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*Comparação entre Segundo Enxertos Artéria Radial, Mamária Direita e Veia Safena: Análise Combinada dos 4 Maiores Trials Recentes*

# Radial Artery *Versus* Saphenous Vein *Versus* Right Internal Thoracic Artery For Coronary Artery Bypass Grafting

## OBJECTIVES

We used individual patient data from 4 of the largest contemporary coronary bypass surgery trials to evaluate differences in long-term outcomes when radial artery (RA), right internal thoracic artery (RITA) or saphenous vein graft (SVG) are used to complement the left internal thoracic artery-to-left anterior descending graft.

## METHODS

Primary outcome was all-cause mortality. Secondary outcome was a composite of major adverse cardiac and cerebrovascular events (all-cause mortality, myocardial infarction and stroke). Propensity score matching and Cox regression were used to reduce the effect of treatment selection bias and confounders.

## RESULTS

A total of 10 256 patients (1510 RITA; 1385 RA; 7361 SVG) were included. The matched population consisted of 1776 propensity score-matched triplets. The mean follow-up was 7.9 ± 0.1, 7.8 ± 0.1 and 7.8 ± 0.1 years in the RITA, RA and SVG cohorts respectively. All-cause mortality was significantly lower in the RA versus the SVG [hazard ratio (HR) 0.62, 95% confidence interval (CI): 0.51-0.76, P=0.003] and the RITA group (HR 0.59, 95% CI 0.48-0.71, P=0.001). Major adverse cardiac and cerebrovascular event rate was also lower in the RA group versus the SVG (HR 0.78, 95% CI 0.67-0.90, P=0.04) and the RITA group (HR 0.75, 95% CI 0.65-0.86, P=0.02). Results were consistent in the Cox-adjusted analysis and solid to hidden confounders.

## CONCLUSIONS

In this pooled analysis of 4 large coronary bypass surgery trials, the use of the RA was associated with better clinical outcomes when compared to SVG and RITA.

## Key question

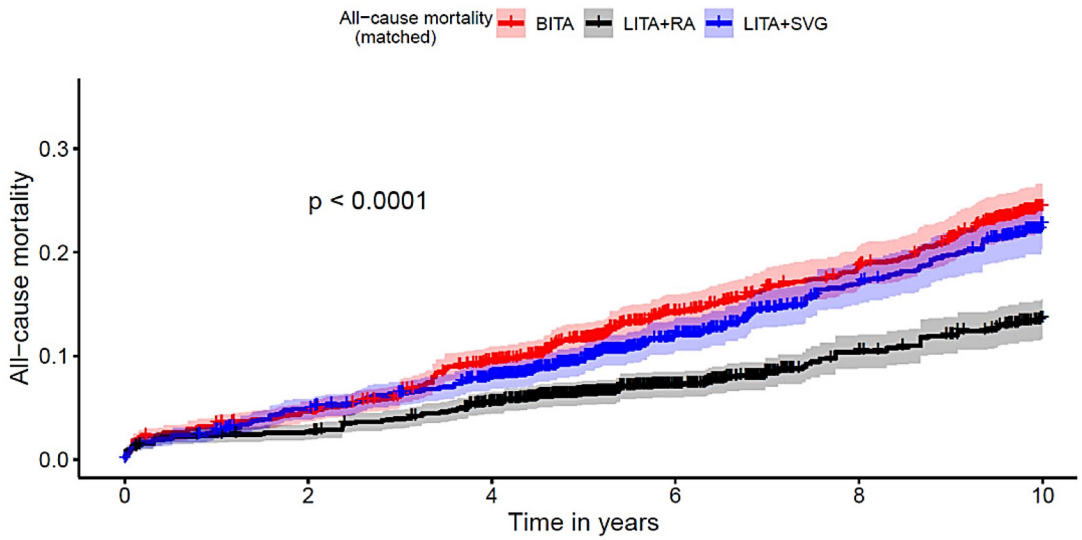
Radial artery, right internal thoracic artery, and saphenous vein: what is the best second conduit for coronary surgery?

## Key finding(s)

Mortality and adverse events were lower in the radial artery group vs right internal thoracic artery and saphenous vein.

## Take-home message

In coronary surgery patients, the radial artery provides better clinical outcomes vs right internal thoracic artery and saphenous vein.



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*TAVI Abaixo dos 55 anos é justificável? Registro Americano com 46.000 Pacientes Aponta Aumento de 167% na Indicação, e Taxa mais Elevada de AVC, em Relação à Cirurgia Convencional*

# Aortic Valve Replacement in Young and Middle-Aged Adults: Current and Potential Roles of TAVR

## BACKGROUND

Contemporary practice patterns and outcomes for aortic valve replacement (AVR) among young and middle-aged adults are unknown given guideline modifications for surgical AVR (SAVR) and increasing transcatheter AVR (TAVR) acceptance. This study describes SAVR and TAVR use and outcomes using The Society of Thoracic Surgeons (STS) National Databases.

## METHODS

Adults 18 to 55 years of age in the Congenital Heart Surgery Database (CHSD) and the Adult Cardiac Surgery Database (ACSD) who underwent SAVR or TAVR from 2013 to 2018 were included. Perioperative characteristics and early outcomes were described by valve type. Multivariable regression identified determinants of death, length of hospital stay, and a composite end point of renal failure, persistent neurologic deficit, readmission, and reoperation.

## RESULTS

The study analyzed 1580 unique CHSD and 44,173 ACSD operations, 16% of which were performed in patients with congenital heart disease. Valve use included the following: TAVR, 1%; mechanical, 42%; bioprosthetic, 55%; autograft, 0.6%; homograft, 1.2%; and Ozaki, 0.4%. Over time, TAVR volumes increased by 167%. The 30-day mortality was as follows: TAVR, 3.8%; mechanical, 3.2%; bioprosthetic, 3.7%; autograft, 0.6%; homograft, 9%; and Ozaki, 3.4%. Stroke rate was lower for isolated SAVR vs isolated TAVR (0.9% vs 2.4%; P=0.002). In multivariable analyses, mortality risk was lower with mechanical valves, congenital morbidity risk was higher with TAVR, and length of stay was shorter with TAVR.

## CONCLUSIONS

TAVR is increasingly used for adults younger than 55 years of age. Given the uniformly excellent results with SAVR, including both mortality and morbidity-particularly regarding stroke, our data favor SAVR in this population, but a prospective trial is needed. Ongoing efforts to harmonize variables and outcomes definitions between the ACSD and CHSD are valuable.

*Table 2. Postoperative Outcomes, by Valve Type, Overall Cohort*

| Outcomes | Total (N = 45,753) | Mechanical (n = 19,292) | Bioprosthetic (n = 24,987) | Autograft (n = 292) | Homograft (n = 554) | Ozaki (n = 181) | TAVR (n = 447) |
|---|---|---|---|---|---|---|---|
| 30-day mortality | 1650 (3.6) | 636 (3.3) | 930 (3.7) | 2 (0.7) | 53 (9.6) | 12 (6.6) | 17 (3.8) |
| 30-day mortality, isolated AVR | 350/21,171 (1.7) | 115/8,747 (1.3) | 214/11,840 (1.8) | … | 6/79 (7.6) | 3/88 (3.4) | 12/417 (2.9) |
| Postoperative LOS, d (IQR) | 7 (5-13) | 7 (5-12) | 7 (5-14) | 5 (4-7) | 14 (7-23) | 6 (5-11) | 4 (2-9) |
| Morbidity (composite) | 9366 (20.5) | 4046 (21) | 5017 (20.1) | 35 (12) | 151 (27.3) | 38 (21) | 79 (17.7) |
| Bleeding requiring reoperation | 1666 (3.6) | 663 (3.4) | 949 (3.8) | 6 (2.1) | 33 (6) | 9 (5) | 6 (1.3) |
| Postoperative cardiac arrest | 1245 (2.7) | 482 (2.5) | 714 (2.9) | 3 (1) | 27 (4.9) | 6 (3.3) | 13 (2.9) |
| Prolonged ventilation[a] | 5931 (13) | 2020 (10.5) | 3668 (14.7) | 14 (4.8) | 162 (29.2) | 25 (13.8) | 42 (9.4) |
| Renal failure | 1584 (3.5) | 616 (3.2) | 913 (3.7) | 5 (1.7) | 34 (6.1) | 6 (3.3) | 10 (2.2) |
| Stroke | 719 (1.6) | 290 (1.5) | 387 (1.5) | 0 (0) | 25 (4.5) | 5 (2.8) | 12 (2.7) |
| Persistent neurologic deficit | 734 (1.6) | 297 (1.5) | 391 (1.6) | 1 (0.3) | 28 (5.1) | 5 (2.8) | 12 (2.7) |
| Reoperation for valve dysfunction | 106 (0.2) | 42 (0.2) | 62 (0.3) | 0 (0) | 0 (0) | 0 (0) | 2 (0.4) |
| Postoperative permanent pacemaker | 2400 (5.2) | 1065 (5.5) | 1253 (5) | 8 (2.7) | 51 (9.2) | 8 (4.4) | 15 (3.4) |

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*Cirurgia Aberta x Endovascular no Tratamento de Aneurismas Toracoabdominais: Análise dos Resultados Imediatos e Tardios*

# Outcomes of Open *Versus* Endovascular Repair of Descending Thoracic and Thoracoabdominal Aortic Aneurysms

## BACKGROUND

Open repair is the standard of care for patients with descending thoracic and thoracoabdominal aortic aneurysms. Although effective, surgery carries a high risk of morbidity and mortality. Endovascular stent grafts were introduced to treat these aneurysms in patients considered too high risk for open repair. Early results are promising, but later results are incompletely known. Therefore, we sought to compare short- and intermediate-term outcomes of open vs endovascular repair for these aneurysms.

## METHODS

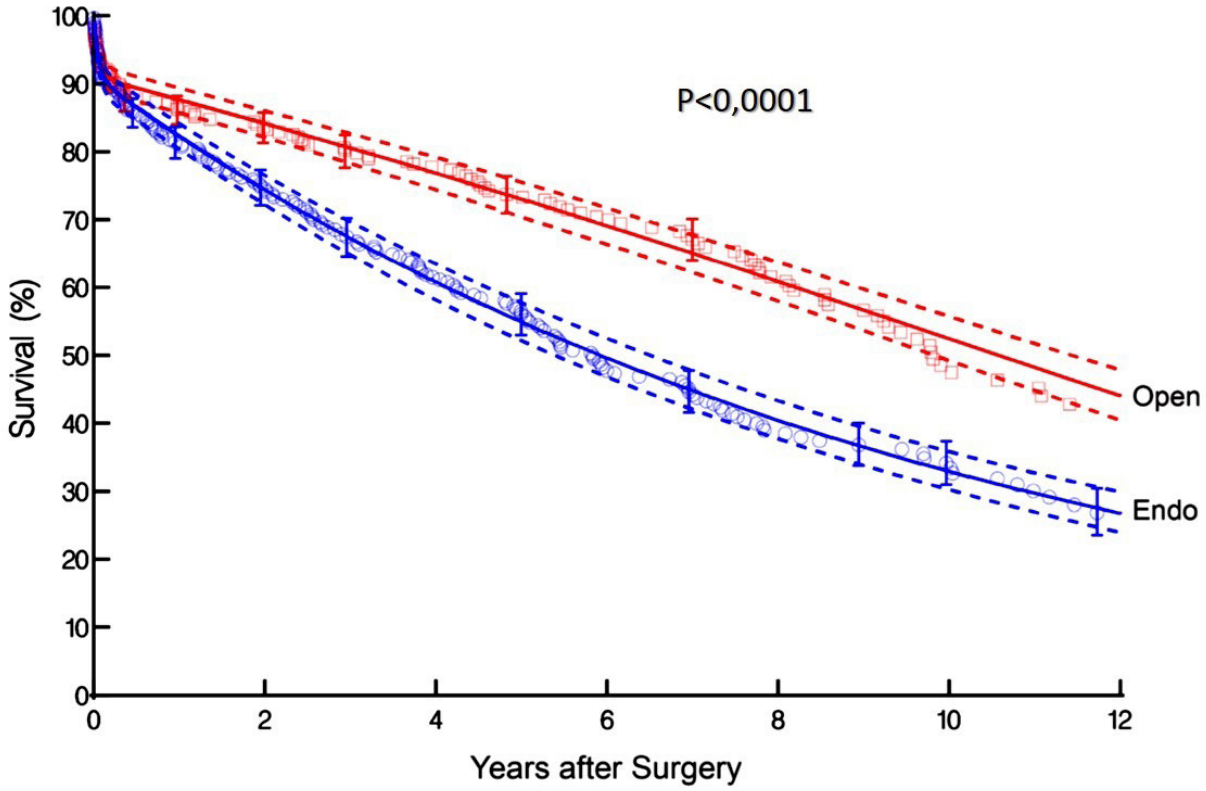
From 2000 to 2010, 1053 patients underwent open (n=457) or endovascular (n=596) repair of descending thoracic and thoracoabdominal aortic aneurysms at Cleveland Clinic. To balance patient characteristics between these groups, propensity score matching was performed, yielding 278 well-matched pairs (61% of possible pairs). End points included short- and long-term outcomes.

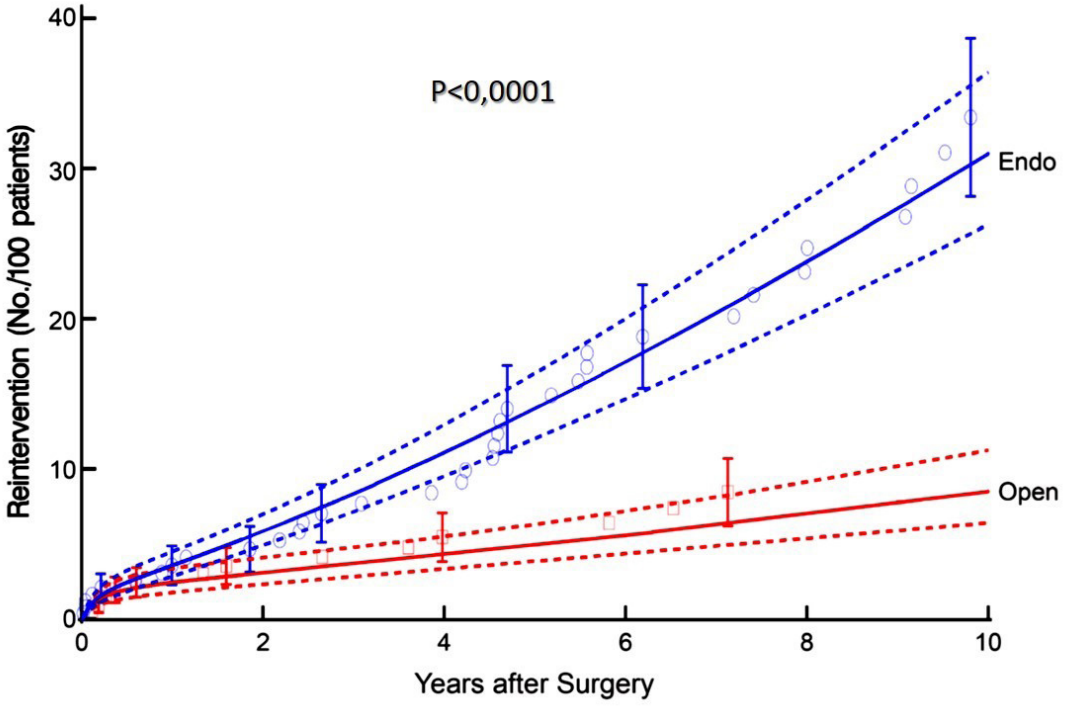
## RESULTS

In matched patients, compared with endovascular stenting, open repair achieved similar in-hospital death (n=23 [8.3%] vs. n=21 [7.6%], P=.80) and occurrence of paralysis and stroke (n=10 [3.6%] vs. n=6 [2.2%], P=.30), despite a longer postoperative stay (median 11 vs. 6 days), more dialysis-dependent acute renal failure (n=24 [8.6%] vs. n=9 [3.3%], P=.008), and prolonged ventilation (n=106 [46%] vs. n=17 [6.3%], P<.0001). Open repair resulted in better 10-year survival than endovascular repair (52% vs 33%, P<.0001), and aortic reintervention was less frequent (4% vs. 21%, P<.0001). Despite a decrease in the first postoperative year, average aneurysm size did not recover to normal range after endovascular stenting.

## CONCLUSIONS

Open repair of descending thoracic and thoracoabdominal aneurysms can achieve acceptable short-term outcomes with better intermediate-term outcomes than endovascular repair.


P<0,0001
Survival (%)
Years after Surgery
Open
Endo


P<0,0001
Reintervention (No./100 patients)
Years after Surgery
Endo
Open

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**doi: 10.1016/j.athoracsur.2021.09.067.**

*Resultados com a Correção da Dissecção Aórtica Tipo A, Sem Ressecção da Lesão Intimal*

# Outcome After Surgery for Acute Type A Dissection With or Without Primary Tear Resection

## BACKGROUND

The outcome in patients after surgery for acute type A aortic dissection without replacement of the part of the aorta containing the primary tear is undefined

## METHODS

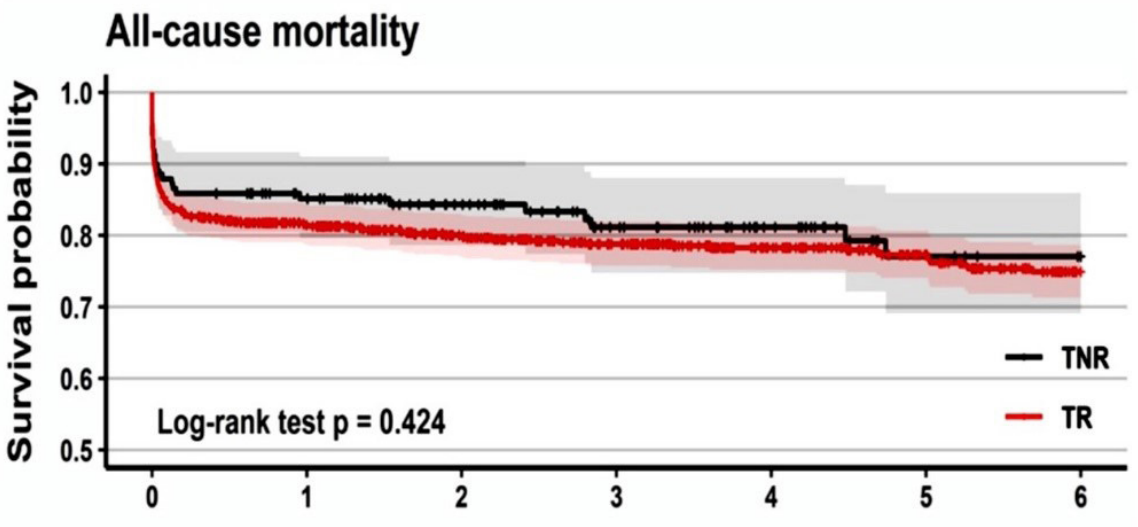
Data of 1122 patients who underwent surgery for acute type A aortic dissection in 8 Nordic centers from January 2005 to December 2014 were retrospectively analyzed. The patients with primary tear location unfound, unknown, not confirmed, or not recorded (n=243, 21.7%) were excluded from the analysis. The patients were divided into 2 groups according to whether the aortic reconstruction encompassed the portion of the primary tear (tear resected [TR] group, n=730) or not (tear not resected [TNR] group, n=149). The restricted mean survival time ratios adjusted for patient characteristics and surgical details between the groups were calculated for all-cause mortality and aortic reoperation-free survival. The median follow-up time was 2.57 (interquartile range, 0.53-5.30) years.

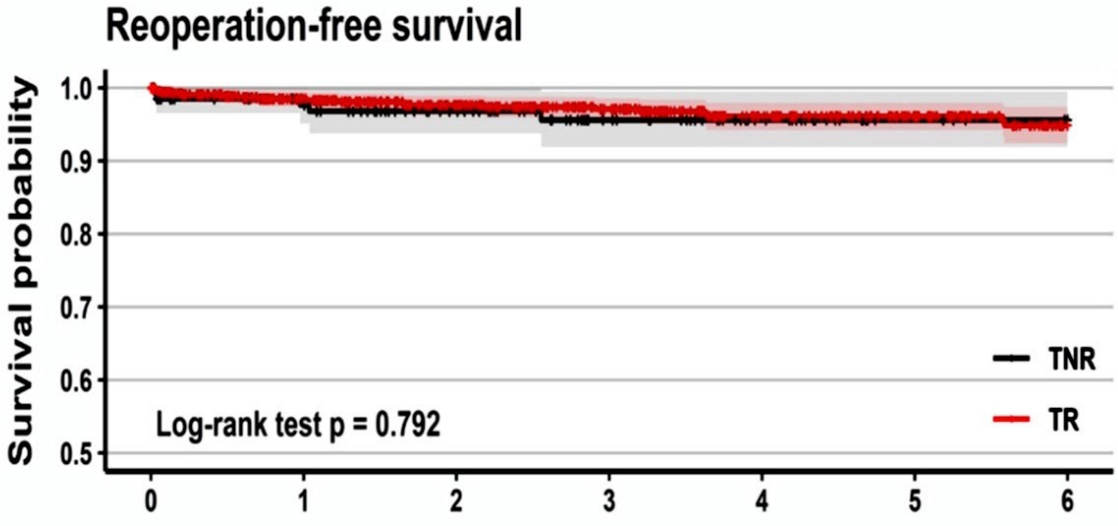
## RESULTS

For the majority of the patients in the TR group, the primary tear was located in the ascending aorta (83.6%). The reconstruction encompassed both the aortic root and the aortic arch in 7.4% in the TR group as compared with 0.7% in the TNR patients (P<.001). There were no significant differences in all-cause mortality (adjusted restricted mean survival time ratio, 1.01; 95% confidence interval, 0.92-1.12; P=.799) or reoperation-free survival (adjusted restricted mean survival time ratio, 0.98; 95% confidence interval, 0.95-1.02; P=.436) between the TR and TNR groups.

## CONCLUSIONS

Primary tear resection alone does not determine the midterm outcome after surgery for acute type A aortic dissection.


All-cause mortality
Survival probability
1.0
0.9
0.8
0.7
0.6
0.5
Log-rank test p = 0.424
TNR
TR
0
1
2
3
4
5
6


Reoperation-free survival
Survival probability
1.0
0.9
0.8
0.7
0.6
0.5
Log-rank test p = 0.792
TNR
TR
0
1
2
3
4
5
6

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**doi: 10.1016/j.athoracsur.2021.07.068.**

*Mapeamento da Função Plaquetária por Tromboelastograma Otimiza Resultados, em Revascularização Miocárdica de Urgência*

# Thromboelastography-Platelet Mapping Allows Safe and Earlier Urgent Coronary Artery Bypass Grafting

## BACKGROUND

The Society of Thoracic Surgeons current (STS) guidelines recommend delaying coronary artery bypass graft surgery (CABG) for several days or performing platelet function testing in stable patients who received P2Y12 inhibitors. Our program routinely uses thromboelastography-platelet mapping (TEG-PM) to expedite CABG in P2Y12 nonresponders. We hypothesize that P2Y12 nonresponders had no difference in length of stay to surgery and blood product transfusion compared with patients undergoing urgent inpatient CABG not treated with a P2Y12 inhibitor.

## METHODS

A total of 221 patients from 2015 to 2019 were P2Y12 nonresponders based on TEG-PM result of less than 50% adenosine diphosphate inhibition. The control group was 232 consecutive patients who also had urgent inpatient CABG but were not treated preoperatively with a P2Y12 inhibitor. Exclusion criteria were identical between groups.

## RESULTS

Sixty-seven percent of inpatient CABG patients who were treated preoperatively with a P2Y12 inhibitor were nonresponders. The mean number of days from cardiac surgical consultation to CABG in the TEG-PM nonresponders group was 1.6 ± 0.1 vs. 2.1 ± 0.1 in the control group (P<.01). The mean total number of blood product units transfused was 1.6 ± 0.2 in the TEG-PM nonresponders group vs 1.6 ± 0.4 in the control group (P=.91).

## CONCLUSIONS

Our results demonstrate a very high incidence of P2Y12 nonresponders among patients undergoing urgent CABG at our program. These patients underwent surgery at least 3 days earlier than STS recommendations and common practice with no difference in transfusion requirement. Routine use of TEG-PM to identify P2Y12 nonresponders can safely decrease preoperative hospital length of stay and associated cost and improve resource utilization and patient satisfaction.

**Table 3.** Post-Operative Outcomes

| Variable | NR (n= 221) | Control (n= 232) | P Value* |
|---|---|---|---|
| | Mean (SD) | Mean (SD) | Multiple linear regression |
| LOS Admit-Surgery (Days) | 3.5 (2.0) | 3.4 (1.9) | 0.85 |
| LOS TEG-Surgery or Consultation-Surgery(Days) | 1.6 (1.0) | 2.1 (1.2) | **<0.001** |
| LOS Surgery-Discharge (Days) | 7.0 (3.7) | 7.9 (5.5) | **0.03** |
| LOS Admit-Discharge (Days) | 10.6 (4.2) | 11.3 (5.8) | **0.04** |

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*Valvuloplastia Aórtica: Resultados de 1 ano do GARY Registry*

# Outcomes of aortic valve repair: early results from the German Aortic Valve Registry

## OBJECTIVES

Aortic valve (AV) repair is an evolving surgical strategy in the treatment of young patients with aortic regurgitation (AR) and/or aortic root aneurysm. We aimed to determine the clinical outcome following AV repair/AV sparing root surgery using real-world data from the German Aortic Valve Registry (GARY).

## METHODS

A total of 2327 patients with AR (mean age 55.2 ± 15.0 years, 76% men), who underwent AV repair/AV sparing root surgery between 2011 and 2015 (i.e., 5% of 42.868 AV surgery patients enrolled in the GARY registry during the same period) were included. Study cohort was subdivided according to the technique of AV repair: isolated AV repair without root surgery (Group I) (n=914), AV sparing root surgery (i.e., reimplantation or remodelling) without cusp repair (Group II) (n=1077), and AV sparing root surgery (i.e., reimplantation or remodelling) with simultaneous cusp repair (Group III) (n=336). Primary end-point was 1-year survival after AV repair/AV sparing root surgery. Secondary end-points were freedom from cardiac adverse events and freedom from AV reinterventions at 1-year follow-up.

## RESULTS

30-day mortality was 19 (0.8%) in the whole study cohort without significant differences in the three subgroups (4 (0.4%) patients in Group I vs. 14 (1.3%) patients in the Group II vs. 1 (0.3%) patient in the Group III (P=0.054)). Postoperatively, 1445 (74%) patients had no residual AR, 474 (24%) patients had mild AR, and 40 (2%) patients had moderate/severe AR at the time of hospital discharge. One-year survival (95% CI) was 97.7% (97.1-98.3) in the whole study cohort and without significant difference among the three subgroups. One-year cardiac adverse event-free survival (95% CI) was 85.7% (84.2-87.1) and was similar in all three study groups in propensity-score weighted analysis. A total of 38 (1.6%) patients required AV reintervention during a 1-year follow-up, without significant difference among subgroups (P=0.11).

## CONCLUSIONS

AV repair/AV sparing root surgery is performed in 5% of patients requiring AV surgery in Germany. Our data demonstrate very satisfactory periprocedural and 1-year survival and cardiac event-free survival after AV repair surgery. Implementation of specific surgical techniques during the index procedure seems to result in comparable outcomes.

## Key question

What are the outcomes of AV repair in a real-world prospective multicenter registry?

## Key finding(s)

Aortic valve repair surgery results in very satisfactory 1-year survival and cardiac event-free survival in a real-world German Aortic Valve Registry.

## Take-home message

AV repair results in favorable 1-year survival and cardiac event-free survival, which is independent of specific surgical technique used during the index procedure.

## What are the early outcomes after aortic valve repair in GARY ?

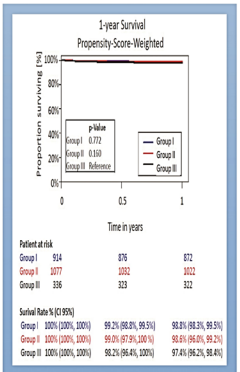
**German Aortic Valve Registry (GARY)**

January 1, 2011 to December 31, 2015

78 centers

Aortic Valve Repair (n=2327)

1-year Survival




**Group I** – AV repair w/o root surgery

**Group II** – AV sparing root surgery w/o cusp repair

**Group III** – AV sparing root surgery with cusp repair

- AV repair / AV sparing surgery resulted in very satisfactory 1-year survival and cardiac event-free survival in GARY Registry
- 1-year survival and cardiac event-free survival after AV repair/AV sparing root surgery was independent of specific surgical technique used during the index procedure.

AV –aortic valve

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**doi: 10.1016/j.athoracsur.2021.09.036.**

*Avaliação Temporal com uso de Vancomicina Tópica para Prevenção de Mediastinite em Cirurgia Cardíaca*

# Topical Vancomycin Reduces the Incidence of Deep Sternal Wound Complications After Sternotomy

## BACKGROUND

Deep sternal wound infection remains a significant hazard for cardiosurgical patients undergoing median sternotomy. Although the prophylactic use of topical vancomycin to reduce the incidence of deep sternal wound complications (DSWC) has been repeatedly examined, the method remains controversial.

## METHODS

We report here on a continuous experience that encompassed a total of 1251 cardiosurgical patients who underwent various procedures via median sternotomy. Beginning in October 2015 and in response to a surge of DSWC (4.4%), 3 surgeons on our team began to apply 2.5 g vancomycin paste to the sternal edges just prior to closure, while the remaining 2 surgeons did not. An interim analysis comparing the 2 groups suggested that vancomycin was indeed effective, and from February 2016 on, all surgeons adopted the routine use of vancomycin in all patients.

## RESULTS

Retrospective analysis of 496 surgical patients from January to September 2015 had revealed a baseline incidence of DSWC of 4.4%. In the divided-use period between October 2015 and February 2016, DSWC was seen in 8.6% (8 of 93) of the no-vancomycin group. In the vancomycin group, the incidence fell to 0.8% (1 of 129). In March 2016, all surgeons began using vancomycin and the overall rate of DSWC for all surgeons and all patients subsequently declined to 1.1%. no adverse effects were observed.

## CONCLUSIONS

Topical vancomycin application is highly effective in the prevention of DSWC after median sternotomy.

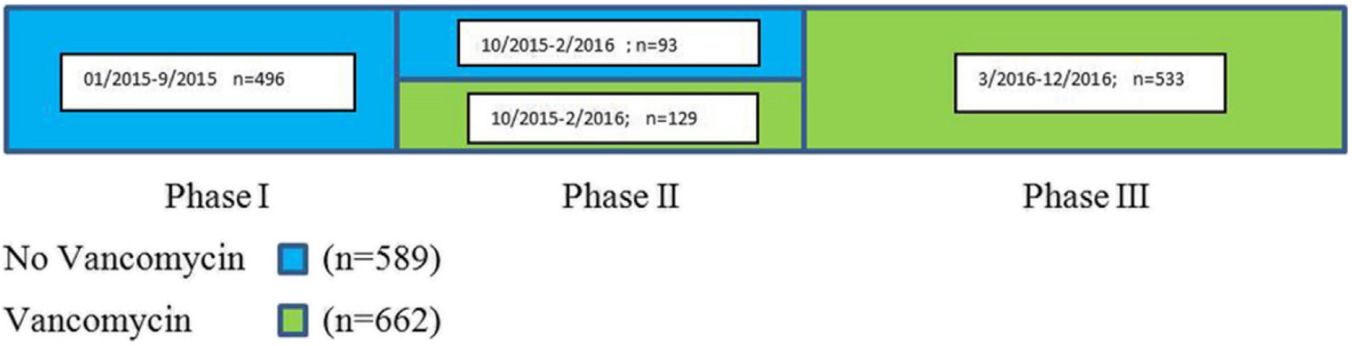


**FIGURE 2** Chronology of patient inclusion demonstrating retrospective baseline analysis (Phase I), the splitting of closure techniques into control and treatment groups (Phase II), and subsequent crossover (Phase III).

**TABLE 4 Comparison of Typical Risk Factors for DSWC Between Cohorts**

| Risk Factor | No-Vancomycin Group | Vancomycin Group | *P* Value |
|---|---|---|---|
| Total/DSWC | 589/30 | 662/7 | .001 |
| Ejection fraction ≤30% | 11/1 | 10/0 | 1.0[a] |
| Operation time ≥300 min | 96/8 | 77/4 | .1[b] |
| BIMA | 61/3 | 86/3 | .175 |