Hybrid Transcatheter Aortic Valve Implantation and Off-Pump Coronary Artery Bypass in a High-Risk Patient - Case report

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Background

Transcatheter aortic valve implantation (TAVI) has become an alternative technique to surgical aortic valve replacement(SAVR) in high-risk patients. Off-pump coronary artery bypass (OPCAB) is often performed to treat coronary artery disease (CAD) in Japan. TAVI and OPCAB have common advantages; they are performed on the beating heart without cardiopulmonary bypass (CPB) or aortic cross-clamp.

Case

【Patient】78-year-old female, height 145cm, body weight 47.5kg, with severe aortic stenosis(AS), CAD, atrial fibrillation, chronic kidney disease, left internal carotid artery stenosis
【TTE】LVDD/Ds=45/32mm, EF=55%, Wall motion normal, AVAi=0.6cm²/m², mean LV-Ao PG=41mmHg, mild AR/MR/TR
【CAG】LMT 50%, LAD 90%, LCX 90% stenosis

Surgery

Transfemoral(TF)-TAVI(Evolut R 26) + CABG(Left internal thoracic artery(LITA)-LAD, Aorta-Saphenous vein(SVG)-LCX)
Operative time: 5hr03min RBC:720ml Alb:250ml Fluid infusion 2100ml Blood loss:530ml Urine output:145ml

Anesthesia

- General anesthesia was induced smoothly. An arterial line, central venous catheter and transesophageal echocardiography were used.
- While LITA was anastomosed to LAD, small doses of phenylephrine, dobutamine and norepinephrine were required.
- After the artificial valve was inserted with controlled pacing (VVI 70), complete atrioventricular block developed, and temporary ventricular pacing was needed.
- While the heart was lifted to anastomose SVG to LCX, increased dose of norepinephrine was required.
- During the operation, aortic valve position and coronary inlet were carefully monitored.
- The surgery finished without obvious problems.
- The patient was moved to ICU, kept sedated and intubated.

After the surgery
POD1, the patient improved hemodynamically and was extubated.
LCX graft stenosis and left femoral artery occlusion occurred. Percutaneous coronary intervention(PCI) for LCX graft and femoral artery bypass were performed.

Discussion

- CAD is associated with worse outcome in patients who undergo TAVI. There are evidences of increased early and late mortality in patients undergoing concomitant PCI and TAVI. CABG is better than PCI for some patients. TAVI is better than SAVR for some patients. So, CABG with TAVI can be an option for these patients .
- The number of reported cases of hybrid TAVI and OPCAB is limited. We have to be careful about interaction between the two diseases and the two procedures; hemodynamic changes related to valve insertion, lifting of the heart, anastomosis of the graft to aorta, and complications of each operation.
- In our case, there were no problems during the surgery. But, the patient had stenosis of the graft.
- High-risk patients are planned for TAVI. Considering the potential benefits of the hybrid surgery, it could be a preferred option for them, but we should continue to investigate the risks of the hybrid surgery as well.

Conclusion

Hybrid TAVI and off-pump CABG can be performed and could become a preferred option for high-risk patients. But, indication should be discussed carefully and further studies are needed to assess effectiveness and safety.

Reference: 1 Junjiro Kobayashi, et al. Early results of simultaneous transaortic transcatheter aortic valve implantation and total arterial off-pump coronary artery