Review of Graft Patency in Robotically Assisted Coronary Artery Bypass and Totally Endoscopic Coronary Bypass Surgery

Elan A. Sherazee, MD[1], Sarah A. Chen, MD, MA[2], Timothy M. Guenther, MD[2], Bob Kiaii, MD[2]

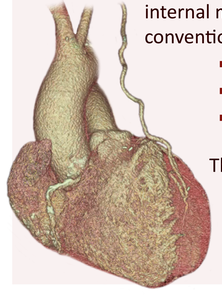
[1]Department of Surgery, University of California, Davis, Sacramento, CA, USA; [2]Department of Surgery, Division of Cardiac Surgery, University of California, Davis, Sacramento, CA, USA

Objective

Robotically Assisted coronary artery bypass grafting surgery (**RACABG**) avoids the morbidities of a sternotomy and cardiopulmonary bypass and is becoming increasingly popular.

Robotically assisted minimally invasive direct CABG (**RMIDCAB**) and totally endoscopic CABG (**TECAB**) have been shown to have similar patency rates compared to conventional CABG left internal mammary artery patency. Patency for conventional CABG:

- 5 years: 98%
- 10 years: 95%
- 15 years: 88%



The objective was to perform a **systematic review** to evaluate graft patency and clinical outcomes in patients who underwent RACABG.

Figure 1

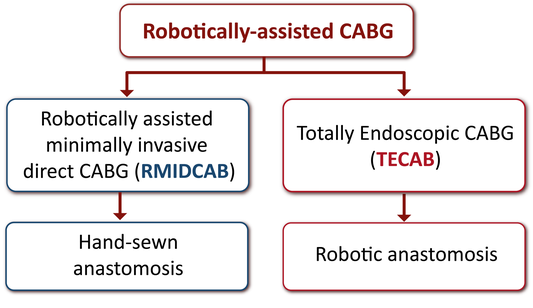


Fig 1. Overview of RMIDCAB vs. TECAB

Disclosures:

The authors have no conflicts of interest or disclosures.

Methods

This review was conducted according to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) statement. A structured literature search of English language articles from MEDLINE, Embase, PubMed, PubMed Central and Google Scholar was performed.

❖ Keywords searched were:

"**Coronary artery bypass graft**" and "**Robotic**" and "**Patency**" and/or"**Minimally invasive**" and/or "**Totally Endoscopic**"

The search took place in June 2021

Figure 2

Identification off Studies via Databases and Registers

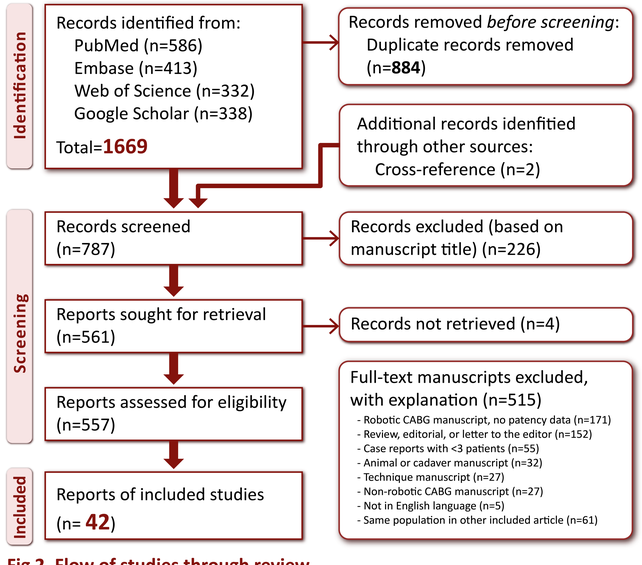


Fig 2. Flow of studies through review

Results

❖ Between June **1998** and August **2018**:

- **4,344** patients underwent RACABG, either by:
  - **RMIDCAB** n=**2,662** (61.3%) or
  - **TECAB** n=**1,682** (38.7%) approach
- Post op graft patency was assessed with CTA or angiogram at similar rates in both cohorts:
  - **RMIDCAB**: **69%**
  - **TECAB**: **70%**
- The average graft patency at short- (<1 month), mid- (<5 years) and long-term (≥5 years) follow up was:
  - **RMIDCAB**: 97.6%, 95.3% and 94.2%, respectively
  - **TECAB**: 98%, 95.6% and 93.7%, respectively

Secondary Outcomes:

- 30-day mortality: **0.3%**
- Conversion to sternotomy: **1.5%**
- Postoperative reintervention for occluded graft: **1.6%**

Figure 3

	Short Term <1 month	Mid Term <5 years	Long Term ≥5 years
RMIDCAB	97.6%	95.3%	94.2%
TECAB	98%	95.6%	93.7%

Fig 3. Average graft patency over different follow up times

Conclusion

RACABG has **comparable patency rates** to conventional CABG with a low rate of reintervention. Short term patency rates are well documented in the literature; however, there are only a few studies reporting on the mid- and long-term outcomes. Although the initial data is very encouraging, further investigation is warranted to further assess this minimally invasive technique for surgical coronary artery revascularization.

Limitations:

- ❒ No randomized trials
- ❒ Need for expert teams
- ❒ Steep learning curve
- ❒ Lack of long-term follow-up

Figure 4

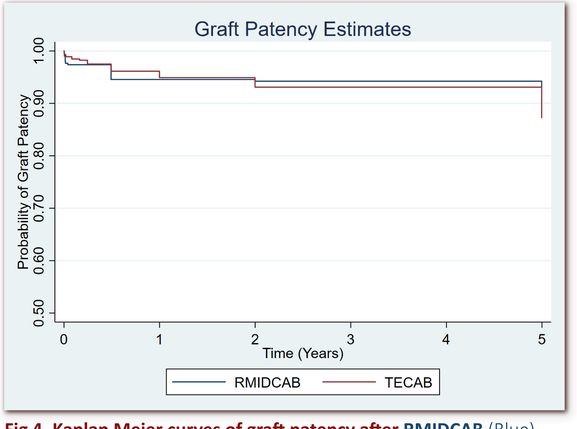


Fig 4. Kaplan Meier curves of graft patency after RMIDCAB (Blue) **and TECAB** (Red) **(p>0.05).**

References :

Tatoulis J, Buxton BF, Fuller JA. Patencies of 2,127 arterial to coronary conduits over 15 years. *Ann Thorac Surg*. 2004;77(1):93–101