What is the reasonable training path for a CTS to TAVR today?
is characterized by a continuous trend towards less invasive interventions, not limited to reducing size of the incisions, but also redesigning the overall management of the procedure, while increasing the role of image-guided decision-making.
Off-pump and MIDCABG
Robotics in valve surgery
Thoracic and thoracoabdominal aneurisms, hybrid procedures
Sutureless aortic valves
Future Surgical Training

- Technological Demand
- Societal Demand
- Scientific Demand
- Professional Demand
- Regulatory Demand
From AVR to TAVR

Operable AS patients

Surgery (AVR) ~65%
Low Risk

Intermed Risk ~25%

High Risk TAVR or AVR ~10%

Extr Risk* TAVR ~10%

Too Sick Futile

TAVR in 2012

irresponsible, reckless

"?")

OK preferred No
From anatomy to imaging
Multisociety (AATS, ACCF, SCAI, and STS) Expert Consensus Statement: Operator and Institutional Requirements for Transcatheter Valve Repair and Replacement, Part 1: Transcatheter Aortic Valve Replacement

Table 1. Transcatheter Aortic Valve Replacement: Criteria for New and Existing Programs

<table>
<thead>
<tr>
<th>New Programs</th>
<th>Institutional Interventional Program</th>
<th>TAVR Interventionalist</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1,000 cath/400 JCI per year*</td>
<td>100 Structural procedures lifetime or 30 left sided structural per year of which 60% should be balloon aortic valvuloplasty (Left sided procedures include EVAR, TEVAR, BALLOON AORTIC VALVE (BAV), aortic valve (AV) and mitral valve (MV) prosthetic leak closures and ventricular septal defect [VSD] closures). (atrial septal defect/patent foramen ovale (ASD/PFO; closure are not considered left sided procedures) Suitable training on devices to be used</td>
</tr>
<tr>
<td></td>
<td></td>
<td>50 Total AVR per year of which at least 10 aortic valve replacement (AVR) should be high-risk (STS score ≥6) Minimum of 2 institutionally-based cardiac surgeons in program (more than 50% time at hospital with surgical program)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>TAVR Surgeon</td>
</tr>
<tr>
<td></td>
<td>100 AVR career, at least 10 of which are “high-risk” (STS score ≥6) or 25 AVR per year or 50 AVR in 2 years and at least 20 AVR in last year prior to TAVR initiation Experience with, and management of, peripherally inserted cardiopulmonary bypass Experience with open retroperitoneal exposure of, and surgical intervention on, the iliac arteries Suitable training on devices to be used</td>
<td></td>
</tr>
<tr>
<td>Training</td>
<td>Cardiologists must be board certified/eligible in interventional cardiology Surgeons must be board certified/eligible in thoracic surgery Additional operators who are trained or experienced in structural heart disease, and have unrestricted hospital privileges in structural procedures, may also be part of the interventional operating team with the interventional cardiologist and cardiovascular surgeon</td>
<td></td>
</tr>
</tbody>
</table>
Training pathway
The surgeon’s role

- Clinical management and patient care
- Surgical skills
- Cath lab and radiologic skills
- Radiologic knowledge and protection
- Materials and devices
The Surgeon’s role
(Clinical management and patient care)

- See and consent all patients
- Integral part of the TAVI MDT
- Key decision maker
- Expanding therapeutic options for the patients
the Heart Team

A new era of partnership for patient screening, completion of the procedure and assessment of the results.

- General Practitioner
- Referring Cardiologist
- Anesthesiologist
- Radiologist
- Patient’s relatives
- Patient!
- Echocardiographer
- Cardiac surgeon
- Nurses Technicians
- Geriatrician
- Other Specialists
- Interventional Cardiologist
The surgeon is familiar with established standards of surgical care for application in transcatheter therapies and is frequently in charge of assessing high-risk patients for catheter-based therapy as an alternative to surgery.

In a valve therapy program, neither the surgeon nor the cardiologist should be in charge of the assessment, but rather the MDT.
The Surgeon’s role
Surgical skills

- The surgeon’s role is not only when the procedure goes wrong, but an active member of the team to deploy their skills to render the procedure safer.
- Provide open access for femoral artery whenever we consider the percutaneous route is not suitable.
- Surgical approaches including subclavian, trans-aortic and transapical.
- Circulatory support including ECMO and ECC.
- Deal with catastrophic complications (vascular, aortic, ventricular).
Vascular access routes

- Vascular access
  - Sites
    - Transfemoral
    - Transapical
      - Left ant. thoracotomy
      - More direct, shorter catheter
      - Septal hypertrophy
      - Ascendra2, Sapien valve
    - Transaortic
      - Upper partial sternotomy
      - Mini-sternotomy 2/3 RICS
      - Aorta 5 cm above valve
      - Less painful, familiar approach
      - Manipulation of ascending aorta
    - Subclavian
Subclavian Approach

- A subclavian approach provides an alternative for TAVI for patients whose iliofemoral anatomy is compromised due to atherosclerosis, calcifications, or tortuosity
- Subclavian arteries are often viable in patients with compromised femoral and/or iliac arteries
- Subclavian access also often presents a better access angle for patients with extremely angulated or horizontal anatomies

Subclavian/Axillary: Right or Left

- Left is preferred due to typically better alignment with native aortic valve anatomy and less obstructive interaction with cranial perfusion
- Most appropriate access route selected by clinician based on patient anatomical characteristics
For Patients with an IMA Graft:
- Use contralateral subclavian/axillary artery or ect aortic access if possible
- Monitor cardiac function and patent ipsilateral IMA graft to ensure acceptable perfusion is maintained during intervention
  - 18 Fr introducer -- suggested minimum subclavian artery diameter is 7.5 mm
  - InLine Sheath -- suggested minimum subclavian artery diameter is 6.5 mm
  - If signs of compromised perfusion are present, adjust position of introducer to maintain acceptable perfusion
Key tips for a successful subclavian approach

- Local anesthesia
- Diagnostic access via the right radial artery
- Surgical exposure of the first portion of the axillary artery
- Direct puncture (vs T grafting)
- Surgical closure of the artery
Transaortic Direct Access

- Midline sternotomy
- Ministernotomy
- Minimal right thoracotomy
The pericardium is incised and stay sutures are placed.
The working field is perfectly exposed.
Determining working length

<table>
<thead>
<tr>
<th></th>
<th>CRS-26</th>
<th>CRS-29</th>
<th>CRS-31</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>26 mm</td>
<td>29 mm</td>
<td>31 mm</td>
</tr>
<tr>
<td>B</td>
<td>22 mm</td>
<td>24 mm</td>
<td>25 mm</td>
</tr>
<tr>
<td>C</td>
<td>40 mm</td>
<td>43 mm</td>
<td>44 mm</td>
</tr>
<tr>
<td>D</td>
<td>55 mm</td>
<td>53 mm</td>
<td>52 mm</td>
</tr>
</tbody>
</table>
Transapical approach
The surgeon’s role (cath lab and radiologic skills)

- Hybrid use of percutaneous and open surgical techniques
- Analyse CT-scan for annular sizing and access route.
- Acquiring cath lab skills
- Exchange skills as the boundaries between interventional structural cardiologist and cardiac surgeon are becoming interchangeable particularly at certain steps of the procedure
Radiologic knowledge and protection

- Radiation safety
- Radiation protection
- ALARA (as low as reasonably achieved)
- Risk estimates to the patient
- Basic CT and Knowledge
- Basic echocardiographic knowledge
<table>
<thead>
<tr>
<th>Type of device</th>
<th>Release</th>
<th>Valve Size (mm)</th>
<th>Sheath access route</th>
<th>Repositionable?</th>
<th>Retrieval?</th>
<th>PVL* (&gt;2)</th>
<th>PPM (30 days)*</th>
<th>Stroke* (30 days)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lotus™ Valve</td>
<td>M</td>
<td>23, 25, 27</td>
<td>18 Fr TF</td>
<td>Yes</td>
<td>Yes</td>
<td>1.4%</td>
<td>23.4-28.6%</td>
<td>1.7-4%</td>
</tr>
<tr>
<td>CoreValve Evolut R</td>
<td>SE</td>
<td>23, 26, 29, 31</td>
<td>14 Fr TF, TS</td>
<td>Yes</td>
<td>No</td>
<td>3.4-5.7%</td>
<td>8.3-11.7%</td>
<td>0-2.7%</td>
</tr>
<tr>
<td>SAPIEN 3</td>
<td>BE</td>
<td>20, 23, 26, 29</td>
<td>14 Fr TF, TA</td>
<td>No</td>
<td>No</td>
<td>1.8-4.8%</td>
<td>8.2-10.1%</td>
<td>1.4-2.6%</td>
</tr>
<tr>
<td>CENTERA</td>
<td>SE</td>
<td>23, 26, 29</td>
<td>14 Fr TF</td>
<td>Yes</td>
<td>No</td>
<td>8%</td>
<td>27%</td>
<td>0%</td>
</tr>
<tr>
<td>Direct Flow Medical</td>
<td>IR</td>
<td>23, 25, 27, 29</td>
<td>18 Fr TF</td>
<td>Yes</td>
<td>Yes</td>
<td>1.2-6%</td>
<td>13-17%</td>
<td>2.4-4%</td>
</tr>
<tr>
<td>ACURATE</td>
<td>SE</td>
<td>23, 25, 27</td>
<td>Sheathless 28 Fr, TA</td>
<td>No</td>
<td>No</td>
<td>7.7%</td>
<td>2.5%</td>
<td>5%</td>
</tr>
<tr>
<td>ACURATE neo™</td>
<td>SE</td>
<td>23, 25, 27</td>
<td>18 Fr TF</td>
<td>No</td>
<td>No</td>
<td>0%</td>
<td>6.7%</td>
<td>0%</td>
</tr>
<tr>
<td>JenaValve</td>
<td>SE</td>
<td>23, 25, 27</td>
<td>Sheathless 32 Fr, TA</td>
<td>Yes</td>
<td>No</td>
<td>0%</td>
<td>12.1%</td>
<td>3%</td>
</tr>
<tr>
<td>Engager</td>
<td>SE</td>
<td>23, 26</td>
<td>30 Fr TA</td>
<td>Yes</td>
<td>No</td>
<td>0%</td>
<td>28.5%</td>
<td>1.7%</td>
</tr>
<tr>
<td>Portico</td>
<td>SE</td>
<td>23, 25</td>
<td>18 Fr TF</td>
<td>Yes</td>
<td>No</td>
<td>4%</td>
<td>9.7%</td>
<td>2.9%</td>
</tr>
</tbody>
</table>
Results: How Do Surgeons Learn Best?

**Ideal Learning Condition**
- Deliberate Practice
- Relevant Learning Materials

**Optimal Teaching Methods**
- Mentors
- Narratives
- Active Learning
- Simulation

**Peer Surgeons as Teachers**
- Surgical Champions
- Simulators
- Didactic
- Cases review
- Hands on
- Live cases
We have to adapt our cardiothoracic surgical training programs to ensure that surgeons who are qualify are sufficiently equipped and specialized to thrive in their clinical practice. It will not be possible to train each surgeon in all the latest technological skills, but the skillsets that the surgeons learn must be relevant to their clinical practice. It will be valuable for surgeons to learn catheter skills as transcatheter heart valve technology and aortic stenting increases. Newly qualified surgeons should be encouraged to hone their skills in a specific field by doing a fellowship in a high volume centre of excellence. Prof. J. Janson
CORSO DI PERFEZIONAMENTO IN CARDIOCHIRURGIA E CARDIOLOGIA STRUTTURALE

Maggio Giugno 2017

Gruppo Ospedaliero San Donato
5,104 follower
3 giorni

Corso di perfezionamento in Cardiochirurgia e Cardiologia strutturale all'Istituto Clinico Sant'Ambrogio, struttura del Gruppo Ospedaliero San Donato specializzata nella Cardiologia Interventionistica valvolare e nella Cardiochirurgia mini invasiva.

Al via il primo corso universitario di perfezionamento in cardiochirurgia... santiambrogio.grupposandonato.it
Thank you for the attention!!