

Early-term Outcomes And Experience Of No-touch Endoscopic Saphenous Vein Graft Harvesting

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1 Background

Saphenous vein graft (SVG) is one of the most versatile and frequently used graft in coronary artery bypass surgery and an endoscopic vein harvesting (EVH) was developed to reduce its invasiveness. Recently, no-touch saphenous vein graft (NT-SVG) has been reported to increase graft patency, however, NT-SVG is often associated with wound complication. To address this issue, we developed a no-touch endoscopic vein harvesting (NT-EVH) technique¹.

2 Methods

NT-EVH is performed by initially dissecting the anterior and posterior surfaces of the connective tissue surrounding SVG, and then the lateral side of the SVG is dissected with a 0.5-1 cm gap. NT-EVH was initiated in 2018 and we retrospectively evaluated its early patency rate and perioperative characteristics.

3 Statistical Analysis

Descriptive statistics are presented as count (%) for categorical variables and mean ± standard deviation (SD), 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. Spearman's rank correlation coefficient was used to analyze the learning curve. The criterion of significance was an α value of 0.05 or less.

4 Results

Baseline Characteristics (Table1)

59 patients underwent coronary artery bypass grafting (CABG) with 63 endoscopically harvested NT-SVGs. The average age was 67.3±9.9, and 50 patients (84.7%) were male. The mean ejection fraction was 51.2±13.5% and the mean Euro2 score was 3.05±4.12.

Perioperative Characteristics (Table2)

41 patients (69.5%) underwent off-pump CABG, and 11 patients (18.6%) underwent urgent or emergent surgeries. No patient experienced lower extremity surgical-site infections requiring antimicrobial therapy.

Details of the harvested SVGs (Table3)

The early graft patency rate was 91.4% (53/58 grafts). The right coronary artery was the most common anastomotic site (91.5%). Intraoperative graft flow tended to be lower in the early occlusion group of SVG compared to the patency group (25.0±8.0 vs 61.7±44.1 ml/min, p=0.071).

Learning Curve of NT-EVH (Figure1)

There was a learning curve for NT-EVH (64.3±19.9min) and a correlation between case number and harvesting time (r=-0.425, p=0.001).

Table1 Baseline characteristics

All patients (n=59)	
Age, y	67.3±9.9
Sex, male	50(84.7)
Body mass index, kg/m ²	25.9±5.3
Hypertension	52(88.1)
Hyperlipidemia	56(94.9)
Diabetes mellitus	37(62.7)
Use of insulin	7(11.9)
Atrial fibrillation	5(8.5)
Chronic kidney disease	27(45.8)
Dialysis	3(5.1)
Peripheral artery disease	7(11.9)
Current Smoker	12(20.3)
Euro2 score	3.05±4.12

Data presented as mean ± standard deviation or n (%).

Table2 Perioperative characteristics

All patients (N=59)			
Off-pump CABG		41(69.5)	Operative details
On-pump CABG		18(30.5)	CPB time, min
On-pump beating		12(20.3)	Surgery time, min
On-pump arrest		6(10.2)	ICU stay, d
Concomitant procedures			Hospital stay, d
Valve surgery		7(11.9)	Follow up, d
Thoracic aortic surgery		2(3.4)	Hospital death
Other cardiac surgery		1(1.7)	Assessment timing of SVG, d
Operative indication			Leg wound infection
Scheduled		48(81.4)	
Urgent or Emergent		11(18.6)	

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

5 Discussion

The NT-SVG technique has a high early patency rate of 97.2%, but wound infections can occur in about 10.3% of cases.²⁾ Conventional EVH has an 85% patency rate at 6 months.³⁾ NT-EVH combines the advantages of both techniques and has good early patency and no wound infections.

The NT-EVH technique takes longer to harvest and requires more learning compared to EVH. However, the difference in harvest time is not significant, with NT-EVH taking 60 minutes on average and EVH taking 57 minutes⁴⁾. Furthermore, the harvesting device is not designed for pedicle harvesting and needs improvements.

Figure1 Learning Curve of NT-EVH

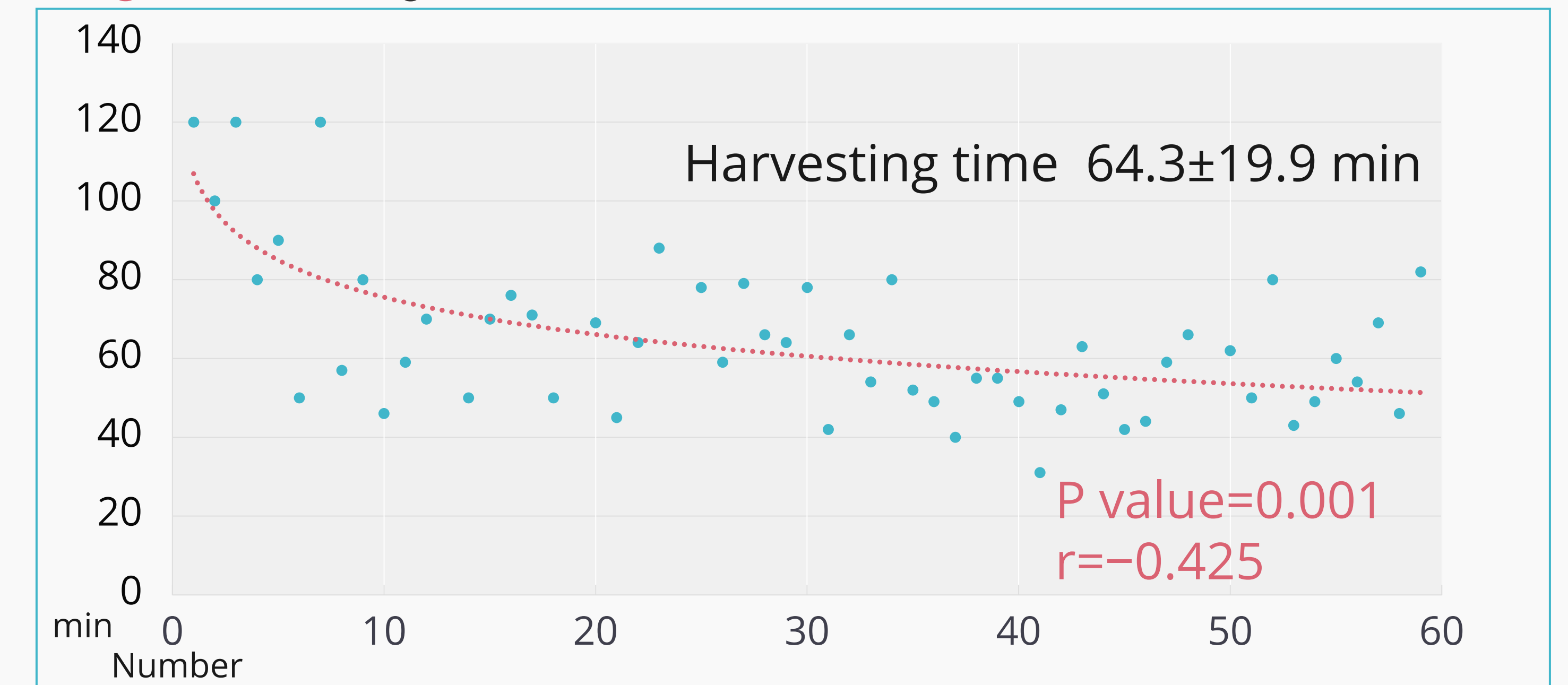


Table3 Details of the harvested SVGs

All NT-EVH grafts (N=63)		Patent	Occlusion	P value
Evaluated grafts (N=58)		N=53 (91.4)	N=5 (8.6)	
Target of coronary artery				
Right coronary artery	54(85.7)	46(86.8)	4(80.0)	0.538
#2 or 3	12(19.0)	11(20.8)	0(0.0)	0.572
#4PD or 4AV	42(66.7)	35(66.0)	4(80.0)	1.000
Left anterior descending artery	1(1.6)	1(1.9)	0(0.0)	1.000
Diagonal artery	5(7.9)	3(5.7)	1(20.0)	0.310
Left circumflex artery	3(4.8)	3(5.7)	0(0.0)	1.000
Transit time flow measurement				
Mean graft flow, ml/min	59.2±44.3	61.7±44.1	25.0±8.0	0.071
Pulsatility index	2.86±2.29	2.99±2.45	2.44±1.03	0.626
Diastolic filling	60.2± 9.6	59.9±10.1	59.8±4.8	0.982

Data presented as mean ± standard deviation or n (%). PD, Posterior descending branch; AV, Atrio-ventricular branch

6 Conclusion

NT-EVH has shown good initial results with few wound complications. It is an innovative technique that requires further study to determine its long-term patency.

7 References

1. Yoshino K, et al. *Innovations* 2020;15:475-7
2. Tian M, et al. *Circulation* 2021;144:1120-9.
3. Williams J B, et al. *JAMA* 2012;308:475-84.
4. Zenati M A, et al. *N Engl J Med* 2019;380:132-41