Development of a totally robotic beating heart coronary artery bypass graft program; simulation to clinical practice

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Introduction/Background

Despite a decade of Da Vinci AUS robotics TECABG has not been performed.

TECABG is the logical MICS extension of existing OFF pump AAA CABG and Robotic MIDCABG programs. DaVinci coronary stabilisers are not available in AUS.

When the Torregrassa Gell-port Medtronic Nuovo stabiliser system makes TECAB possible we committed to starting a program.

Challenges: Isolation, small case numbers, Robotic access blocked by prostates.

Methodology

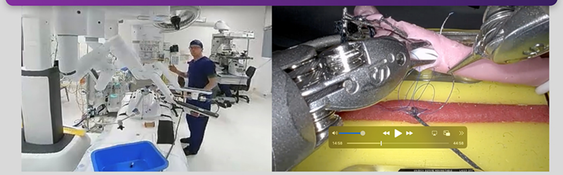
Minimum requirements Skills:

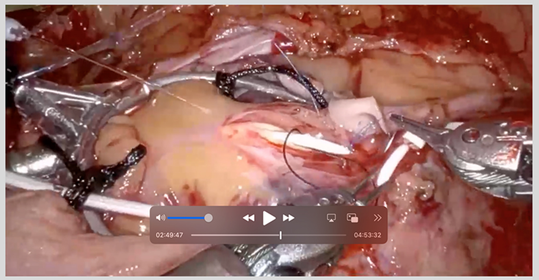
1. **Well trained coronary robotic team**
2. **OFF-pump CABG: Anaortic All Arterial**
3. **MICS skills RATS and MID-CABG.**
4. **ECMO: peripheral and wire skills**
5. **Micro-suture robotic platform & equipment**
6. **Minimally invasive stabiliser**

Lead surgeon experience:
- 80% off pump CAGS 100+ da Vinci MID-CABG
- Active in TAVI and da Vinci mitral repair programs
- SXR Image capture stream store & analyse platform and 360 room cam for team analysis developed

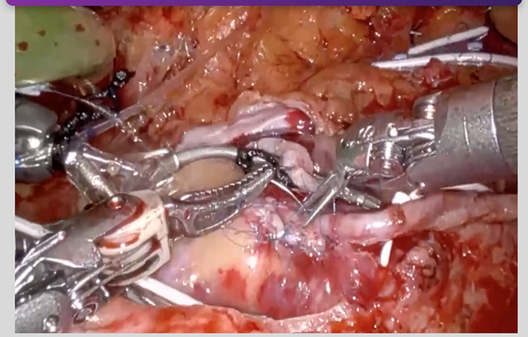
Program started after:
- Ethics research and credentialling approved
- 3 successful Sims anastomotic time < 20'
- Operating team comfortable with simulation
- Consensus from northern hemisphere experts that it was safe to proceed

Simulation and Operations





Results



Conclusion

- **5/5 Successful Cases;**
  - 4: LIMA-LAD
  - 1: RIMA-LAD LIMA-D-1
- **DaV ave console time 245', op time 290'**
- **No infarcts or conversion**
- **Mean LOS 5**
- **Enhanced recovery**

High fidelity simulation
Allows technically demanding innovation in small volume remote site to be safely initiated.

SXR: platform used to score and analyse the procedural steps, including salvage sim to develop minimum standards of team procedural function.

Streaming and Networking with Northern Hemisphere colleagues is facilitated.

This benchmarking collaboration and simulation approach allowed the safe introduction of a challenging procedure.

References

Robotic-assisted coronary artery bypass grafting: current knowledge and future perspectives

A. Amabile, G. Torregrossa and H. H. Balkhy
Minerva Cardioangiol 2020 Vol. 68 Issue 5 Pages 497-510

Systematic review of robotic-assisted, totally endoscopic coronary artery bypass grafting

M. Seco, J. J. Edelman, T. D. Yan, M. K. Wilson, P. G. Bannon and M. P. Vallely
Ann Cardiothorac Surg 2013 Vol. 2 Issue 4 Pages 408-18

For more information scan the QR code

STEPS

1. ECMO Access
2. Ports for TECABG
3. Dock Robot
4. Assess ICNB
5. Pericard-iotomy LAD assess
6. LIMA Harvest
7. Heparin & Clip
8. 2nd ics 12mm port
9. Gellport Nuovo
10. LAD Stabilise
11. SL-IPC
12. IMA Prep
13. SL-IPC Off
14. Setup Equipment
15. SL-On
16. LAD Open & Shunt
17. SL-Off
18. VAS Anastomosis
19. SL-On Shunt Out Tie
20. Flow Probe
21. Close Up