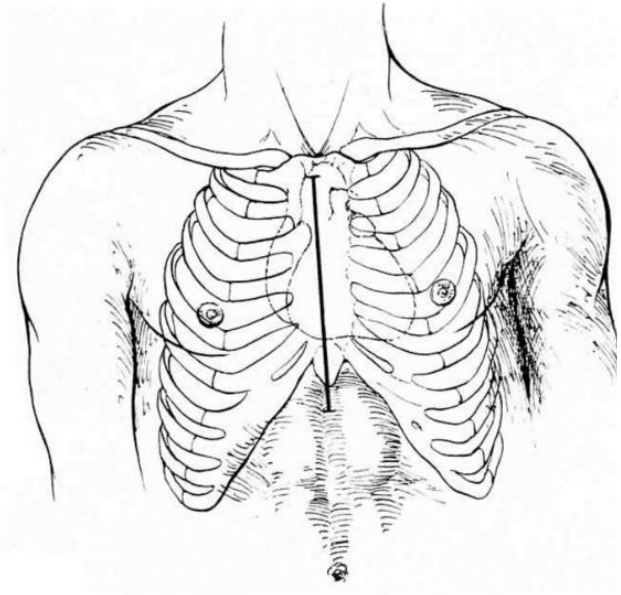
The Future is Now – Minimal-invasive Aortenchirurgie

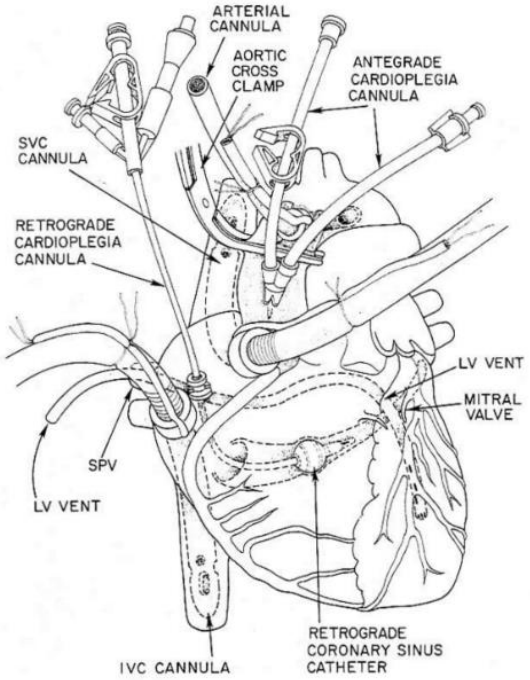
Patiententag Aortenchirurgie 2024

Medizinische Hochschule Hannover

Dr. Florian Helms

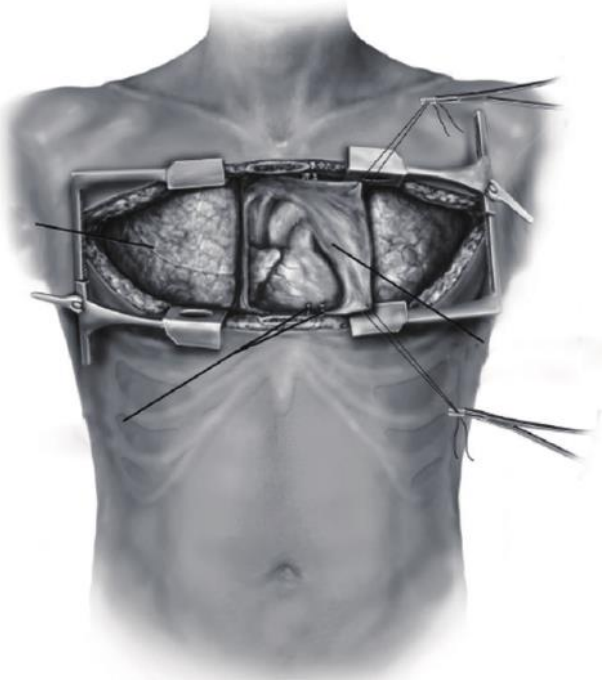
Minimal-invasive Herzchirurgie – geht das überhaupt?



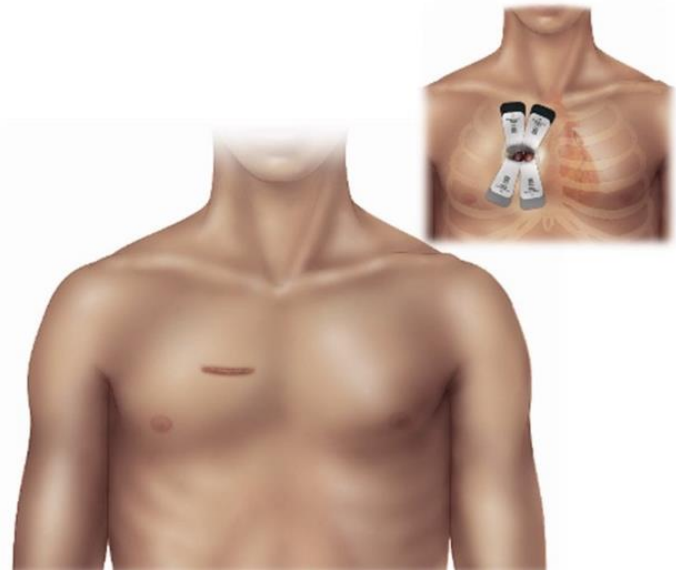


Minimal-invasive Chirurgie

Früher: Große Chirurgen und große Schnitte



Heute: Je weniger invasiv desto besser



Warum minimalinvasive Aortenchirurgie?

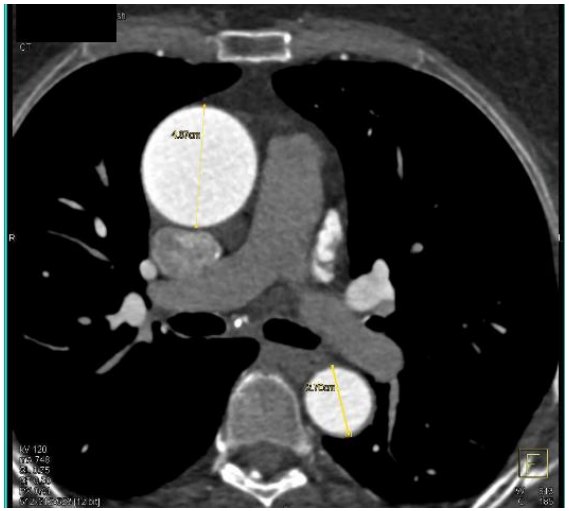
- (Partieller) Erhalt der Sternumstabilität
- Weniger Knochen- und Weichteildefekte
- Schnellere / einfachere postoperative Mobilisation
- Kosmetische Vorteile

Wer profitiert (nicht)?

- Elektive (geplante) Operation
- Normalgewicht
- Passende Aortenanatomie
- Lokal begrenzte Pathologien
- Spezialisierte High-Volume Zentren

- Notfall-Operationen
- Ausgeprägtes Übergewicht
- Komplexe / ausgedehnte Pathologien und Anatomien (mit Ausnahmen!)

Minimal-invasive Aortenchirurgie – Auf die Planung kommt es an!



Techniken für die minimalinvasive Aortenchirurgie

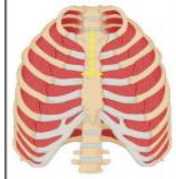
medicina MDPI

Review

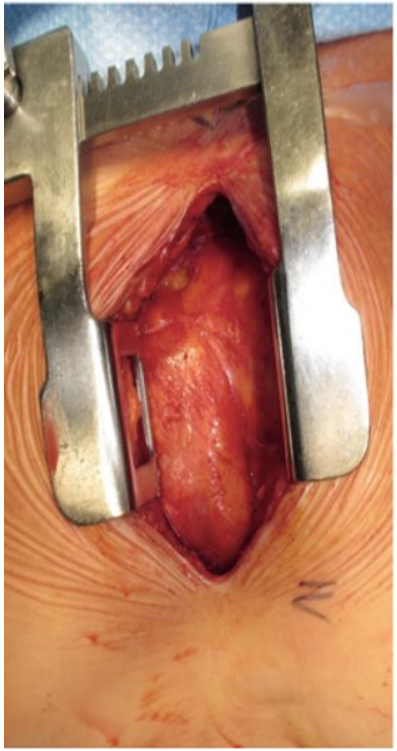
Expanding the Minimally Invasive Approach towards the Ascending Aorta—A Practical Overview of the Currently Available Techniques

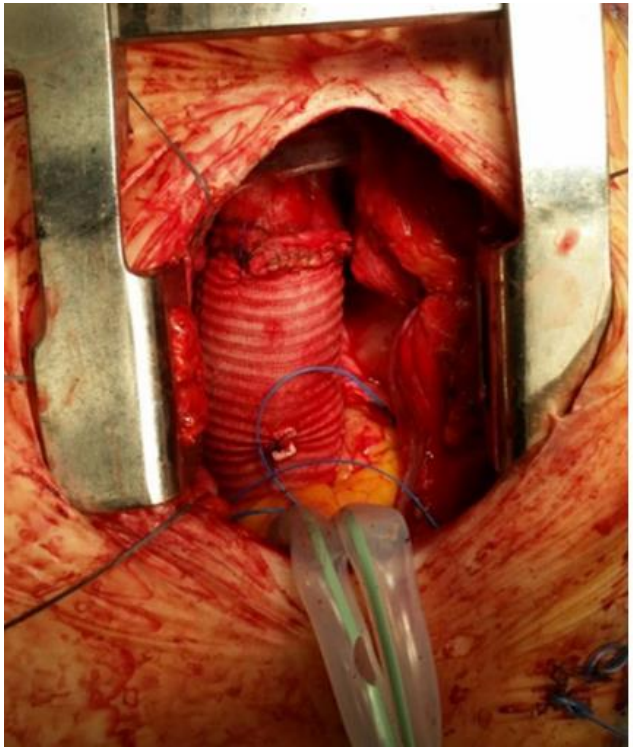
Florian Helms *, Bastian Schmack, Alexander Weymann, Jasmin Sarah Hanke, Ruslan Natanov, Andreas Martens, Arjang Ruhparwar and Aron-Frederik Popov

Abstract: Minimally invasive techniques have gained immense importance in cardiovascular surgery. While minimal access strategies for coronary and mitral valve surgery are already widely accepted and often used as standard approaches, the application of minimally invasive techniques is currently expanded towards more complex operations of the ascending aorta as well. In this new and developing field, various techniques have been established and reported ranging from upper hemisternotomy approaches, which allow even extensive operations of the ascending aorta to be performed through a minimally invasive access to sternal sparing thoracotomy strategies, which completely avoid sternal trauma during ascending aorta replacements. All of these techniques place high demands on patient selection, preoperative planning, and practical surgical implementation. Application of these strategies is currently limited to high-volume centers and highly experienced surgeons. This narrative review gives an overview of the currently available techniques with a special focus on the practical execution as well as the advantages and disadvantages of the currently available techniques. The first results demonstrate the practicability and safety of minimally invasive techniques for replacement of the ascending aorta in a well-selected patient population. With success and complication rates comparable to classic full sternotomy, the proof of concept for minimally invasive replacement of the ascending aorta is now achieved.

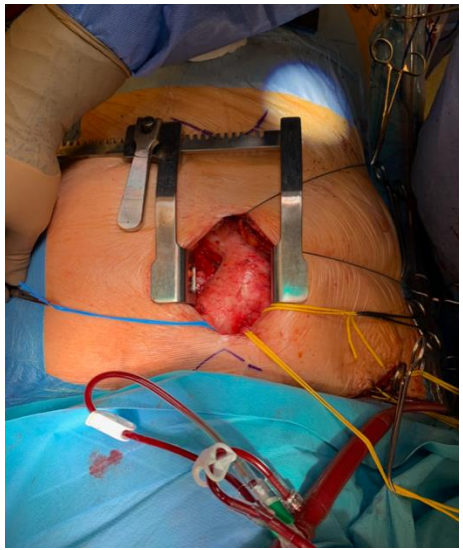
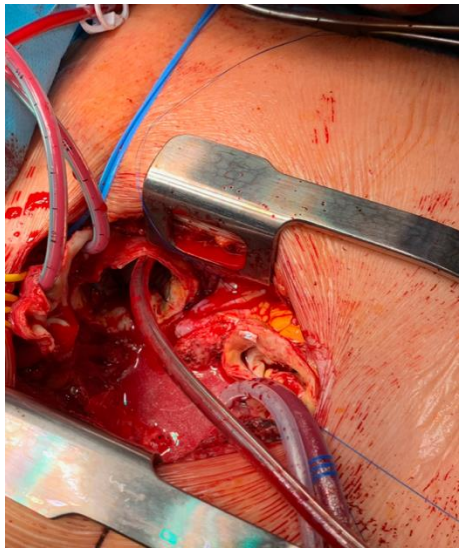
	J-shaped upper hemisternotomy	T-shaped upper hemisternotomy	V-/ Arrow- shaped hemisternotomy	Right anterior/ lateral thoracotomy
schematic				
advantages	• Frequently used, largest experience • lowest sternal trauma among hemisternotomies • Good horizontal stability	• Excellent exposure for complex aortic morphologies • Facilitates direct arterial and venous cannulation and venting	• Excellent exposure for complex aortic morphologies • Facilitates direct arterial and venous cannulation and venting • Better horizontal stability compared to T-shaped hemisternotomy	• Avoids sternal trauma • Immediate postoperative load stability of the thorax
disadvantages	• Limited exposure for abnormal ascending aorta and aortic arch positions	• relatively extensive sternal trauma • Low horizontal / translational stability	• relatively extensive sternal trauma	• Selective antegrade cerebral perfusion is not possible
references	Haunschild 2022 Kaneko 2012 Tabata 2007 Svensson 2001 Byrne 2000	Haunschild 2022	Stramolynski 2020	LaPierta 2017 Lamelas 2018

How we do it





How we do it – in ausgewählten Fällen!

Sind die Ergebnisse vergleichbar mit konventionellen OP-Techniken?

Article

Minimally Invasive Approach for Replacement of the Ascending Aorta towards the Proximal Aortic Arch

Florian Helms [1,*,†], Ezin Deniz [1,†], Heike Krüger [1], Alina Zubarevich [1], Jan Dieter Schmitto [1], Reza Poyanmehr [1], Martin Hinteregger [1], Andreas Martens [2], Alexander Weymann [1], Arjang Ruhparwar [1], Bastian Schmack [1,‡] and Aron-Frederik Popov [1,‡]

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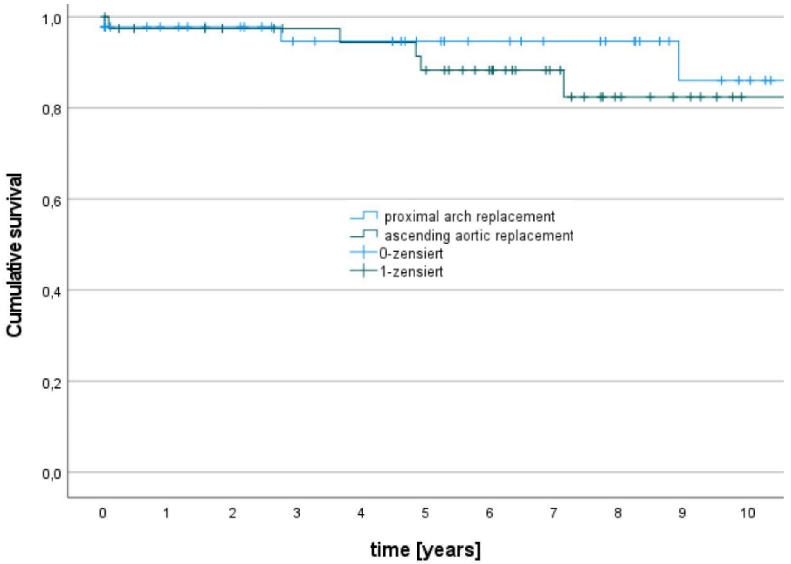
‡ These authors also contributed equally to this work.

Abstract: Objectives: In recent years, minimally invasive approaches have been used with increasing frequency, even for more complex aortic procedures. However, evidence on the practicability and safety of expanding minimally invasive techniques from isolated operations of the ascending aorta towards more complex operations such as the hemiarch replacement is still scarce to date. **Methods:** A total of 86 patients undergoing elective surgical replacement of the ascending aorta with (n = 40) or without (n = 46) concomitant proximal aortic arch replacement between 2009 and 2023 were analyzed in a retrospective single-center analysis. Groups were compared regarding operation times, intra- and postoperative complications and long-term survival. **Results:** Operation times and ventilation times were significantly longer in the hemiarch replacement group. Despite this, no statistically significant differences between the two groups were observed for the duration of the ICU and hospital stay and postoperative complication rates. At ten-year follow-up, overall survival was 82.6% after isolated ascending aorta replacement and 86.3% after hemiarch replacement (p = 0.441). **Conclusions:** Expanding the indication for minimally invasive aortic surgery towards the proximal aortic arch resulted in comparable postoperative complication rates, length of hospital stay and overall long-term survival compared to the well-established minimally invasive isolated supracommissural ascending aorta replacement.

check for updates

Citation: Helms, F.; Deniz, E.; Krüger, H.; Zubarevich, A.; Schmitto, J.D.; Poyanmehr, R.; Hinteregger, M.; Martens, A.; Weymann, A.; Ruhparwar, A.; et al. Minimally Invasive Approach for Replacement



Herzlichen Dank für Ihre Aufmerksamkeit

Dr. Florian Helms