Relationship between Vein Repairs, Postoperative Transfusions, and Survival in Single Digit Replantations

Michael T. Milone[1], Christopher S. Klifto[1], Z-Hye Lee[2], Vishal Thanik[2], Jacques H. Hacquebord[1,2]
[1]NYU Langone Orthopedics, [2] Hansjörg Wyss Department of Plastic Surgery at NYU

Department of Orthopedics
Hansjörg Wyss Department of Plastic Surgery
Division of Hand Surgery

INTRODUCTION

- Replantation success requires restoration and balance of arterial inflow and venous outflow
- Traditional teaching is to repair two veins per artery
- Depending on mechanism and degree of injury, anastomosing additional veins can be very challenging and require significant additional operative time.

PURPOSE & HYPOTHESIS

- The primary purpose of this study is to assess the relationship between number of veins repaired and replant survival
- We hypothesize that increased number of vein repairs leads to improved venous outflow, resulting in lower need for iatrogenic leeching and bleeding, lower transfusion requirements, and better survival rates

METHODS

- Retrospective review of past 10 year adult single digit replants at single urban academic replant center
- Data collected:
  - Age, sex, smoking status
  - Mechanism, level, digit, associated fracture
  - Veins repaired
  - Postoperative transfusions, leeching requirements
  - Replant survival
- Statistical testing:
  - Paired t-tests

RESULTS

- 54 single digit replants
  - 49 males, 13 smokers
  - 18 thumb, 6 index, 13 long, 11 ring, 6 small
  - 38 lacs, 6 crushes, 5 avulsions, 5 guillotines
  - Proximal phalanx most common level (21)
  - 37 with concomitant fractures

- Single digital artery repaired in all cases
  - 44% artery anastomosed with vein graft
- Mean of 1.5 veins repaired/digit (range 0-3)
- Mean transfusion 1.7 units
- Mean LOS 10.2 days
- Digit survival rate: 50%

- Increased transfusion units was associated with decreasing survival rates (R=-0.23)
  - 0-1 transfusions: 57% survival
  - 4+ transfusions: 27% survival

- Bimodal distribution between vein repairs and both transfusions and survival rates
  - Less transfusions (p=0.01) and higher survival for 1 or 2 vein repairs versus 0 or 3 vein repairs

- No difference between 1 or 2 vein repairs in
  - Transfusion requirements (p=0.75)
  - Survival (p=0.78)

- No correlation between survival and smoking, all smokers with 1 to 2 veins repaired survived

FIGURE 1: SURVIVAL VS TRANSFUSIONS

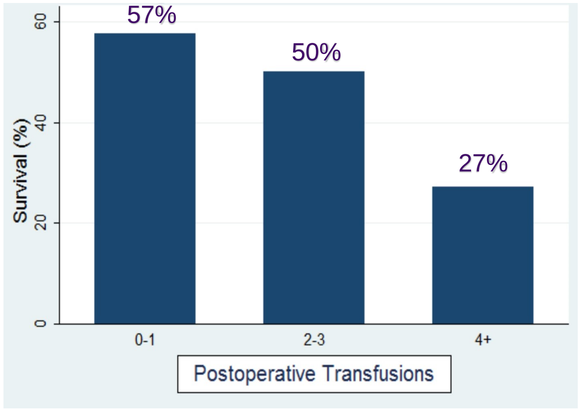


FIGURE 2: TRANSFUSIONS VS. VEINS REPAIRED

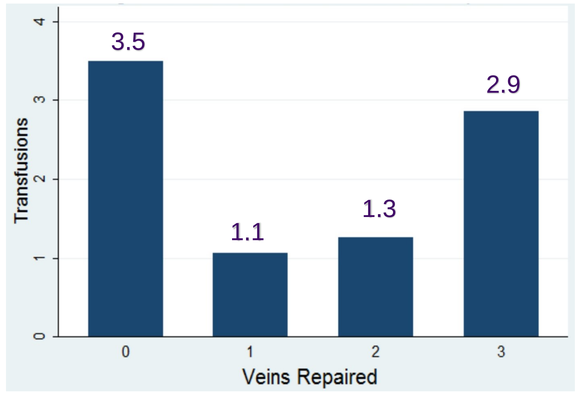
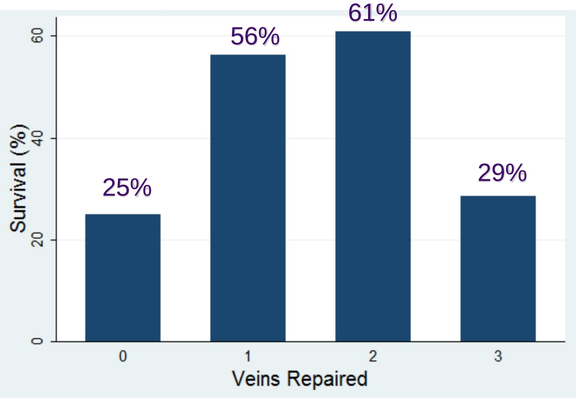


FIGURE 3: SURVIVAL VS VEINS REPAIRED



CONCLUSIONS

- Higher transfusion requirement and poorer survival in digits replanted with 0 or 3 veins repaired compared to 1 or 2 veins repaired
- No difference between 1 or 2 veins repaired
- This did NOT support our hypothesis that more vein repairs were protective against bleeding, transfusions, and replant failure
- Results are contradictory to common teaching that emphasizes 2 veins per arterial repair
- Theorize two potential reasons for this finding
  - Patients obtained 3rd vein repair because first two yielded poor intra-operative flow (suggest quality, not quantity of vein repairs is protective against venous congestion)
  - More veins causes for lower pressure flow increasing risk of thrombosis

No conflicts of interest reported; Corresponding Author (MTM) Michael.Milone@nyumc.org