

# Increased patency with comparable mortality and revascularization risk: Is the case for no-touch vein harvesting open and shut?

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## Abstract

Since the introduction of the saphenous vein graft (SVG) for coronary artery bypass grafting (CABG) in 1962<sup>1</sup>, the SVG has remained the most commonly used conduit to the non-LAD territories for more than half a century. However, several issues surrounding the use of SVGs, including higher graft occlusion rates and wound complications from the harvesting process, have been identified in clinical practice. As such, significant interest has been dedicated towards developing harvesting techniques that minimize the risk of these acute and late complications. In this issue of the Journal of Cardiac Surgery, Yokoyama and colleagues compared the impact of open vein harvesting (OVH), endoscopic vein harvesting (EVH) and no-touch vein harvesting (NT) on all-cause mortality, revascularization and graft failure, using a network meta-analysis based on randomized controlled trials and propensity-score matched studies. The results showed that the risk of graft failure was approximately halved amongst patients receiving NT compared with EVH and OVH; importantly, though, NT was not associated with lower all-cause mortality or revascularization risk. To further examine whether the use of NT grafts endow patients with better long-term clinical outcomes, such as mortality, myocardial infarction, and revascularization rates, a large-scaled randomized controlled trial or a patient-level combined meta-analysis is required.

**TITLE:** Increased patency with comparable mortality and revascularization risk: Is the case for no-touch vein harvesting open and shut?

**RUNNING TITLE:** Vein harvesting technique for CABG

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## ABSTRACT

Since the introduction of the saphenous vein graft (SVG) for coronary artery bypass grafting (CABG) in 1962<sup>1</sup>, the SVG has remained the most commonly used conduit to the non-LAD territories for more than half a century. However, several issues surrounding the use of SVGs, including higher graft occlusion rates and wound complications from the harvesting process, have been identified in clinical practice. As such, significant interest has been dedicated towards developing harvesting techniques that minimize the risk of

these acute and late complications. In this issue of the Journal of Cardiac Surgery, Yokoyama and colleagues compared the impact of open vein harvesting (OVH), endoscopic vein harvesting (EVH) and no-touch vein harvesting (NT) on all-cause mortality, revascularization and graft failure, using a network meta-analysis based on randomized controlled trials and propensity-score matched studies. The results showed that the risk of graft failure was approximately halved amongst patients receiving NT compared with EVH and OVH; importantly, though, NT was not associated with lower all-cause mortality or revascularization risk. To further examine whether the use of NT grafts endow patients with better long-term clinical outcomes, such as mortality, myocardial infarction, and revascularization rates, a large-scaled randomized controlled trial or a patient-level combined meta-analysis is required.

## MANUSCRIPT

Since the introduction of the saphenous vein graft (SVG) for coronary artery bypass grafting (CABG) in 1962<sup>1</sup>, the SVG has remained the most commonly used conduit to the non-LAD territories for more than half a century.<sup>2</sup> Despite its widespread use, the SVG failure rate remains as high as 40-50% at 10 years, which can result in the reoccurrence of angina or myocardial infarction<sup>3, 4</sup>. Contrary to expectation, though, previous literature has demonstrated that better SVG patency does not necessarily predict improved clinical outcomes. This finding is likely a reflection of the multitude of intersecting factors that contribute to patient-important clinical outcomes, including grafted territory, native artery stenosis, and the function of additional grafts or collaterals<sup>5</sup>.

Currently, a number of techniques are utilized in clinical practice for SVG harvesting. These techniques include: the traditional open vein harvesting (OVH), which involves a full-range open wound, the standard bridging technique (SBT) and endoscopic vein harvesting (EVH), which have been cultivated to reduce leg wound complications<sup>6</sup>, and no-touch vein harvesting (NT), which is purported to minimize mechanical trauma to the SVG. In this issue of the Journal of Cardiac Surgery, Yokoyama and colleagues conducted a network meta-analysis based on randomized controlled trials and propensity-score matched studies to compare the impact of OVH, EVH and NT on all-cause mortality, revascularization, and graft failure<sup>7</sup>. The results demonstrated that the risk of graft failure amongst patients receiving NT grafts was approximately half of their counterparts in the EVH and OVH group. Importantly, though, NT was not associated with lower all-cause mortality or revascularization risk compared with the other techniques. Interestingly, Vuong and colleagues similarly performed a network meta-analysis based on randomized controlled trials to compare OVH, SBT, EVH and NT<sup>8</sup>. Their results showed favorable, but not significantly improved, graft patency in NT compared with OVH along with identical mortality.

Since the introduction of NT grafts in 1996<sup>9</sup>, randomized controlled trials of this technique have demonstrated their benefit at both short term and long term follow-up,<sup>10-12</sup> owing to its decreased vascular smooth muscle activation.<sup>13</sup> Contrastingly, the recent randomized controlled trial comparing EVH and OVH did not show any significant difference in outcomes<sup>14</sup>. Infection and wound healing are the primary short-term issues related to NT up to 3 months postoperatively; indeed, higher risk of early infection at the vein harvest site and leg wound discomfort have been identified in patients with NT grafts compared with conventional OVH<sup>15</sup>.

As Yokoyama and colleagues demonstrated in the present study, better graft patency can be expected with utilization of the NT technique for vein harvesting. Future investigations should aim to elucidate whether better long-term clinical outcomes such as mortality, myocardial infarction and revascularization can be achieved with the use of NT veins. To this end, methodologies similar to those used to confirm the superiority of radial artery grafts to vein grafts,<sup>16</sup> including large-scaled randomized controlled trials or patient-level combined analysis, should be employed.

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