Original Article

One-year patency rates of saphenous vein grafts harvested using the no-touch technique in off-pump coronary artery bypass grafting

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Background: Coronary artery bypass grafting (CABG) is an effective and durable treatment for coronary artery atherosclerotic heart disease. However, stenosis or occlusion of vein grafts frequently occurs after CABG, posing a significant challenge in postoperative management. This study aims to evaluate the clinical efficacy of saphenous vein graft (SVG) harvesting using the no-touch technique during off-pump CABG (OPCABG).

Methods: In this prospective study, a comparative analysis of 1-year postoperative graft patency rates between left internal mammary artery (LIMA) grafts and SVGs harvested using the no-touch technique was conducted. The recruiting and data collection period was between June 2018 and December 2020. The study included 140 patients who underwent OPCABG at the Heart Center of The Second Hospital of Hebei Medical University. The primary outcomes assessed were the occurrence of major adverse cardiovascular and cerebrovascular events (MACCEs), which encompassed all-cause mortality, sudden cardiac death, acute myocardial infarction, recurrent angina, coronary revascularization, cerebral infarction, and cerebral hemorrhage, as well as the 1-year graft patency rate.

Results: No MACCEs occurred during the perioperative period, and all patients survived to discharge. During follow-up, two patients died, and 10 were lost to follow-up. Of the 128 patients who underwent coronary computed tomography angiography at the 1-year follow-up, there were no statistically significant differences in patency rates between SVGs and LIMA grafts (94.5% *vs.* 97.7%, P=0.15). Similarly, for end-to-side anastomosis, SVG and LIMA graft patency rates were comparable (93.9% *vs.* 97.7%, P=0.11). Among these patients, three cases (2.3%) of recurrent angina were reported, predominantly in those with occluded LIMA grafts, while one case of dyspnea was observed in a patient with an occluded SVG.

Conclusions: The 1-year patency rate of SVGs harvested using the no-touch technique was similar to that of LIMA grafts. Further research is warranted to explore the long-term effects of the no-touch technique on SVG patency.

Keywords: Left internal mammary artery (LIMA); no-touch technique; off-pump coronary artery bypass grafting (OPCABG); saphenous vein graft (SVG)

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Introduction

According to the World Health Statistics 2019 report from the World Health Organization (WHO), coronary artery disease is the leading cause of mortality worldwide, accounting for approximately 16% of all deaths (1). Coronary artery bypass grafting (CABG) remains one of the most effective and durable treatments for coronary artery disease. However, the long-term patency rate of saphenous vein grafts (SVGs) remains inferior to that of left internal mammary artery (LIMA) grafts (2). Improving SVG patency following CABG has become a critical focus in coronary surgery.

In recent years, various strategies have been employed to enhance SVG patency rates, including the use of extravascular stents, postoperative dual antiplatelet therapy, endoscopic harvesting techniques for the great saphenous vein (GSV), and the no-touch harvesting technique (3). Among these methods, the no-touch technique, originally introduced by Souza, has shown significant promise in improving SVG patency compared to conventional harvesting techniques (3). Studies have demonstrated superior patency rates for grafted vessels harvested using the no-touch technique at 1.5 years (95% *vs.* 89%), 8.5 years (91% *vs.* 77%), and 16 years (83% *vs.* 64%) when compared to traditional methods (4,5).

Commonly utilized graft conduits in CABG include the LIMA, GSV, radial artery, right internal mammary artery, and right gastroepiploic artery. Previous studies have demonstrated that the internal mammary artery exhibits a significantly high long-term patency rate, making it especially well-suited for grafting onto the left anterior descending artery (4,5). Consequently, it is regarded as the "gold standard" conduit (5). However, the effectiveness of other arterial grafts recommended in Class IIa guidelines for myocardial revascularization remains a subject of debate, as highlighted by prior randomized controlled trials and relevant studies (6-10).

Although some cardiac surgical specialists advocate for total arterial revascularization, the choice of arterial grafts requires careful consideration of multiple factors. These include anatomical characteristics of the coronary arteries, the severity of lesions, the availability of arterial conduits, and patient-specific factors such as age, diabetes, and overall health, as well as the expertise of the surgical team. In contrast, the GSV remains widely employed due to its ease of harvesting, suitable size, and versatility for use in various target vessels, accounting for approximately 80% of all grafts (11). Despite its extensive use, early studies have demonstrated a significantly lower long-term patency rate for SVGs compared to arterial conduits (4-10). This has driven considerable efforts to improve the durability of SVGs.

Recent advancements in GSV harvesting techniques, along with long-term follow-up data, have contributed to a substantial improvement in the long-term patency rates of SVGs, reinforcing their increasing recognition in modern surgical practice (4).

Three decades ago, Souza *et al.* (3) introduced the no-touch GSV harvesting technique, a method that initially garnered limited attention from thoracic and cardiovascular surgeons. In recent years, however, interest in this approach has increased, driven by the release of long-term follow-up data by Souza *et al.* This growing interest has prompted more thoracic and cardiovascular surgeons to investigate and conduct studies on the technique (3,4). Despite extensive global research, the adoption of the no-touch technique has been limited to a few large cardiac centers in China, with the Heart Center of The Second Hospital of Hebei Medical University being one of the early adopters.

Highlight box

Key findings
- One-year graft patency rates for no-touch saphenous vein grafts (SVGs) are comparable to left internal mammary artery (LIMA) grafts.
- No perioperative deaths or major adverse cardiovascular and cerebrovascular events were observed among 140 patients.
- No-touch harvesting reduces vein trauma, preserving graft integrity and improving long-term patency.

What is known and what is new?
- Traditional SVG harvesting methods are associated with lower long-term patency compared to arterial grafts. No-touch SVG harvesting preserves vascular adventitia and improves outcomes, gaining attention in modern coronary surgery.
- This study highlights the feasibility of using no-touch SVGs in off-pump coronary artery bypass grafting (CABG) with outcomes approaching LIMA grafts.

What is the implication, and what should change now?
- No-touch SVG harvesting should be considered a standard technique to improve CABG outcomes.
- Wider adoption of the no-touch technique could reduce graft failure rates and improve patient quality of life.
- Further large-scale studies are needed to confirm long-term benefits and refine surgical practices.

The short- and long-term patency rates of GSVs harvested using the no-touch technique have been shown to approach those of LIMA grafts, significantly outperforming traditional saphenous vein harvesting methods. The pathophysiology of SVG occlusion typically follows a progression of thrombosis within the first month, neointimal hyperplasia from 1 month to 1 year, and atherosclerosis after 1 year (12). Historically, traditional saphenous vein harvesting techniques involved stripping the vascular adventitia and distending the vein with water, which substantially reduced patency rates due to mechanical trauma, endothelial injury, and diminished blood supply caused by these manipulations (13-18).

In contrast, the no-touch technique appears to mitigate the risk of SVG occlusion and deterioration through several mechanisms, including minimizing injury to the endothelial and smooth muscle layers, preserving the adventitia and surrounding tissues, and preventing excessive compression and dilation of the vessel.

CABG is currently regarded as one of the most effective and durable treatments for coronary artery atherosclerotic heart disease. However, stenosis or occlusion of vein grafts frequently occurs after CABG, presenting a significant challenge in postoperative management. Improving the long-term patency of vein grafts remains a critical concern. Recent Chinese and international studies have indicated that the no-touch harvesting technique for the GSV demonstrates superior efficacy compared to traditional methods (13-20). Despite these promising findings, extensive clinical validation through large-scale research is still lacking. In this study, a 1-year postoperative follow-up was conducted to evaluate the patency rates of GSV grafts in CABG. It was hypothesized that the use of the no-touch harvesting technique in CABG is both safe and reliable. We present this article in accordance with the STROBE reporting checklist (available at https://cdt.amegroups.com/article/view/10.21037/cdt-24-295/rc).

Methods

This single-center observational study commenced in June 2018 and included 140 patients who underwent off-pump coronary artery bypass grafting (OPCABG) at the Heart Center of The Second Hospital of Hebei Medical University. Ethical approval was obtained from the Medical Ethics Committee of The Second Hospital of Hebei Medical University and Fuwai Hospital (approval No. 2016-827), and informed consent was obtained from all participants. This study was conducted in accordance with the Declaration of Helsinki (as revised in 2013).

Study design

Patients were eligible for inclusion if they were undergoing OPCABG for the first time and received either LIMA grafts for the left anterior descending artery or no-touch SVGs for other coronary regions. Exclusion criteria included: cardiac insufficiency (ejection fraction <50%), chronic renal insufficiency (serum creatinine >120 μmol/L), emergency CABG, preoperative intra-aortic balloon counterpulsation, malignancy with a life expectancy of less than 1 year, thin GSV (diameter <1.2 mm as assessed by Doppler ultrasound), bilateral GSV varicosities or history of venous stripping, and a documented allergy to contrast media.

Patient characteristics

Preoperative baseline patient data were collected, including demographic and clinical information. Postoperatively, additional data were collected, including details of target vessel anastomotic techniques, as well as the number and type of grafts used, specifically for SVGs and LIMA grafts.

Surgery strategies

No-touch GSV harvesting technique

Prior to surgery, bilateral GSVs were routinely assessed using Doppler ultrasound to delineate their pathways for reference during the procedure. The identified pathways were marked and used as guides for skin incisions to expose the GSV. Tissue scissors and an electrotome were employed to carefully dissect the vascular pedicles on both sides, while ensuring the preservation of the vein's tunica adventitia and surrounding tissue. The dissection extended approximately 0.5 cm on either side of the vein using an electrotome (set at approximately 25 Joules) and tissue scissors, with great care taken to avoid direct contact with the vessel, preventing vascular injury. This was accomplished by using tweezers or other instruments rather than handling the vein directly.

Branch vessels were ligated using No. 1 silk sutures, and high-pressure dilatation of the vein post-dissection was strictly avoided. To confirm patency and control potential bleeding from branches, the vein was flushed with heparinized normal saline or autologous blood, delivered via an extracorporeal circulation machine (FLY, Type BII-1000, Ningbo Fly Medical Healthcare CO., LTD, Ningbo,

Figure 1 Great saphenous vein harvested using the no-touch technique.

Figure 2 Surgical incision following vein harvesting.

China; Stockert S3, Sorin Group Deutschland GmbH, Munchen, Germany) at a controlled pulsation pressure of approximately 30 mmHg. After harvesting, the GSV was immersed in a preservation solution of normal saline containing 2,500 units of heparin and 30 mg of papaverine.

Highly trained senior residents with considerable experience were responsible for performing the GSV harvesting. *Figure 1* shows the GSV harvested using the no-touch technique, while *Figure 2* illustrates the surgical incision following the vein harvest.

LIMA harvesting technique

Before surgery, Doppler ultrasound was routinely performed to assess the diameter of both the LIMA and the left subclavian artery, as well as to detect any lesions. The LIMA was harvested as a pedicle, ensuring the preservation of surrounding vascular tissues throughout the procedure. Following a median sternotomy, an internal mammary artery retractor was used to expose the surgical field, and the chest wall fascia parallel to the LIMA was dissected using an electrotome, maintaining a distance of approximately 1 cm on each side.

For branches encountered during the dissection, the proximal end was excised with a titanium clip, and the hemorrhagic distal end was cauterized using electric coagulation. To prevent the occurrence of a steal phenomenon, the first intercostal branch of the LIMA was ligated. The LIMA, along with the adjacent fascia and connective tissue, was carefully dissected from the first intercostal space down to its bifurcation at the sixth intercostal space. Care was taken to avoid direct contact with the LIMA to prevent intimal injury. Prior to disconnecting the distal end of the LIMA, the patient was systemically heparinized (1 mg/kg), and a 0.2% to 0.3% papaverine solution was applied to the surface of the vessel to prevent arteriospasm. The LIMA was harvested by either an associate chief physician or a chief physician.

Treatment of lower limb incision

The subcutaneous fat layer of the lower limb incision was closed with continuous 2-0 absorbable sutures, followed by continuous intradermal suturing with 3-0 absorbable sutures to ensure proper hemostasis. Postoperatively, compression and dressing were routinely applied to the lower limb for 48 to 72 hours. Dressing changes were performed every three days, and the healing process was closely monitored, with assessments of pain, numbness, edema, exudation, scab formation, infection, and dehiscence. The wound healing status of a patient one

Figure 3 Wound healing status of the patient one week post-surgery.

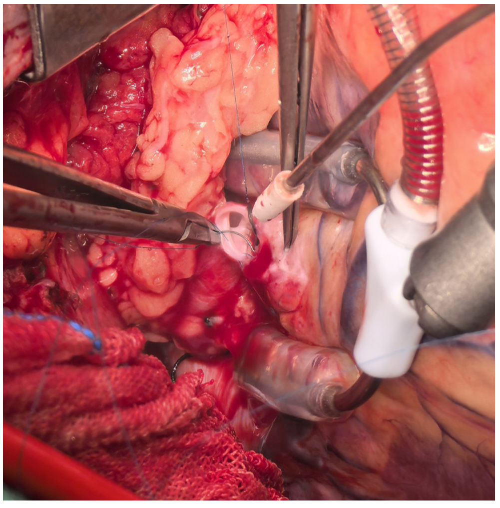

Figure 4 Vascular anastomosis performed during the surgical procedure.

week postoperatively is shown in *Figure 3*.

OPCABG

After performing a median sternotomy, the LIMA was anastomosed to the left anterior descending coronary artery. Sequentially, the distal end of the SVG was anastomosed first, followed by the proximal end, connecting the left coronary artery region to the right coronary artery region. The parachute suturing technique was utilized for all vascular anastomoses, including both end-to-side and side-to-side sequential anastomosis. The diamond-shaped side-to-side anastomosis technique was employed for sequential anastomotic sites.

To reduce the risk of hypothermic ventricular fibrillation during surgery, a temperature-adjusting blanket was used to maintain the patient's body temperature. Upon completion of the proximal and distal anastomoses, protamine was administered to neutralize the effects of heparin. The OPCABG procedure was performed by an experienced senior chief physician. Postoperatively, all patients were prescribed dual antiplatelet therapy, consisting of enteric-coated aspirin (100 mg once daily) and clopidogrel hydrogen sulfate (75 mg once daily) for 1 year, after which a single antiplatelet drug was continued. The vascular anastomosis procedure is shown in *Figure 4*.

Angiographic assessment of graft patency

At the 1-year follow-up, patients underwent computed tomography angiography (CTA) using a 128-slice spiral computer tomography (CT) scanner (Philips Brilliance ICT, Royal Philips Electronics, Eindhoven, Netherlands) to assess the patency of both SVGs and LIMA grafts. Two medical imaging specialists analyzed and interpreted the processed CTA images. Graft conditions were categorized as follows: occlusion without development, mild stenosis (lumen diameter <50%), moderate stenosis (lumen diameter 50–75%), and severe stenosis (lumen diameter >75%).

Assessment of clinical outcomes

Definition of major adverse cardiovascular and cerebrovascular events (MACCEs)

MACCEs were defined to include all-cause mortality, sudden cardiac death, acute myocardial infarction, recurrent angina, coronary artery revascularization, and cerebrovascular accidents.

Follow-up

Follow-up was conducted through telephone interviews and outpatient visits, during which the incidence of MACCEs and postoperative complications, particularly at the lower limb incision site, were monitored. CTA examinations were performed 1 year after CABG at

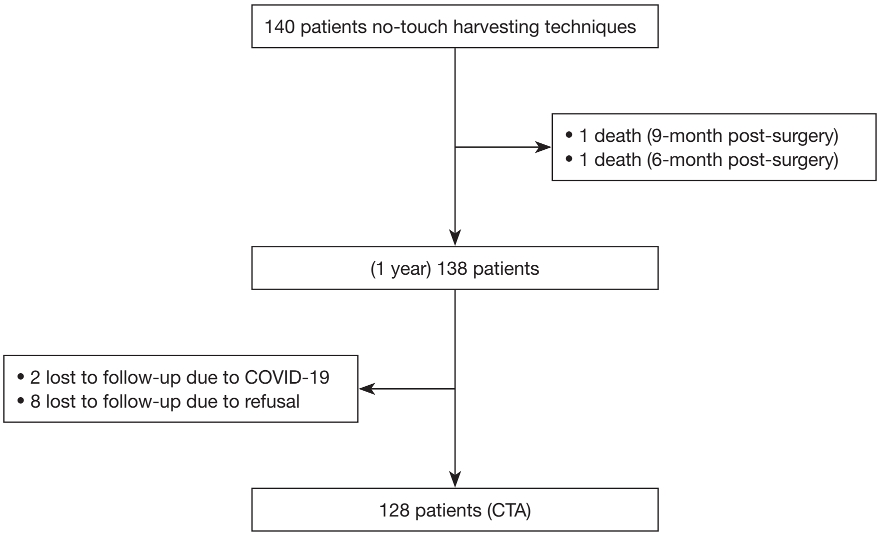

Figure 5 Flowchart illustrating the study design. COVID-19, coronavirus disease 2019; CTA, computed tomography angiography.

the outpatient department, with results documented by designated personnel.

Statistical analysis

There was no missing data throughout the study. Data analysis was conducted using SPSS software version 26.0. Data distribution was examined by Kolmogorov-Smirnov test. Measurement data with a normal distribution were reported as mean ± standard deviation, while non-normally distributed data are presented as median [interquartile range]. Categorical variables, expressed as frequencies and percentages, were compared using the Chi-squared test. A P value of <0.05 was considered to indicate statistical significance.

Results

A total of 140 patients who underwent OPCABG were enrolled in this study, and 128 of these patients completed a CTA examination 1-year post-surgery. The study flowchart is depicted in *Figure 5*. The median follow-up duration was 1 year.

Clinical outcomes

Among the 140 participants, no perioperative deaths or MACCEs were recorded. Lower-limb pain or numbness was reported in 16 patients (11.4%), while 29 patients (20.7%) presented with edema or exudation. Twelve patients (8.6%) experienced wound healing under a scab, and three patients (2.1%) developed infections or dehiscence. After discharge, two patients (1.4%) died—one from sudden cardiac death at 6 months, and the other from hepatic biliary tract cancer at 9 months. Additionally, 10 patients were lost to follow-up; eight declined follow-up, and two were unreachable due to complications related to the COVID-19 pandemic. Consequently, 128 patients (91.4%) completed the 1-year follow-up and underwent CTA examinations.

The mean age of the 128 patients was 60.9±8.0 years, with a female proportion of 18.8%, and an average body mass index (BMI) of 26.4±2.6. Hypertension, diabetes, and hyperlipidemia were prevalent in 66.4%, 31.3%, and 40.6% of patients, respectively, while 44.5% had a history of smoking. Baseline patient characteristics are summarized in *Table 1*. Among the 128 patients, recurrent angina was reported in three cases (2.3%), primarily in patients with internal mammary artery graft occlusion. These patients exhibited symptoms such as anterior thoracic pain, chest discomfort, and shortness of breath during physical activity. In contrast, only one patient with an occluded SVG experienced dyspnea, while the remainder were asymptomatic.

One-year CTA results

A total of 128 patients underwent CTA examination at the 1-year follow-up, with the imaging results shown in

Table 1 Preoperative characteristics and risk factors of study patients

Variables	Value (n=128)
Age (years)	60.9±8.0
Female	24 (18.8)
Risk factors	
Smoking	57 (44.5)
Body mass index (kg/m^2)	26.4±2.6
Hypertension	85 (66.4)
Diabetes mellitus	40 (31.3)
Dyslipidemia	52 (40.6)
History of stroke	18 (14.1)
Left main disease	80 (62.5)
Three-vessel disease	48 (37.5)
Vascular graft material	
Diameter of LIMA (mm)	2.40 [0.4]
Diameter of SVG (mm)	2.55 [0.9]

Data are presented as mean ± standard deviation, n (%) or median [interquartile range]. LIMA, left internal mammary artery; SVG, saphenous vein graft.

Figure 6. Among the 128 LIMA grafts, three (2.3%) were occluded, while 18 (5.5%) of the 326 SVGs were occluded. The overall graft patency rate was 95.4% (433/454), with no significant difference observed between the patency rates of SVGs and LIMA grafts [94.5% (308/326) *vs.* 97.7% (125/128), P=0.15]. Additionally, there were no significant differences in patency rates between SVGs and LIMA grafts with end-to-side anastomosis [93.9% (214/228) *vs.* 97.7% (125/128), P=0.11]. Detailed data on target vessel anastomoses and their corresponding patency rates are provided in *Tables 2,3*. Three patients (2.3%) had a diagnosis of recurrent angina.

Furthermore, analysis revealed no significant impact of age, sex, BMI, hypertension, or diabetes mellitus on SVG patency rates, as detailed in *Table 4*.

Discussion

In this study, we observed no MACCEs during the perioperative period, and all patients survived to discharge. There were no statistically significant differences in patency rates between SVGs and LIMA grafts. For end-to-side anastomosis, SVG and LIMA graft patency rates

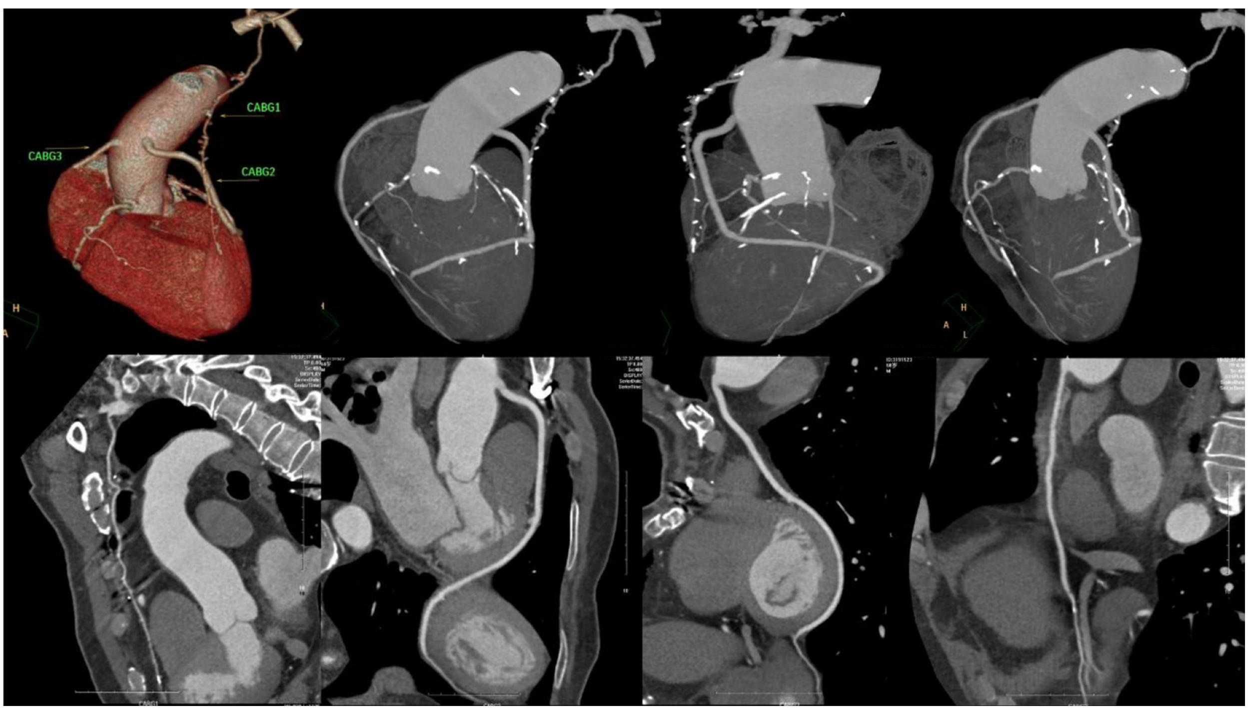

Figure 6 Imaging outcomes from CTA 1 year after CABG showing no-touch SVG and LIMA grafts. CABG, coronary artery bypass grafting; CTA, computed tomography angiography; LIMA, left internal mammary artery; SVG, saphenous vein graft.

Table 2 Number of distal anastomoses between SVG and LIMA and conduit patency of target coronary arteries

Target coronary arteries	Total		End-to-side anastomosis		Side-to-side anastomosis	
	N	Patency rate, n/N (%)	N	Patency rate, n/N (%)	N	Patency rate, n/N (%)
LAD	128	125/128 (97.7)	128	125/128 (97.7)	0	0
DIG	84	81/84 (96.4)	6	6/6 (100.0)	78	75/78 (96.2)
RI	2	2/2 (100.0)	2	2/2 (100.0)	0	0
LCX	4	4/4 (100.0)	4	4/4 (100.0)	0	0
OBM	78	75/78 (96.2)	71	68/71 (95.8)	7	7/7 (100.0)
RCA	3	3/3 (100.0)	3	3/3 (100.0)	0	0
PLV	58	53/58 (91.4)	55	50/55 (90.9)	3	3/3 (100.0)
PDA	97	90/97 (92.8)	87	81/87 (93.1)	10	9/10 (90.0)
Vein graft	326	308/326 (94.5)	228	214/228 (93.9)	98	94/98 (95.9)
Total	454	433/454 (95.4)	356	339/356 (95.2)	98	94/98 (95.9)

DIG, diagonal branches; LAD, left anterior descending branch; LCX, left circumflex branch; LIMA, left internal mammary artery; OBM, obtuse marginal branch; PDA, posterior descending artery; PLV, left posterior ventricular branches; RCA, right coronary artery; RI, ramus intermedius artery; SVG, saphenous vein graft.

Table 3 Patency rate of SVG (total and end-to-side anastomosis) compared with LIMA

Anastomosis	Patency rate, n/N (%)		χ^2	P value
	SVG	LIMA		
Total	308/326 (94.5)	125/128 (97.7)	2.104	0.15
End-to-side anastomosis	214/228 (93.9)	125/128 (97.7)	2.59	0.11

LIMA, left internal mammary artery; SVG, saphenous vein graft.

Table 4 Influence of age and other factors on the SVG occlusion rate

Characteristics	Patency group (n=115)	Occlusion group (n=13)	P value
Age (years)	60.8±8.1	61.2±6.9	0.90
Female (cases)	21 (18.3)	3 (23.1)	0.96
Body mass index (kg/m^2)	26.3±2.7	27±1.7	0.42
Smoking (cases)	50 (43.5)	7 (53.8)	0.48
Hypertension (cases)	77 (67)	8 (61.5)	0.93
Diabetes mellitus (cases)	35 (30.4)	5 (38.5)	0.78
History of stroke (cases)	18 (15.7)	0	0.26

Data are presented as mean ± standard deviation or n (%). SVG, saphenous vein graft.

were comparable. Compared to GSVs harvested using traditional or endoscopic techniques, GSVs harvested via the no-touch technique maintain the integrity of the vascular adventitia and surrounding tissues. However, the frequent use of electrotome in this procedure has been linked to significant trauma at the lower limb incision site, contributing to an increased incidence of lower limb complications, as demonstrated in our previous study (19). Postoperative complications such as pain or numbness, edema or exudation, healing under a scab, infection, and dehiscence impede early patient mobilization, lower quality of life, intensify discomfort, and impose varying degrees of economic burden. The elevated rate of complications observed in this study, compared to the findings of Tian *et al.*, may be due to differences in suturing techniques and suture materials used during the surgical procedure (20). Further research is warranted to elucidate the precise etiological factors underlying these complications.

In contrast to prior studies, the primary objective of this study was to compare the patency rates of SVGs and LIMA grafts within the same patient cohort using a self-controlled design (19.20). This approach represents a key strength of the study, as it allows for a direct comparison of post-CABG patency rates while minimizing the impact of baseline variables and other confounding factors. Following reports from both Chinese and international studies that demonstrated significant improvements in graft patency with the no-touch technique (16-20), particularly after its inclusion in the "Guidelines for Myocardial Revascularization" by the European Society of Cardiology and the European Association for Cardio-Thoracic Surgery, our cardiac center adopted the no-touch technique for all patients undergoing CABG. Consequently, we did not compare the patency rates of no-touch SVGs with those of conventionally harvested SVGs.

The findings of our study indicate that among the 140 patients who underwent OPCABG, there were no perioperative deaths or MACCEs. This suggests that the no-touch technique is both safe and feasible in CABG, without increasing perioperative mortality or the incidence of severe adverse cardiovascular or cerebrovascular events. Additionally, the 1-year graft patency rate for SVGs was comparable to that of LIMA grafts [94.5% (308/326) *vs.* 97.7% (125/128)], with no statistically significant difference. However, the observed patency rate was slightly lower than that reported by Tian *et al.*, which may be attributed to variations in surgical techniques (20). All patients in our study underwent OPCABG, a procedure known to potentially reduce patency rates for both arterial and venous grafts (21,22).

A previous study reported that the short-term clinical and angiographic outcomes of skeletonized LIMA grafts surpass those of pedicled LIMA grafts used for left anterior descending artery revascularization in CABG procedures (23). However, our cardiac center does not employ skeletonized LIMA grafts for CABG, primarily due to the significantly greater technical demands placed on cardiac surgeons during both the harvesting and anastomosis processes. These complexities may have influenced the results of our study, potentially leading to an underestimation of LIMA graft patency rates.

Despite this, our findings suggest that the short-term patency rates of SVGs harvested using the no-touch technique remain favorable. Among patients who underwent follow-up, three reported angina symptoms, which were attributed to the occlusion of their internal mammary artery grafts, while only one patient experienced shortness of breath due to occlusion of an SVG. Although LIMA grafts are considered the gold standard in CABG compared to SVGs, the results demonstrate that the clinical outcomes of no-touch harvested SVGs in OPCABG are satisfactory in terms of both patency rates and overall clinical effectiveness.

Additionally, while all LIMA grafts in this study were anastomosed using the end-to-side technique, some SVGs were anastomosed side-to-side. To evaluate whether the anastomotic technique affected graft patency, we compared the patency rates of SVGs and LIMA grafts treated with end-to-side anastomosis. No statistically significant difference was observed [93.9% (214/228) *vs.* 97.7% (125/128), P=0.11]. Furthermore, the 128 patients were classified into occlusion and patency groups based on the status of their SVGs. Subsequent statistical analysis revealed that variables such as age, sex, BMI, hypertension, and diabetes mellitus had no significant impact on vein graft patency rates (refer to *Table 4*).

The results of this study indicate that the use of the no-touch technique for harvesting GSVs in OPCABG off-pump achieves patency rates that are comparable to those of LIMA grafts. Although these findings are promising, additional long-term studies are necessary to determine whether the no-touch technique for GSV harvesting can be considered a viable secondary option for graft material in CABG surgery.

Several limitations of this study should be acknowledged, as they may affect the overall outcomes. These include a small sample size, a single-center design, and a focus on short-term follow-up. Additionally, the reliance on CT imaging for assessing graft patency, rather than coronary angiography—which is regarded as the gold standard for this purpose—may raise concerns regarding the validity of the results. The decision to use CT imaging for follow-up was influenced by the economic and time constraints experienced by participants, which could have impacted the study findings.

Furthermore, this study did not incorporate histological analysis of the harvested GSVs, which is a foundational element in medical research. The absence of histological evaluation limits the theoretical support for the conclusions drawn. Additionally, the study did not include a quantitative assessment of graft stenosis or occlusion following surgery, relying instead on qualitative analysis. This limitation hampers precise diagnosis, treatment planning, and accurate evaluation of surgical outcomes, thereby complicating efforts to predict the risk of future cardiovascular events in patients.

To establish whether GSVs harvested using the no-touch technique can serve as a viable alternative to LIMA grafts in CABG, further research with larger sample sizes and extended follow-up periods is essential. These future studies will help validate the current findings and provide more definitive evidence regarding the clinical utility of this technique.

Conclusions

This study highlights the promising efficacy of the no-touch technique for harvesting the GSV in OPCABG. This technique offers several advantages, including simplicity, a short learning curve, and greater feasibility for adoption in primary cardiac centers, particularly in comparison to arterial graft harvesting techniques. Its relative ease of use and shorter learning curve also make it more accessible for implementation in smaller hospitals. These findings may serve as a valuable reference for the clinical utility of the no-touch technique in improving patient outcomes and reducing postoperative complications in CABG.

Acknowledgments

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Footnote

Reporting Checklist: The authors have completed the STROBE reporting checklist. Available at https://cdt.amegroups.com/article/view/10.21037/cdt-24-295/rc

Data Sharing Statement: Available at https://cdt.amegroups.com/article/view/10.21037/cdt-24-295/dss

Peer Review File: Available at https://cdt.amegroups.com/article/view/10.21037/cdt-24-295/prf

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Conflicts of Interest: All authors have completed the ICMJE uniform disclosure form (available at https://cdt.amegroups.com/article/view/10.21037/cdt-24-295/coif). The authors have no conflicts of interest to declare.

Ethical Statement: The authors are accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved. This study was approved by the Ethics Committee of The Second Hospital of Hebei Medical University and Fuwai Hospital (approval No. 2016-827). This study was conducted in accordance with the Declaration of Helsinki (as revised in 2013). Written informed consent was obtained from all the participants.

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