

Defekte Herzklappen:

moderne Therapien für ein altes Problem

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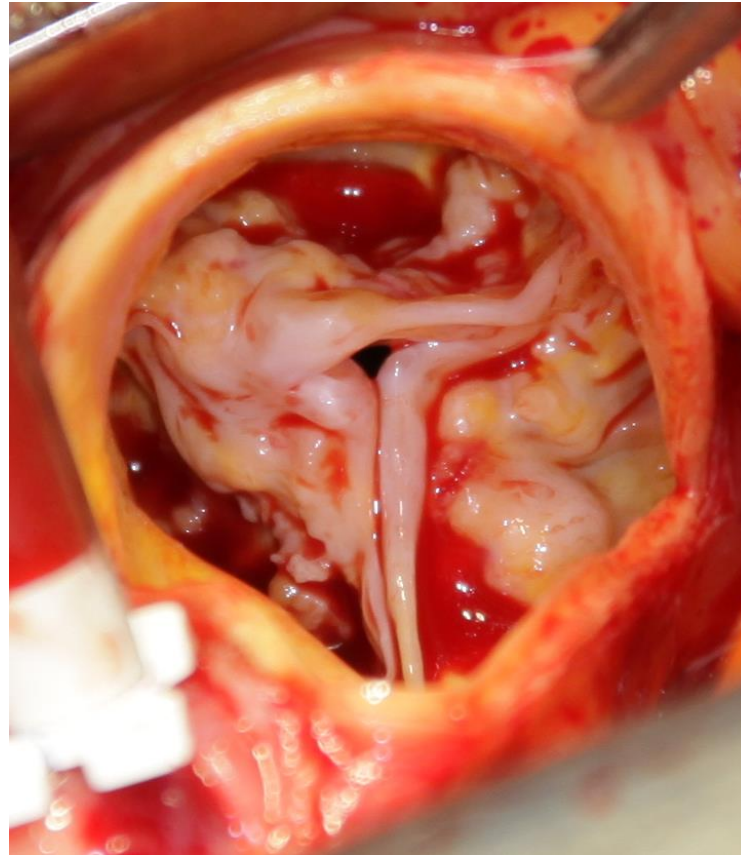


HERZKLINIK
HIRSLANDEN

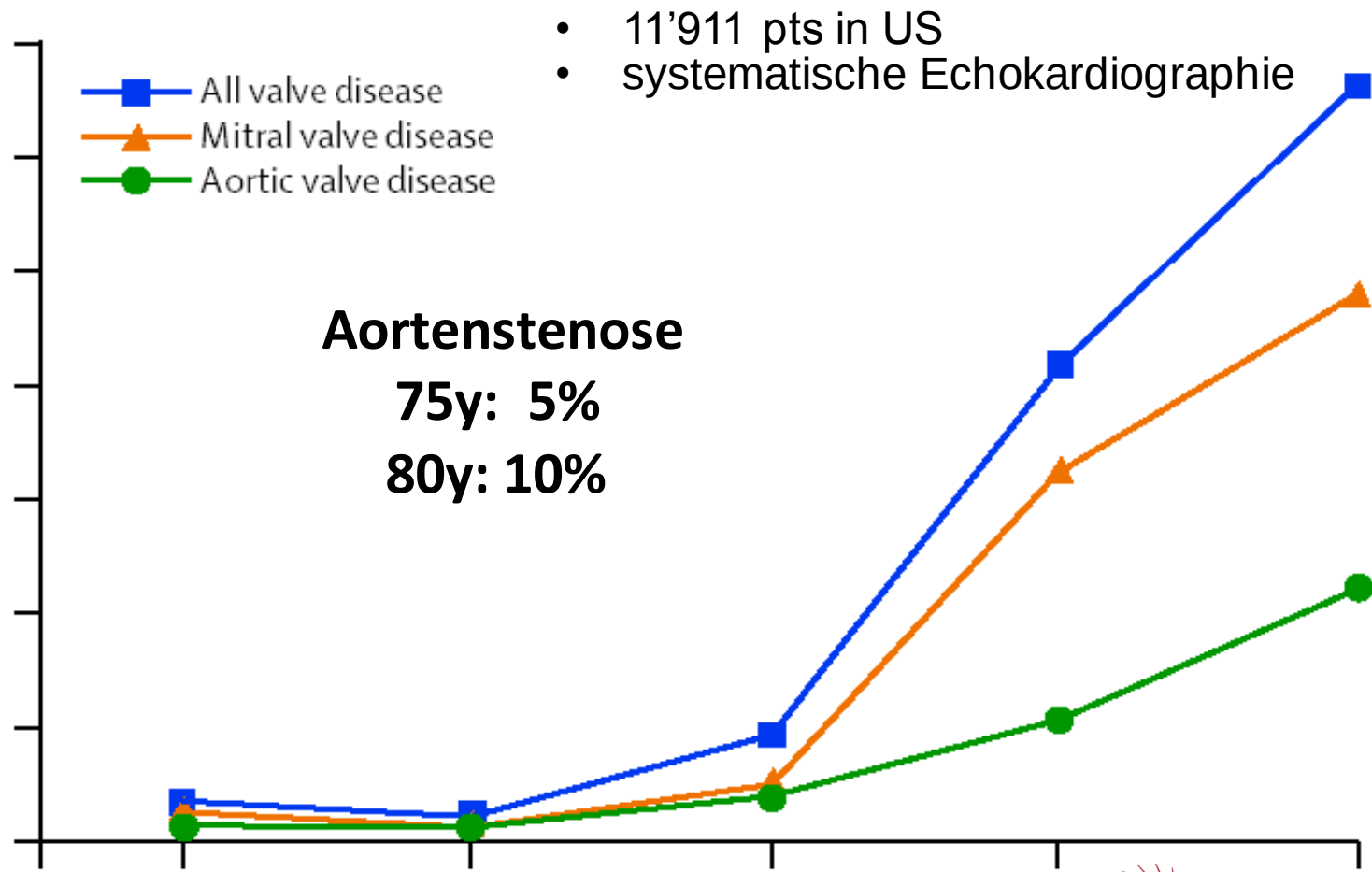
HIRSLANDEN
KLINIK HIRSLANDEN



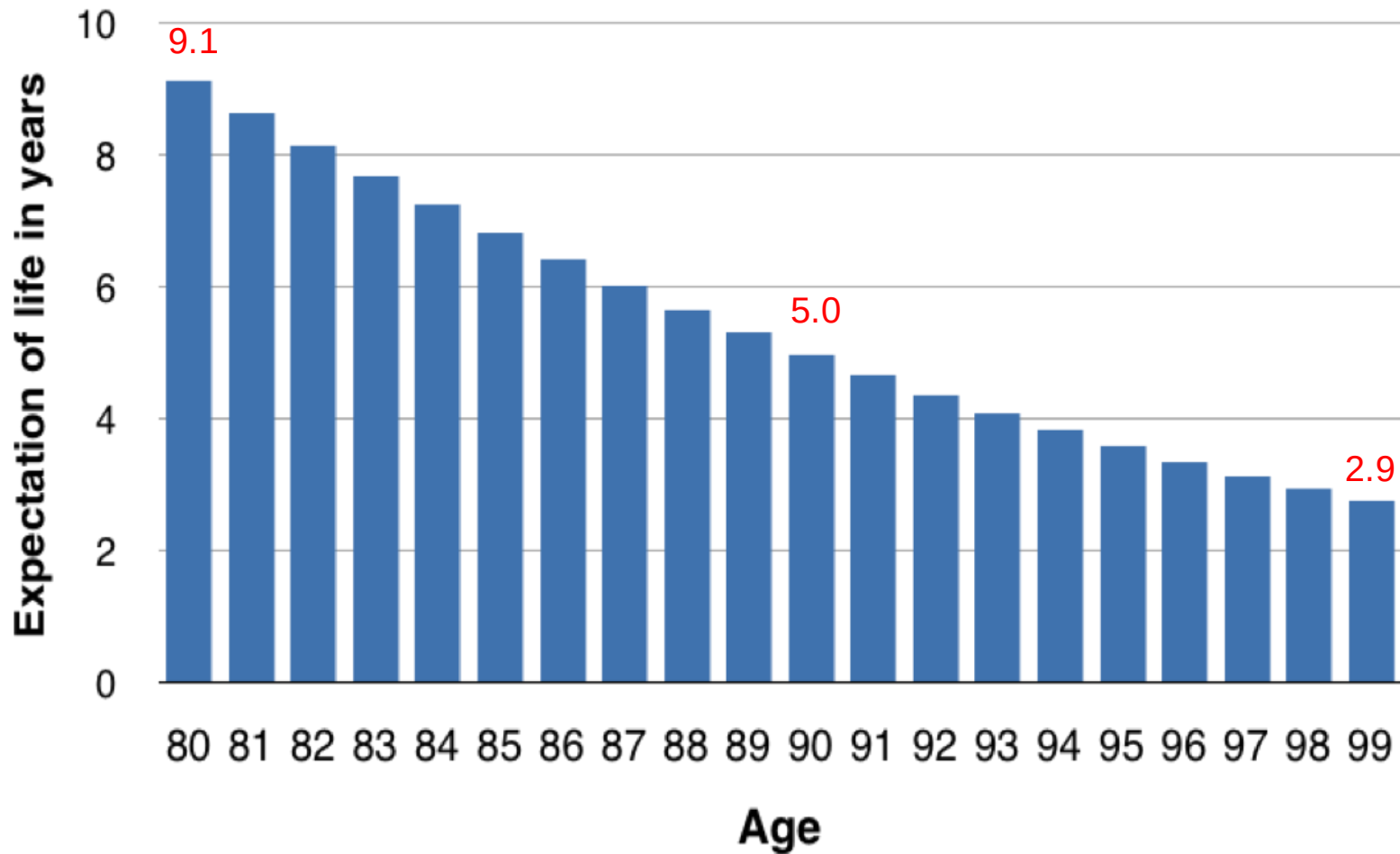
Behandlung der Aortenstenose



Prävalenz der Herzklappenerkrankung



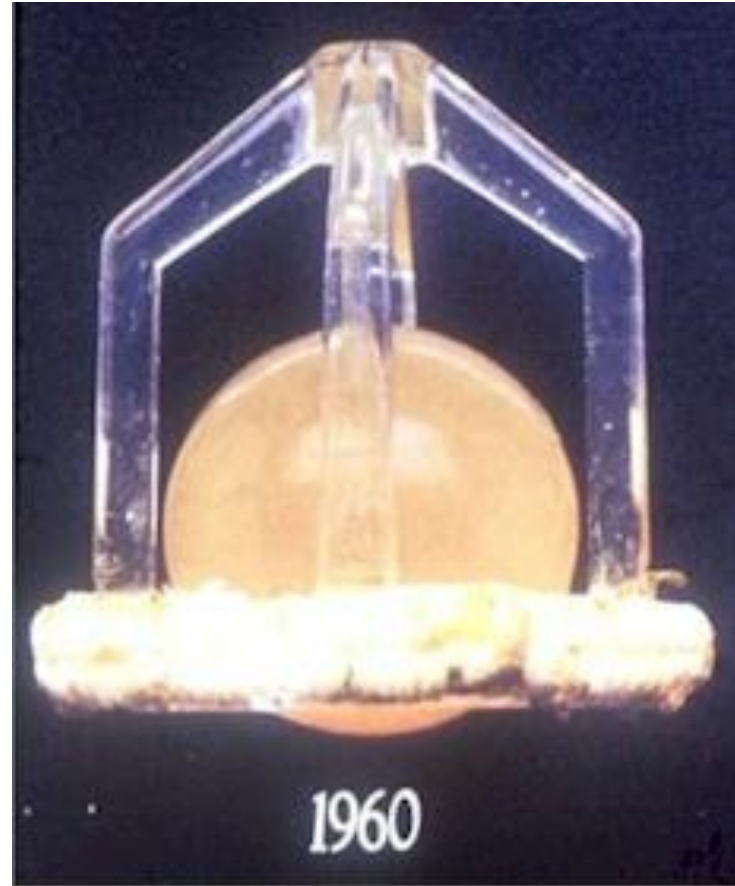
Lebenserwartung nach Alter in USA

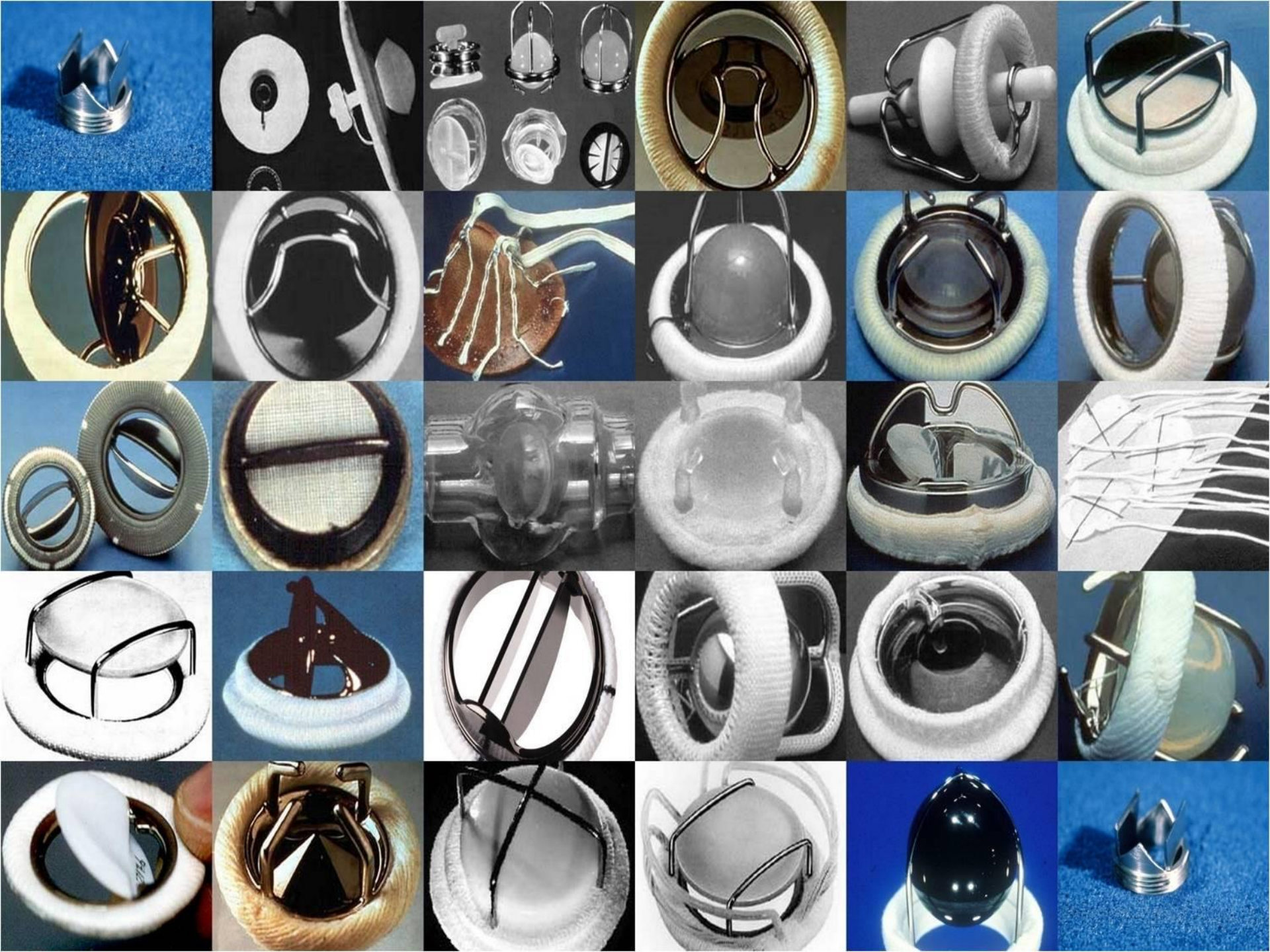


Chirurgischer Aortenklappenersatz



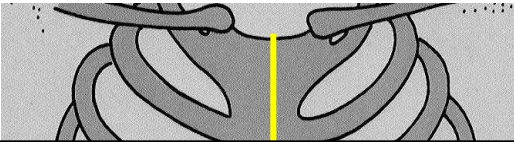
Dr. Harken, Boston





AKE: Standard-Technik

Sternotomie oder
minimal-invasiv



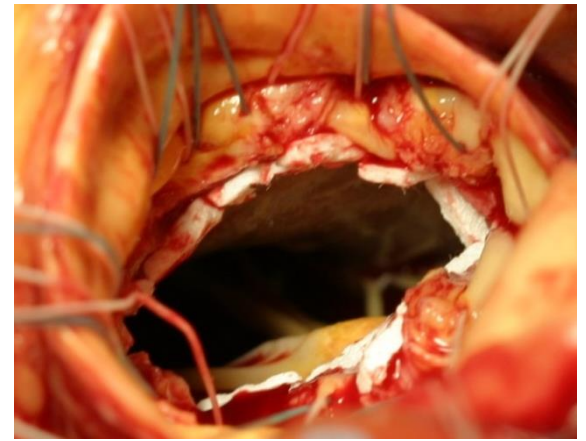
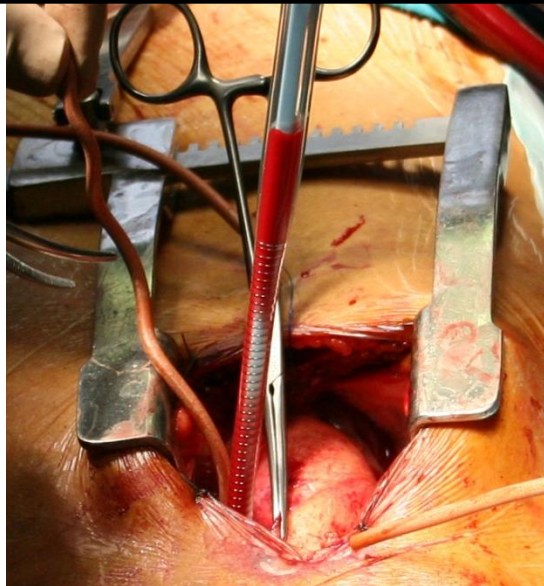
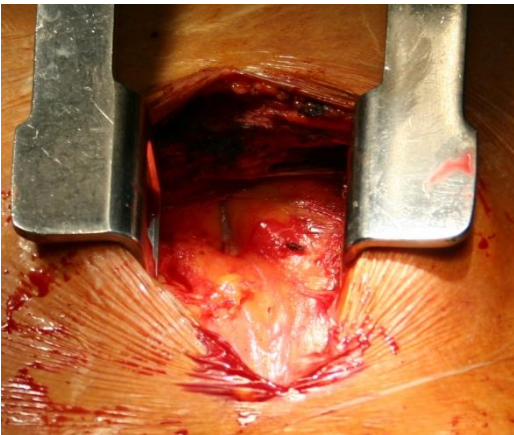
Herz-Lungen-
Maschine



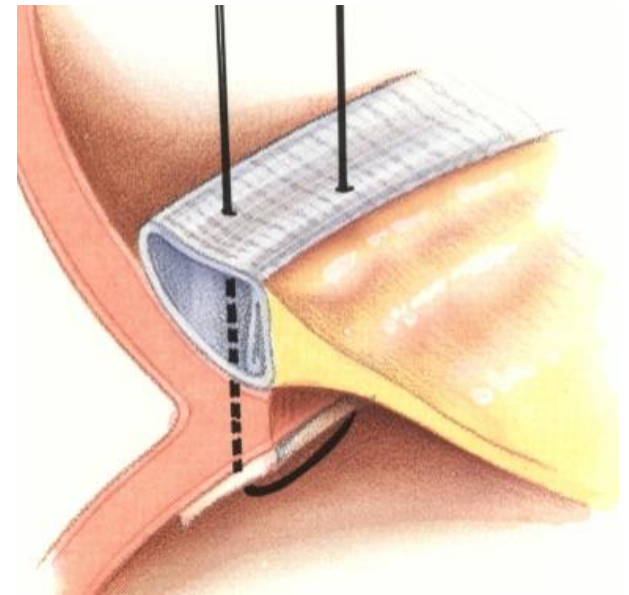
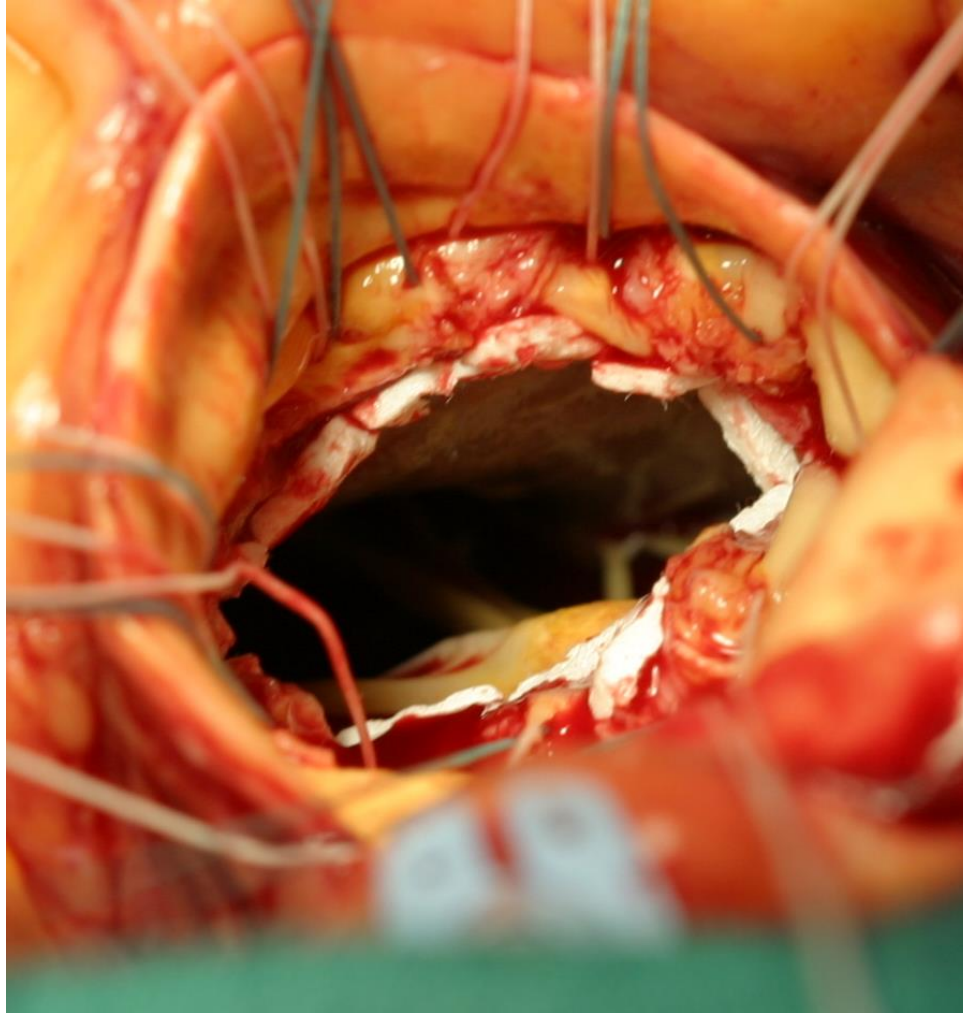
Resektion Kalk +
Prothesen-fixation



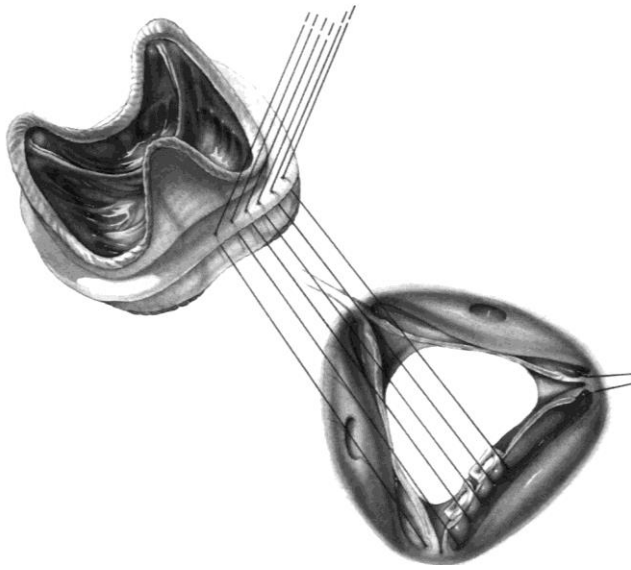
Risiko 1-3%, > 80 Jahre 8-15%



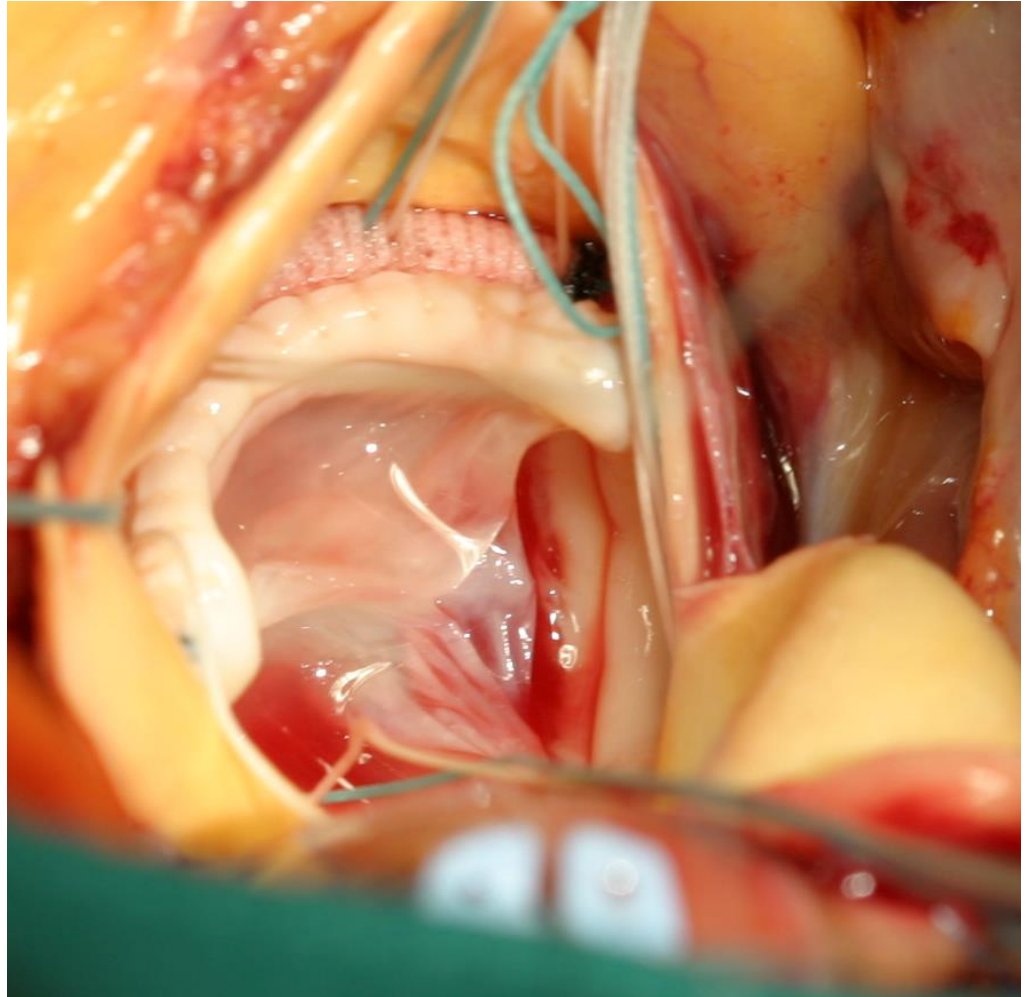
AKE: Horizontale Matratzennaht



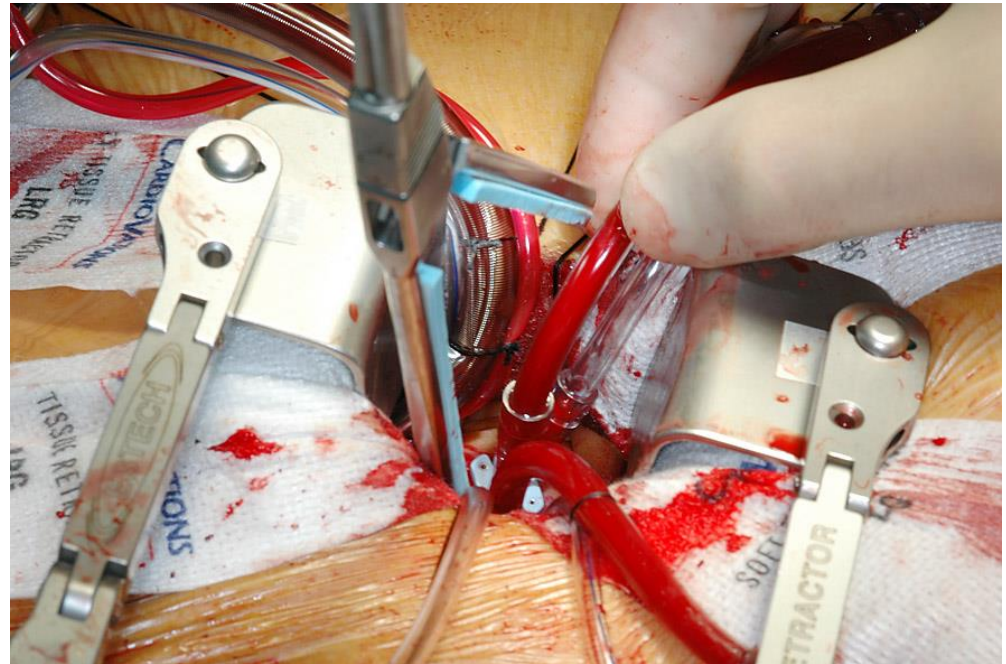
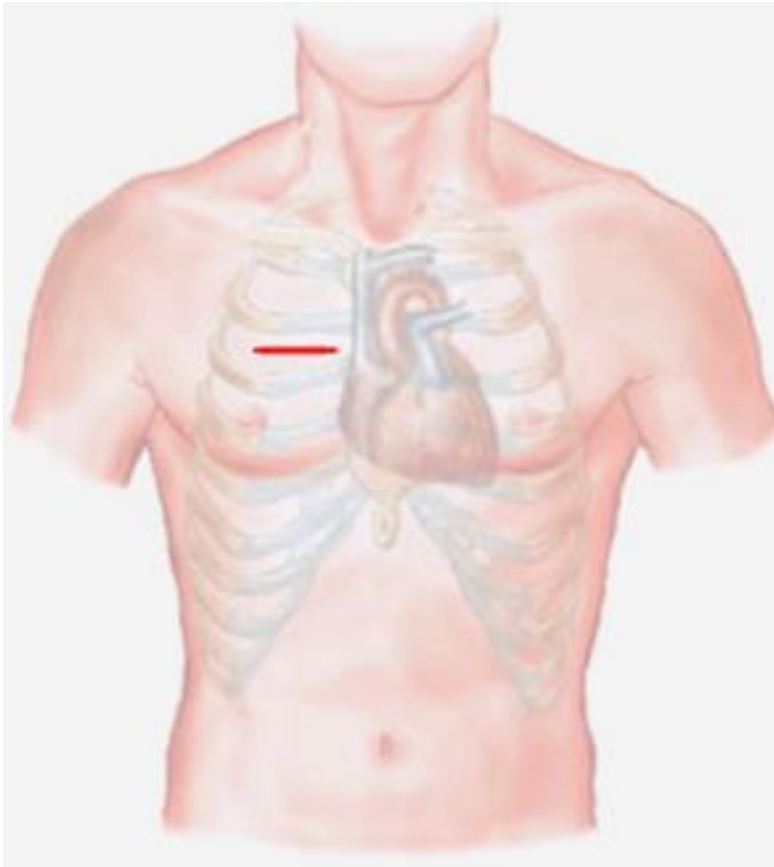
AKE: Herunterführen der Prothese



AKE: Knoten der Fäden



AKE: laterale Minithorakotomie



AKE: laterale Minithorakotomie

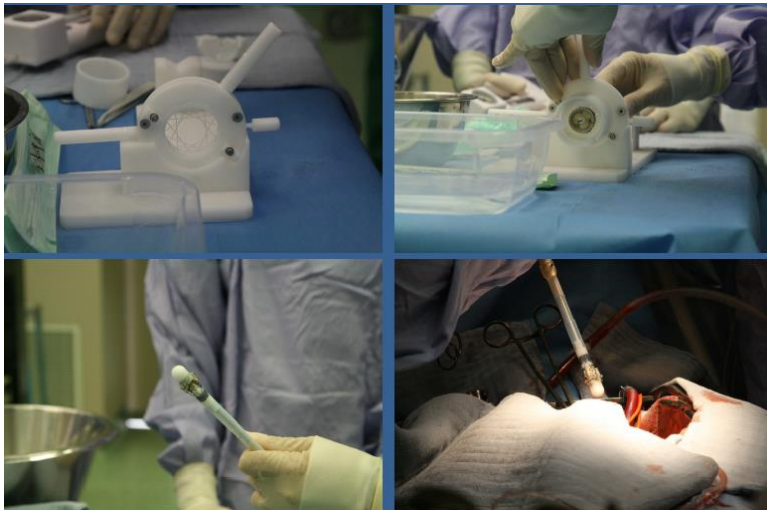
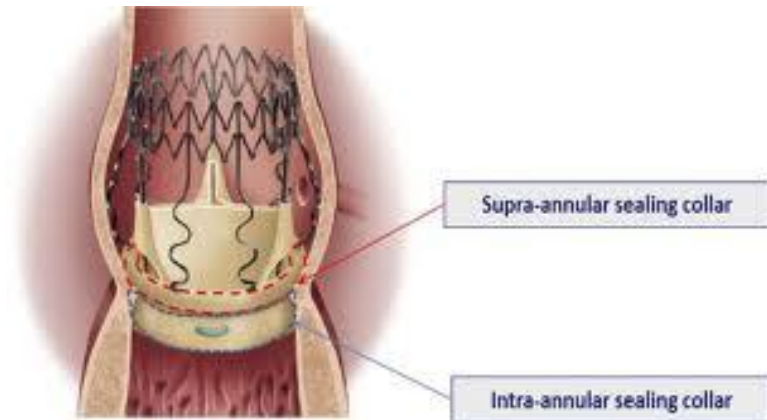


AKE: laterale Minithorakotomie

3 Monate postoperativ



AKE: mit nahtfreier Klappenprothese



Resultate der minimal-invasiven AKE

Aortic Valve Replacement Through a Minimally Invasive Approach: Preoperative Planning, Surgical Technique, and Outcome

Andre Plass, MD, Hans Scheffel, MD, Hatem Alkadhi, MD, PhD, Philipp Kaufmann, MD, PhD, Michele Genoni, MD, PhD, Volkmar Falk, MD, PhD, and Jürg Grünenfelder, MD, PhD

Clinic for Cardiovascular Surgery, Institute of Diagnostic Radiology, and Cardiovascular Center, University Hospital Zurich, Zurich, Switzerland

Background. This study reports the experiences of minimally invasive aortic valve replacement (MIAVR) through a right minithoracotomy performed in the past 26 months and describes the surgical technique, the learning curve, the complication rate, and the patient outcomes.

Methods. From March 2006 to June 2008, 172 patients (113 men; mean age, 71 ± 12 years) were scheduled for MIAVR (6- to 7-cm incision). Multislice computed tomography (MSCT) imaging was used for surgical planning in 139. Aortic cannulation/clamping were performed through a right-sided minithoracotomy and venous cannulation percutaneously through the groin. For obtaining optimal intercostal space (ICS) distances between the incision to the aorta and cardiac structures, 2- and 3-dimensional MSCT images were evaluated.

Results. Operations were done in 171 patients. MIAVR was successfully performed in 160 (94%). Six patients underwent a conventional operation due to adhesions in

4, small diameter of aortic annulus (17 mm) in 1, and concomitant coronary artery disease in 1. One patient was considered nonoperable. After CT-planning choice of second ICS in 17%, third in 81%, and fourth in 1%. Five conversions to sternotomy were necessary. Intraoperative and postoperative complications occurred in 20 patients, including 1 death. Overall cardiopulmonary bypass was 158 ± 41 min and cross-clamp time was 107 ± 26 min. No blood products in 43% of MIAVR patients. Mean hospital length of stay was 10 ± 3 days.

Conclusions. MIAVR demonstrates excellent results. A considerably reduced complication rate in the course was noted. MSCT for preoperative planning is helpful for an improved mental preparation and for an accurate surgical strategy, including optimal access.

(Ann Thorac Surg 2009;88:1851-6)

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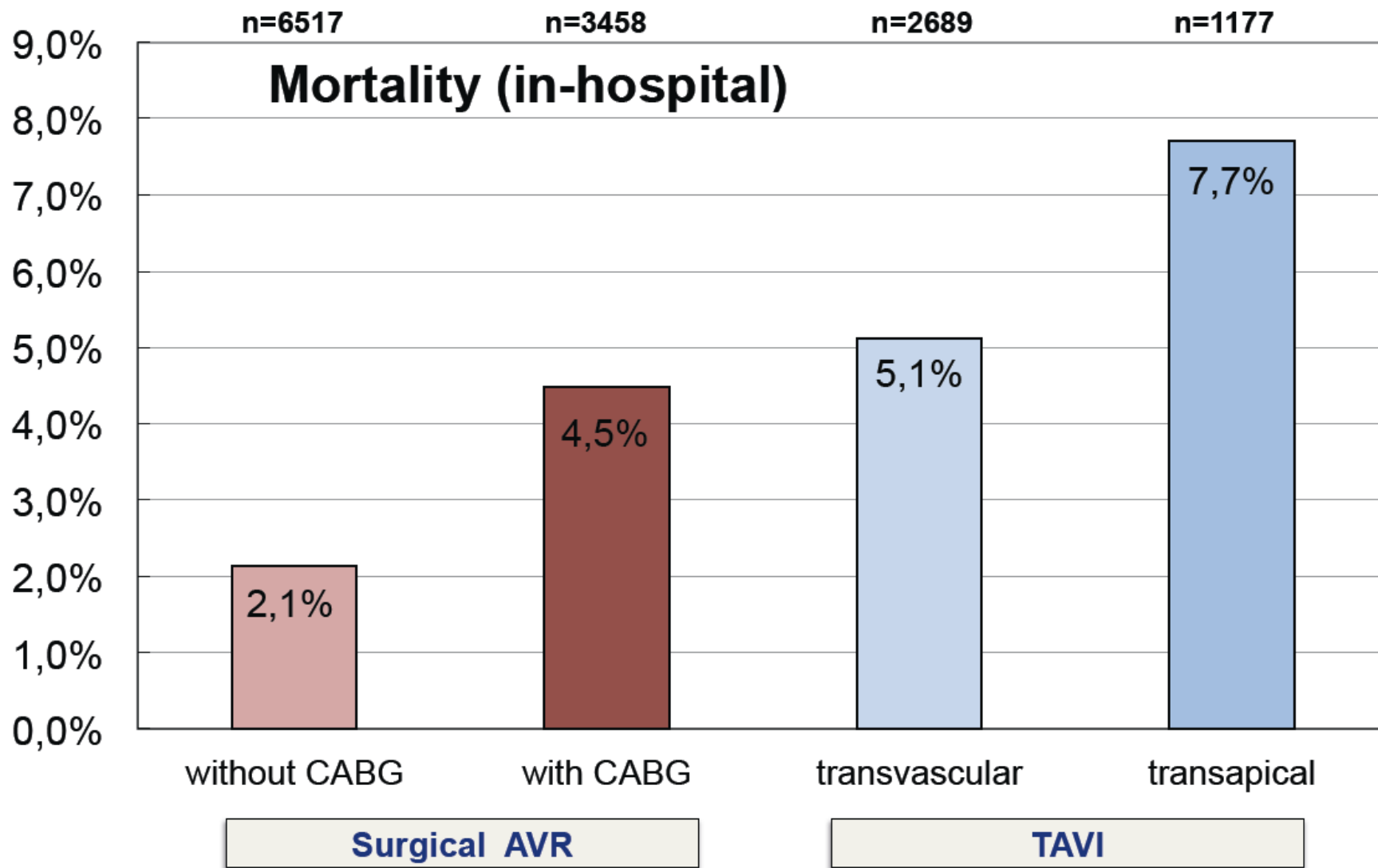
Resultate der minimal-invasiven AKE

Table 3. Intraoperative and Postoperative Patient Data

Variable	No. (%) or Mean $\pm$ SD
MIAVR patients	
Scheduled	165/172 (96)
Successfully operated on	160/165 (97)
CPB time, min	158 $\pm$ 41
Cross-clamp time, min	107 $\pm$ 26
30-day mortality	3 (1.9)
Reexploration	6 (3.8)
Neurologic event	6 (3.8)
Iliac injury	4 (2.5)
Wound infection	0 (0)
Pacemaker requirement	2 (1.3)
Intra-op/post-op blood products	
Erythrocyte concentrate, U	2 $\pm$ 3
Thrombocyte concentrate, U	0.3 $\pm$ 0.7
Fresh frozen plasma, U	0.9 $\pm$ 2.3
Length of stay, d	
Intensive care unit	2 $\pm$ 2
Hospital	10 $\pm$ 3

Mortalität 1.9%

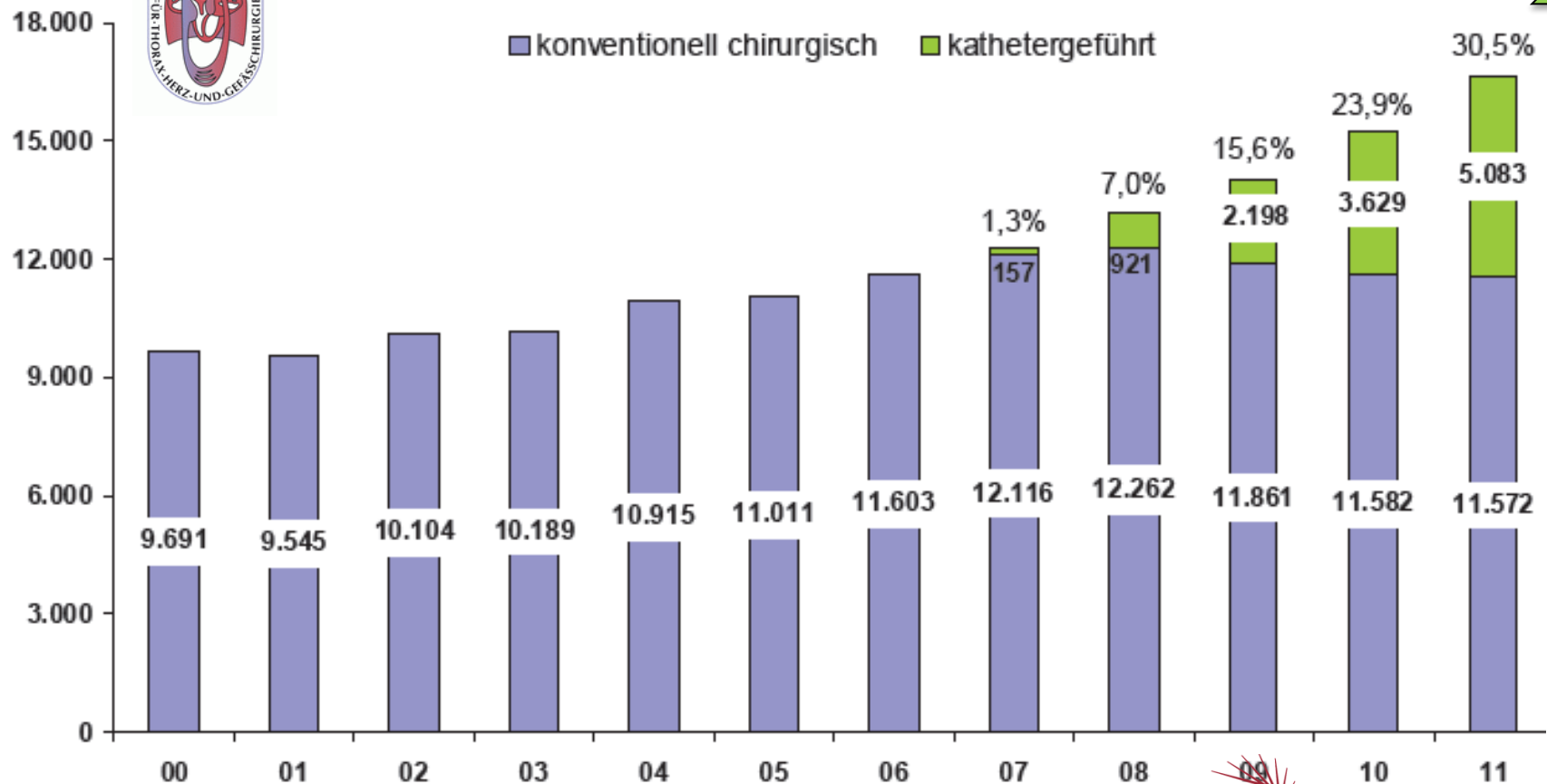
CPB = cardiopulmonary bypass; MIAVR = minimally invasive aortic valve replacement; SD = standard deviation.



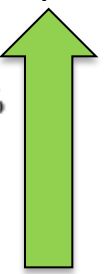
Aortenklappenersatz in Deutschland



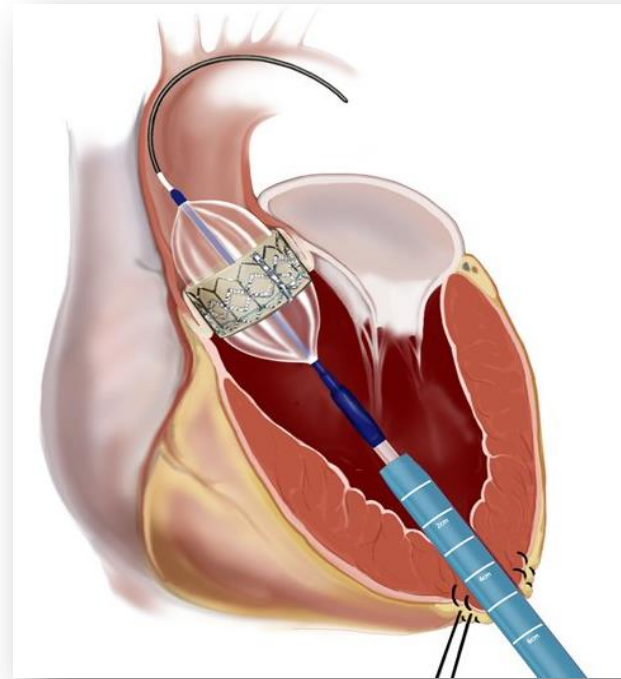
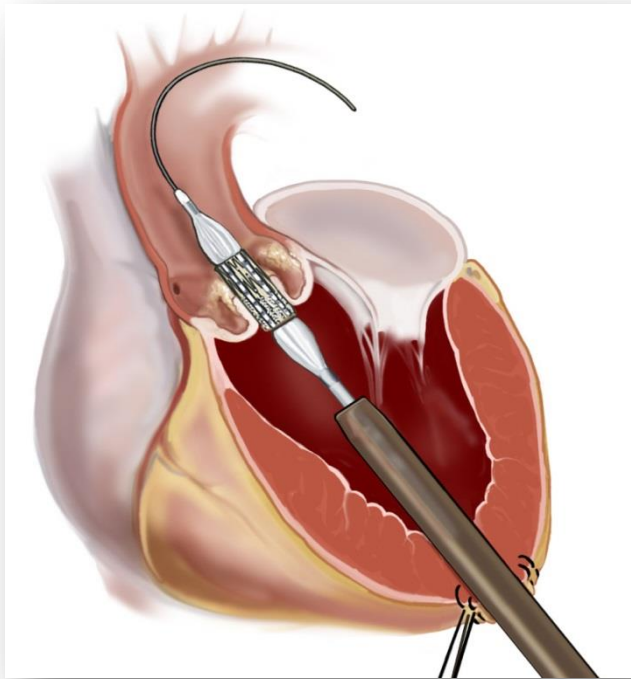
Isolierte Implantation einer Aortenklappenprothese 2000 - 2011



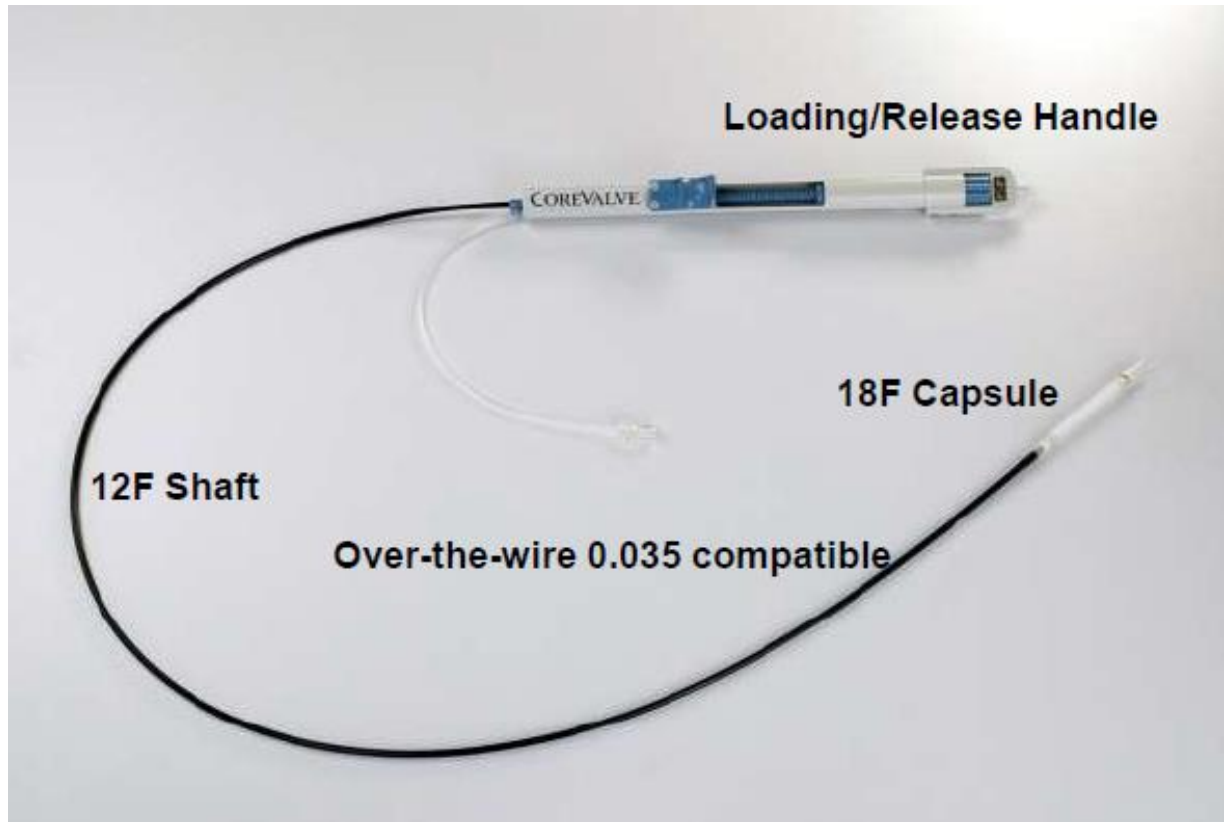
+ (2000 ?)
unreported



Katheter-basierter Aortenklappenersatz = TAVI



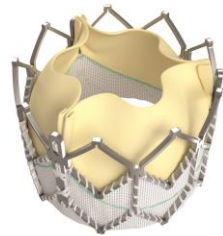
Katheter



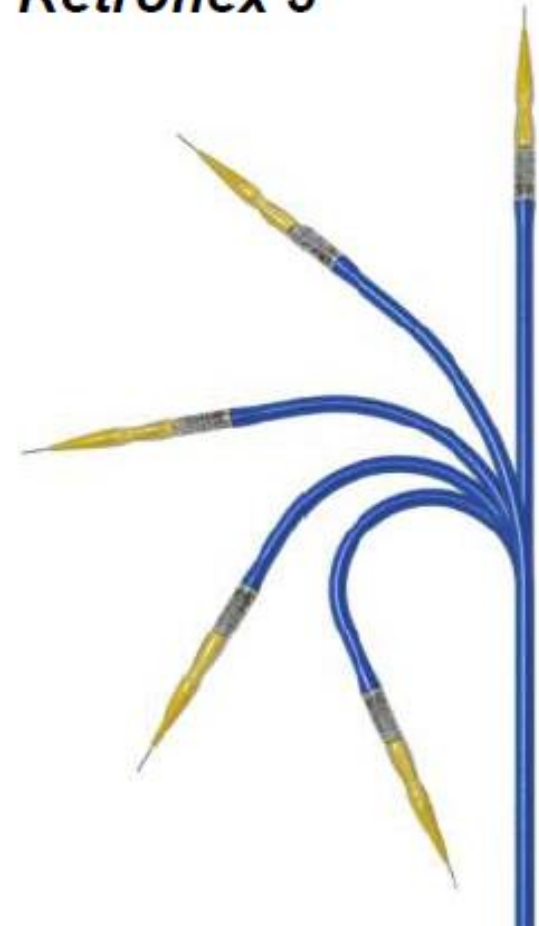
Katheter



18 Fr profile

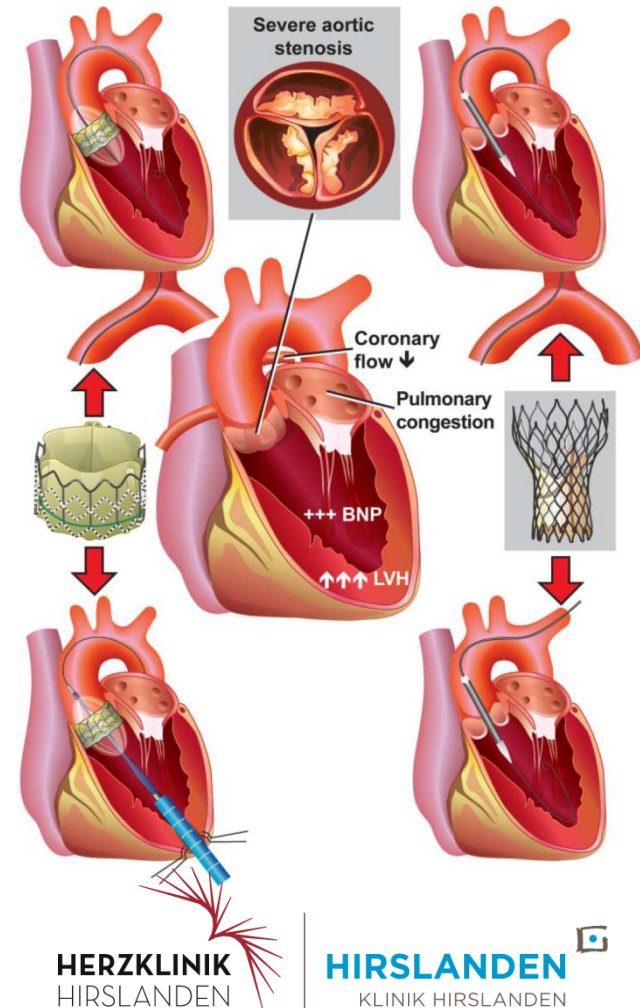
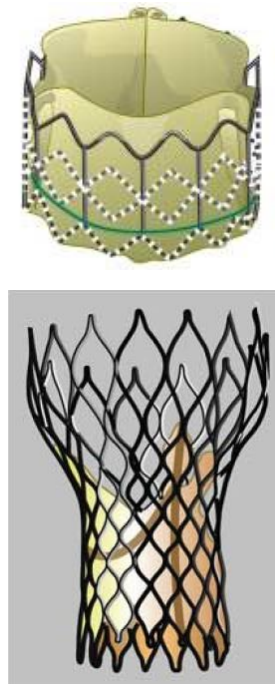
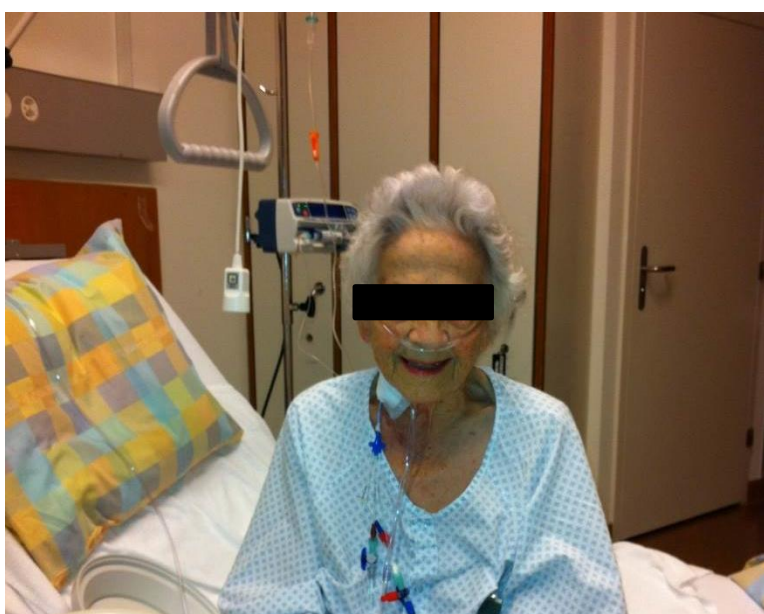


Retroflex 3



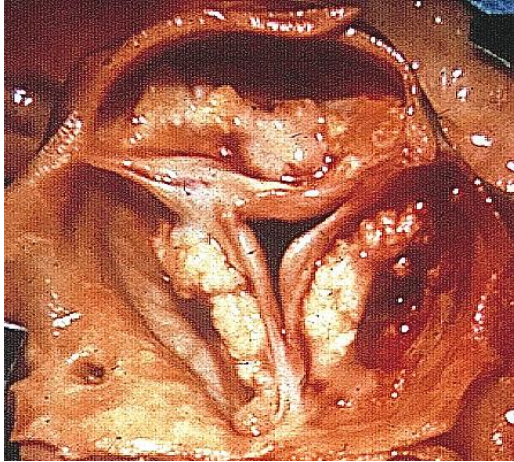
Selektionsprozess

1. Welcher Patient? 2. Welche Klappe? 3. Welcher Zugang?



Welcher Patient?

1.



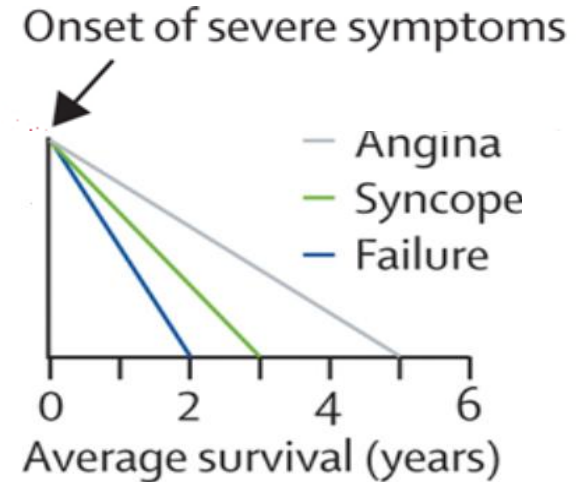
Degenerative Aortenstenose

2.

Schwere Aortenstenose

Jet velocity (m per s)	> 4.0
Mean gradient (mmHg)	> 40
Valve area (cm ²)	< 1.0
Valve area index (cm ² /m ²)	< 0.6

3.



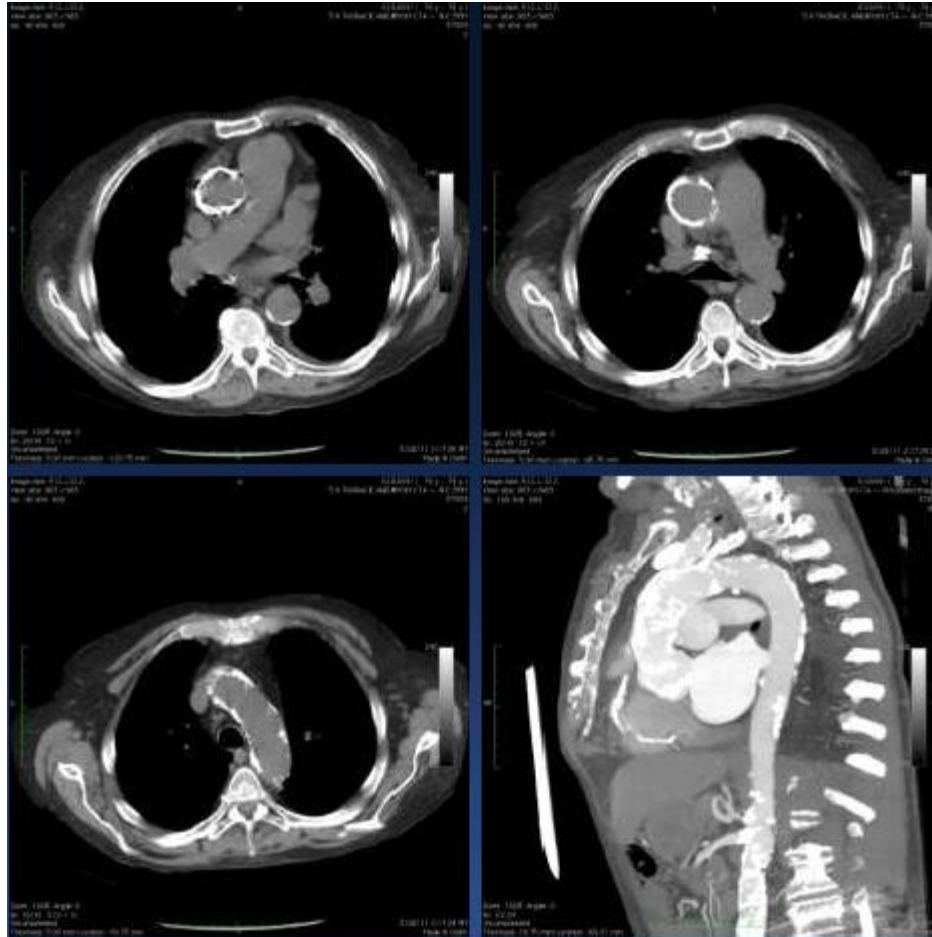
Symptomatischer Patient

4.

Hohes Risiko für konventionelle Operation

- Hohes Alter (>80 Jahre)
- 2. Herzoperation
- Starke Verkalkungen der Aorta

Risk assessment: Porzellan Aorta



Risk assessment: schwieriger Brustkorb



Risk assessment: Gebrechlichkeit

Patient A



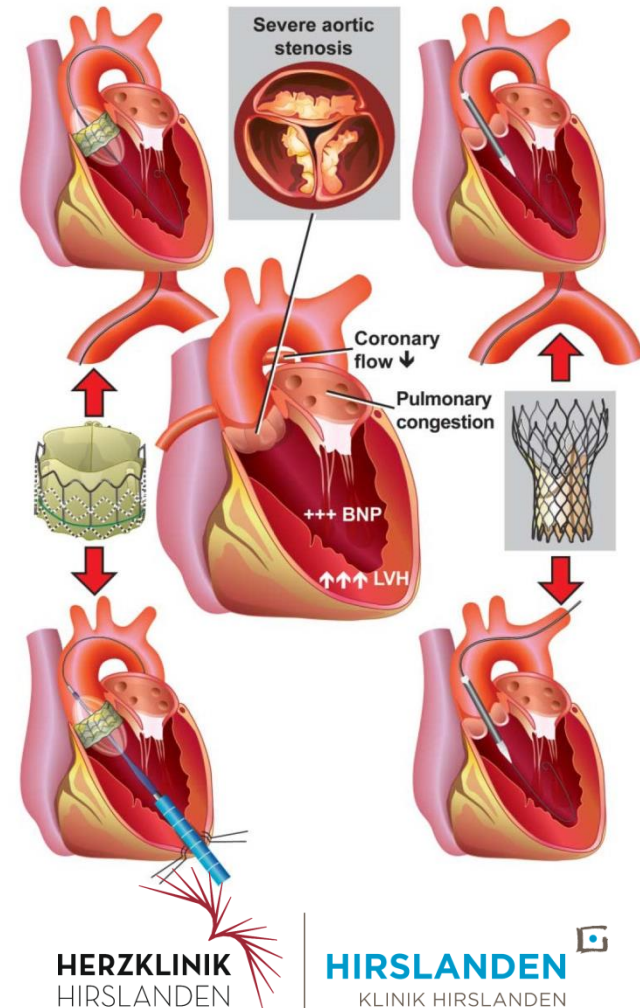
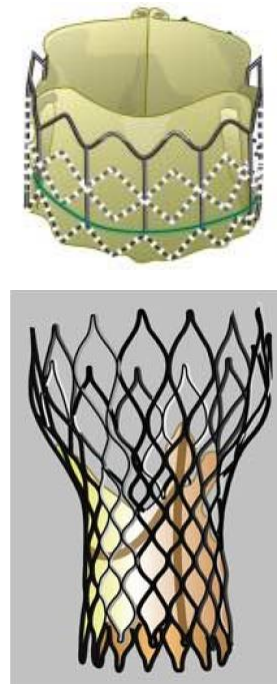
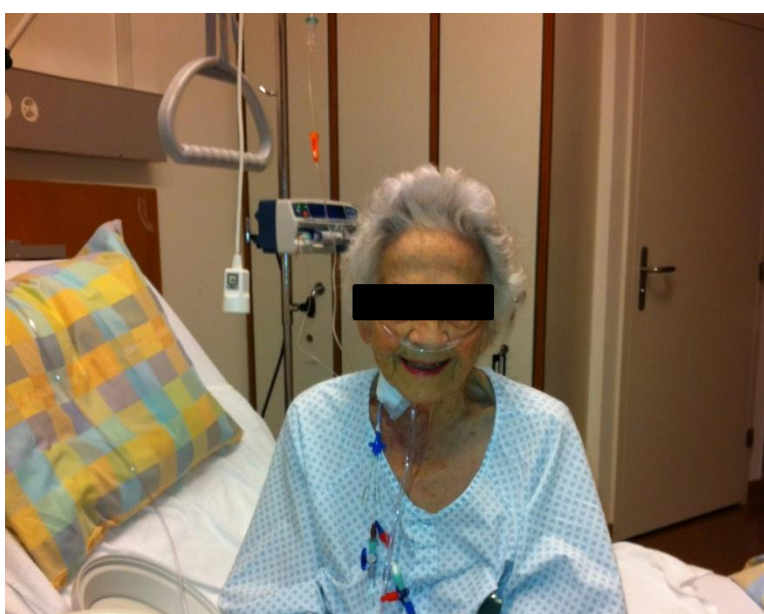
Patient B



*Same age and predicted risk (STS score)
One passes the “eyeball” test – one does not*

Selektionsprozess

1. Welcher Patient? 2. Welche Klappe? 3. Welcher Zugang?



TAVI Prothesen



CoreValve



Engager



Acurate



Portico



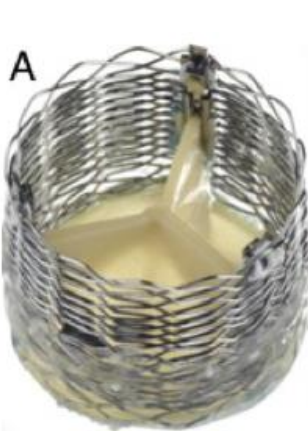
HTL



**Edwards
SAPIEN XT**



Inovare



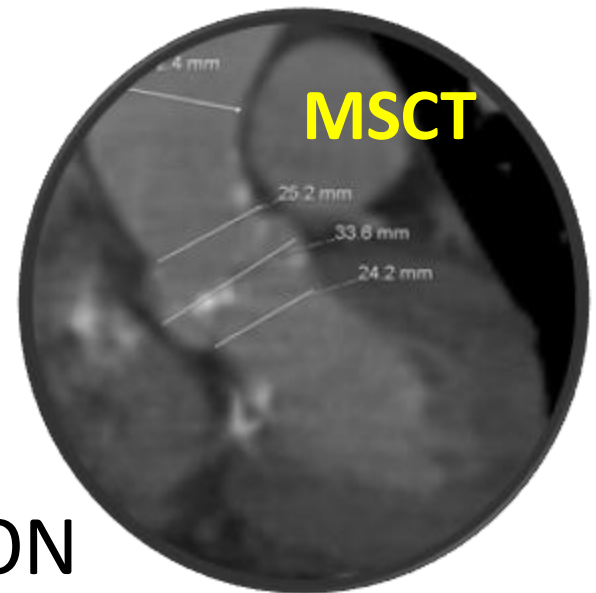
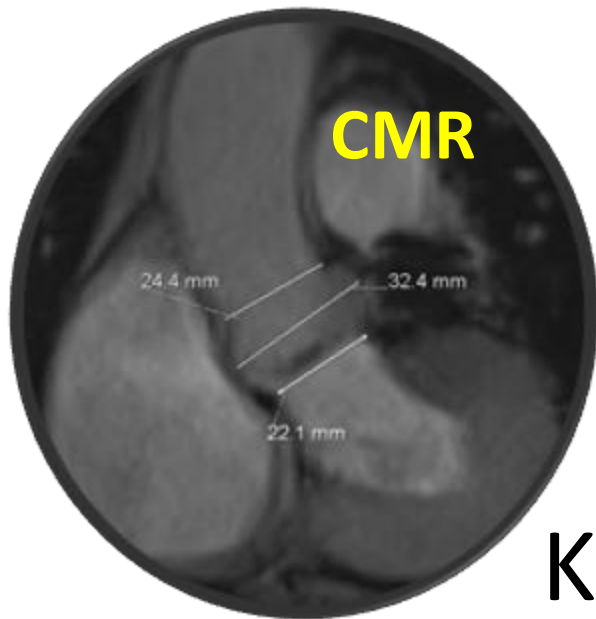
Lotus



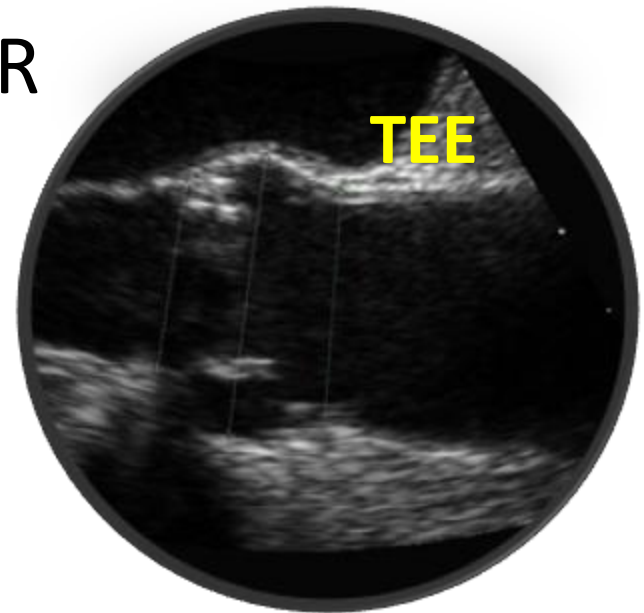
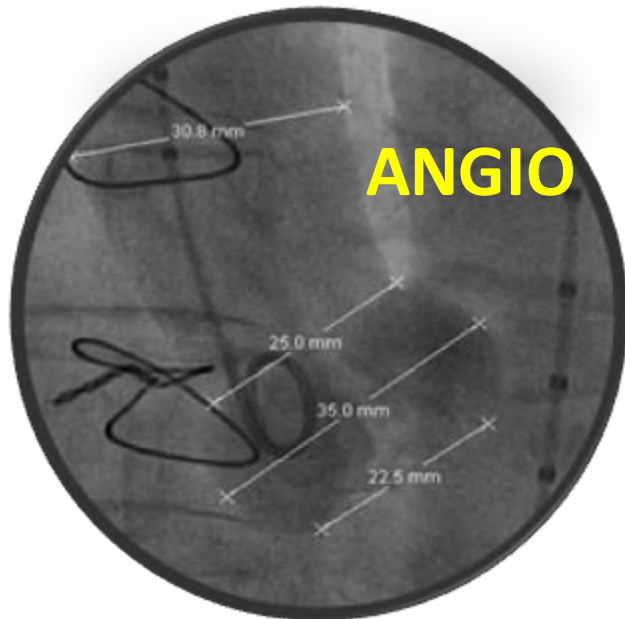
JenaValve



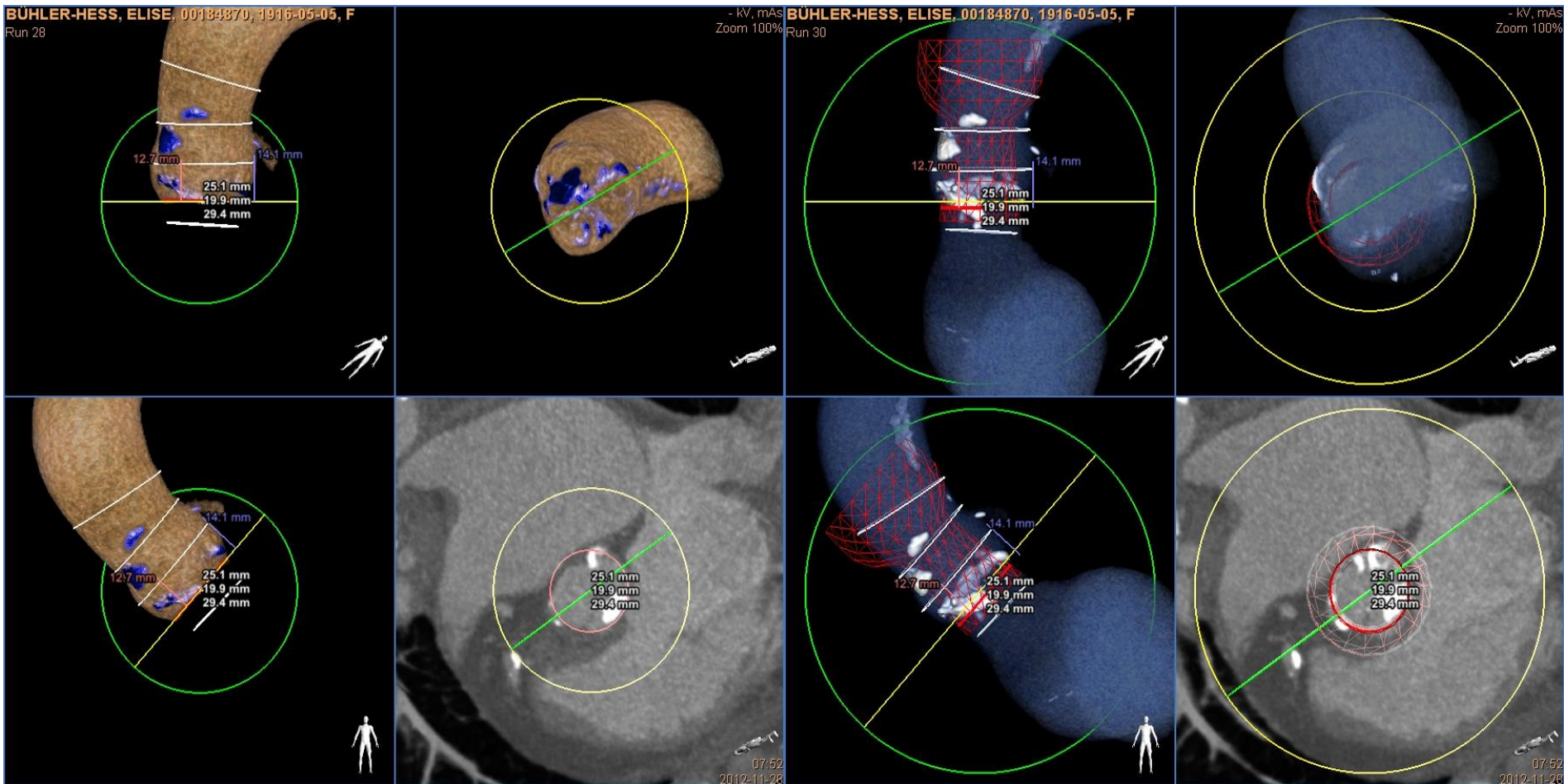
Direct Flow



KLAPPENSELEKTION AUFGRUND DER ANATOMIE



Planung: heart navigator

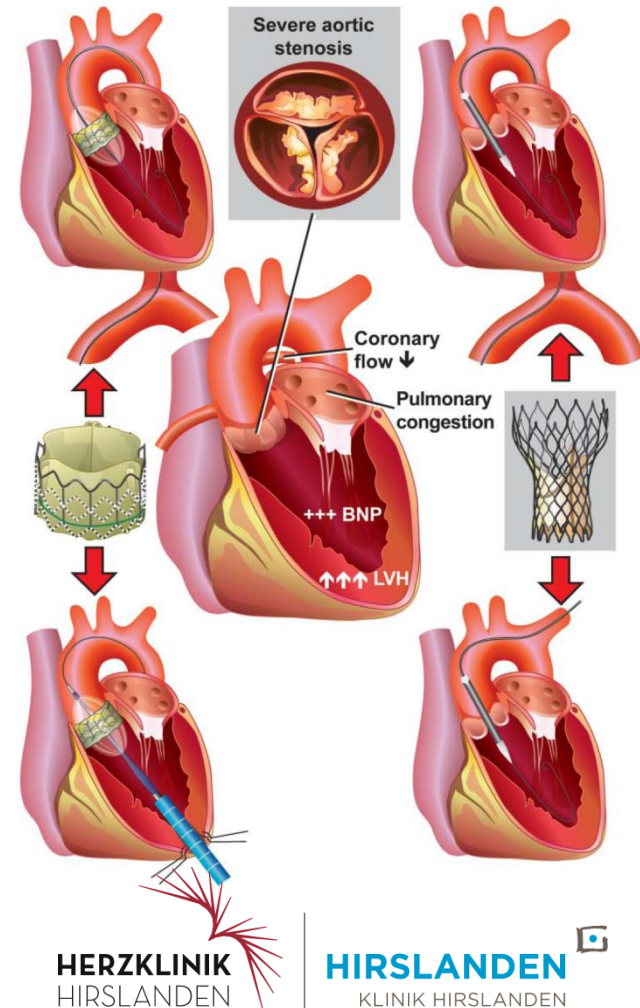
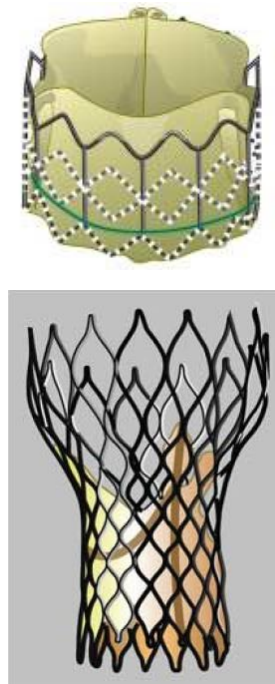
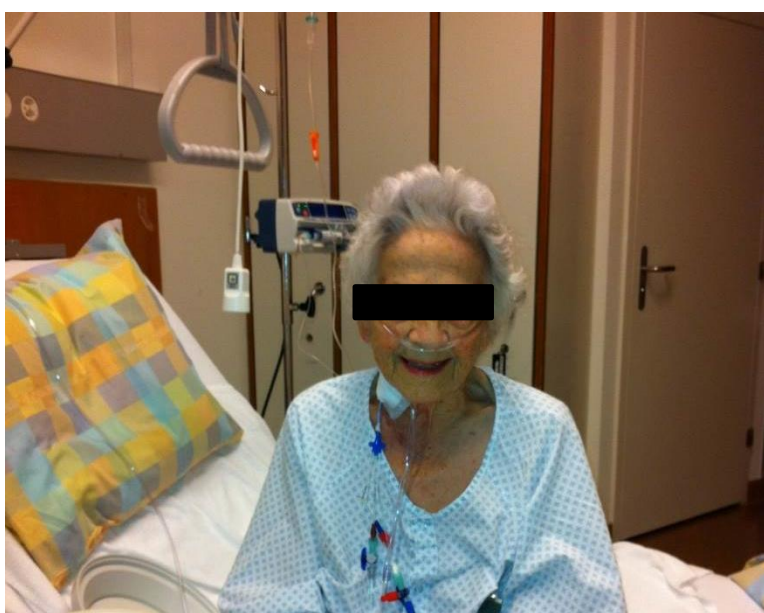


Optimaler Implantationswinkel

Klappenverkalkungen

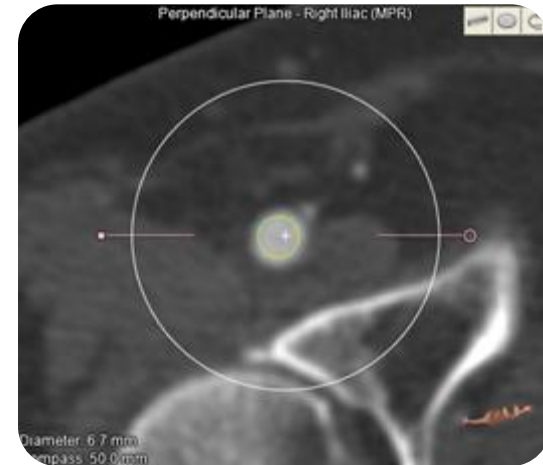
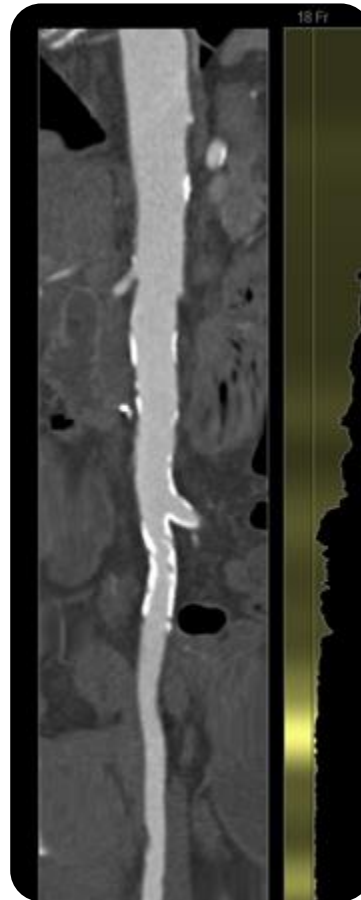
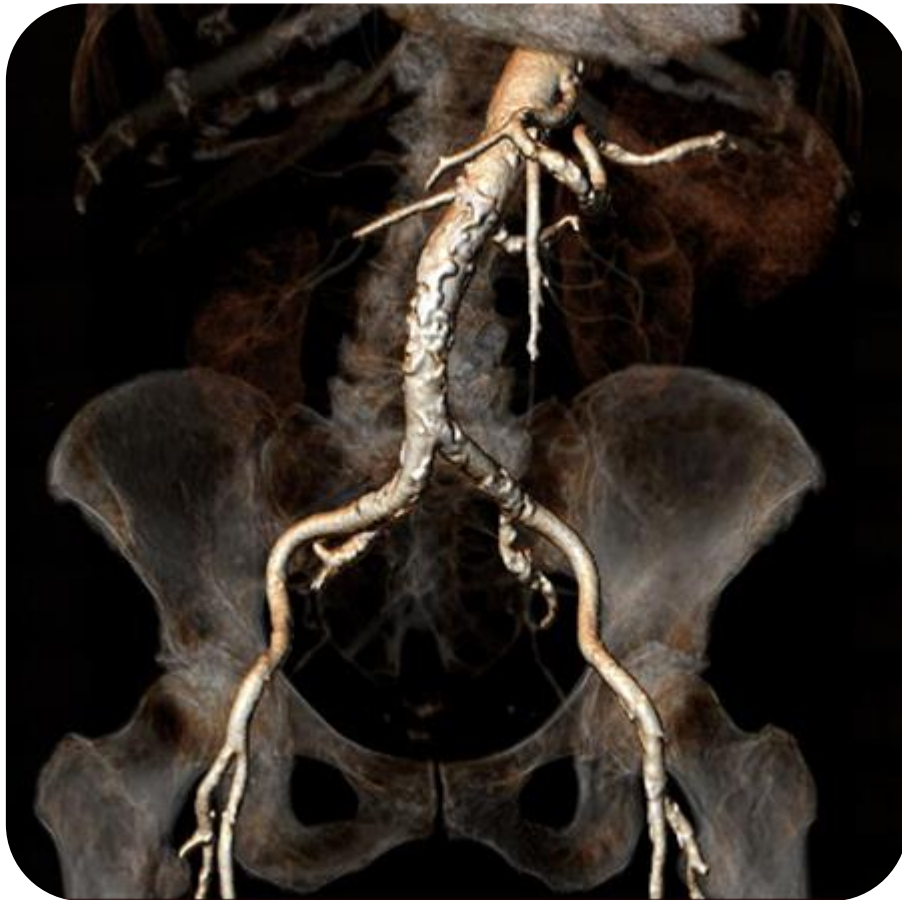
Selektionsprozess

1. Welcher Patient? 2. Welche Klappe? 3. Welcher Zugang?

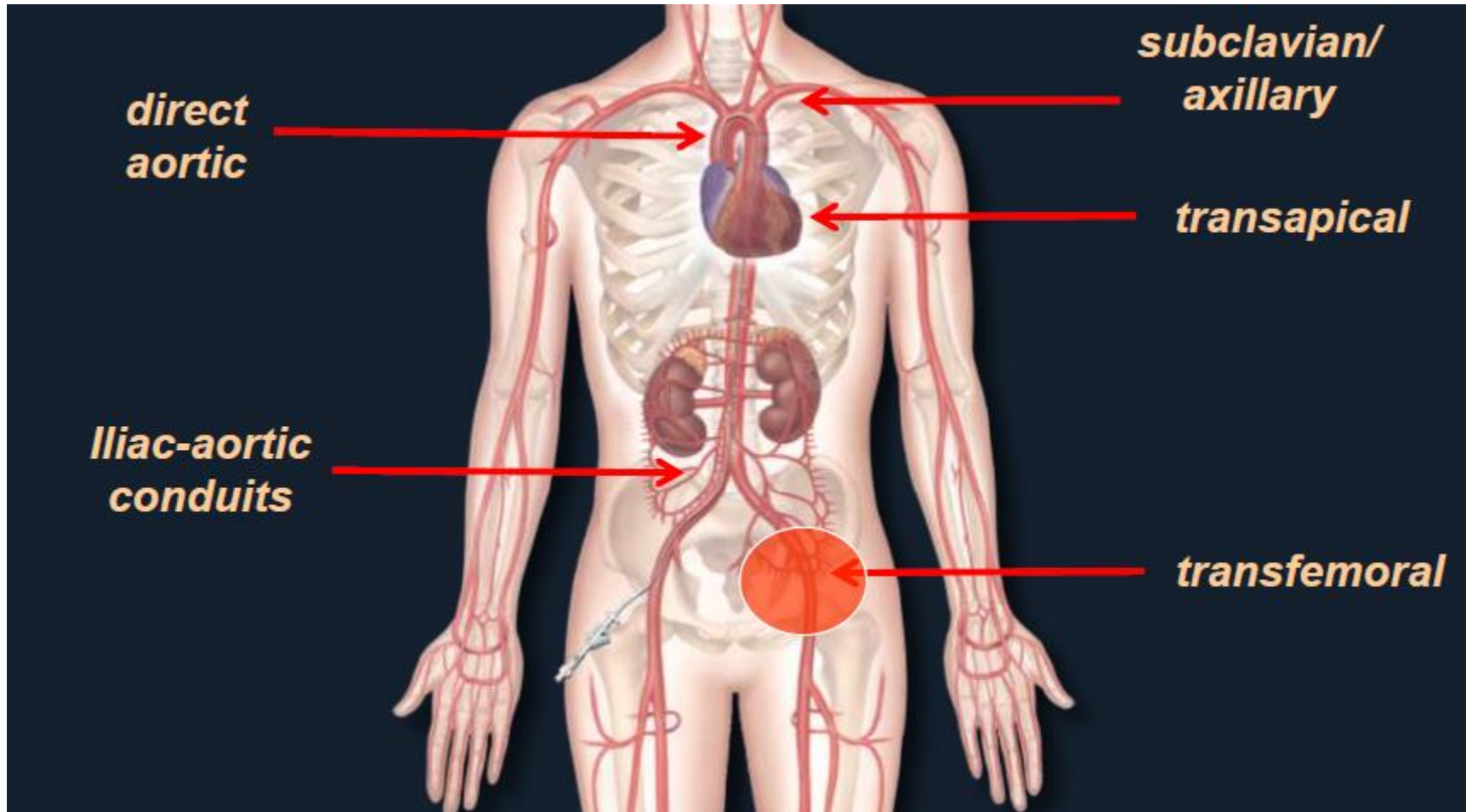


SCREENING DER GEFÄSSZUGÄNGE

BEURTEILUNG DER TORTUOSITÄT, GEFÄSSDURCHMESSER, CALCIFICATION

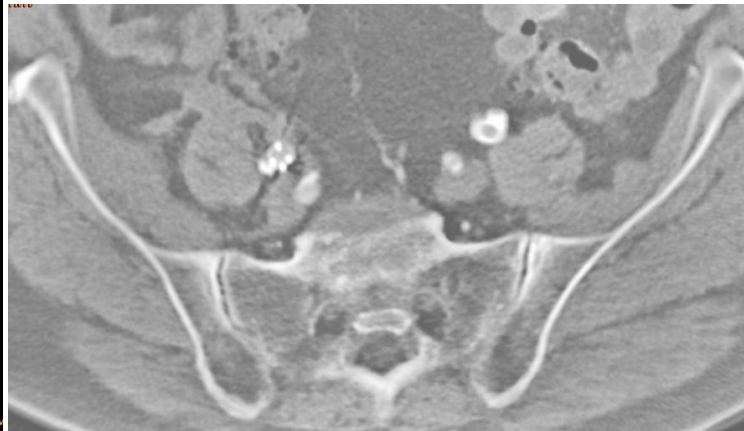
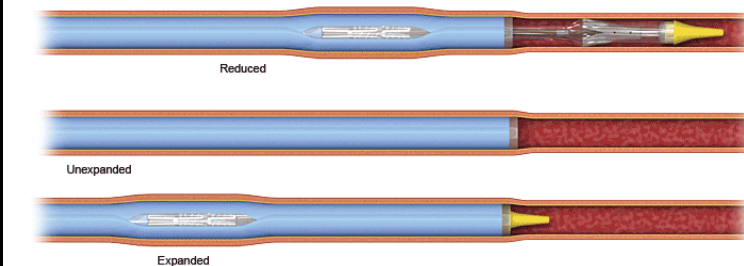


Verschiedene Zugangswege

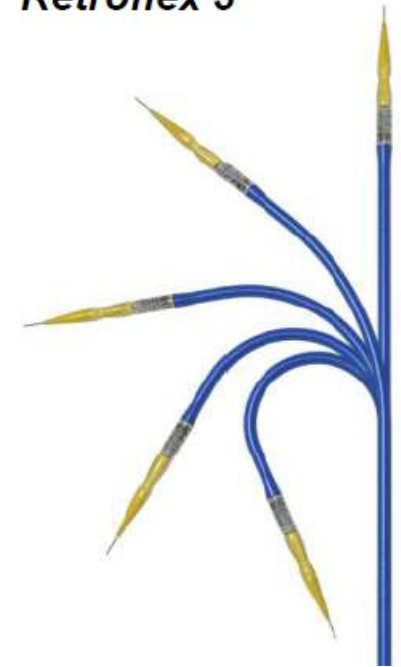


Welcher Zugang?

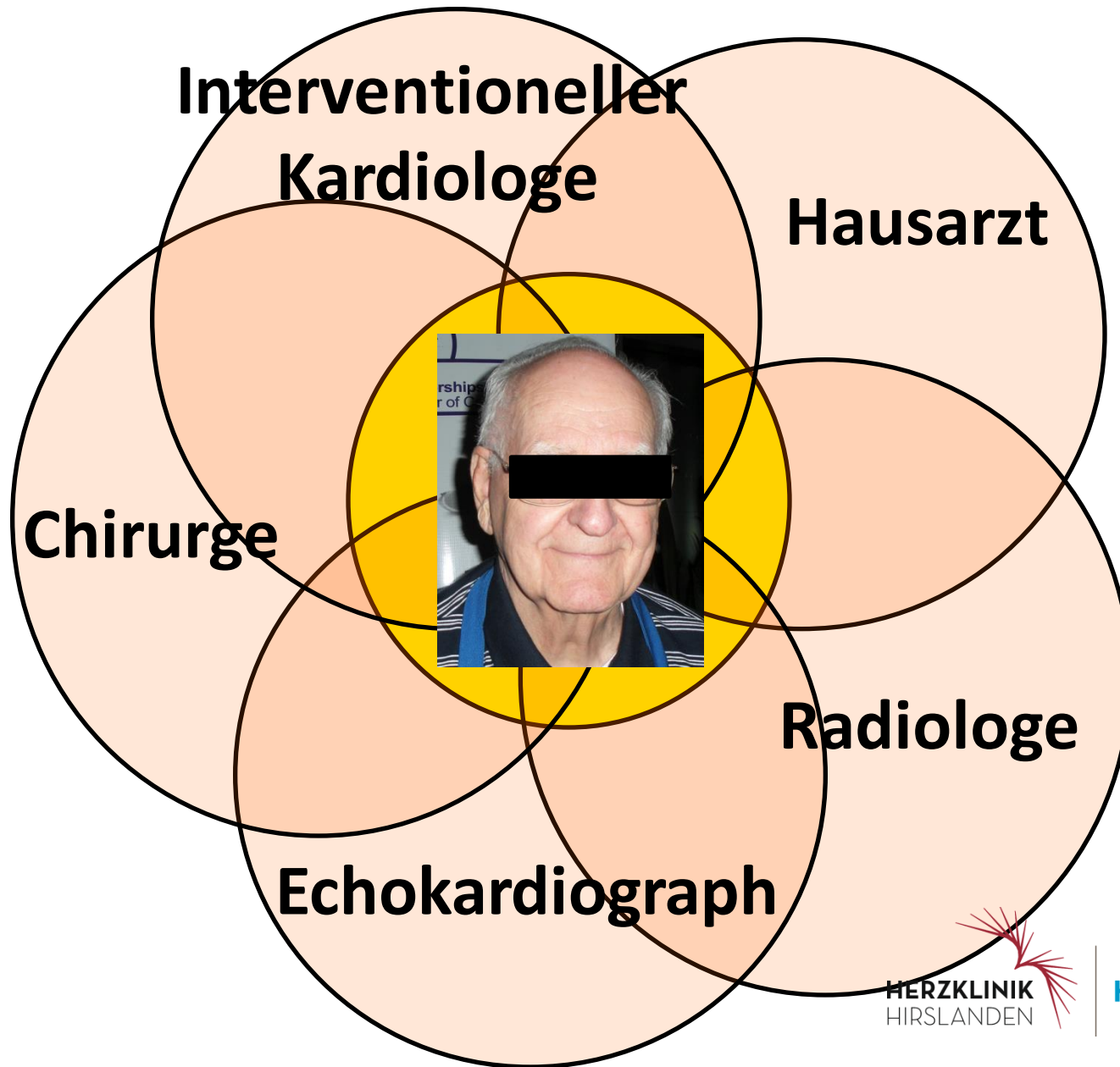
- Zugang durch 18 F Schleuse (7.2 mm Aussendurchmesser)
- 1. Wahl transfemorale (ca. 80% der Patienten)
 - ➔ minimaler Durchmesser der Gefäße ~6mm
- 2. Wahl transapikal, falls TF nicht möglich



Retroflex 3



INDIVIDUALISIERTE THERAPIE



The Heart Team

- Interventioneller Kardiologe
- Herzchirurg
- Herzanästhesist
- Echokardiographist

Patient mit
schwerer AS

konservativ

Operative AKE

TAVI

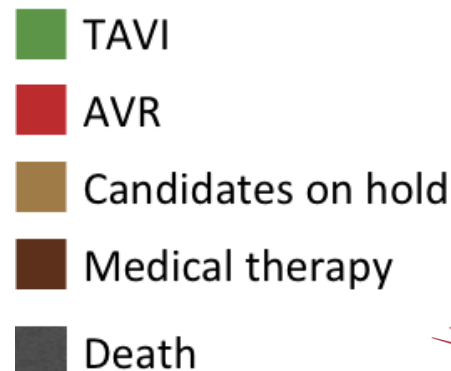
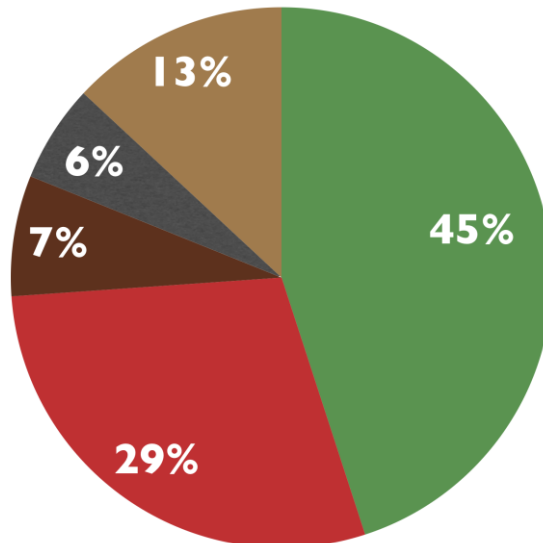
Biologische
Klappe

Mechanische
Klappe

Transfemoraler
Zugang

Transapikaler
Zugang

05/2008
n≈900



Hybrid-OP



Zusammenfassung

- Die Chirurgie ist und bleibt der Goldstandard in der Behandlung der Herzklappenerkrankung
- Der Katheter ist eine komplementäre Behandlungsmöglichkeit für selektionierte und Hochrisikopatienten
- Die Therapiemöglichkeit jedes Patienten wird in einer interdisziplinären Konferenz besprochen und sollte individuell angepasst werden