

Multiple Arterial Bypass Grafting Should Be Routine

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Disclosures:
None

MABG Should Be Routine: Background

- Adding a 2nd arterial graft during CABG improves long term survival.¹⁻³
- Either the radial artery (RA) or the right internal thoracic artery (RITA) may be used.⁴
- Yet, use of a 2nd arterial graft is 10% (RITA 4% and RA 6%) in the U.S.⁵
- What is potential survival benefit of “routine” multiple arterial grafting?

1. Halkos, JTCVS, 2104. 2. Taggart, Euro Heart J, 2010. 3. Schwann, Ann Thorac Surg, 2014. 4. Tranbaugh, JTCVS, 2014. 5. Head, Euro Heart J, 2013



Non-compliance with Guidelines Costs Lives

The NEW ENGLAND JOURNAL of MEDICINE

SPECIAL ARTICLE

Cost-Effectiveness of Hypertension Therapy According to 2014 Guidelines

Andrew E. Moran, M.D., M.P.H., Michelle C. Odden, Ph.D., Anusorn Thanataveerat, M.P.H., Keane Y. Tzong, M.P.H., Petra W. Rasmussen, M.P.H., David Guzman, M.S.P.H., Lawrence Williams, M.S., Kirsten Bibbins-Domingo, Ph.D., M.D., Pamela G. Coxson, Ph.D., and Lee Goldman, M.D., M.P.H.

ABSTRACT

BACKGROUND

On the basis of the 2014 guidelines for hypertension therapy in the United States, many eligible adults remain untreated. We projected the cost-effectiveness of treating hypertension in U.S. adults according to the 2014 guidelines.

METHODS

We used the Cardiovascular Disease Policy Model to simulate drug-treatment and monitoring costs, costs averted for the treatment of cardiovascular disease, and quality-adjusted life-years (QALYs) gained by treating previously untreated adults between the ages of 35 and 74 years from 2014 through 2024. We assessed cost-effectiveness according to age, hypertension level, and the presence or absence of chronic kidney disease or diabetes.

Implementation of 2014 hypertension guidelines in U.S. adults between 35 and 74 years.

Potentially could prevent 13,000 deaths annually.

Eng J Med. Jan, 2015.

MABG Should Be Routine: Objectives

- To estimate the reduction in deaths and number of additional person years of life that could potentially be gained by nationwide adoption of routine multiple arterial bypass grafting (MABG).
- To define an achievable and optimal MABG rate.



MABG Should Be Routine: Methods

- 4,883 consecutive, isolated CABG-LITA procedures from January, 1995 to June, 2011.
- RA: 1,965 patients; SV: 2,918 patients.
- Propensity matching on 31 prospectively collected variables resulted in 1002 matched RA and SV pairs.
- Kaplan Meier estimates of survival.
- Primary endpoints: all cause mortality using the SSDI (10/2012).



MABG Should Be Routine: Statistical Methods

- Evaluated 2 rates of MABG—**20% and 80%**--and compared these to the current national rate of **10%**.
- Applied these MABG rates to a hypothetical population of **200,000 patients** similar to our propensity matched patients (2010: 395,000 CABG in U.S.).
- Calculated the potential number of lives saved and the number of added person years of life based on the Kaplan Meier survival estimates.



MABG Should Be Routine: Results

- Propensity matched **1002 RA** and **1002 SV** pairs:

Age: 62 years

Male: 75%

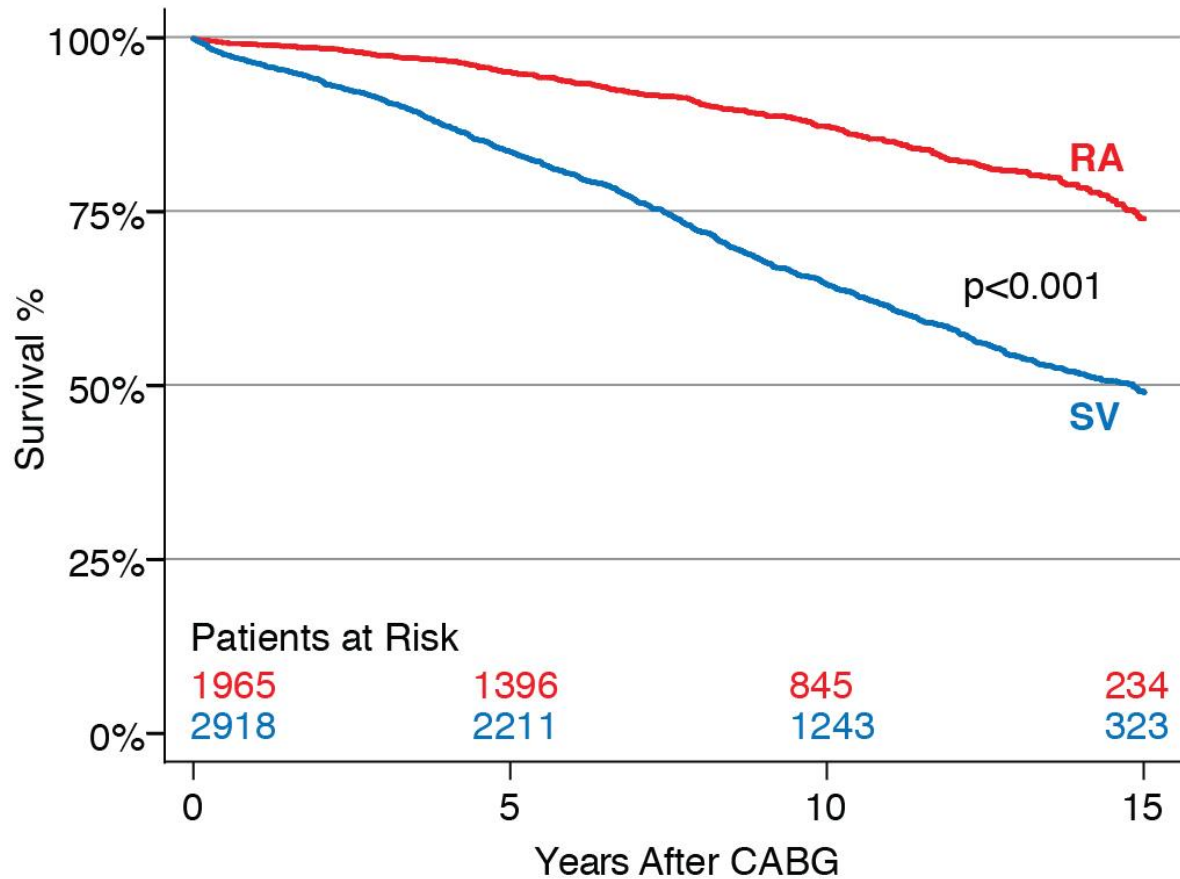
Diabetic: 40%

3VD: 80%

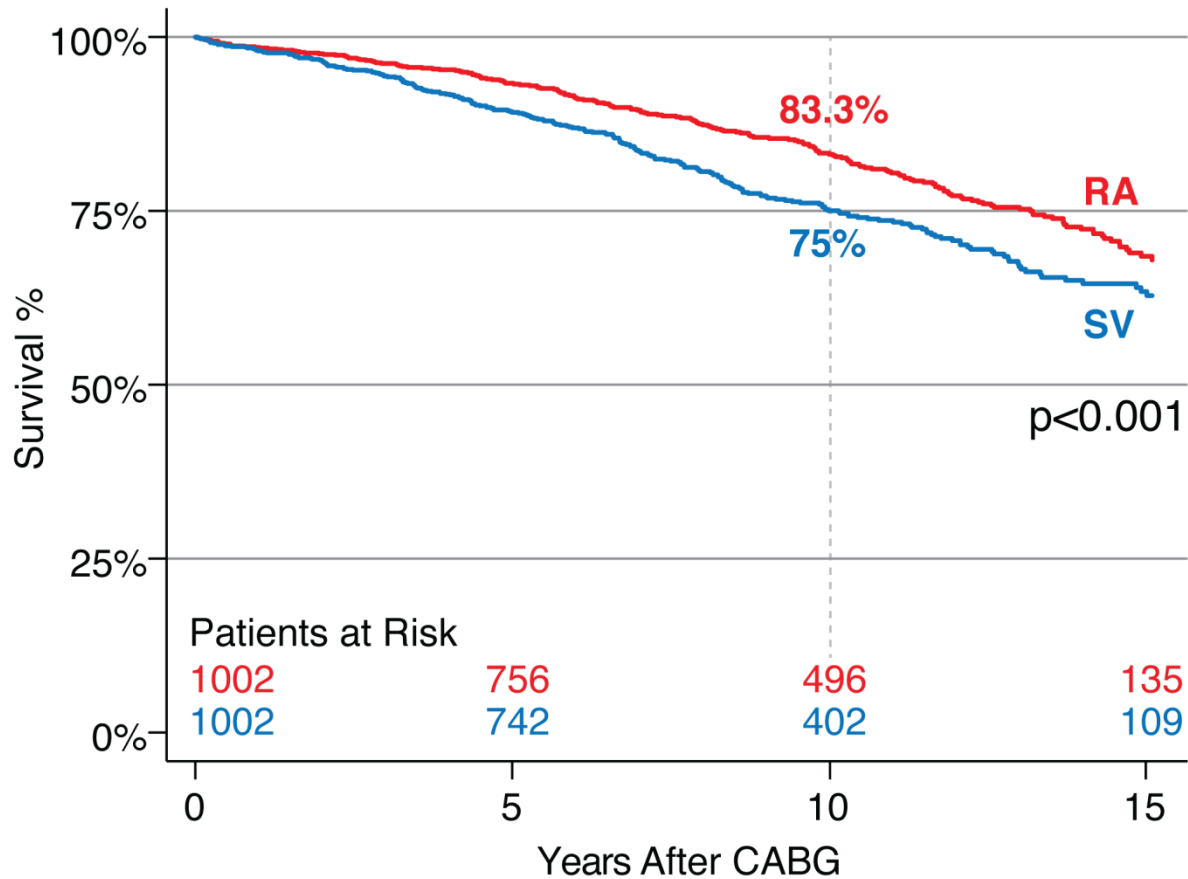
Mean # of grafts: 3.7/patient



Kaplan Meier Survival Curves: Unmatched patients



Kaplan Meier Survival Curves: Matched Patients



**200,000 patients
Present Reality in USA**

**MABG
20,000 (10%)**

**SITA
180,000 (90%)**

83.3%

75.0%

16,660 alive

**135,000
alive**

**151,660
alive at 10 yrs**

10 years

10 years



**Mount
Sinai
Heart**

200,000 patients
(80% MABG strategy)

MABG
160,000 (80%)

SITA
40,000 (20%)

83.3%

75.0%

133,280
alive

30,000
alive

163,280
Alive at 10 yrs

$\Delta=11,620$
Fewer deaths

10 years

10 years

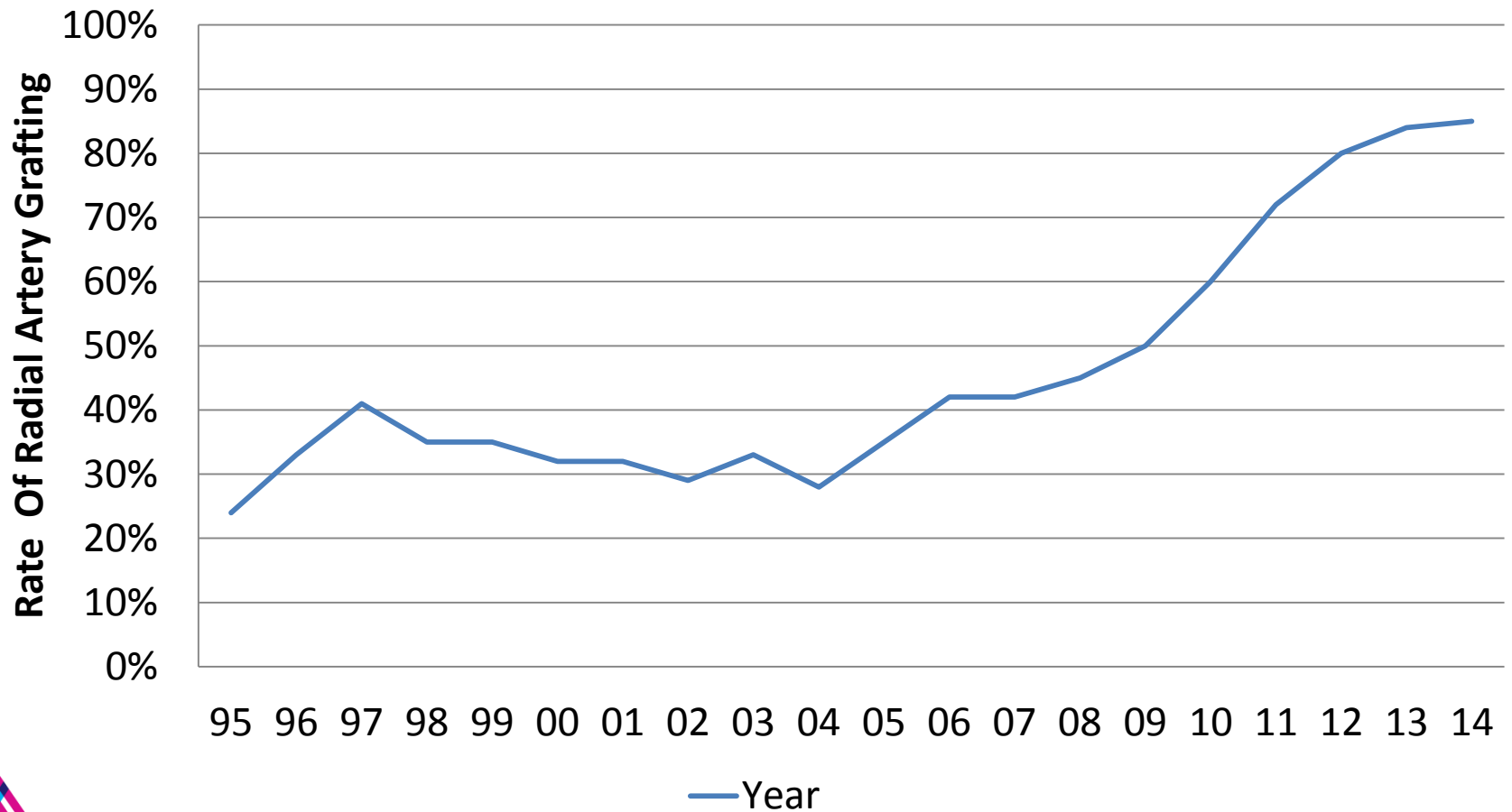


MABG should be routine: Results

Time after CABG	Kaplan Meier RA survival rate	Kaplan Meier SV survival rate	Patients at risk RA 10%	Patients at risk RA 20%	Patients at risk RA 80%	Reduction in deaths @20% RA	Reduction in deaths @80% RA	Cumulative person-years @20% RA	Cumulative person-years @80% RA
1 year	98.5%	98.0%	196,100	196,200	196,800	100	700	100	700
5 years	93.5%	89.1%	179,080	179,960	185,240	880	6,160	2,450	17,150
10 years	83.3%	75.0%	151,660	153,320	163,280	1,660	11,620	9,190	64,330



Radial Artery Utilization: Mount Sinai Heart at Beth Israel



MABG Should Be Routine: Limitations

- Retrospective study with patient selection bias
- Propensity matching was thorough but there remains the possibility of uncontrolled confounding effects
- Model and assumptions may not be applicable to all patients
- Only all cause mortality was available



MABG Should Be Routine: Summary

- RA-based MABG strategy could potentially prevent over 11,000 deaths annually in the USA.
- Over the course of 10 years, over 64,000 person years of life may be added.
- An 80% rate of multiple arterial grafting is achievable using a RA-based multiple arterial grafting strategy.



MABG Should Be Routine: Conclusions

- Multiple arterial grafting should be routine during CABG in the majority of patients with the appropriate age, anatomy and clinical indications.
- RA grafting should be more widely utilized to achieve a rate of 80% MABG use (which may define an coronary arterial grafting reference center).

