

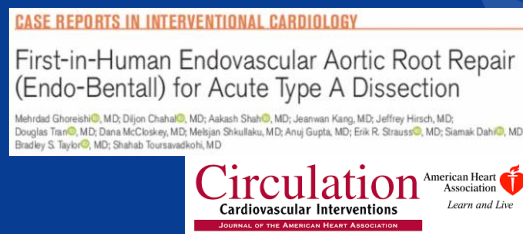
# Anatomical feasibility of EndoBentall strategies for management of acute type A aortic dissection

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# Background

**Acute type A aortic dissection (ATAAD) is a catastrophic condition with a perioperative mortality of 19.5-26%, and up to 45% in octogenarians. More than 10% of patients are rejected from surgery due to high-risk comorbidities.**

**Endobentall concept, has been proposed to incorporate the aortic valve, the coronary arteries and the proximal ascending aorta . However, its applicability to type A aortic dissections has not yet been studied except for a recent case report.**



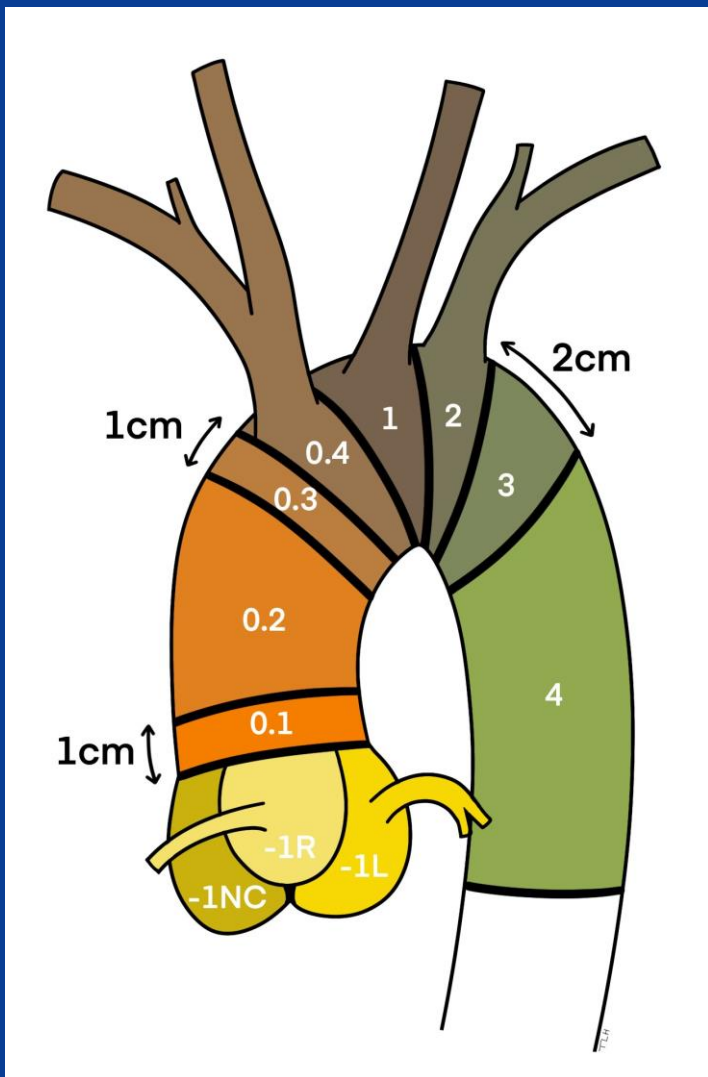
# Objectives

**Assess the anatomical feasibility of total endovascular management of ATAAD with a dedicated aortic root endograft (Endobentall), and introduce a new endovascular anatomical classification for the aortic root and ascending aorta to facilitate comparison of future treatments and devices.**

# Materials and Methods

- ***Inclusion criteria*** : All consecutive patients treated for an acute Stanford type A aortic dissection between 2016 and 2020 with workable CT scan (High quality arterial phase and maximal thickness  $>1\text{mm}$ ) in three French aortic centers retrospectively.
- Aortic measurements were assessed by one cardiovascular surgeon with a large experience in aortic endograft and TAVR, using pre-operative CT scans.
- Several aortic and coronary lengths and diameters were assessed. Aortic annulus dimensions and coronary height were studied.
- Entry tear location were reported based on our adapted aortic classification.

# Dedicated Adapted Aortic Classification

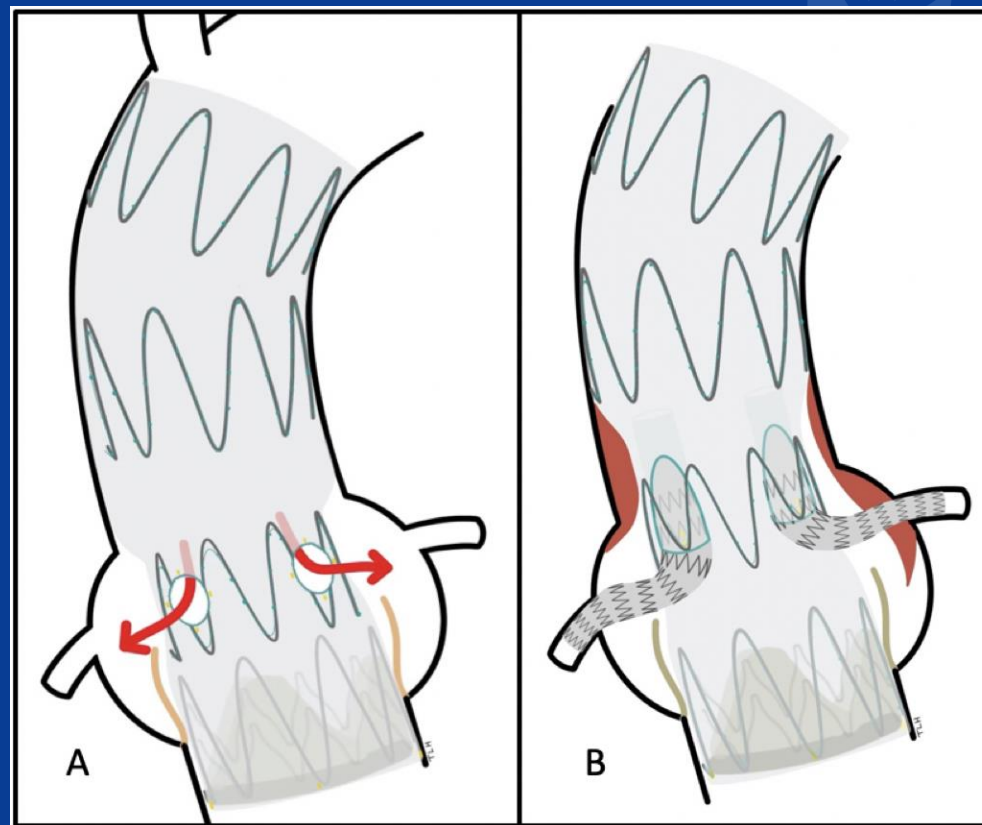


- **Zone -1** : Valsalva sinuses (R: right, L: left, NC: non coronary)
- **Zone 0.1** : “proximal landing zone”, 1cm above the sinotubular junction
- **Zone 0.3** : “distal landing zone”, 1cm proximal to the innominate artery
- **Zone 0.4** : aortic zone of the innominate artery ostium

# Treatment concepts

## *Fenestrated Endobentall*

- Sealing at the level of sino-tubular junction
- Perfused Valsalva sinuses



## *Branched Endobentall*

- Sealing in the coronary arteries
- Excluded Valsalva sinuses



# Treatment concepts

- **One centimeter of sealing was considered to exclude the primary entry tear**
- **Aortic annulus sizing was based on TAVR measurements, size of the valve was selected on Sapiens 3 EDWARDS® and EvolutPro Medtronic® instructions for use**
  - ***Two subgroups were defined :***
    - “marginal group” : 2mm were added to the instructions for use diameters to defined the aortic valve size in order to account for the fabric thickness of the endograft implanted in the annulus
    - “extended group” : annular dimensions were considered in accordance with the possible overexpansion of TAVR devices. <sup>(1),(2)</sup>

(1) Mathur M et al, Overexpansion of the 29 mm SAPIEN 3 transcatheter heart valve in patients with large aortic annuli (area > 683 mm<sup>2</sup>): A case series. Catheter Cardiovasc Interv, 2018

(2) Sathananthan J et al, Overexpansion of the SAPIEN 3 Transcatheter Heart Valve: An Ex Vivo Bench Study. JACC Cardiovasc Interv 2018

# Anatomic feasibility criteria

## ■ *Fenestrated Endobentall :*

- Aortic root dimensions fit with the instruction for use of the Sapiens 3 EDWARDS® and EvolutPro Medtronic®
- Coronary height >10mm

## ■ *Branched Endobentall :*

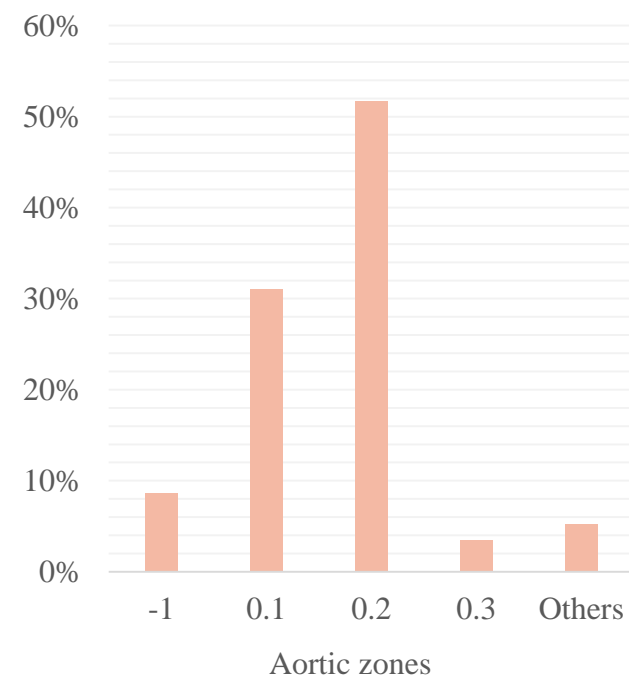
- *Satisfied the criteria for Fenestrated Endobentall and left main coronary length was >5mm*
- *Mandatory if Entry tear localized in zone 0.1 and -1*



# Results

## Entry tear distribution in function of the aortic zones

- 250 CT scans for acute type A aortic dissection were reviewed and 116 were included for final analysis
- The primary entry tear was located in the aortic root (zone -1) in 9% of the patients and 31% in zone 0.1
- >80 % of the patients were eligible to an *Edwards® sapiens valve* (84,5%<sup>1</sup> and 84%<sup>2</sup>) or a *Medtronic® Corevalve Evolut PRO* (78%<sup>3</sup> and 84%<sup>4</sup>)



<sup>1</sup> based on area derived mean diameter, <sup>2</sup> based on aortic annulus area, <sup>3</sup> based on the perimeter, <sup>4</sup> based on the mean diameter

# Anatomic feasibility

## Cohort

63.7% of the patients were eligible for an Endobentall procedure



41.3%  
*Fenestrated  
Endobentall*

22.4%  
*Branched  
Endobentall*

## Marginal group

69.8% of the patients were eligible for an Endobentall procedure



45.7%  
*Fenestrated  
Endobentall*

24.1%  
*Branched  
Endobentall*

## Extended group

73.3% of the patients were eligible for an Endobentall procedure

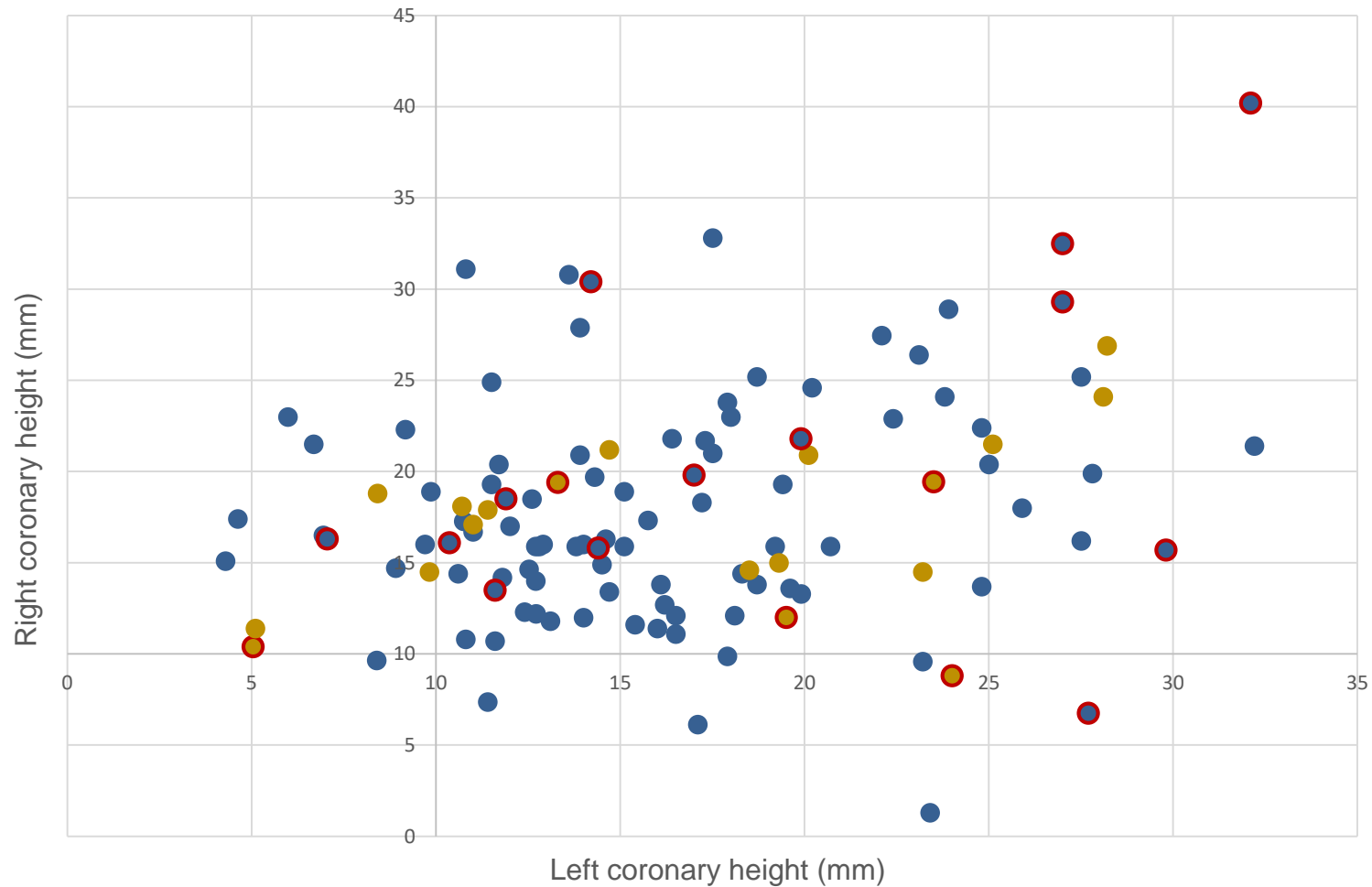


49.1%  
*Fenestrated  
Endobentall*

24.1%  
*Branched  
Endobentall*

# Anatomic feasibility exclusion criteria

Cloud of point representing the anatomical exclusion criteria of Endobentall feasibility



- left main > 5 mm
- left main < 5 mm
- too large annulus

# Conclusion

- In our study, 63.7% of patients with aortic type A dissections are deemed eligible to an “Endobentall repair”, increasing to 73.3% when considering extended anatomical criteria
- The development of dedicated devices combining TAVR and branched or fenestrated endografts is needed to achieve a higher rate of applicability and be evaluated, prior to its application in routine clinical practice