Contemporary Use Of Suboptimal Great Saphenous Vein In Lower Extremity Bypass Yields Favorable Mid-term Patency

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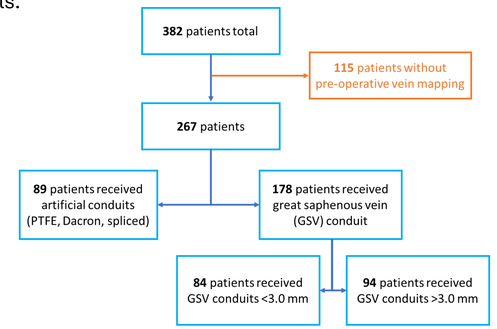
Introduction

Studies originating in the 1980s have identified a great saphenous vein (GSV) diameter threshold of **at least 3.0mm** for optimal durability for lower extremity bypass. Historically at our institution, we have had subjective success with the use of suboptimal GSVs (<3.0mm) without any formal analysis of durability or long-term benefit to the patient. **Therefore, we sought to compare post-operative complications and long-term patency rates between use of suboptimal GSVs, optimal GSVs, and artificial conduits for lower extremity bypass.**

Methods

Patients with pre-operative GSV vein mapping in an Intersocietal Accreditation Commission accredited vascular lab who underwent infra-inguinal bypass surgery from **1/2016 to 2/2022** at a tertiary center were included. Vascular lab software was utilized to compare patient median GSV across at least six anatomic locations. Patients were seperated and stratified based on median GSV size (both overall and limited to above-knee GSV). Overall GSV size was used to generate results seen on this poster, however, there were no significant differences utilizing above-knee GSV size instead. Concomitant patients undergoing artificial conduit (PTFE, Dacron, spliced) bypass were included for comparison. Primary outcomes included post-operative complications, 30-day major adverse limb events (MALE: untreated loss of patency, secondary re-intervention, major amputation), major adverse cardiac events (MACE: stroke, MI, death), and patency at regular follow-up intervals.



Results

Demographics:

- evenly distributed in age, BMI, gender, race, ethnicity, smoking status, co-morbidities (including CAD, CHF, COPD, DM, HTN), ASA Class, pre-operative medications (including anti-platelets, anti-coagulants, statins, beta blockers)
- equal frequency of prior ipsilateral interventions (including bypass, stents, minor amputations)
- No reported pre-operative major amputations

Technical Details of Peripheral Bypass in Cohorts

- Proximal target was most likely **common femoral** followed by superficial femoral for all groups
- Most likely distal anastomosis was **BK popliteal**, followed by posterior tibial (equal to BK pop for artificial conduits only)

Table 1: Post-operative, discharge, and 30-day complications from lower extremity bypass utilizing GSV

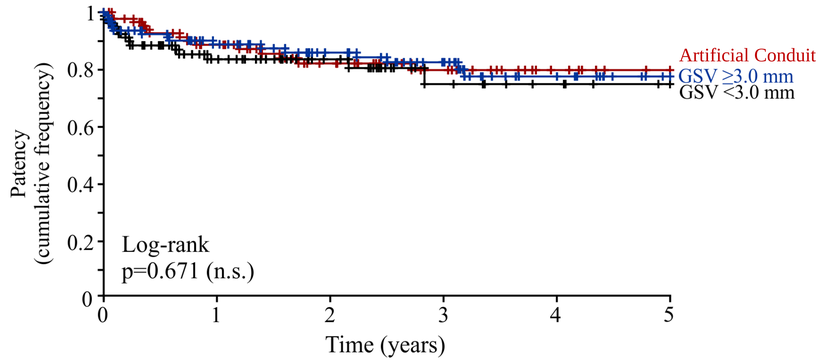
	Total (n=178)	GSV <3.0 (n=82)	GSV ≥3.0 (n=96)	P-value
Length of Stay (post-op to discharge, days)	3 (3-5)	3 (3-5)	4 (3-5)	0.369^
Discharged to home	107 (60.1)	56 (68.3)	51 (53.1)	0.055
Ambulatory without assistance	54 (30.5)	26 (31.7)	28 (29.5)	0.920
Immediate post-operative complications				
Wound infection	6 (3.4)	1 (1.2)	5 (5.3)	0.217
Graft infection	4 (2.3)	1 (1.2)	3 (3.2)	0.625
Cr Increase >0.5 mg/dL	8 (4.5)	**7 (8.5)**	1 (1.1)	**0.026**
Completion angiogram	33 (18.5)	18 (22.0)	15 (15.6)	0.279
Return to OR	18 (10.2)	6 (7.3)	12 (12.6)	0.243
30-day Major Adverse Cardiac Events (MACE)	3 (2.0)	2 (1.4)	1 (1.6)	0.464
30-day Major Adverse Limb Events (MALE)				
Untreated loss of patency	1 (0.6)	1 (1.2)	0	**0.030^^**
Re-intervention of revascularized segment	8 (4.5)	**6 (7.3)**	2 (2.1)	
Major amputation of revascularized limb	2 (1.1)	2 (2.4)	0	

^Independent-samples Kruskal-Wallis Test, ^^Fisher's exact test, All others Pearson's Chi Squared.

Mid-term follow up:

- One-year **primary patency** rates are **equivalent** between conduits
  72% GSV<3.0, 78.1% GSV≥3.0, 80.9% artificial
- **Primary-assisted patency** rates are also **equivalent** between conduits
  79.2% GSV<3.0, 80.2% GSV≥3.0 , 88.8% artificial
  - Similar to other reported one-year patency rates for GSV (72-73%[1], 81%[2]) and higher patency rates than other veins (arm/small saphenous: 61-65%[3,4])
- Long-term **infection rates** were statistically higher for GSV<3.0 (8 patients, 13.8%) compared to GSV≥3.0 (2 patients, 2.7%; **p=0.021**) but not compared to artificial conduits (9 patients, 12.0%, p>0.05)
- No differences in major amputation rates or ipsilateral ABIs for all groups

Figure 1: Kaplan-Meyer curve of 5-year lower extremity bypass patency



Number at risk (number censored)

GSV <3.0 mm	81 (15)	48 (12)	30 (12)	14 (13)	9 (14)	1 (15)
GSV ≥3.0 mm	94 (16)	70 (9)	53 (12)	39 (14)	22 (16)	1 (15)
Artificial Conduit	87 (15)	64 (9)	45 (13)	32 (14)	18 (14)	3 (16)

Conclusions

In our cohort, patients who received GSV bypasses <3.0mm **have the same mid-term patency** as patients who received GSV ≥3.0mm. Use of smaller GSV *may require earlier reintervention*, and therefore closer follow-up to maintain patency. Nonetheless, under appropriate circumstances, sub-optimal GSV can be utilized for lower extremity arterial bypass.

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