Unusual Course of Elderly Patient with Severe Aortic Stenosis

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✓ HOPI
✓ PROBLEM LIST
✓ REPORTS OF 2009
✓ PLAN
✓ PHYSICAL EXAMINATION
✓ PRE-OP REPORTS
✓ OPERATIVE PROCEDURE
✓ REEXPLORATORY SURGERY
✓ DISCUSSION
✓ PERCUTANEOUS MEDICORE AORTIC VALVE REPLACEMENT TRIAL
83 year old female with a past history of CABGx3 in 2000 who began to experience chest pain again in 2009 and worsening shortness of breath.

NYHA Class II

On investigating
Troponin peaked at 0.43 (0-0.1 ng/ml) and an echo revealed severe aortic stenosis.

CT scan then revealed an extensively calcified aorta.
Cardiac catheterization revealed severe native and graft disease.
PROBLEM LIST

- CAD
- NSTEMI
- AS with AVA 0.61 cm (<0.8cm²)
- Calcified aorta
- Hypertension
- Dyslipidemia
- MI in 1971, 2000 and 2009
- Hypothyroidism
- Paroxysmal Atrial Fibrillation
- Osteoarthritis
- Abdominal aortic aneurysm
Calcified aorta
Calcified aorta
Abdominal aortic aneurysm (96mm * 41.9mm)
Abdominal aneurysm
Calcified aorta
Physical Examination

- Pulse: 54
- B/P: 160/80
- Chest: Well healed surgical sternotomy.
- Heart: Murmer RSB radiating throughout.
- Extremities: trace RLE pedal edema.
- Pulses: palpable peripheral pulses.
Treatment Options

- Standard aortic valve replacement
- Given calcified aorta, not a surgical candidate
- Percutaneous core valve placement
PRE OP CHEST XRAY
Preliminary cath report:

- SVG-OM and PDA: known occluded.
- Infrarenal aneurysm
- 80% RCI ostial stenosis
- LCIA occluded at origin with collaterals to distal vessel
Operative Steps for Percutaneous Approach

- Left Subclavian Artery Cutdown
- Left Heart Catheterization
- Hemi-sternotomy
- Catheter Placement,
- Left Subclavian Artery Catheter Placement,
- Ascending Aorta Temporary Pacemaker Placement,
- Right IJ vein Temporary Pacemaker Placement,
- Left Femoral Vein Aortography,
- Ascending Aorta Balloon Aortic Valvuloplasty
- Percutaneous Aortic Valve Replacement
Subclavian Approach
Medicore valve in place
POST OP CHEST XRAY

Termination of ETT 5cm above carina

Pulmonary congestion

2 chest tubes placed
POST CHEST TUBE REMOVAL

Right base opacity
Homogenous opacities in the major fissure and right lung base.
C/O: PATIENT 3 DAYS PO COMPLAINS OF CHEST PAIN

INVESTIGATION: SUDDEN DROP IN HAEMATOCRIT FROM 34.2% TO 28.5%
CT THORAX

RIGHT SIDED PLEURAL EFFUSION
CT SCAN CHEST

LUNG COMPRESSION

HAEMOTHORAX
Extravasation from RIMA
**PROCEDURES**: Mediastinal re-exploration and repair of bleeding right internal mammary artery and vein.

**OPERATIVE FINDINGS**: There was a copious amount of clotted blood in the right hemithorax as well as non clotted blood. There was bright red blood emanating from transected mammary.
CHEST XRAY POST EVACUATION

- ETT IN PLACE
- MARKED IMPROVEMENT IN RGT HAEMOTHORAX
- LEFT LUNG BASAL ATELECTASIS
POD -4

SMALL APICAL PNEUMOTHORAX

SMALL RETROCARDIAC PLEURAL EFFUSION
POD-6

SMALL PLEURAL EFFUSION
POD-6 LATERAL VIEW

PROSTHETIC CORE VALVE IN PLACE
ECHO Post Op

- Mild symmetric left ventricular hypertrophy with preserved global and regional function.
- Well-seated Corevalve prosthesis with normal gradient and no regurgitation.
- Mild to moderate pulmonary hypertension.
- The severity of mitral regurgitation is reduced (but not well seen on current study)
PATIENT WAS ASYMPTOMATIC AND DISCHARGED ON POD-7
PERCUTANEOUS MEDICORE AORTIC VALVE REPLACEMENT TRIAL
Statistics of heart valve replacement surgery

It is estimated that more than 60,000 patients per year are undergoing heart valve replacement in the United States.
Complications of valve replacement surgery

- primary valve failure
- prosthetic valve endocarditis (PVE)
- prosthetic valve thrombosis (PVT)
- thromboembolism
- mechanical hemolytic anemia
- Anticoagulant related haemorrhage
Starr-Edwards Silastic ball valve

Medtronic hall tilting disc valve

St Jude mechanical heart valve

Source: images from medscape
Hancock MII Aortic valve

Source: images from medscape
A bioprosthetic valve is a replacement valve, usually for the heart, made of either human or animal tissue.
Mechanical Valves

Advantages
- Durability
- Less risk of re-surgery

Disadvantages
- Life long use of anticoagulants
- Loud and noisy
Bioprosthetic valves

Advantages
- No use of life long anticoagulating therapy.
- Valves do not click.

Disadvantages
- Less durability
  - Pig valves (10-15 yrs)
  - Cow valves (20 yrs)
CoreValve bioprosthesis: A – side view; B – aortic outflow view; C – partially “compressed” prior to mounting on the delivery device; D – completely mounted on the delivery system.
Medtronic heart valve

- The Medtronic Mosaic® bioprosthetic heart valve (bioprosthesis), carefully crafted from porcine tissue and preserved with innovative techniques, is an artificial heart valve.

- The Medtronic Mosaic bioprosthesis is a third-generation valve made of porcine (pig) tissue. The tissue is attached to a cloth-covered, flexible plastic frame, called a stent. The bioprosthesis is then sewn into place where the patient’s diseased valve used to be.
Percutaneous Approach

- The subclavian approach was found to be feasible and safe with procedural success and in-hospital complication rates similar to those of femoral approach.
- The subclavian approach presents a safe and feasible access route for TAVI in patients without suitable femoral access.
- Use of subclavian access has increased from 0% in 2007 to 18% in 2010

**Clinical Experience**: CoreValve Transcatheter Aortic Valve Implantation received CE-Mark approval for the treatment of severe Aortic Stenosis in 2007. To date, over 12,000 patients in 34 countries have undergone the CoreValve procedure.
Complications of Cardiopulmonary Open Heart Surgery

- Postperfusion syndrome
- Haemolysis
- Capillary leak syndrome
- Clotting of blood in circuit
- Air embolism
- Leakage
- ARDS
Profile of Medtronic heart Valves

- Transforms open heart surgical aortic valve replacement into a beating heart procedure.
- Delivery profile: 18 Fr (1Fr = 0.333mm) delivery profile
- Unique coverage sheath protects valve during delivery to the point of deployment.
- Valve able to be repositioned proximally at any point prior to full deployment.
- No rapid pacing required through deployment.
Nitinol stent in diamond cell configuration

Scalloped skirt

Porcine pericardium sutured to frame

Source: Br J Anaesth © 2009 Oxford University Press
The US CoreValve Pivotal Trial is an ongoing clinical study designed to assess the safety and efficacy of the 18Fr CoreValve percutaneous aortic valve in patients at « High-Risk » or « Extreme-Risk » for surgical aortic valve replacement (sAVR).

A total of 487 patients treated by the iliofemoral approach will be included in this Registry. An additional 100 patients non ilio-femoral access (subclavian or direct aortic) will also be enrolled and analyzed separately from the primary cohort.
Concerns associated with medtronic heart valves

- Risk of stroke
- Risk of peripheral vascular disease
References

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