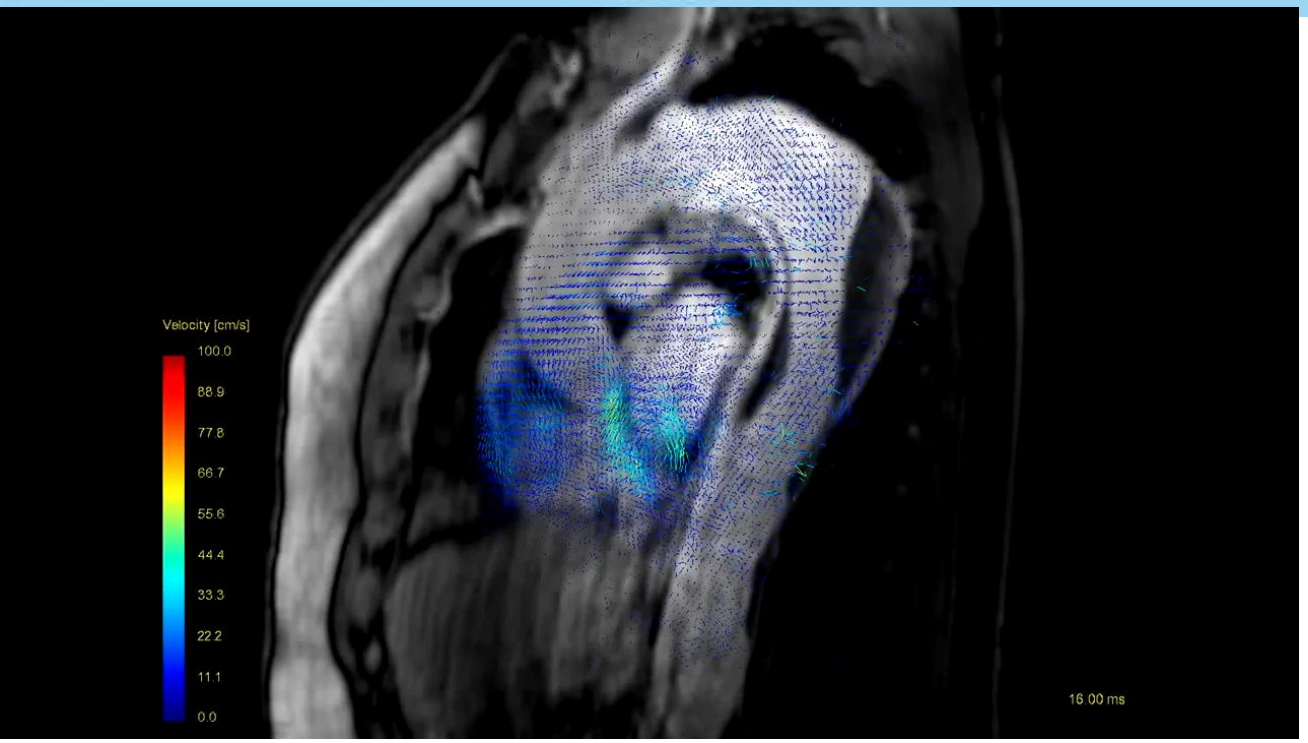
2023

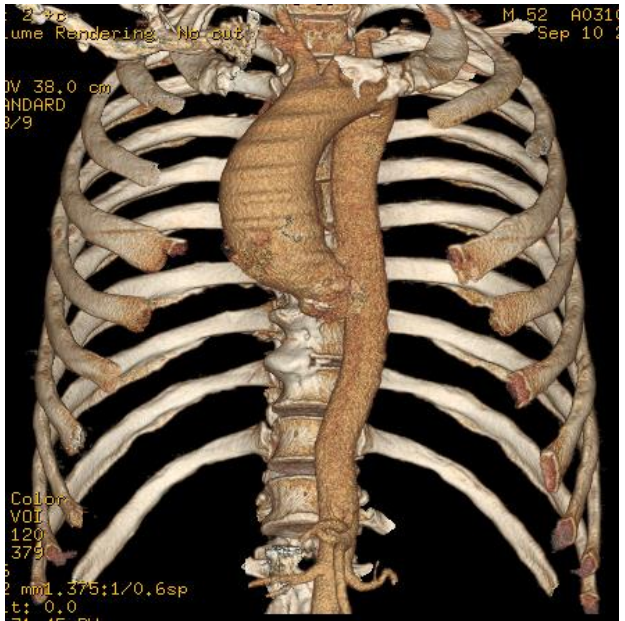
11ème SÉMINAIRE de CARDIOLOGIE INTERVENTIONNELLE de TROYES

01 & 02 AVRIL

SALLE DU CONSEIL MUNICIPAL
HOTEL DE VILLE de TROYES



Anévrysmes de l'aorte thoracique
La chirurgie ouverte



Dr Eric BERGOEND

GH Henri MONDOR - Créteil

Conflits d’intérêts

SURGERY OF THE HEART

By CHARLES P. BAILEY, M.D., M.Sc. (MED.), L.L.D. (HON.) F.A.C.S., F.C.C.P., F.I.C.S.

Professor and Head of the Department of Thoracic Surgery, Hahnemann Medical College and Hospital, Philadelphia, Pa. Director of Thoracic Surgery, Deborah Sanatorium, Browns Mills, N. J. Director, Bailey Thoracic Clinic, Philadelphia, Pa.

Thoracic Surgeon: Doctors Hospital, Inc., Philadelphia; Abington Memorial Hospital, Abington, Pa.; Philadelphia General Hospital, Philadelphia; United States Veterans Hospital, Philadelphia, Pa.

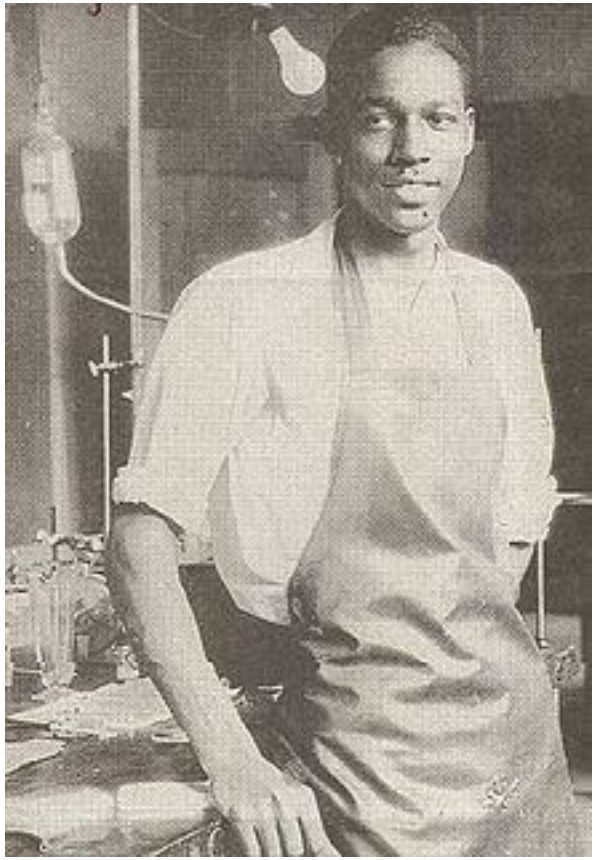
1452 Illustrations on 671 Figures and 3 Color Plates

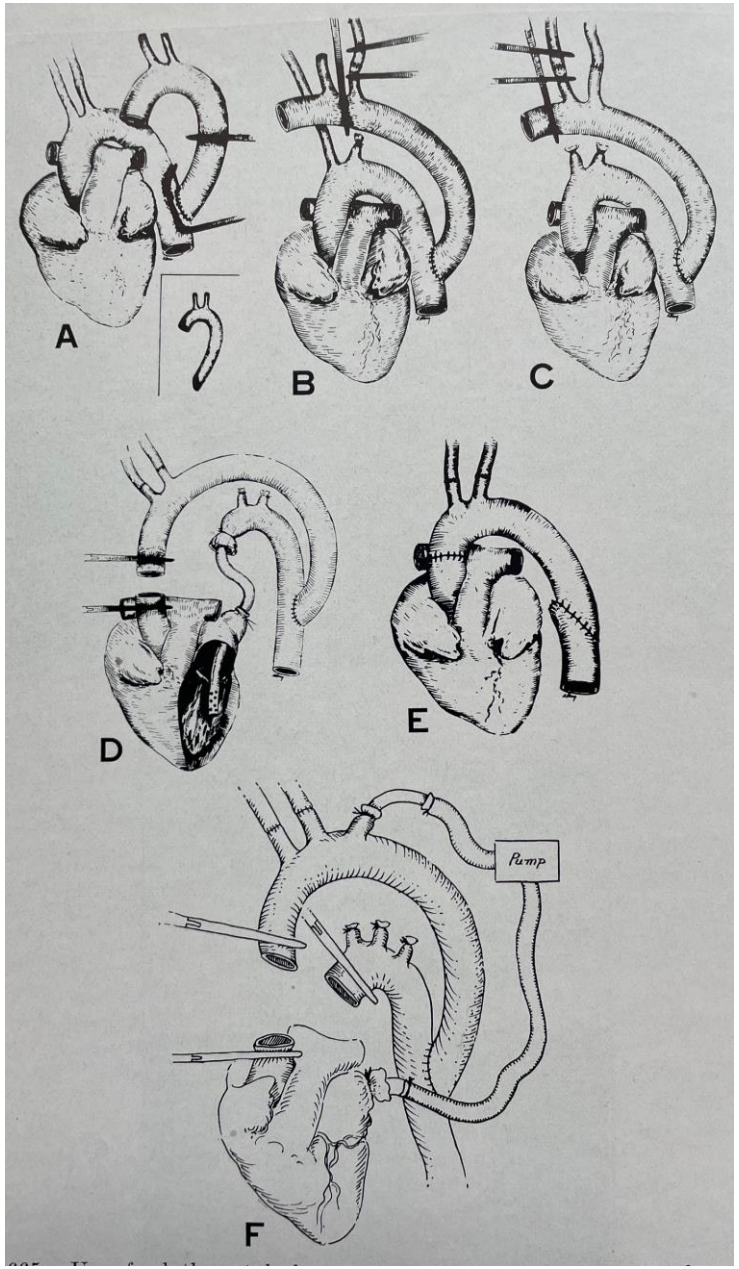
LEA & FEBIGER

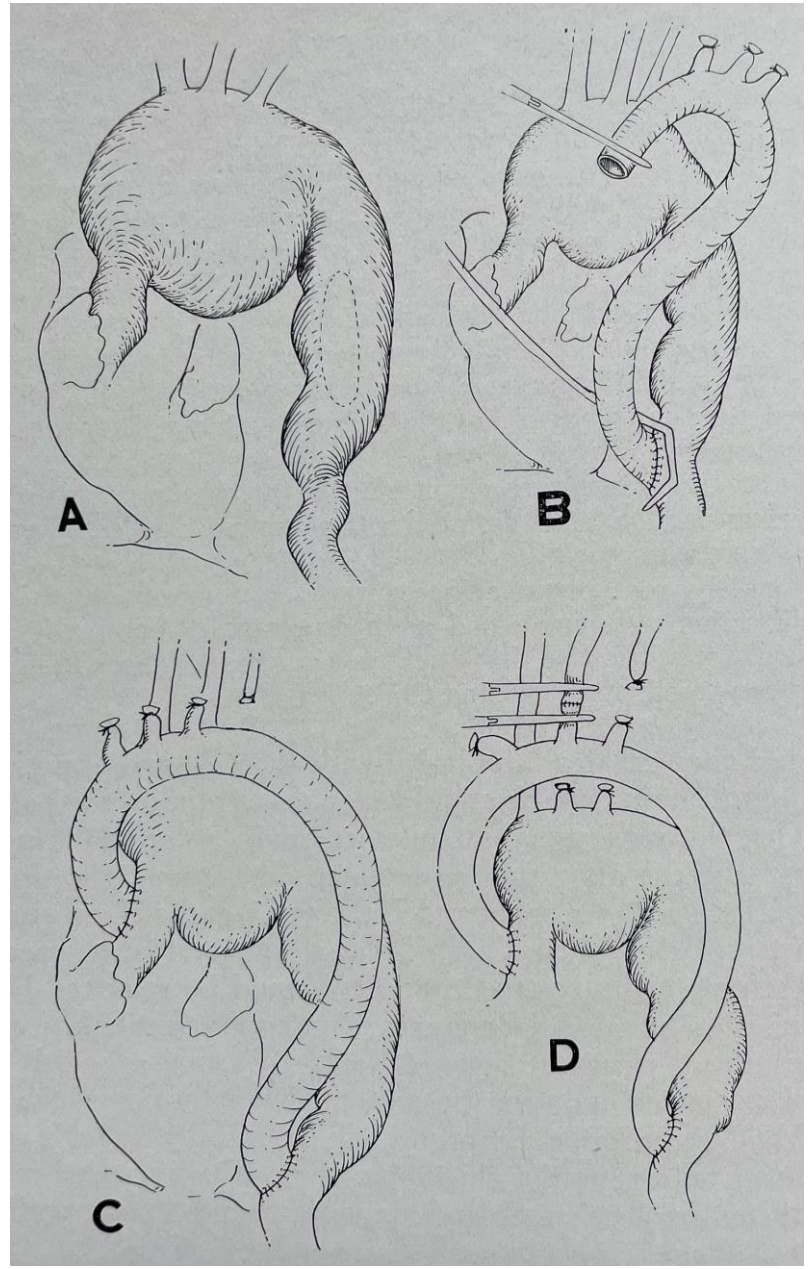
PHILADELPHIA

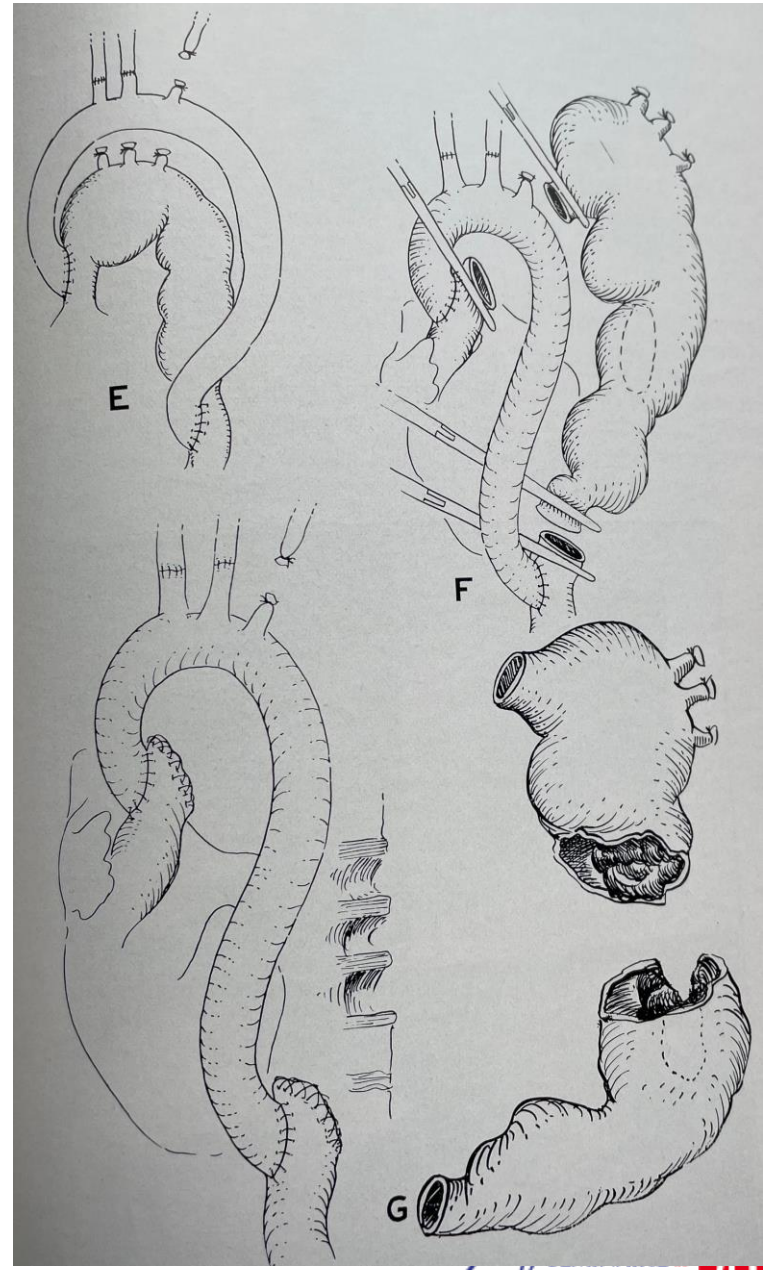
1955

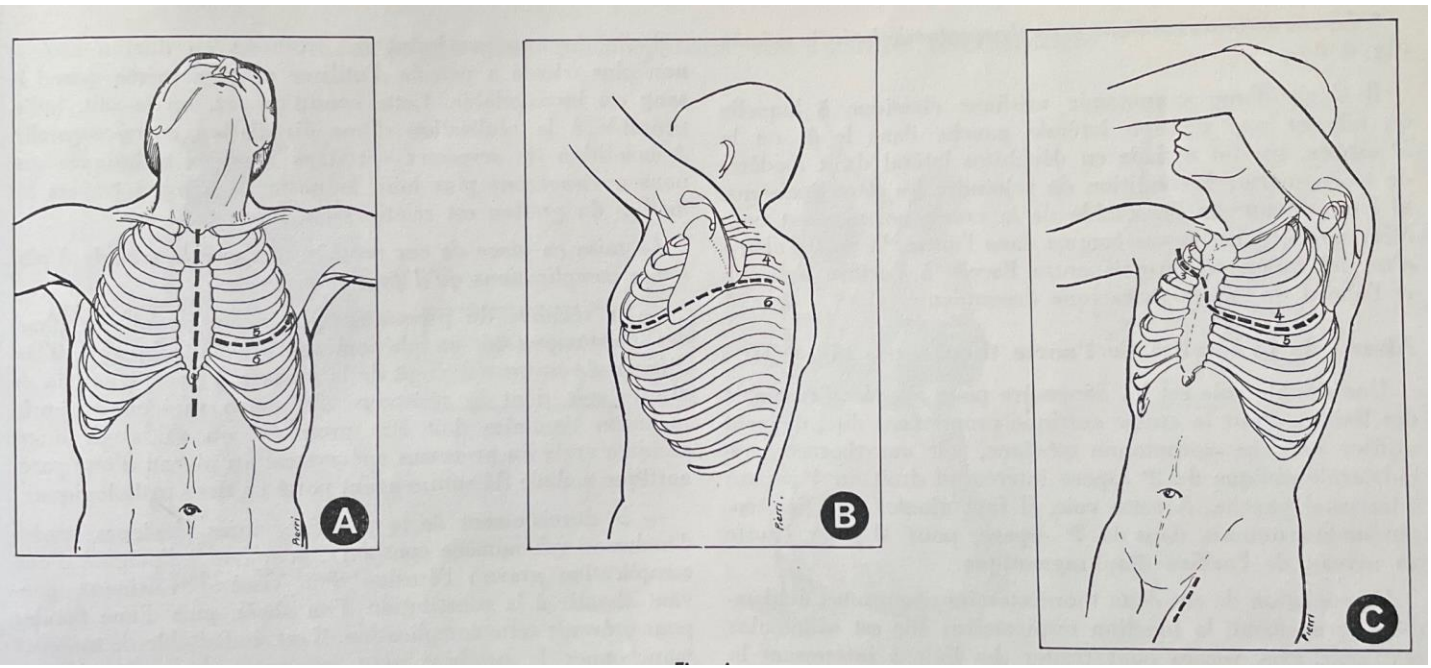
Ils ne savaient pas que c'était impossible, alors ils l'ont fait











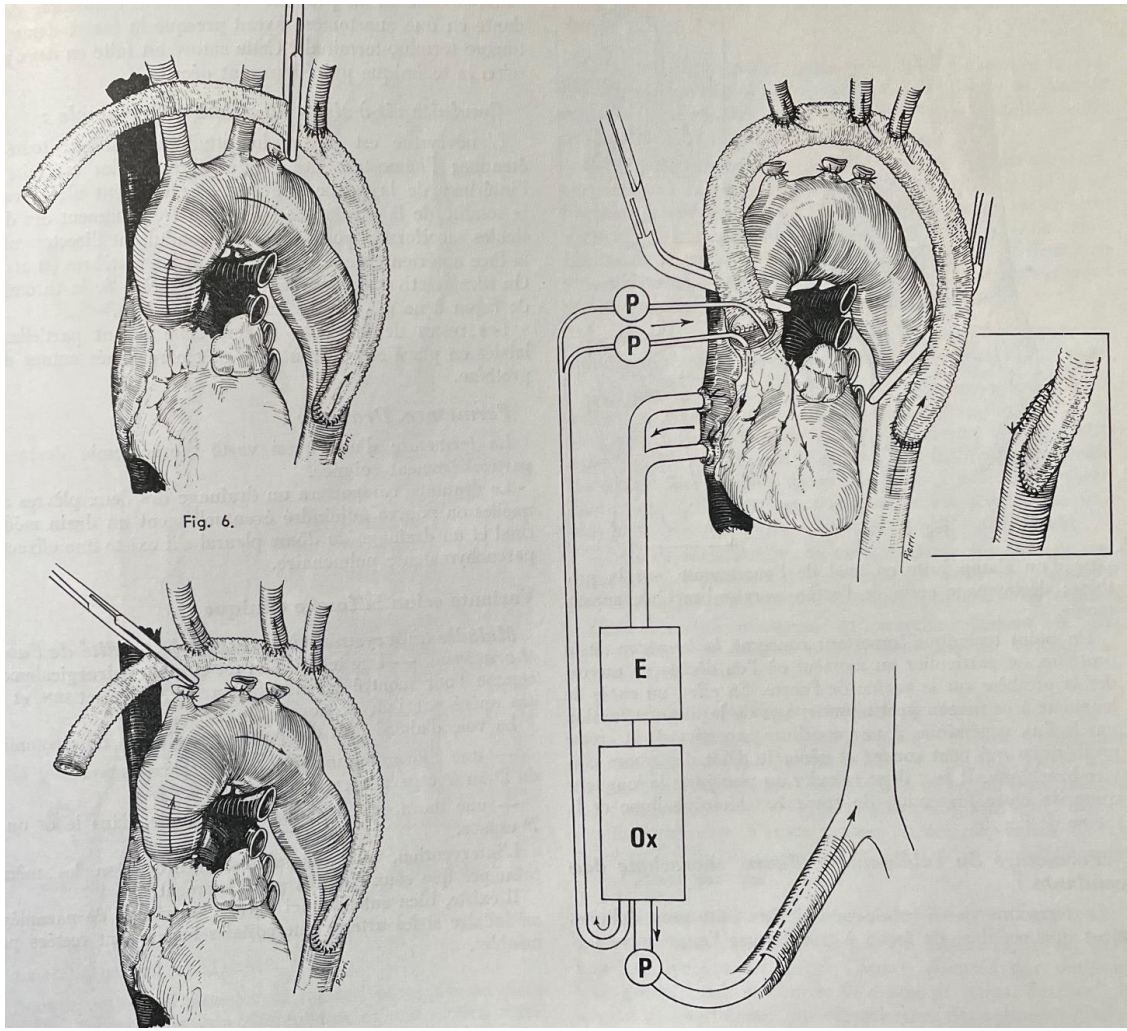
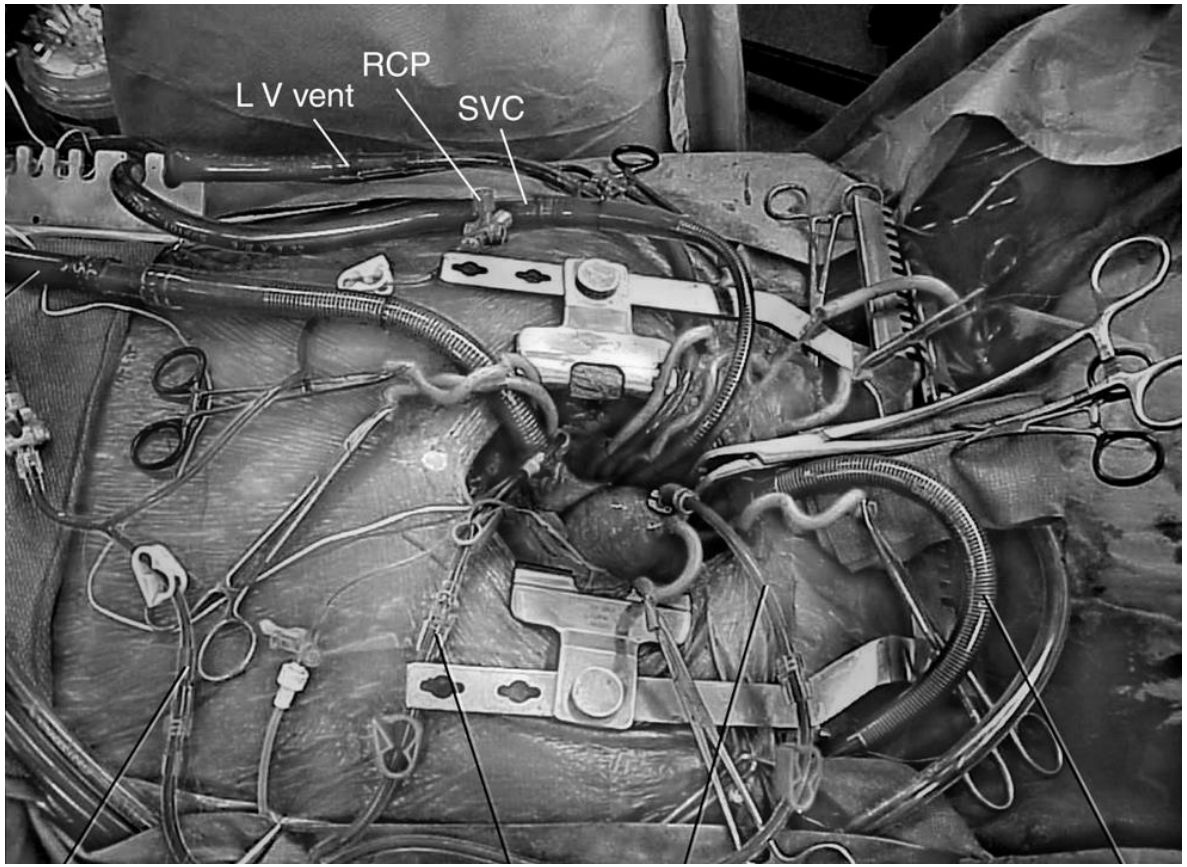
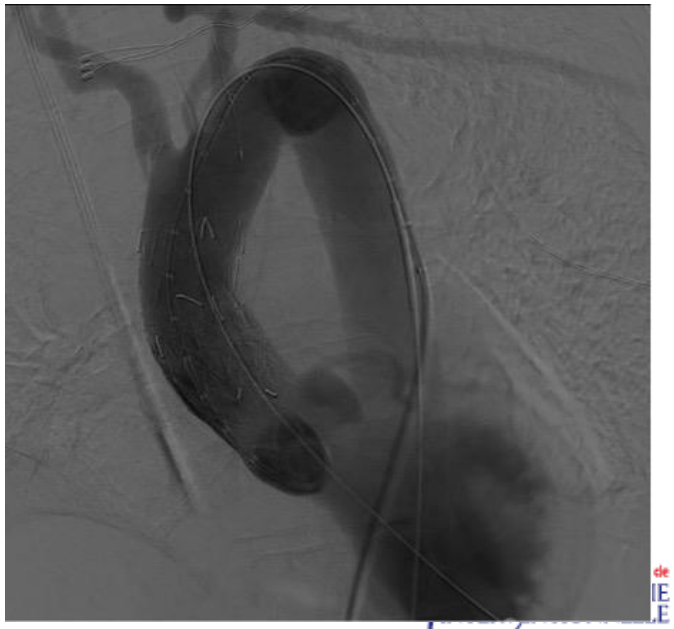
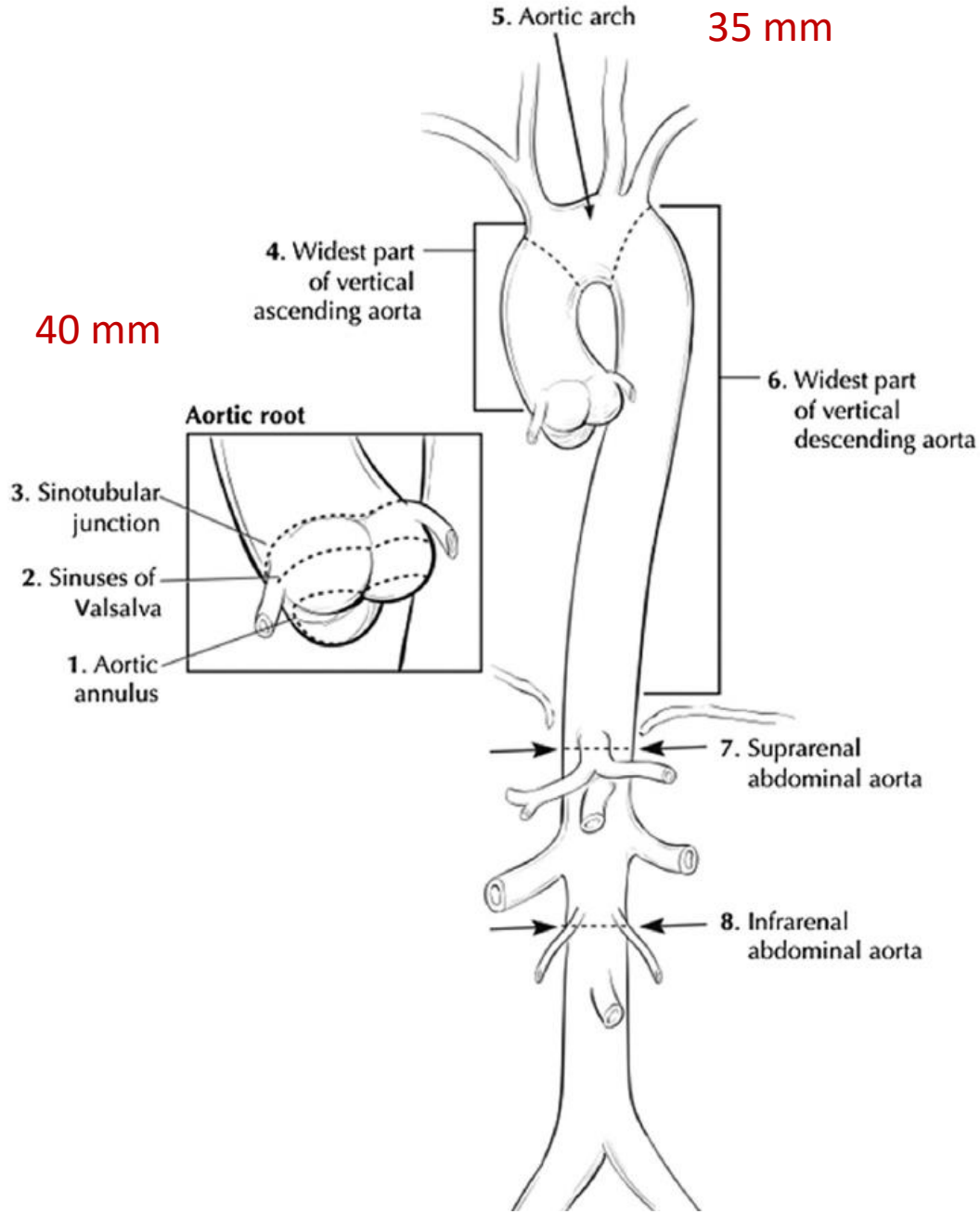


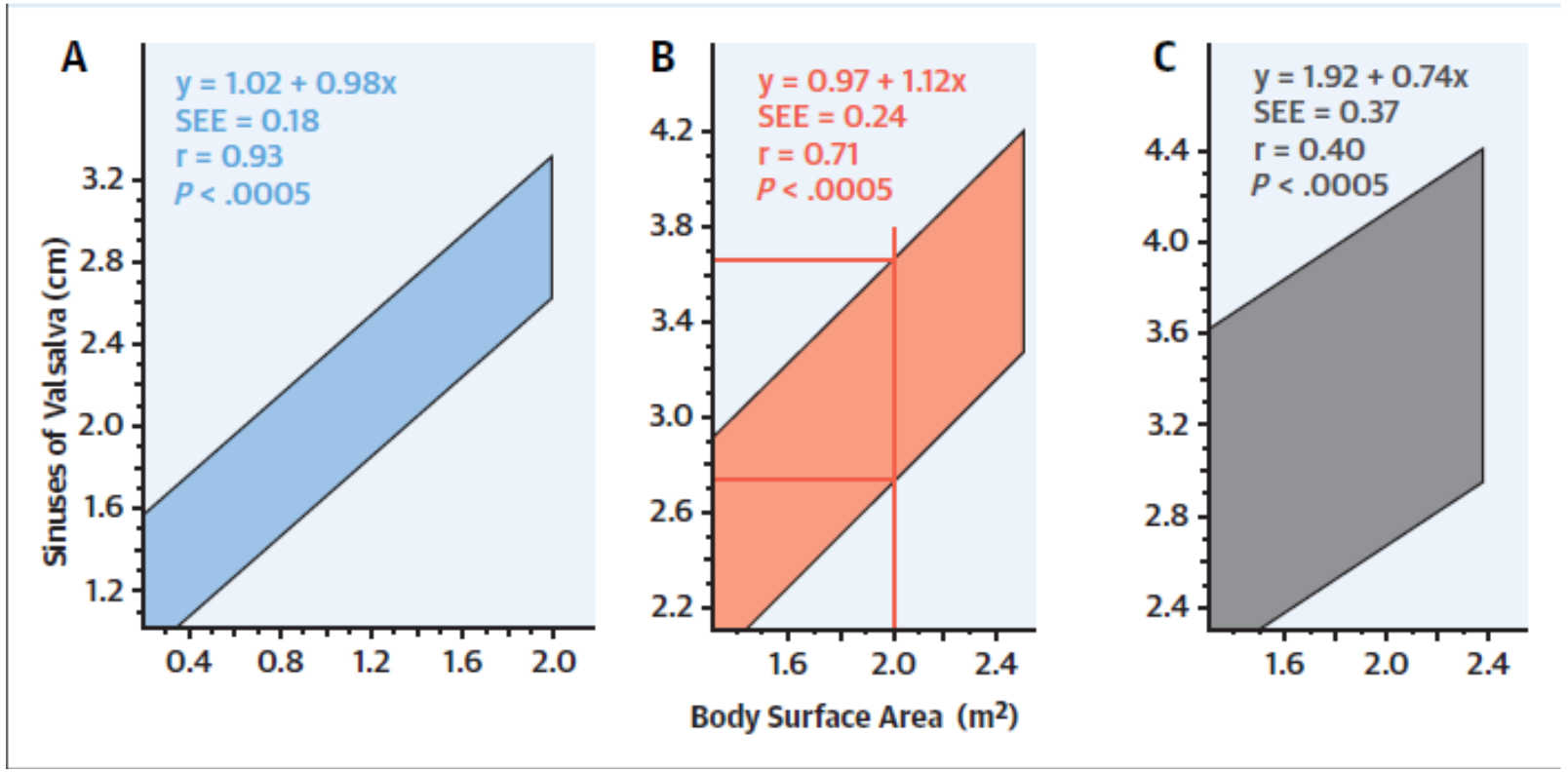
Fig. 6.


L V vent
RCP
SVC

?







< 15 years

20 – 39 years

> 40 years

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2021

Anévrysmes Ao asc 0,1 %
Ao desc 0,1 %
AAA 3,7%

FdR :

- Ao dilatation at another location ++
- Family history of Ao aneurysm
- HTA

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ORIGINAL INVESTIGATIONS

Population-Based Risk Factors for Ascending, Arch, Descending, and Abdominal Aortic Dilations for 60-74–Year-Old Individuals

Lasse M. Obel, MD,[a,b,c] Axel C. Diederichsen, MD, PhD,[a,d] Flemming H. Steffensen, MD, PhD,[e] Lars Frost, MD, PhD, DMSc,[f] Jess Lambrechtsen, MD, PhD,[g] Martin Busk, MD, PhD,[e] Grazina Urbonaviciene, MD, PhD,[f] Kenneth Egstrup, MD, DMSc,[g] Marek Karon, MD,[h] Lars M. Rasmussen, DMSci,[a,i] Oke Gerke, MSc, PhD,[c,i] Anders S. Bovling, MD,[a,b,c] Jes S. Lindholt, MD, PhD, DMSc[a,b]

ABSTRACT

BACKGROUND Aortic dilations (ectasias and aneurysms) may occur on any segment of the aorta. Pathogenesis varies between locations, suggesting that etiology and risk factors may differ. Despite this discrepancy, guidelines recommend screening of the whole aorta if 1 segmental dilation is discovered.

OBJECTIVES The purpose of this study was to determine the most dominant predictors for dilations at the ascending, arch, descending, and abdominal part of the aorta, and to establish comprehensive risk factor profiles for each aortic segment.

METHODS Individuals aged 60-74 years were randomly selected to participate in DANCAVAS I+II (Danish Cardiovascular Multicenter Screening Trials). Participants underwent cardiovascular risk assessments, including blood samples, blood pressure readings, medical records, and noncontrast computed tomography scans. Adjusted odds ratios for potential risk factors of dilations were estimated by multivariate logistic analyses.

RESULTS The study population consisted of 14,989 participants (14,235 men, 754 women) with an average age of 68 ± 4 years. The highest adjusted odd ratios for having any aortic dilation were observed when coexisting aortic dilations were present. Other noteworthy predictors included coexisting iliac dilations, hypertension, increasing body surface area, male sex, familial disposition, and atrial fibrillation, which were present in various combinations for the different aortic parts. Smoking and acute myocardial infarction were inversely associated with ascending and abdominal dilations. Diabetes was a shared protective factor.

CONCLUSIONS Risk factors differ for aortic dilations between locations. The most dominant predictor for having a dilation at any aortic segment is the presence of an aortic dilation elsewhere. This supports current guidelines when recommending a full screening of the aorta if a focal aortic dilation is discovered. (J Am Coll Cardiol 2021;78:201–11)

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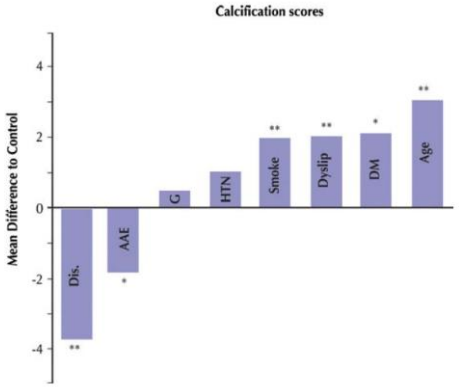
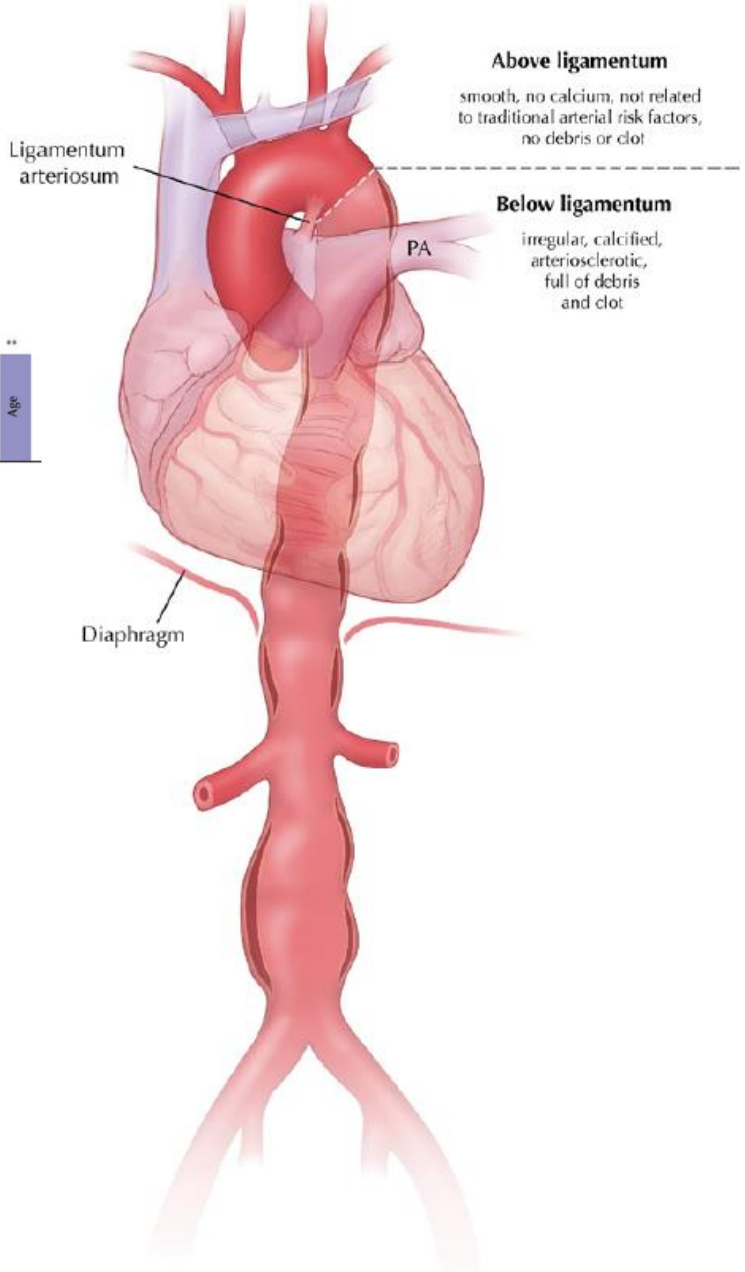




Anévrysmes Aorte Thoracique

21 % antécédent familial d'anévrysme artériel

Croissance >
Age <

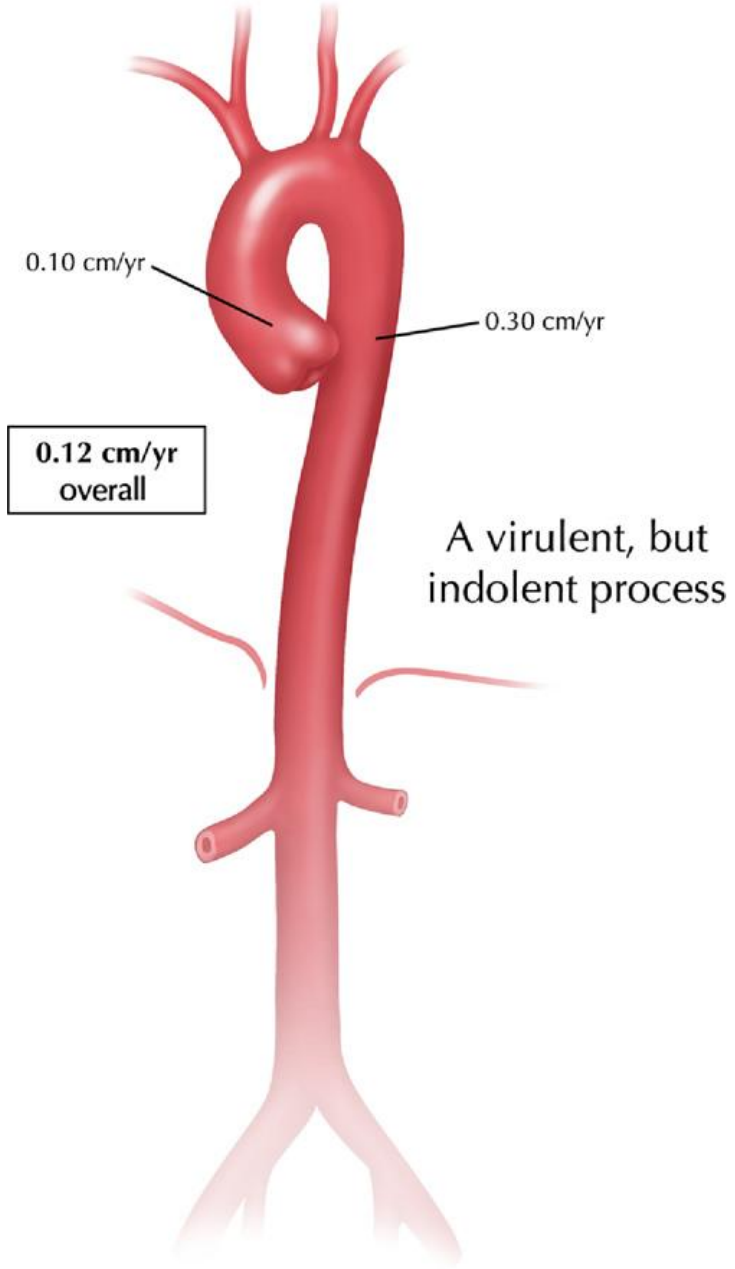
Ao Ascendante : famille Ao Ascendante

Ao Descendante : famille Ao Abdominale

0,5 – 1 mm/an

Croissance rapide ?

Excessivement rare

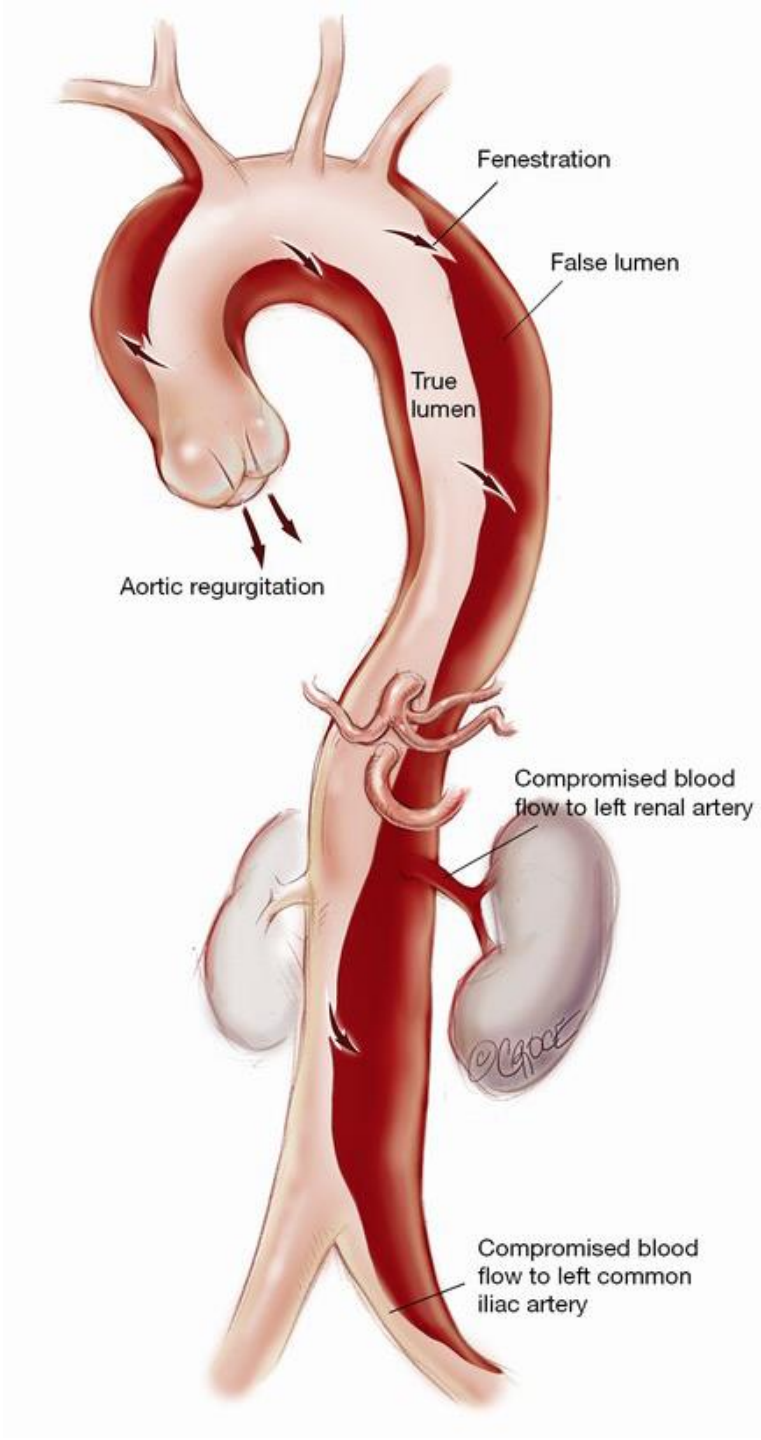


2 – 3 mm/an

Croissance rapide ?

Possible

Dissection aortique



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2010

Yale New Haven Hospital
Aortic Institute

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STATE-OF-THE-ART PAPER

Thoracic Aortic Aneurysm

Clinically Pertinent Controversies and Uncertainties

John A. Elefteriades, MD,* Emily A. Farkas, MD†
New Haven, Connecticut; and St. Louis, Missouri

This paper addresses clinical controversies and uncertainties regarding thoracic aortic aneurysm and its treatment. 1) Estimating true aortic size is confounded by obliquity, asymmetry, and noncorresponding sites: both echocardiography and computed tomography/magnetic resonance imaging are necessary for complete assessment. 2) Epidemiology of thoracic aortic aneurysm. There has been a bona fide increase in incidence of aortic aneurysm making aneurysm disease the 18th most common cause of death. 3) Aortic growth rate. Although a *virulent* disease, thoracic aortic aneurysm is an *indolent* process. The thoracic aorta grows slowly—0.1 cm/year. 4) Evidence-based intervention criteria. It is imperative to extirpate the thoracic aorta before rupture or dissection occurs; surgery at 5.0- to 5.5-cm diameter will prevent most adverse natural events. Symptomatic (painful) aneurysms must be resected regardless of size. 5) Development of nonsize criteria. Mechanical properties of the aorta deteriorate at the same 6 cm at which dissection occurs; elastic properties of the aorta may soon become useful intervention criteria. 6) Medical treatment of aortic aneurysm. Medical treatment is of unproven value, even beta-blockers and angiotensin-receptor blockers. 7) A genetic disease. Even non-Marfan aneurysms have a strong genetic basis. 8) Need for biomarkers. Virulent but silent, TAA cries out for a biomarker that can predict the onset of adverse events. Pathophysiologic understanding has led to identification of promising biomarkers, especially metalloproteinases. 9) Endovascular therapy for aneurysms. Endovascular therapy has burgeoned, despite the fact that the EVAR-2, DREAM, and INSTEAD trials showed no benefit at mid-term over medical or conventional surgical therapy. We must avoid "irrational exuberance." 10) Inciting events for acute aortic dissection. Recent evidence shows that dissections are preceded by a specific severe exertional or emotional event. 11) "Silver lining" of aortic disease. Proximal aortic root disease seems to protect against arteriosclerosis. (J Am Coll Cardiol 2010;55:841–57) © 2010 by the American College of Cardiology Foundation

This review of the key issues in thoracic aortic aneurysm disease maintains a clinical focus, calling on basic science as directly needed in addressing topics that arise daily in the care of patients. We call extensively on data reported or currently emerging from the Yale Center for Aortic Disease (with its database including 3,000 patients, 9,000 imaging studies, and 9,000 patient-years of observation), but we supplement liberally with key information from other leading aortic centers.

Estimating True Aortic Size (and Reconciling Discrepant Reports) Can Be Difficult

It is important to know the size of the aorta because key decisions regarding management of aortic aneurysms depend on size. However, the question "How big is the aorta?" is not always easy to answer.

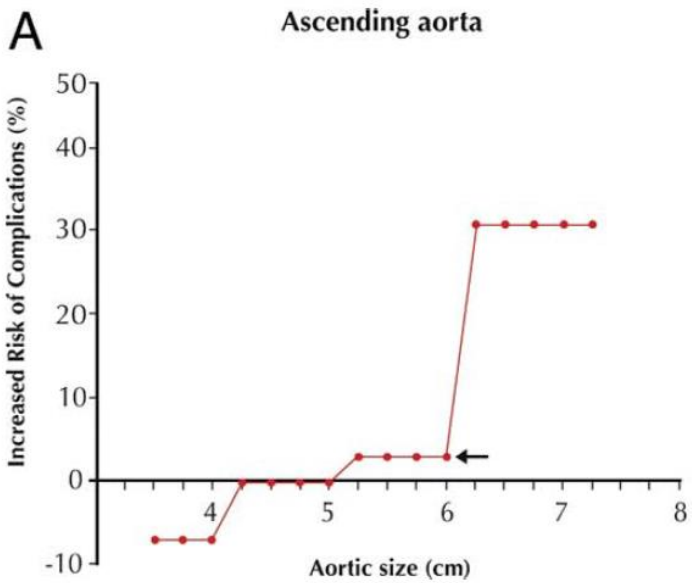
The following specific sources of error are encountered regularly in the clinical practice of aortic care.

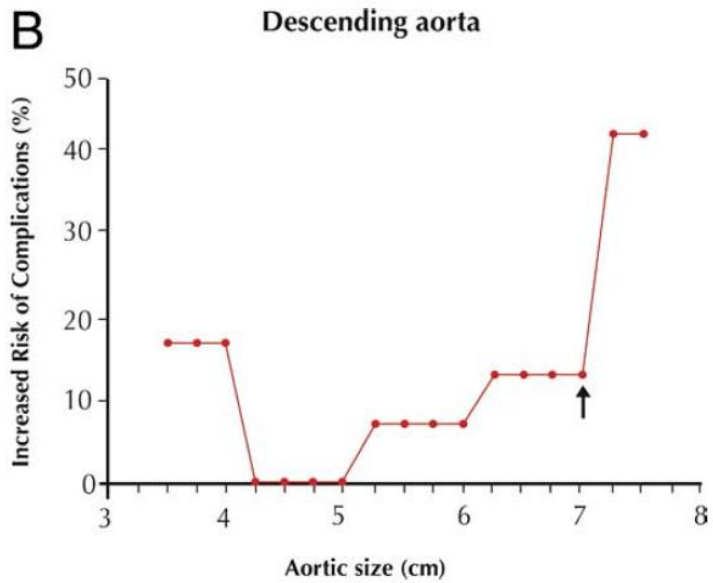
From the *Yale University School of Medicine, New Haven, Connecticut; and the †Saint Louis University School of Medicine, St. Louis, Missouri.
Manuscript received May 28, 2009; revised manuscript received August 24, 2009, accepted August 31, 2009.

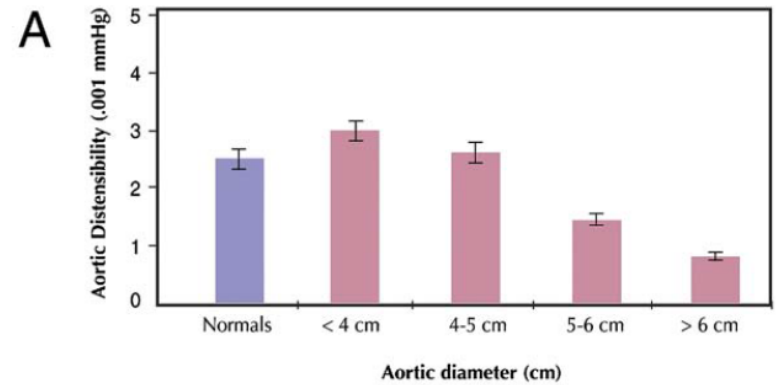
Inherent level of resolution of current imaging technologies. A radiologist may report an increase in size of 1 or 2 mm between the current scan and the previous scan. However, we cannot reliably detect so small a change, be it on echocardiography (echo), computed tomography (CT), or magnetic resonance imaging (MRI). Unlike the precise physical sciences, in clinical aortic size estimation, one cannot have confidence in a measured change of <3 or 4 mm, and even this level of precision requires carefully ascertaining that similar levels of the aorta are being measured.

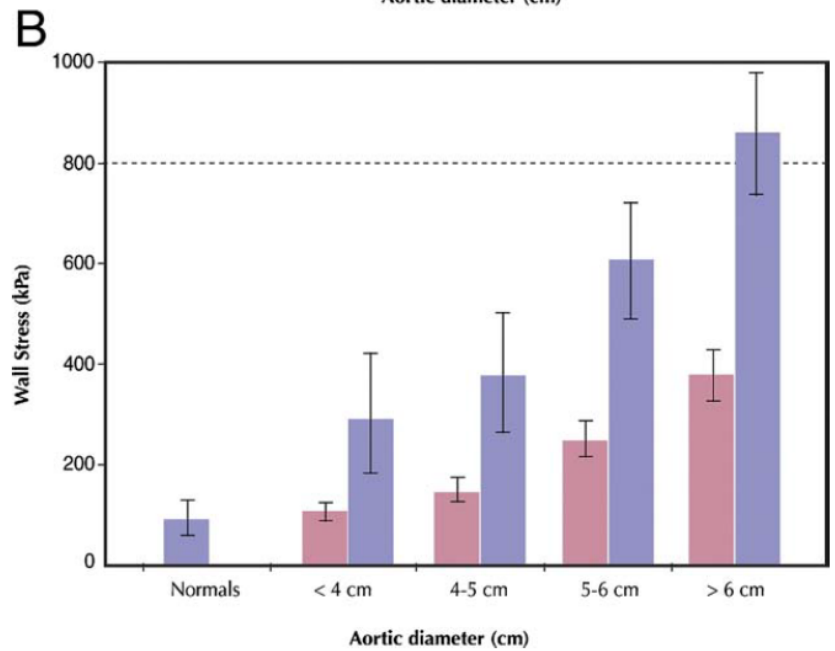
Include or exclude the aortic wall itself in a measurement? There is no consensus on whether the aortic wall should be included or excluded in the aortic diameter, whether the test is made by echo, CT, or MRI. This may make a difference of several millimeters in the calculated measurements. On a noncontrast CT image, for example, it is most comfortable to measure the entire aortic wall, including the lumen and wall; on the other hand, on a contrast image, it may be more comfortable to measure the luminal shadow alone.

Limitations of specific imaging modalities. Echocardiographic images of the ascending aorta are often beautifully crisp. However, a transthoracic echocardiogram can only









Journal of the American Heart Association

2021

ORIGINAL RESEARCH

Root Dilatation Is More Malignant Than Ascending Aortic Dilation

Paris D. Kalogerakos, MD, PhD; Mohammad A. Zafar, MD; Yupeng Li, PhD; Sandip K. Mukherjee, MD; Bulat A. Ziganshin, MD, PhD; John A. Rizzo, PhD; John A. Elefteriades, MD, PhD (Hon)

BACKGROUND: Data from the International Registry of Acute Aortic Dissection indicate that the guideline criterion of 5.5 cm for ascending aortic intervention misses many dissections occurring at smaller dimensions. Furthermore, studies of natural behavior have generally treated the aortic root and the ascending aorta as 1 unit despite embryological, anatomical, and functional differences. This study aims to disentangle the natural histories of the aforementioned aortic segments, allowing natural behavior to define specific intervention criteria for root and ascending segments of the aorta.

METHODS AND RESULTS: Diameters of the aortic root and mid-ascending segment were measured separately. Long-term complications (dissection, rupture, and death) were analyzed retrospectively for 1162 patients with ascending thoracic aortic aneurysm. Cox regression analysis suggested that aortic root dilatation (P=0.017) is more significant in predicting adverse events than mid-ascending aortic dilatation (P=0.087). Short stature posed as a serious risk factor. The dedicated risk curves for the aortic root and the mid-ascending aorta revealed hinge points at 5.0 and 5.25 cm, respectively.

CONCLUSIONS: The natural histories of the aortic root and mid-ascending aorta are uniquely different. Dilation of the aortic root imparts a significant higher risk of adverse events. A diameter shift for intervention to 5.0 cm for the aortic root and to 5.25 cm for the mid-ascending aorta should be considered at expert centers.

Key Words: aneurysm ■ aortic root ■ dissection ■ mid-ascending aorta ■ natural history ■ surgical threshold

Aortic dissection is a devastating disease that threatens life without premonitory signs. The surgical guidelines of the American Heart Association,[1] Society of Thoracic Surgeons, American Association for Thoracic Surgery, and European Society of Cardiology[2] recommend preemptive repair of ascending aorta aneurysms at a diameter of 5.5 cm and 5.0 cm for patients with connective tissue aortopathies whose malevolent behavior dictates a more aggressive approach and earlier intervention. The cutoff value of 5.5 cm corresponds to a steep rise in the respective risk curve. The threshold for intervention for patients with bicuspid aortic valve has varied over the years, with the most recent dedicated bicuspid valve guidelines (American Heart Association, Society of Surgery) back to 5.5 cm.[3] Beyond intervention criterion values, the major adverse aortic events (MAAEs), defined as dissection, rupture, and death, pose a considerable threat to patients, exceeding operative risk at experienced centers.

Despite improved access to healthcare services, increased awareness of clinicians, implemented screening policies, and improved surgical outcomes, the prevalence of thoracic aortic disease has been reported on the increase.[4] The study by Evangelista et al from the International Registry of Acute Aortic Dissection demonstrated that 60% of acutely dissected ascending aortas present with a diameter <5.5 cm and 40% <5.0 cm.[5] Our recent study showed that population dynamics at least partially

Anévrysme

Racine Ao

= risque x 2

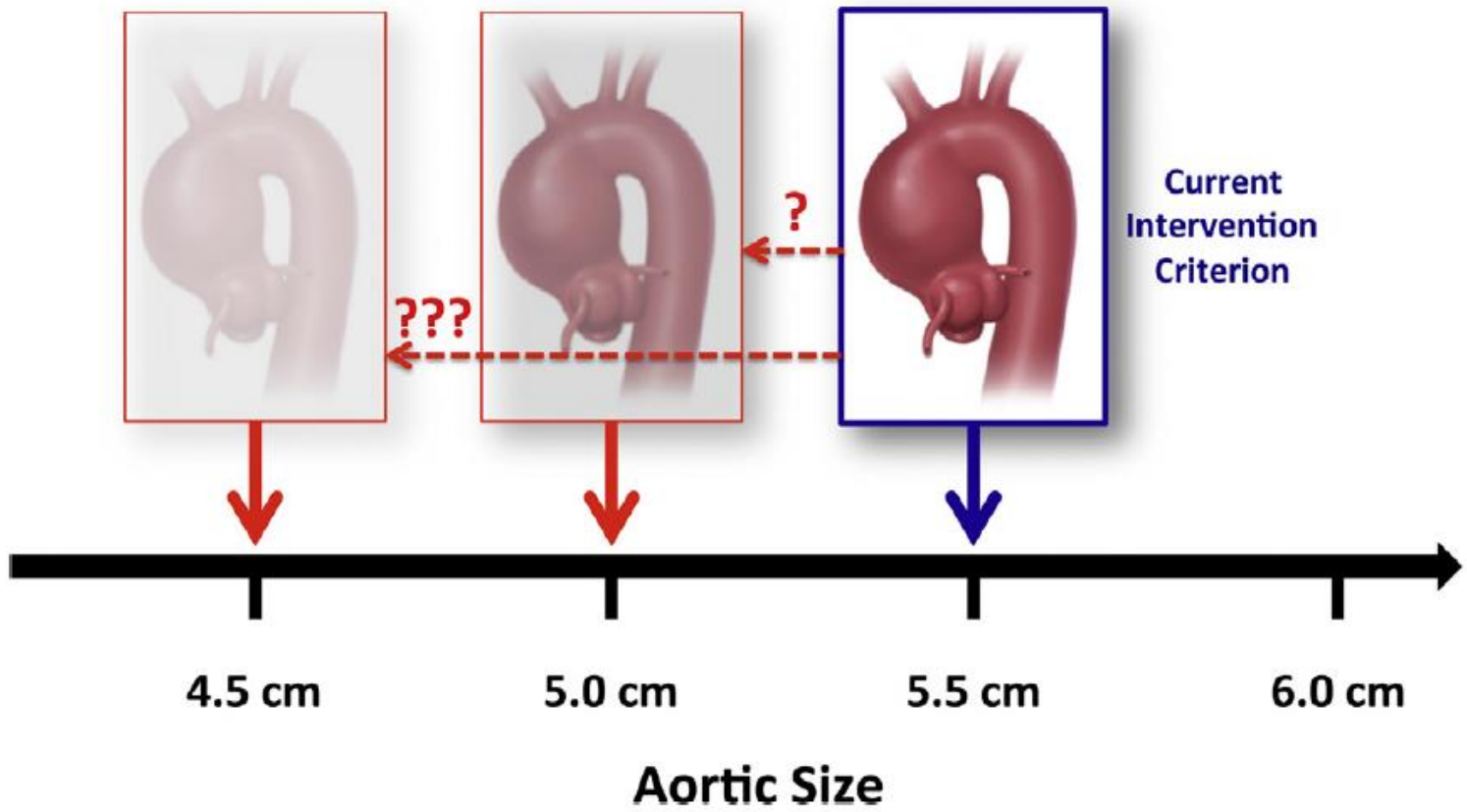
par rapport Segment 1

Risque de complication :

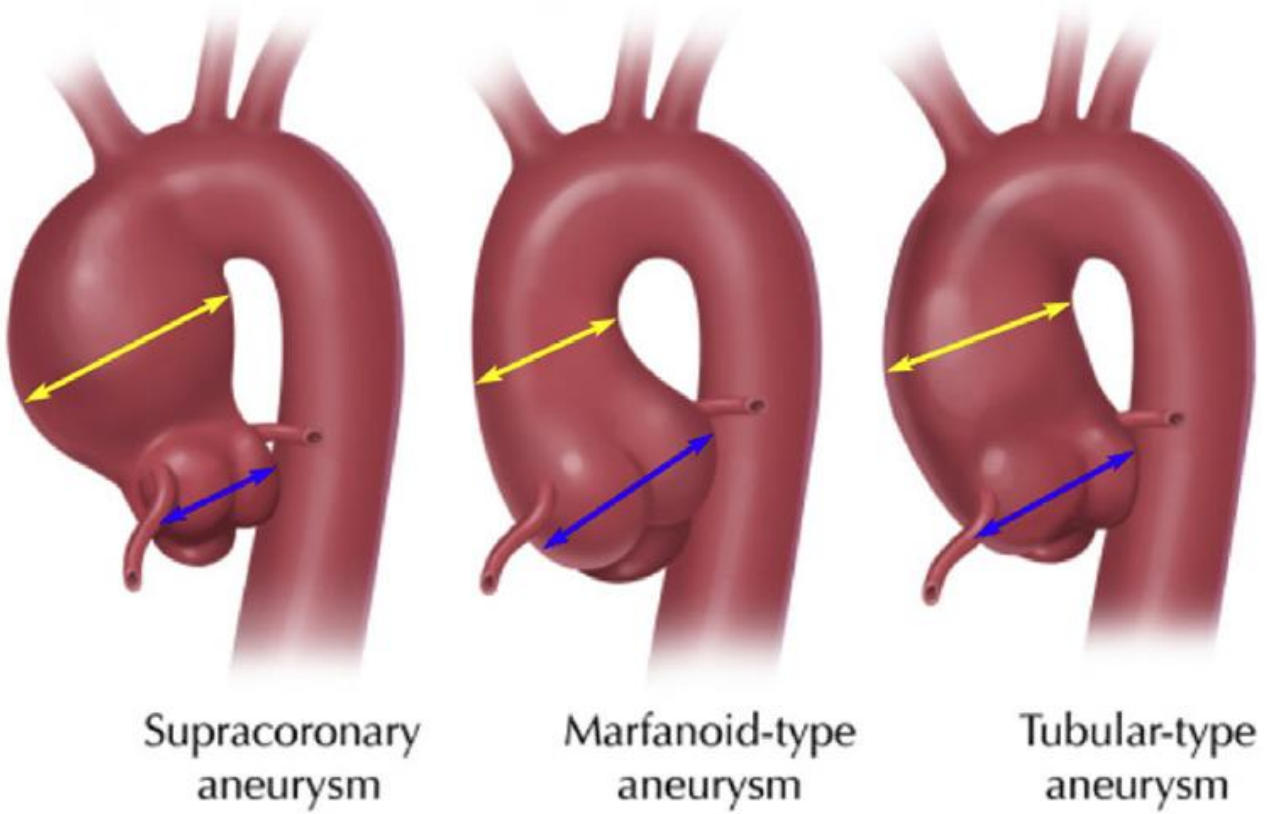
Racine Ao : 5,0 cm

Segment 1 : 5,25 cm

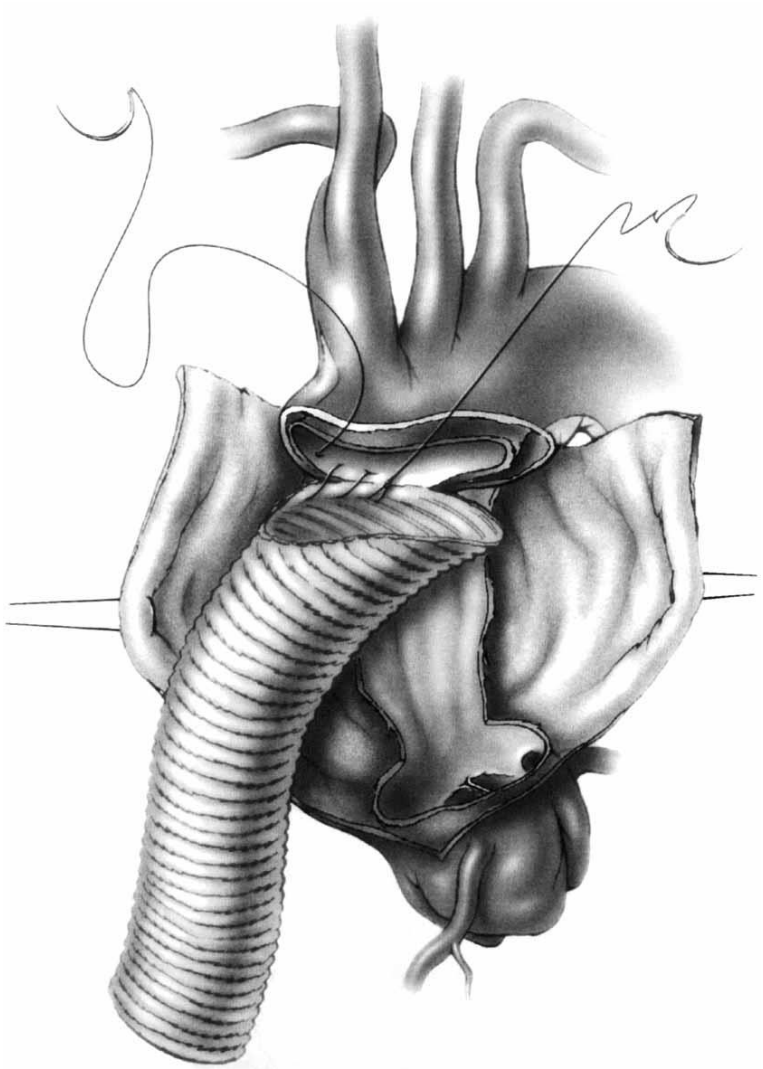
Time for a Leftward Shift in Ascending Aortic Guidelines?

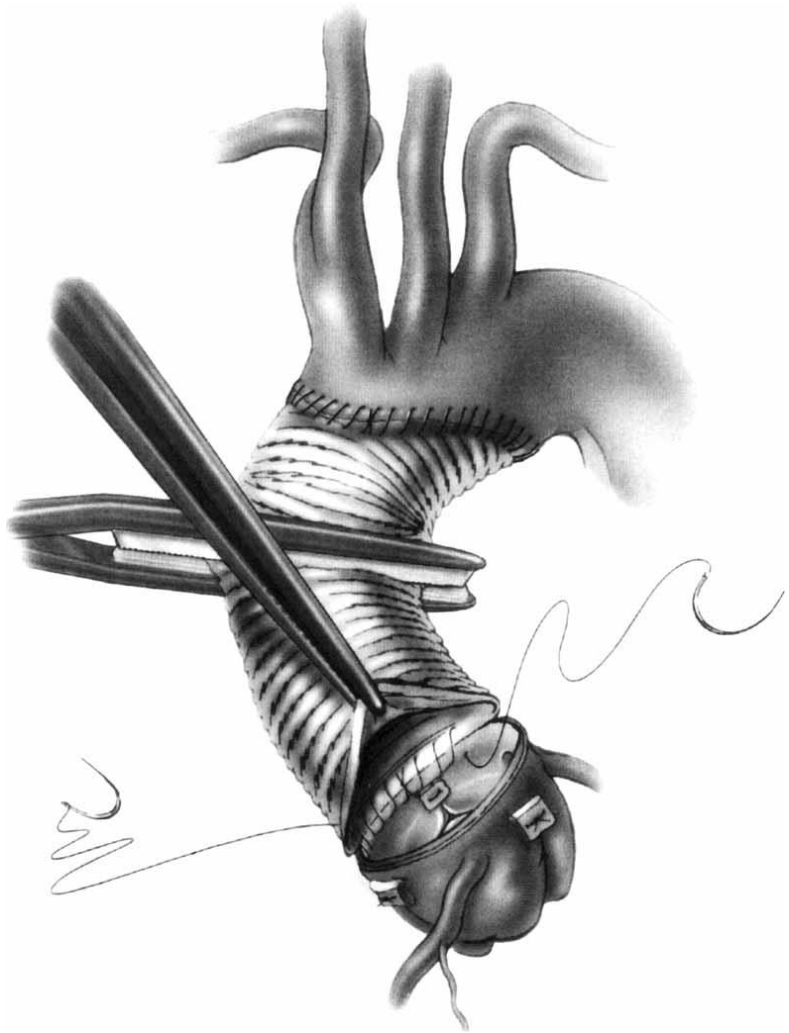


Phénotypes des Anévrysmes de l'Aorte Ascendante

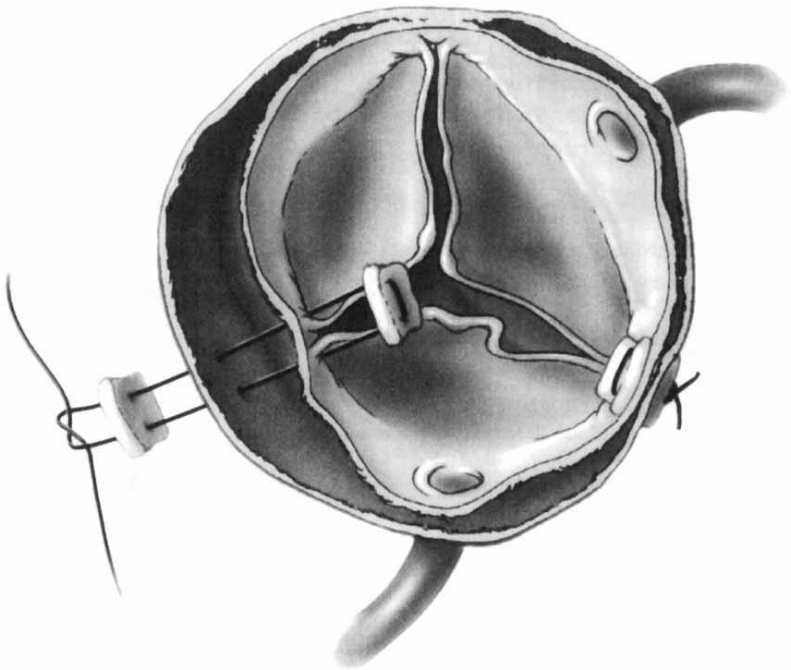


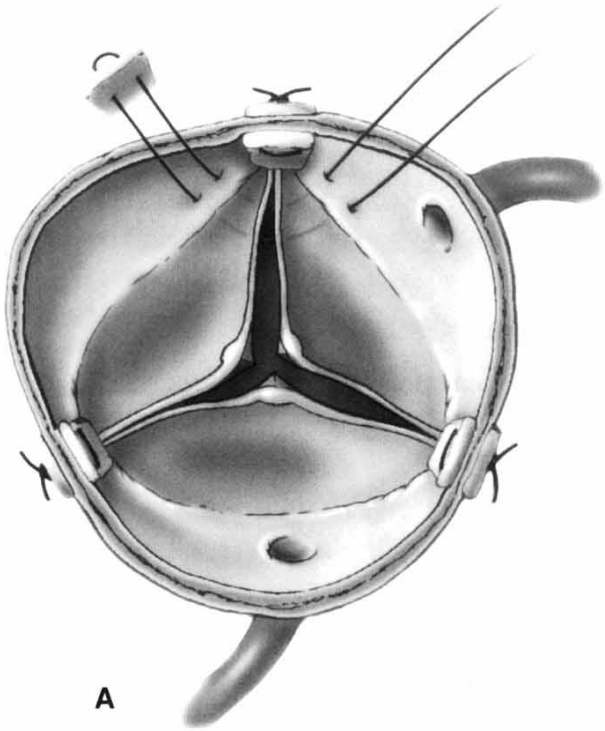
Tube sus-coronaire

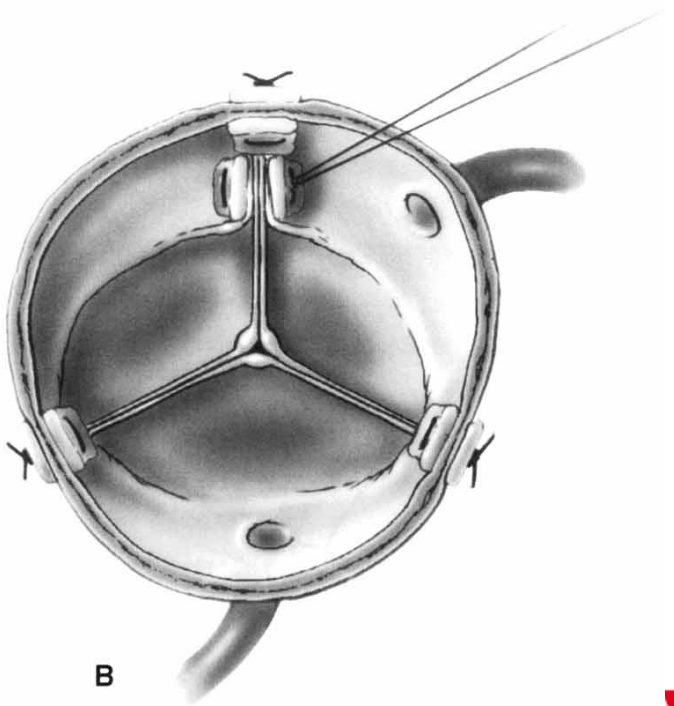




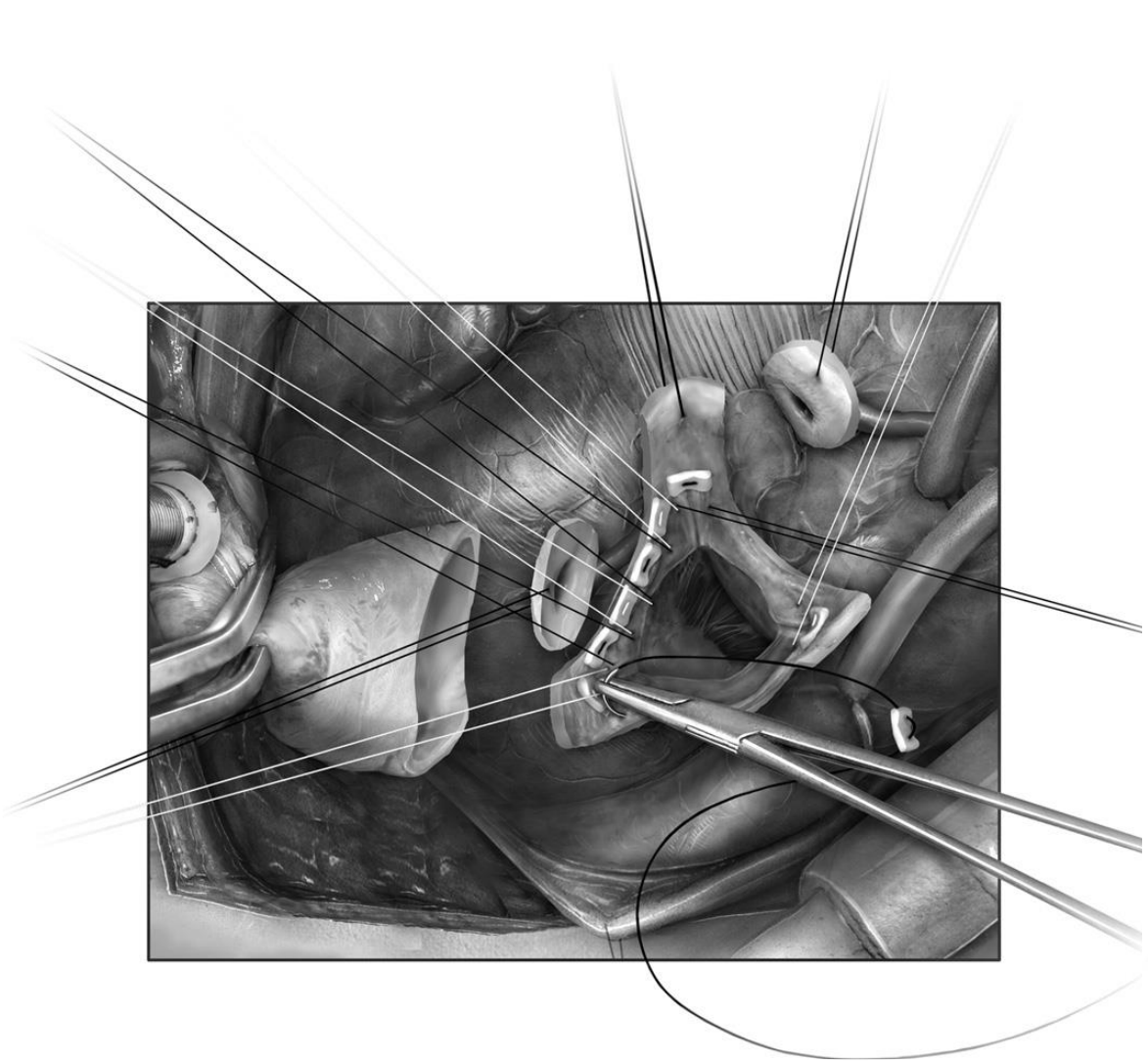
Re-suspension des commissures

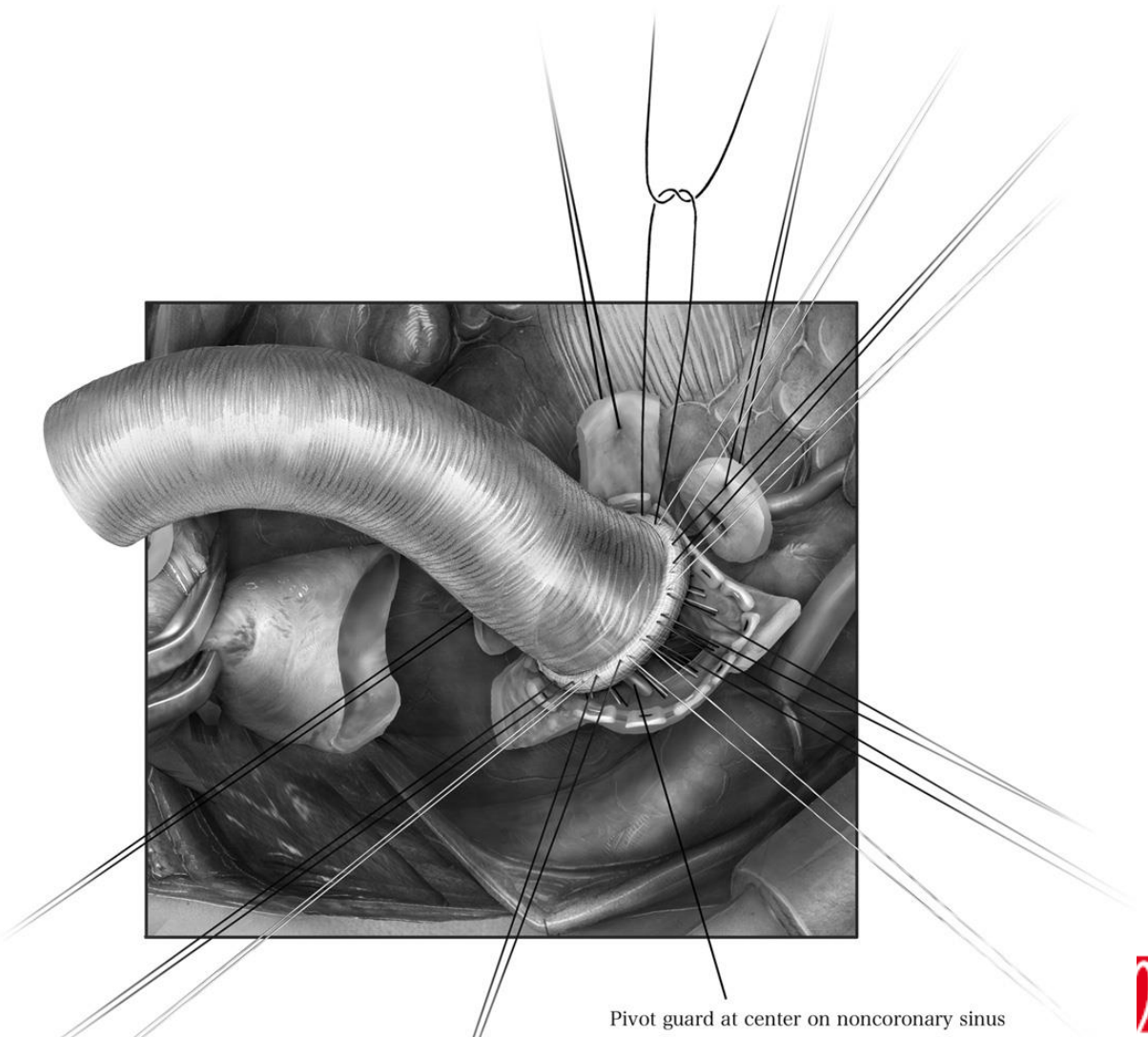






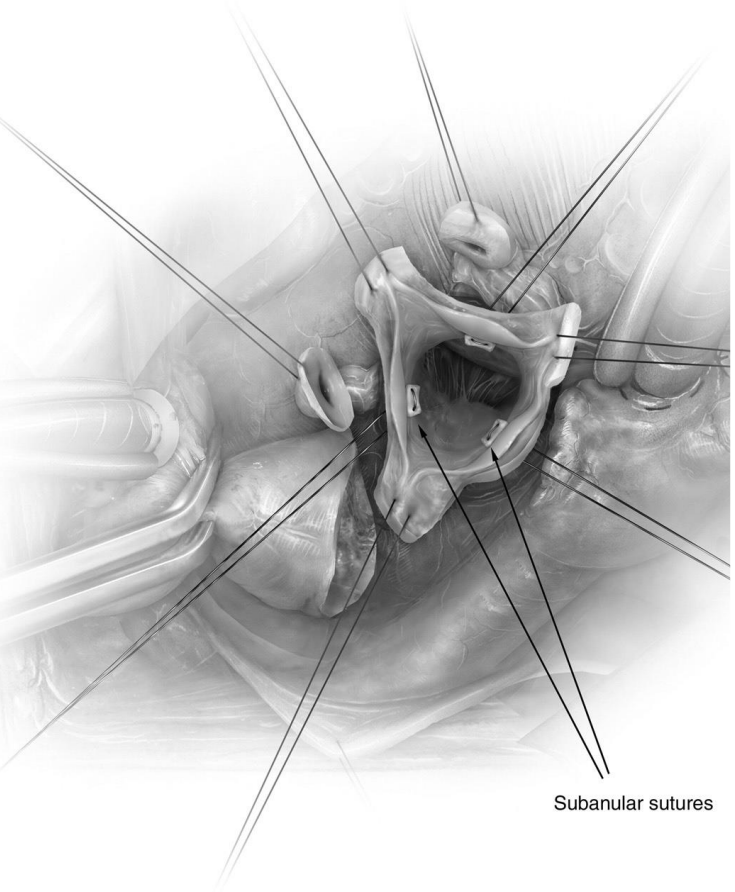
Bentall

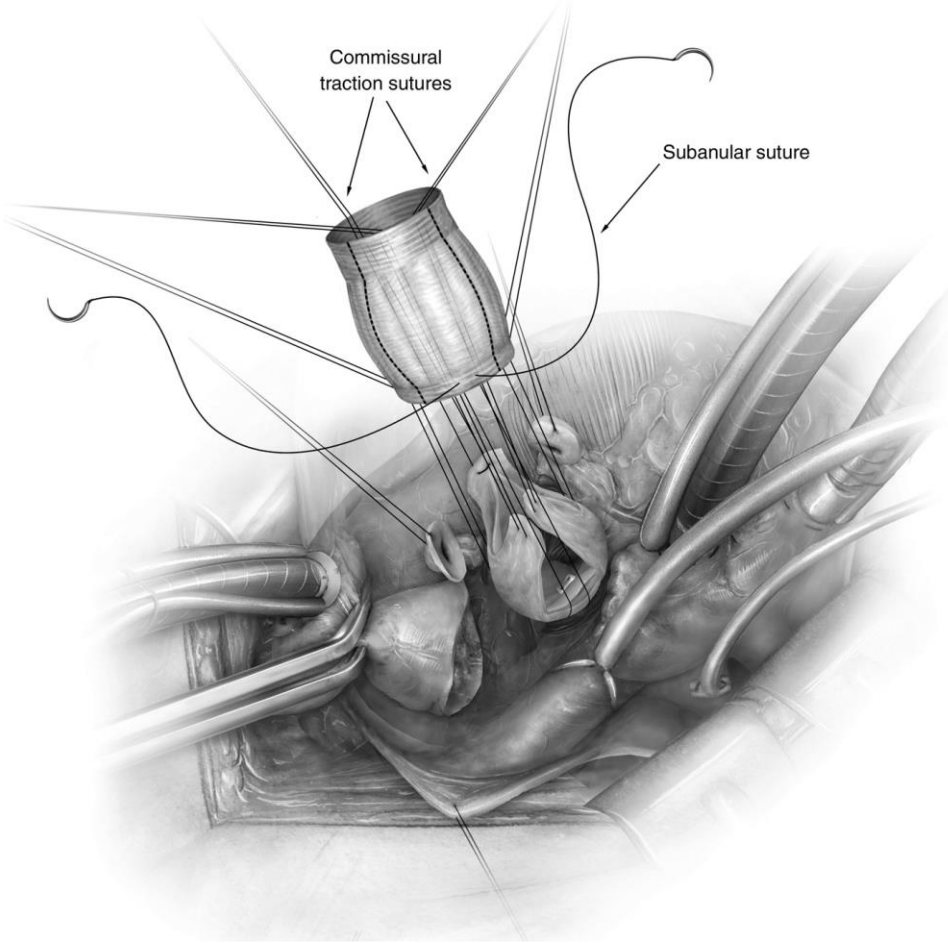


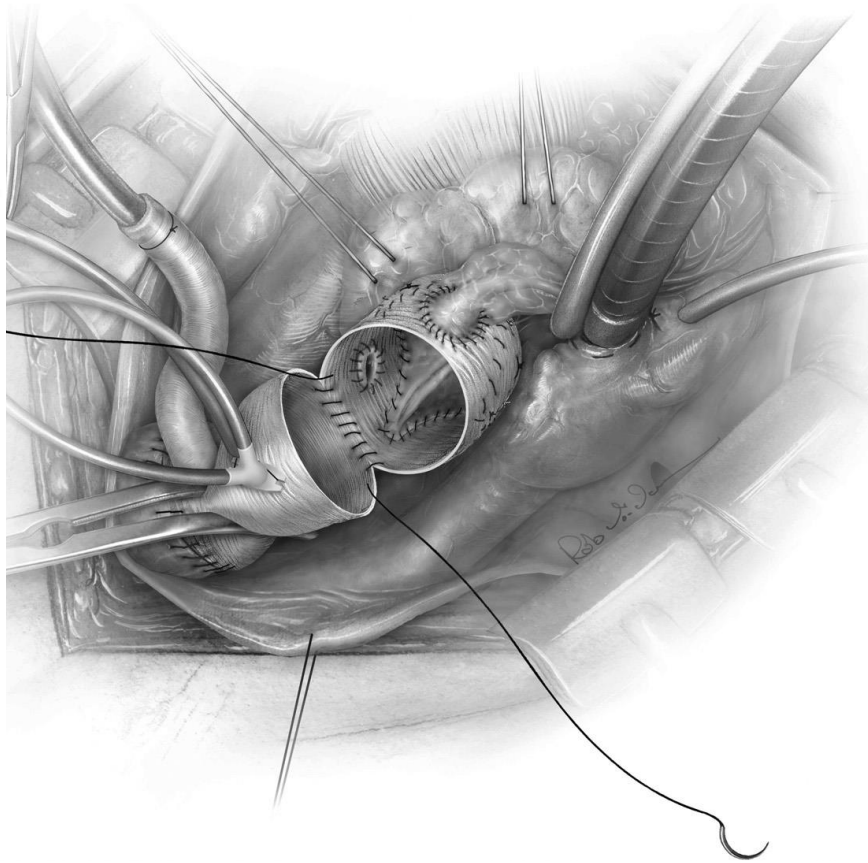


Pivot guard at center on noncoronary sinus

Yacoub ou Tirone David

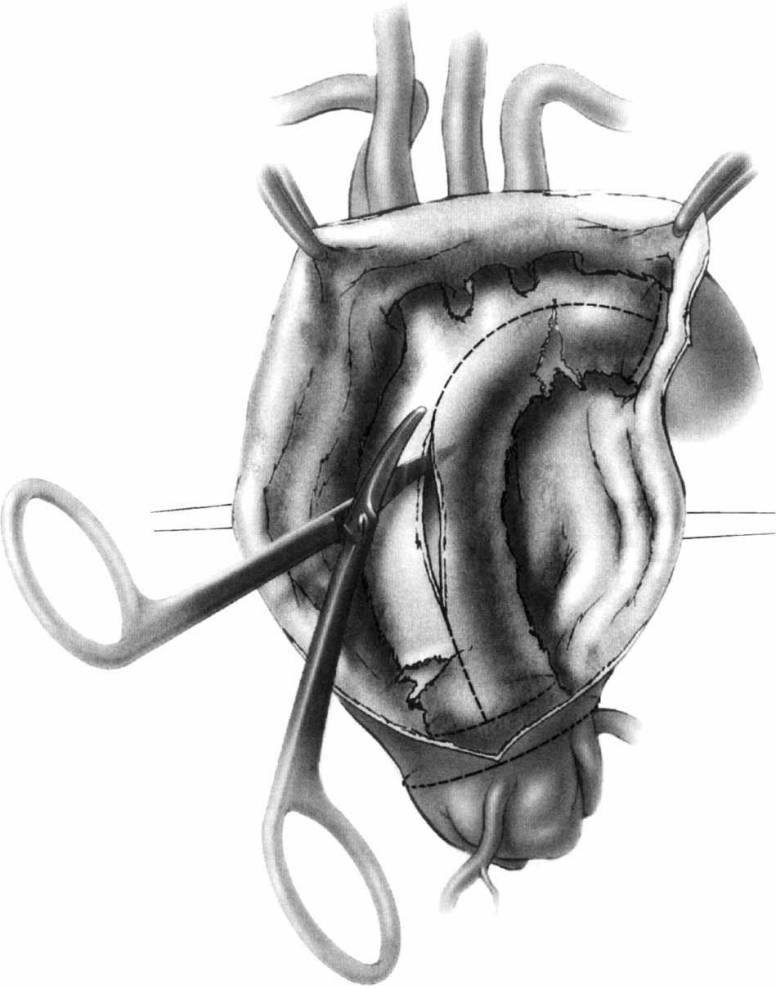


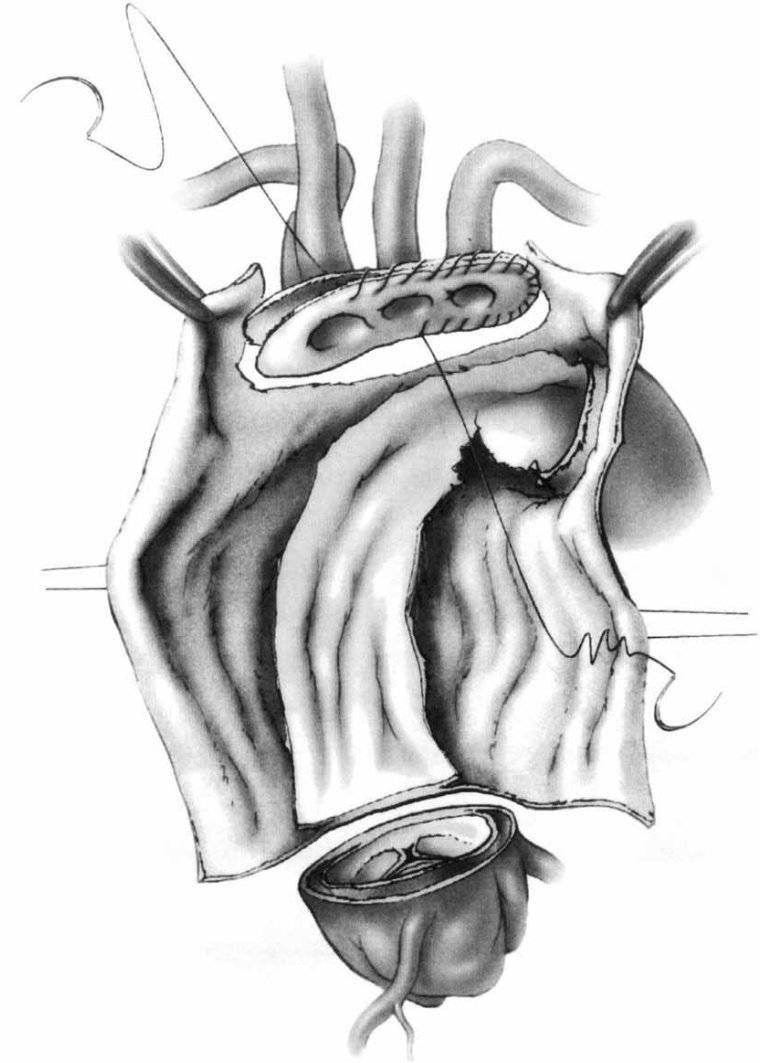


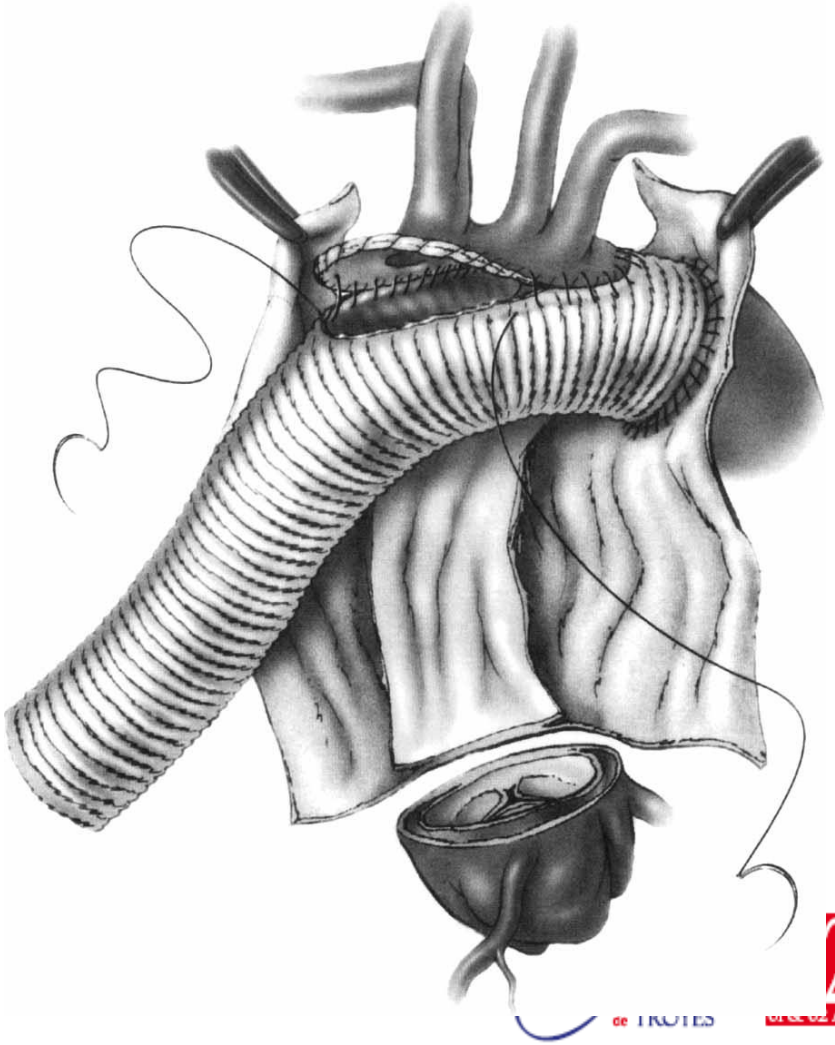


Crosse aortique

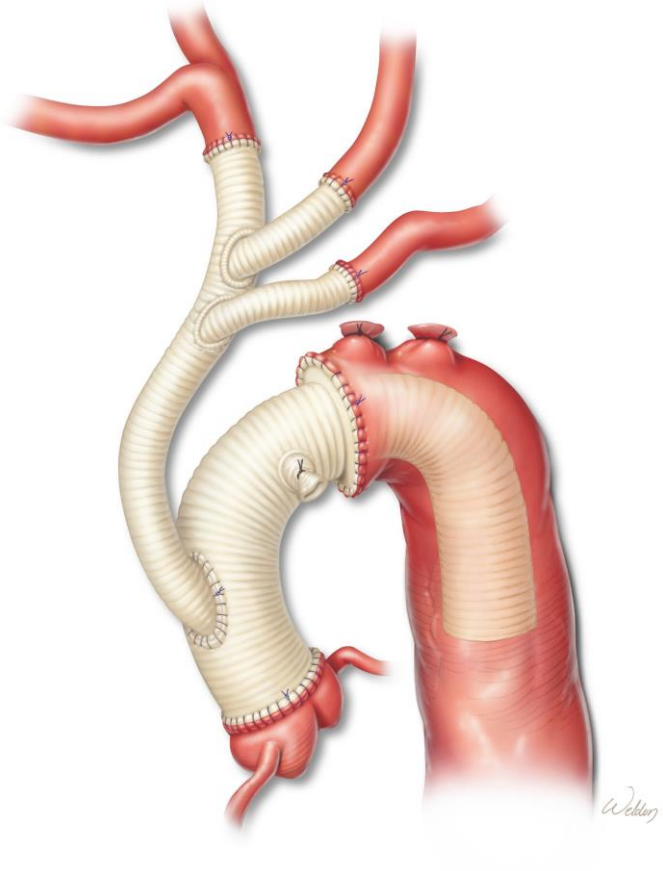
Remplacement de la Crosse aortique



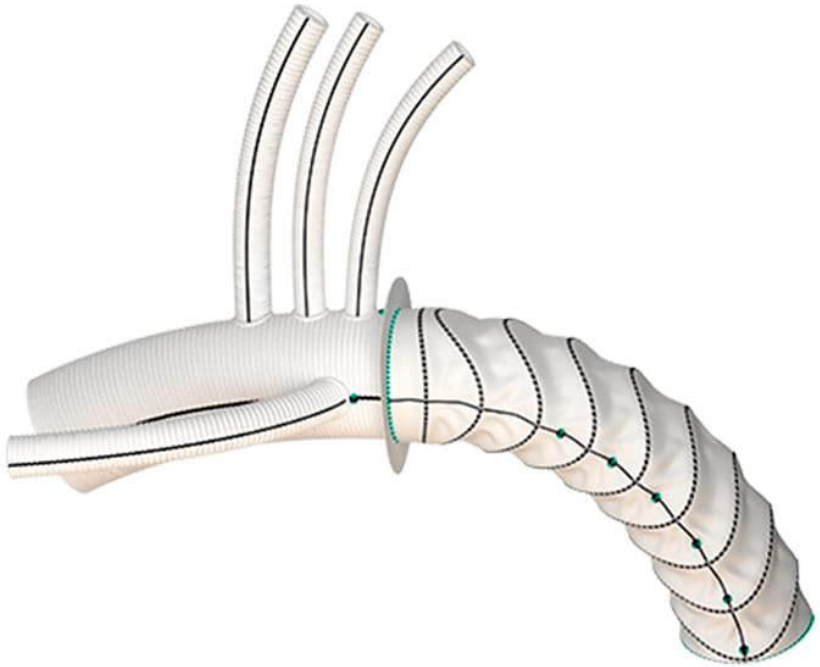


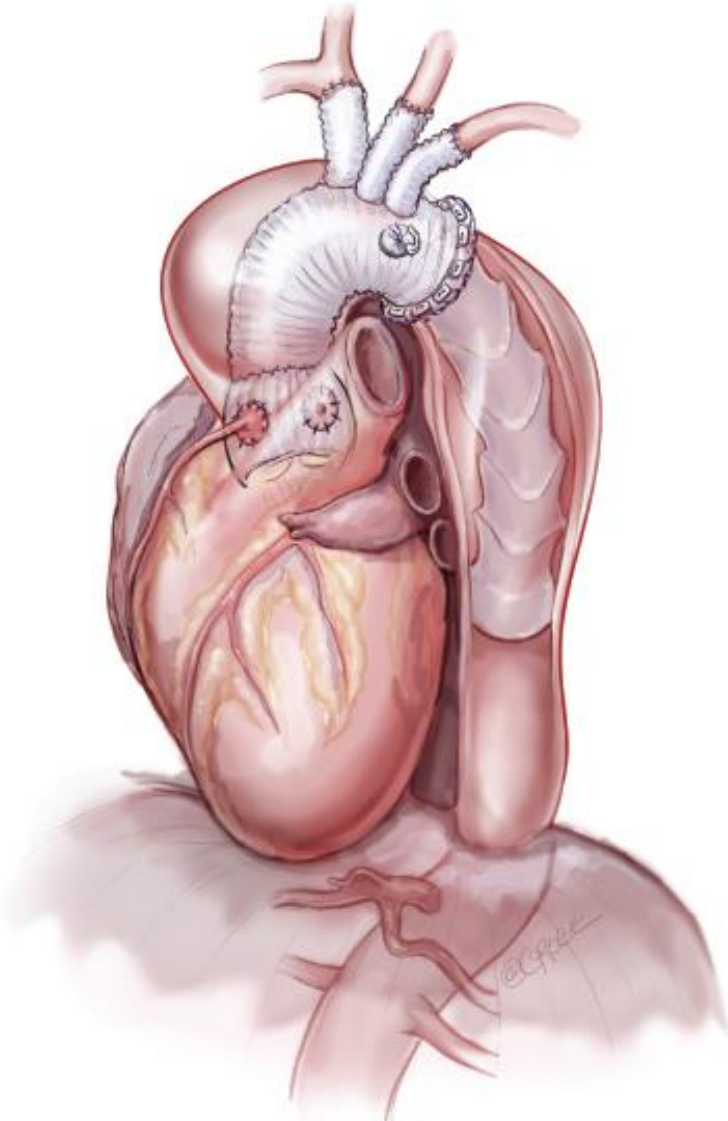


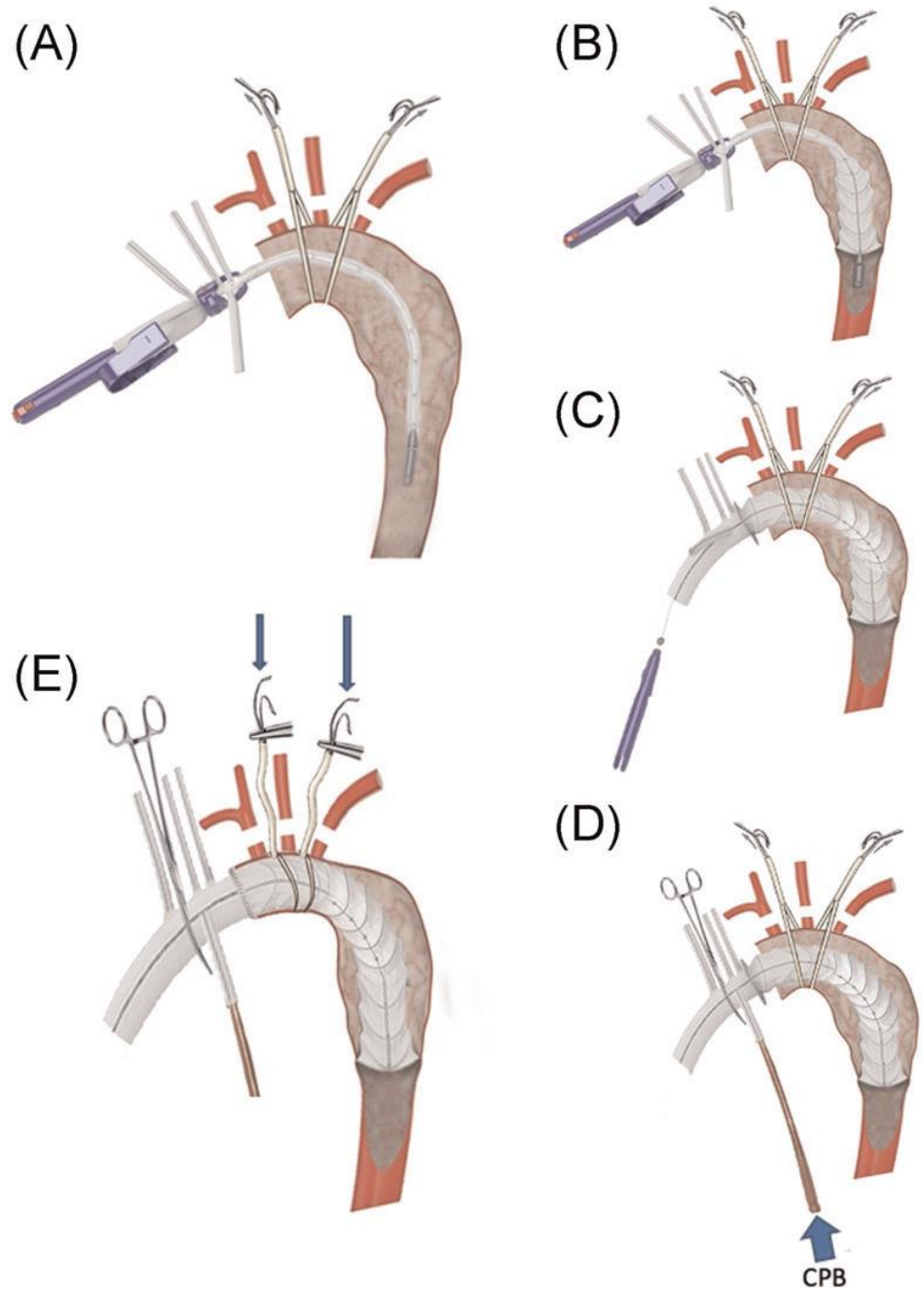
Trompe d'éléphant



Thoraflex







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Operative anatomy of the arch

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OPERATIVE ANATOMY OF THE ARCH

Aneurysmal disease of the aorta carries the risk of an ongoing progression in the long term, and, thus, it comes as no surprise that the number of publications dealing with extended aortic aneurysm repair is increasing. In 2011, there have been, in the *European Journal of Cardio-Thoracic Surgery* alone, numerous reports on aortic aneurysm repair, including, among others the ascending aorta and root [1–4], the descending thoracic and thoraco-abdominal aorta [5–8], the arch in-between [9–12] and also more general issues [13–18].

Ascending aortic aneurysm repair is familiar to most cardiac surgeons from the aortic root to the proximal part of the aortic arch and the same holds true for the descending thoracic aorta, be it with or without the distal aortic arch. However, if the aortic arch is also diseased in between the proximal and the distal part, usually requiring total arch repair in addition to ascending and descending aortic cures, the battlefield may be somewhat less familiar to many of us.

In this issue, Hino *et al.* [19] report their experience with the extended replacement of the thoracic aorta, including a consecutive series of 29 patients with total arch replacement; out of whom about half had already undergone Bentall de Bono procedures, TEVAR and/or hemi-arch repair previously. This is indeed a complex group of patients. The preferred surgical approach of Hino *et al.* was a left postero-lateral thoracotomy with femoro-femoral cardiopulmonary bypass using additional venous drainage in six of 29 patients versus other drainage sites in 13 of 29 patients (right atrium and pulmonary artery) and additional arterial inflow in seven of 29 versus other sites in seven of 29 in moderate-to-deep hypothermia. Brain protection was realized with antegrade cerebral perfusion using balloon-tipped catheters from the inside of the aortic arch. The outcome in the series was outstanding with a 30-day mortality of two of 29 patients and a 5-year actuarial survival of 80.6 + 9.0% and freedom from subsequent aortic events of 96.0 + 3.9%. Only one patient suffered from reversible right forearm paralysis and one patient suffered from transient paraparesis. The authors do not report any transient or permanent brain nerve lesions although several, i.e. n. vagus, n. recurrens and n. phrenicus, are within the surgical field at various levels. Considering hard endpoints, like mortality and stroke, this aspect may seem to be a minor issue and, therefore, appears to be somewhat underreported in the current literature. Symptoms of laryngeal nerve fatigue either due to an overstretched recurrent nerve or a transsected one

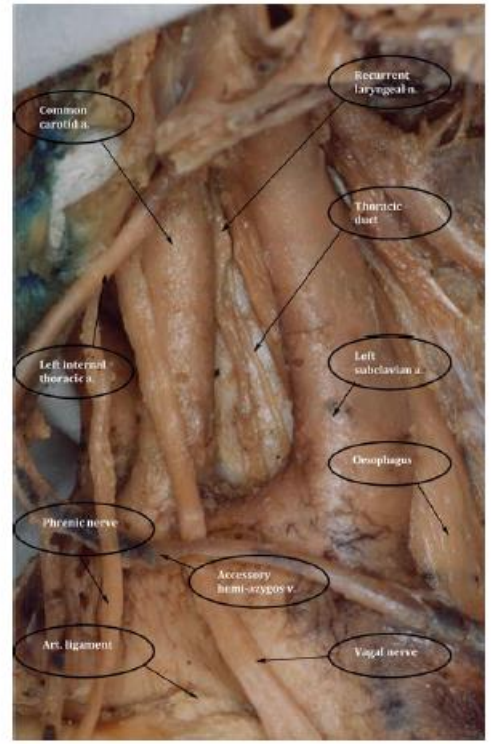

Figure 1: Operative anatomy of the arch seen from the left side with its interwoven noble structures which are to be preserved: courtesy of Berdajs and Turina [20].

Dissection = risque de rupture


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