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**Expanding the minimally invasive  
approach for replacement of the  
ascending aorta towards the  
proximal aortic arch**

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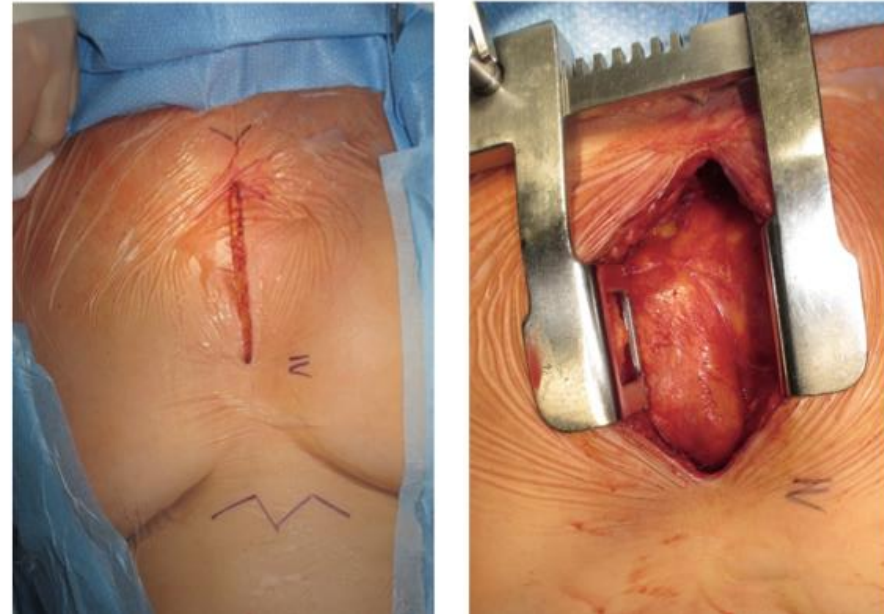


# Expanding the minimally invasive approach for replacement of the ascending aorta towards the proximal aortic arch

## Objectives

The **minimally invasive access** using an **upper hemisternotomy** has become more and more the standard approach for open surgical replacement of the **aortic valve** and **aortic root**.

As the next step, minimally invasive techniques for more complex operations of the **supracommissural ascending aorta** and **proximal aortic arch** have moved into the center of attention

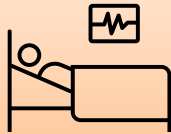


Currently available **evidence** focusing on the **supracommissural aorta** and the **proximal aortic arch** is still **scarce** to date.

# Expanding the minimally invasive approach for replacement of the ascending aorta towards the proximal aortic arch

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## Patients and Methods



### **Patients:**

86 consecutive patients who underwent supracommissural ascending aorta replacement with or without proximal aortic arch replacement via an upper J-shaped hemisternotomy between June 2009 and April 2023.



### **Data collection:**

Data regarding patient characteristics, surgical procedures, postoperative outcome, and overall survival was collected prospectively in our institutional database



### **Analysis:**

Retrospective Single center analysis with prospective follow-up

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patient characteristics

86 consecutive patients undergoing minimally invasive aortic repair

53%  
(n=46)

46%  
(n=40)

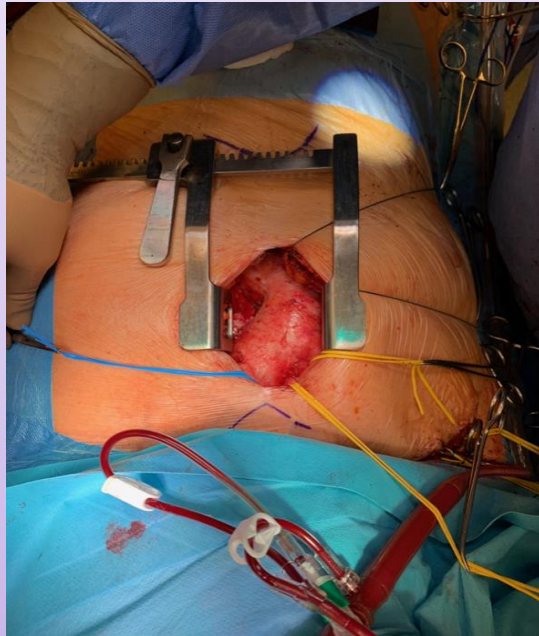
	isolated supra commissural ascending aorta replacement	supra commissural ascending aorta + proximal arch replacement	P-value
Sex (male)	47.8% (n=12)	35.0% (n=14)	0.229
Age [years]	62.9 ± 13.5	68 ± 13.1	0.065
Bicuspid aortic valve	23.9% (n=11)	7.5% (n=3)	<b>0.040</b>
Aortitis	4.3% (n=2)	2.4% (n=1)	0.641
Aortic valve stenosis	8.7% (n=4)	5.0% (n=2)	0.502
Chronic renal insuff.	2.2% (n=1)	7.5% (n=3)	0.242

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## Operative technique

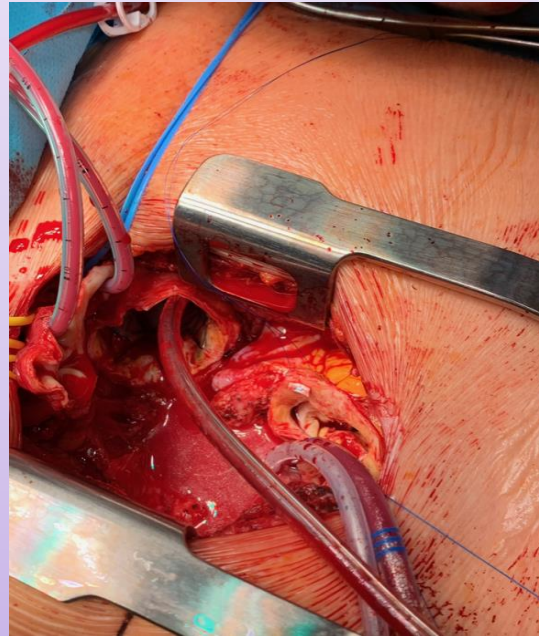
### Incision

Upper J-shaped hemisternotomy until the 4th intercostal space



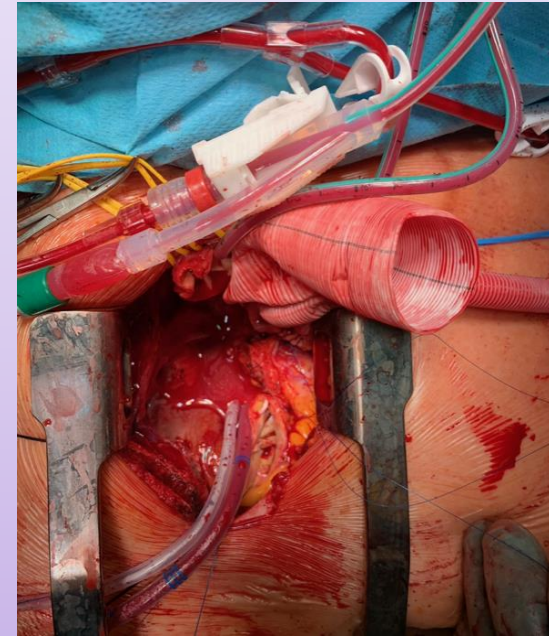
### Cannulation

Direct arterial cannulation via the hemisternotomy; if necessary: establishment of selective antegrade cerebral perfusion



### Graft implantation

Distal and proximal anastomoses of the graft in standard fashion



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## Results – operation times

	isolated supracommissural ascending aorta replacement	supracommissural ascending aorta + proximal arch replacement	P-value
Operation time [min]	184.2 ± 54.4	224.5 ± 34.1	<0.001
Bypass time [min]	87.7 ± 32.1	124.5 ± 27.6	<0.001
Cross-clamp time [min]	49.1 ± 14.6	55.7 ± 22.5	0.11

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### Results – complications

**Overall Conversion Rate: 1.2% (n=1)**  
(Redo-Case after prior mechanical aortic valve implantation)

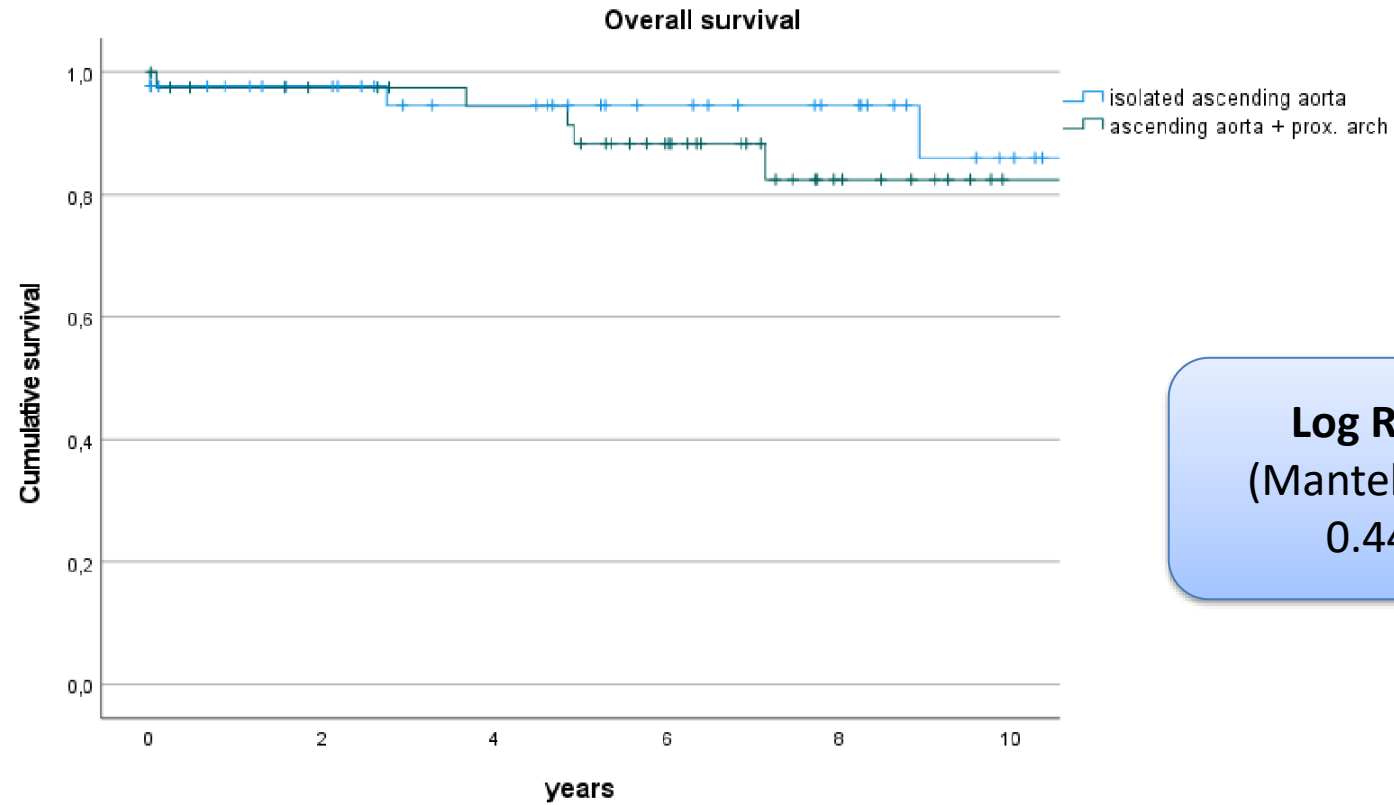
**Re-thoracotomy Rate: 1.2% (n=1)**  
(due to postoperative bleeding)

**In-hospital mortality: 1.2% (n=1)**

**Re-operation Rate: 0%**

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## Results – long-term survival





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### Conclusions

Supracommissural ascending aorta replacement as well as proximal aortic arch repair can be safely performed via the minimally invasive approach with a low conversion rate.

Postoperative complications as well as overall survival after minimally invasive surgery of the ascending aorta and proximal aortic arch are comparable to results previously reported for complete sternotomy.

Expanding the indication for the minimally invasive access towards the proximal aortic arch did not impair short- and long-term survival.