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No-touch vein harvesting in coronary artery bypass surgery

Associated with reduced vein graft occlusion

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Coronary artery bypass grafting (CABG) remains a primary revascularisation strategy for complex coronary artery disease.[1] The long term success of CABG heavily depends on graft durability, with saphenous vein grafts the most frequently used owing to their widespread availability and ease of harvesting.[2] However, saphenous vein grafts show significantly higher failure rates than arterial grafts,[3] with occlusion rates of 10-15% within the first year and 13.7% by three years after surgery.[4] In 1996, Souza introduced the no-touch saphenous vein harvesting technique, which preserves the vein along with its surrounding adipose and fibrous tissue.[5] This approach has been associated with improved graft patency, leading to its endorsement by the ESC/EACTS (European Society of Cardiology/European Association for Cardio-Thoracic Surgery) and ACC/AHA/SCAI (American College of Cardiology/American Heart Association/Society for Cardiovascular Angiography and Interventions) guidelines—albeit selectively, mainly for patients with low risk of wound complications.[6 7]

The PATENCY (graft patency between the no-touch vein harvesting technique and conventional approach in coronary artery bypass graft surgery) trial, reported by Hu and colleagues in a linked paper (doi:10.1136/bmj-2024-082883), provides important evidence on the durability and clinical outcomes associated with the no-touch technique. This report presents the three year extended follow-up of the PATENCY trial, which previously showed significantly lower graft occlusion rates with no-touch compared with conventionally harvested vein grafts at three months and 12 months after surgery.[8] However, the sustained efficacy of the no-touch technique over a longer term remained uncertain.

In this multicentre randomised trial, 2655 patients aged 18 years or older undergoing isolated CABG at seven cardiac surgery centres in China were assigned to receive no-touch vein harvesting (n=1337) or the conventional technique (n=1318). At three years, the no-touch group showed a significantly lower rate of graft occlusion among initially patent grafts (5.7%) compared with the conventional group (9.0%). Furthermore, several secondary outcomes—including rates of non-fatal myocardial infarction, repeat revascularisation, recurrent angina, and readmission to hospital for cardiac reasons—were all significantly reduced in the no-touch group (1.2% *v* 2.7%, 1.1% *v* 2.2%, 6.2% *v* 8.4%, and 7.1% *v* 10.2%, respectively), reinforcing the potential clinical benefits of the no-touch technique.

The follow-up rates for computed tomography angiography at three months, 12 months, and three years were excellent—96.0%, 92.2%, and 86.5%, respectively—enhancing the robustness of the findings that support no-touch harvesting in reducing vein graft occlusion. However, the study population consisted exclusively of Chinese patients, with a relatively young mean age of 61 years. Additionally, a substantial proportion of patients (approximately 57%) underwent off-pump CABG, without cardiopulmonary bypass. Although some studies have suggested that off-pump CABG might be associated with lower saphenous vein graft patency that could be attributed to differences in anastomotic performance,[9 10] the PATENCY trial showed consistent results regardless of cardiopulmonary bypass use. Combined with results from recent trials—such as the SWEDEGRAFT study (ClinicalTrials.gov NCT03501303),[11] which found that the no-touch technique was not superior to the conventional approach in reducing graft failure or improving clinical outcomes—these results might contribute to a more balanced understanding of graft selection strategies in CABG.

In the PATENCY trial, vein graft occlusion was chosen as the primary outcome. Although graft patency is not a direct measure of clinical benefit, it remains a key indicator of CABG success. Studies have shown that patients with occluded grafts tend to have worse outcomes,[12] however not all graft failures lead to clinical events because the incidence of occlusion exceeds that of symptomatic complications.[13] This highlights the importance of evaluating graft patency and clinical endpoints. In the PATENCY trial's three year follow-up, no significant differences were observed in all cause mortality, cardiac specific mortality, or major adverse cardiac and cerebrovascular events. Ongoing follow-up and detailed assessment of individual clinical events are warranted.

Although current guidelines assign a class 1, level B-R recommendation for using the radial artery as the second conduit to the most significantly stenosed, non-left anterior descending target in isolated CABG,[7] randomised trials to date have not shown a clear long term survival advantage of radial artery over saphenous vein grafts.[14] Further trials directly comparing radial artery and no-touch vein grafts are underway.[15] Additionally, the recognised advantages of endoscopic harvesting in reducing wound complications suggest that adapting the no-touch technique to minimally invasive approaches could offer added value—though this could present technical challenges and require a steeper learning curve.[16] Nonetheless, the three year extended follow-up results of the PATENCY trial are encouraging for ongoing discussion about the optimal second conduit in CABG. These findings might help

shape future surgical strategies and inform updates to clinical guidelines.

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1 Head SJ, Milojevic M, Daemen J, etal. Mortality after coronary artery bypass grafting versus percutaneous coronary intervention with stenting for coronary artery disease: a pooled analysis of individual patient data. *Lancet* 2018;391:-48. . doi: 10.1016/S0140-6736(18)30423-9 pmid: 29478841

2 Schwann TA, Habib RH, Wallace A, etal. Operative outcomes of multiple-arterial versus single-arterial coronary bypass grafting. *Ann Thorac Surg* 2018;105:-19. doi: 10.1016/j.athoracsur.2017.10.058 pmid: 29453002

3 Gaudino M, Benedetto U, Fremes S, etalRADIAL Investigators. Radial-artery or saphenous-vein grafts in coronary-artery bypass surgery. *N Engl J Med* 2018;378:-77. doi: 10.1056/NEJMoa1716026 pmid: 29708851

4 Xenogiannis I, Zenati M, Bhatt DL, etal. Saphenous vein graft failure: from pathophysiology to prevention and treatment strategies. *Circulation* 2021;144:-45. doi: 10.1161/CIRCULATIONAHA.120.052163 pmid: 34460327

5 Souza D. A new no-touch preparation technique. Technical notes. *Scand J Thorac Cardiovasc Surg* 1996;30:-4. doi: 10.3109/14017439609107239 pmid: 8727856

6 Neumann FJ, Sousa-Uva M, Ahlsson A, etalESC Scientific Document Group. 2018 ESC/EACTS Guidelines on myocardial revascularization. *Eur Heart J* 2019;40:-165. doi: 10.1093/eurheartj/ehy394 pmid: 30165437

7 Lawton JS, Tamis-Holland JE, Bangalore S, etalWriting Committee Members. 2021 ACC/AHA/SCAI Guideline for Coronary Artery Revascularization: A report of the American College of Cardiology/American Heart Association Joint Committee on Clinical Practice Guidelines. *J Am Coll Cardiol* 2022;79:-129. doi: 10.1016/j.jacc.2021.09.006 pmid: 34895950

8 Tian M, Wang X, Sun H, etal. No-touch versus conventional vein harvesting techniques at 12 months after coronary artery bypass grafting surgery: multicenter randomized, controlled trial. *Circulation* 2021;144:-9. doi: 10.1161/CIRCULATIONAHA.121.055525 pmid: 34510911

9 Hattler B, Messenger JC, Shroyer AL, etalVeterans Affairs Randomized On/Off Bypass (ROOBY) Study Group. Off-Pump coronary artery bypass surgery is associated with worse arterial and saphenous vein graft patency and less effective revascularization: results from the Veterans Affairs Randomized On/Off Bypass (ROOBY) trial. *Circulation* 2012;125:-35. doi: 10.1161/CIRCULATIONAHA.111.069260 pmid: 22592900

10 Sousa Uva M, Cavaco S, Oliveira AG, etal. Early graft patency after off-pump and on-pump coronary bypass surgery: a prospective randomized study. *Eur Heart J* 2010;31:-9. doi: 10.1093/eurheartj/ehq210 pmid: 20595221

11 Thelin S, Modrau IS, Duvernoy O, etal. No-touch vein grafts in coronary artery bypass surgery: a registry-based randomized clinical trial. *Eur Heart J* 2025;ehaf018. doi: 10.1093/eurheartj/ehaf018. pmid: 39969129

12 Halabi AR, Alexander JH, Shaw LK, etal. Relation of early saphenous vein graft failure to outcomes following coronary artery bypass surgery. *Am J Cardiol* 2005;96:-9. doi: 10.1016/j.amjcard.2005.06.067 pmid: 16253593

13 Zhao Q, Zhu Y, Xu Z, etal. Effect of ticagrelor plus aspirin, ticagrelor alone, or aspirin alone on saphenous vein graft patency 1 year after coronary artery bypass grafting: a randomized clinical trial. *JAMA* 2018;319:-86. doi: 10.1001/jama.2018.3197 pmid: 29710164

14 Gaudino M, Bakaeen FG, Sandner S, etal. Expert systematic review on the choice of conduits for coronary artery bypass grafting: endorsed by the European Association for Cardio-Thoracic Surgery (EACTS) and The Society of Thoracic Surgeons (STS). *Eur J Cardiothorac Surg* 2023;64:ezad163. doi: 10.1093/ejcts/ezad163 pmid: 37535847

15 Zhang F, Tian M, Wang X, etal. Rationale and design of a single-center randomized trial to compare the graft patency between the radial artery and the no-touch saphenous vein in coronary artery bypass grafting surgery (GRAFT-CAB Study). *Am Heart J* 2024;274:-53. doi: 10.1016/j.ahj.2024.05.001 pmid: 38710379

16 Goldstein DJ, Chang HL, Mack MJ, etal. Intimal hyperplasia, saphenous vein graft disease, and clinical outcomes: Insights from the CTSN VEST randomized trial. *J Thorac Cardiovasc Surg* 2024;167:-1792.e5. doi: 10.1016/j.jtcvs.2022.10.034 pmid: 36494209