

Prophylactic Axillary Lymphovenous Bypass Using The Branched Vein Graft Technique

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Introduction

- Immediate lymphatic reconstruction (ILR) with lymphovenous bypass (LVB) prevents lymphedema^{1,2} after axillary lymph node dissection (ALND)
- Axillary LVB presents challenges including:
 - Size mismatch between vein and lymphatic vessels
 - Number mismatch between vein and lymphatic vessels
 - Widespread location of lymphatics
 - Anastomotic reflux from high pressure veins
- Vein grafts have been used to address inadequate length³
- A branched vein graft (BVG) may offer further solutions
- **Objective:** To describe the technical details and preliminary outcomes of patients who underwent prophylactic LVB using a superficial circumflex iliac vein (SCIV) BVG

Methods

- Retrospective review
- Immediate lymphatic reconstruction using BVG by a single surgeon between September 2020 and November 2022
- Information collected:
 - Patient demographics
 - Operative details
 - Clinical outcomes
- Follow up measures included:
 - Bioimpedance analysis (BIA): 1mHz and 5mHz
 - Excess volume
 - Patient Reported Outcomes using LYMPH-Q: Symptoms, appearance, function, appearance, psychosocial subscales

Figure 1. Harvested BVG from SCIV

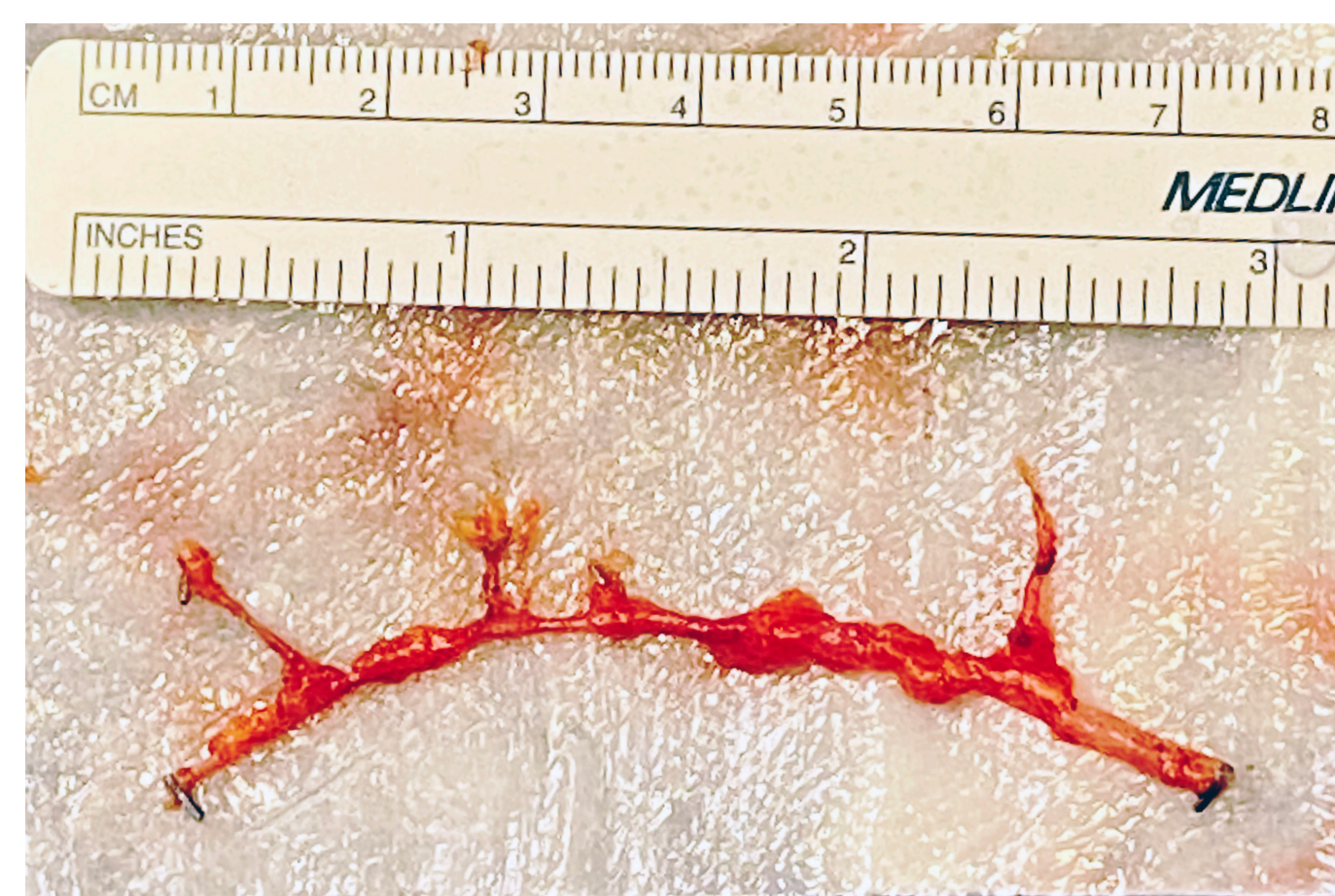
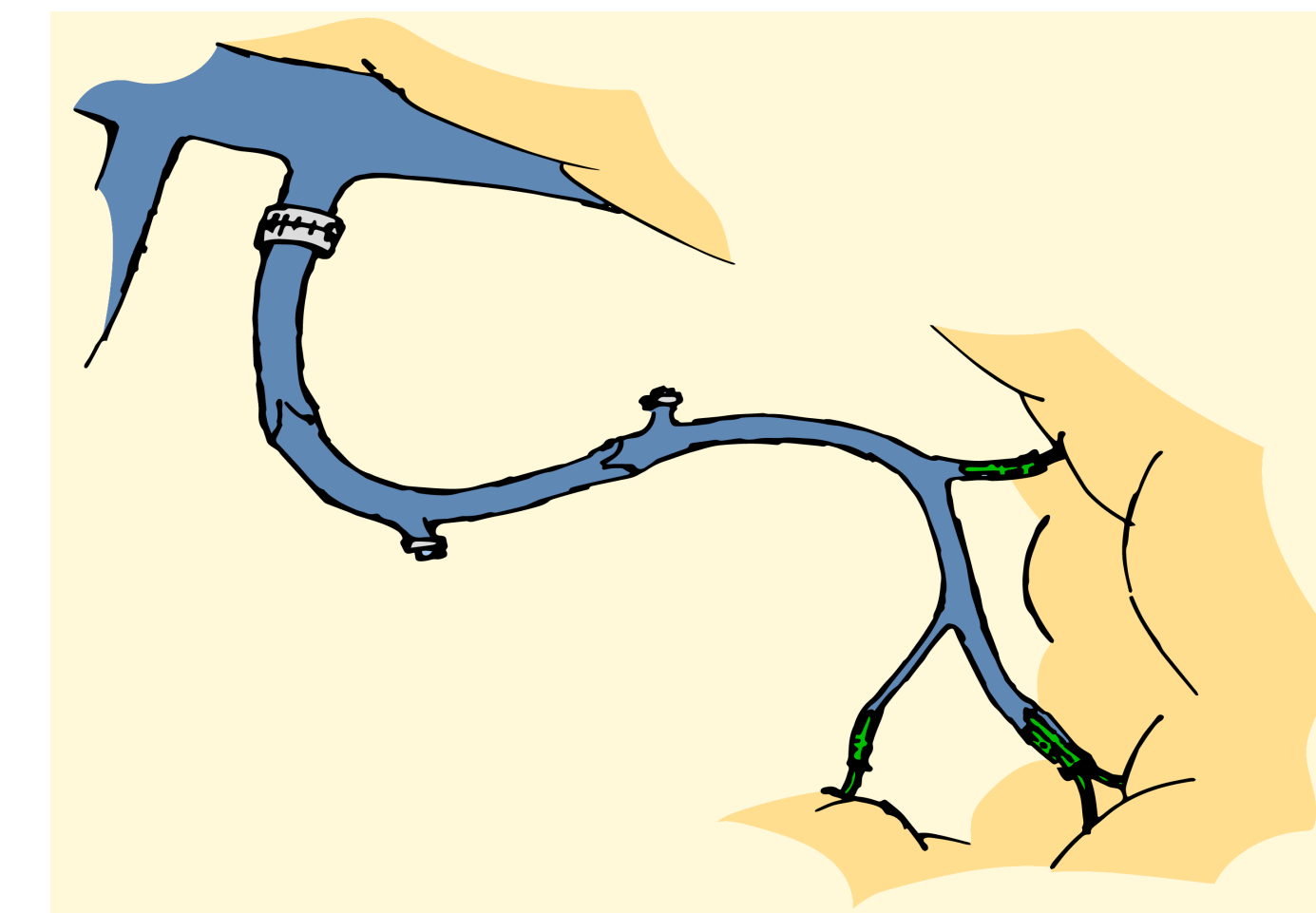


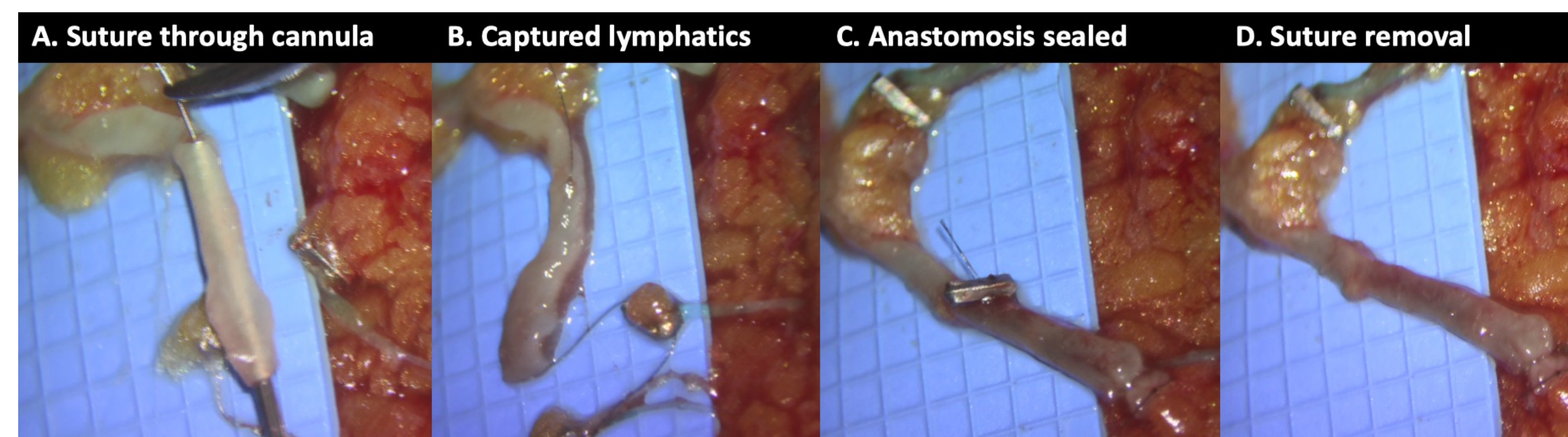
Figure 2. BVG coupled to vein with LVB



Technique

- 8-10 cm SCIV BVG harvested (**Figure 1**) and coupled to recipient vein (**Figure 2**)
 - Valves used to prevent venous reflux
- 27-gauge cannula placed into each BVG lumen to safely pass 10-0 suture into lumen (**Figure 3A**)
- Lymphatic vessels captured (**Figure 3B**) and intussuscepted by passing suture through BVG again
 - Overlap of 4-6mm without bunching or kinking
- Anastomosis sealed (**Figure 3C**) and suture removed (**Figure 3D**) to avoid lymphatic obstruction

Figure 3. Cannula intussusception technique for LVB



Results

- 9 patients, mean age 51 years
- All had ALND: 6 for breast cancer, 1 for cutaneous malignancy
- Mean 3.2 lymphatics captured per patient (range 1-5)
- Mean follow up 8.4 months
- Impedance ratios (normal range <1.07): 1.018 ± 0.033 at 1 mHz; 1.019 ± 0.032 at 5 mHz
- No clinical or subjective evidence lymphedema
- 5 patients responded to LYMPH-Q questionnaire

Table 1. LYMPH-Q Scores (out of 100)

Patient	Symptoms	Function	Appearance	Psychosocial
1	100	100	100	81
2	79.5	100	100	92
3	20	66	100	100
4	92	74	81	59
5	100	85	100	77

Conclusion

- Using a BVG addresses the axillary geographic and physiologic challenges by providing:
 - Adequate length for tension-free anastomosis
 - Increased number of vein openings
 - Bypass options for multiple lymphatic locations
 - Adequate overlap for effective intussusception
 - Valves to prevent reflux
- Limitations include small sample size and short-term follow up
- Investigation of long-term outcomes is needed in the future

References

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3. Friedman R, Bustos VP, Postian T, et al. Utilizing a lower extremity vein graft for immediate lymphatic reconstruction. *J Plast Reconstr Aesthet Surg* 2022;75(8):2831-2870, doi:10.1016/j.bjps.2022.06.076