

1 Background

The saphenous vein graft (SVG) is widely utilized in coronary artery bypass grafting (CABG). The development of endoscopic vein harvesting (EVH) aimed to minimize invasiveness. Recently, no-touch saphenous vein graft (NT-SVG) enhances graft patency but poses wound complications. To address this, a no-touch endoscopic vein harvesting (NT-EVH) technique was developed.¹⁾ This study aims to evaluate one-year NT-EVH patency rates and identify perioperative factors.

2 Methods

The NT-EVH technique involves precise steps. Initially, a minor incision is made in the thigh to isolate SVG carefully. Following heparin administration, a port is placed beneath the superficial tissue layers of SVG. Scope-guided dissection is performed just above the superficial and deep fascia. Then, SVG's lateral sides are dissected, leaving a 0.5-1.0cm space, with SVG being marked to prevent twisting. Ultimately, SVG is extracted through a small incision, and a temporary drain is inserted before closure (Figure 1). Our retrospective study, starting NT-EVH in 2018, assessed patency rates and perioperative characteristics.

3 Statistical Analysis

Descriptive statistics are presented as count (%) for categorical variables and mean ± standard deviation (SD) or median (interquartile range), as appropriate. Fisher's exact test for categorical variables and the student t test or Wilcoxon rank sum test for continuous variables were used, as appropriate. The criterion of significance was an α value of 0.05 or less.

5 Discussion

In the present study, only two patients experienced occlusion after the first postoperative year, suggesting good long-term results can be expected. Early occlusion, caused by kinking, is a major problem, but it is now routinely marked prior to extraction to address this issue. It was reported that the NT-SVG has a high early patency rate of 97.2%, but wound infections can occur in about 10.3% of cases.²⁾ Conventional EVH has a 75% patency rate at 12 months according to a systematic review.³⁾ NT-EVH combines the advantages of both techniques, offering good one-year patency (Figure2) and no wound infections (Table4).

The mean graft flow and DF, as measured by TTFM, indicated lower values in the early occlusion group. This finding aligns with the previously reported cutoff value of 31 ml/min for mean flow in one-year SVG failure, as documented by Une et al.⁴⁾

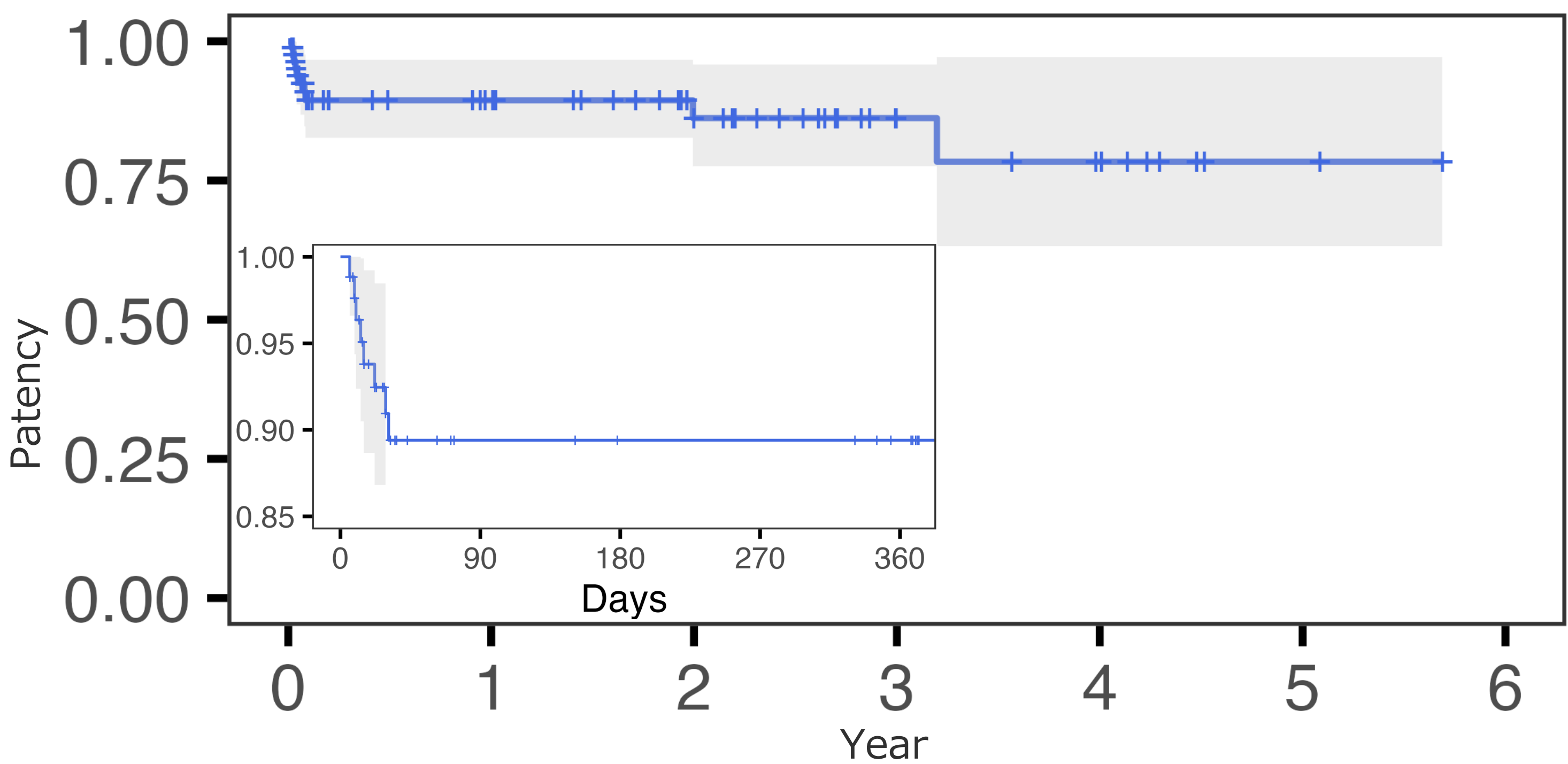
6 References

1. Yoshino K, et al. *Innovations* 2020;15:475-7.
2. Tian M, et al. *Circulation* 2021;144:1120-9.
3. Kodia K, et al. *Ann Cardiothrac Surg* 2018;7:586-97.
4. Une D, et al. *J Card Surg* 2013;28:3-7.

Figure1 The SVG harvested by NT-EVH technique



Figure2 Kaplan-Meier patent estimate for NT-EVH grafts



1-year patency: 89.4%
(95%CI: 82.7-96.7%)

Table4 Details of the NT-EVH grafts

All patients (n=88)	
SVG harvesting time, min (IQR)	60.0 (49.8-74.5)
Lower-extremity SSI, n	0

In NT-EVH, preventing early occlusion ensures long-term patency with minimal wound complications. Continued evaluation is crucial as this technique advances in its developmental stage.

4 Results

Table1 Baseline characteristics

All patients (n=88)			
Age, y	67.1±9.9	Hyperlipidemia	77(87.5)
Sex, male	77(87.5)	Chronic kidney disease	43(48.9)
Body mass index, kg/m ²	25.7±4.9	Dialysis	5(5.7)
Hypertension	76(86.4)	Peripheral artery disease	10(11.4)
Diabetes mellitus	52(59.1)	Current Smoker	19(21.8)
Use of insulin	8(12.3)	Euro2 score	1.54(0.84-2.42)

Data presented as mean ± standard deviation, median (interquartile range) or n (%).

Table2 Perioperative characteristics

All patients (n=88)			
Off-pump CABG	58(65.9)	Urgent or Emergent surgery	18(20.5)
MICS CABG	3(3.4)	Operative details	
On-pump CABG	30(34.1)	CPB time, min	189±60
On-pump beating	11(12.5)	Surgery time, min	362±72
On-pump arrest	19(21.6)	ICU stay, d	3(2-4)
Concomitant procedures		Hospital stay, d	11(9-16)
Valve surgery	12(13.6)	Hospital death	1(1.1)
Thoracic aortic surgery	2(2.3)	Assessment timing of SVG, d	368(28-894)
Other cardiac surgery	6(6.8)		

Data presented as mean ± standard deviation, median (interquartile range) or n (%). CABG, coronary artery bypass grafting; CPB, Cardiopulmonary bypass; ICU, Intensive care unit; SVG, Saphenous vein graft

Table3 Details of the harvested SVGs

All NT-EVH grafts (n=94)		Patent	Occlusion	p value
Evaluated grafts (n=86)		n=76 (88.4)	n=10 (11.6)	
Target of coronary artery				
RCA	68(79.1)	59(77.6)	9(90.0)	0.680
LAD	2(2.3)	2(2.6)	0(0.0)	1.000
Diagonal artery	8(9.3)	7(9.2)	1(10.0)	1.000
LCx	10(11.6)	10(13.2)	0(0.0)	0.598
Transit time flow measurement				
Mean graft flow, ml/min	40.0(27.0-66.8)	46.0(30.0-67.5)	21.5(17.5-29.5)	0.002
Pulsatility index	2.3(1.6-3.0)	2.1(1.6-3.0)	2.7(2.4-4.7)	0.058
Diastolic filling, %	61.0(56.0-67.8)	62.5(56.8-68.0)	54.0(49.3-58.5)	0.007

Data presented as mean ± standard deviation, median (interquartile range) or n (%). RCA, Right coronary artery; LAD, Left anterior descending artery; LCx, Left circumflex artery

There were two cases of mid-term occlusion. One patient with an NT-EVH graft to the RCA showed stenosis improvement postoperatively, leading to graft occlusion after 2 years. Another patient experienced occlusion at the 3-year mark, potentially linked to early subocclusion indicated by mild contrast failure in the postoperative CT. Surprisingly, No cases of lower-extremity surgical site infection (SSI) requiring antibiotics were observed(Table4).