2022 MID-ATLANTIC CONFERENCE

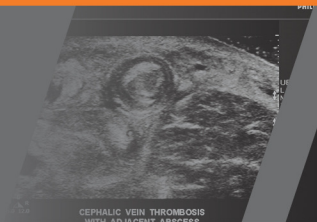
10th ANNUAL CURRENT CONCEPTS IN

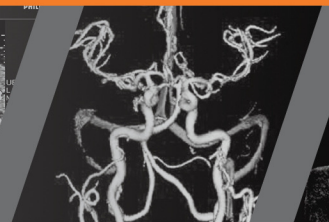
VASCULAR THERAPIES

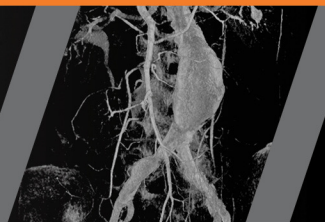
2022

Hilton Virginia Beach Oceanfront
Virginia Beach, Virginia

APRIL 28-30







Sentara Vascular Specialists

2022 MID-ATLANTIC CONFERENCE

10th ANNUAL CURRENT CONCEPTS IN

VASCULAR THERAPIES

2022

Comparing Options for Open or Endovascular Surgery in Critical Limb Ischemia

Christopher L Stout MD, FACS, RPVI

Director Lab and Outpatient Based Angiosuite

Rogers, Arkansas

Ozark Regional

VEIN & ARTERY CENTER

Disclosures

- Terumo: speaker, advisory
- CSI: speaker, advisory
- BD: speaker

To obtain best outcomes we need to shift from a one-size fits all approach to doing what's best for each subset

Objectives

- -Evolution of vascular treatment
- -Understand morbidity of vascular surgery
- -Realize the limitations of vascular surgery
- -Realize the limitations of endovascular

Must consider all treatments if you treat CLI

ATHEROSCLEROSIS or is **ATHEROTHROMBOSIS** a better term???

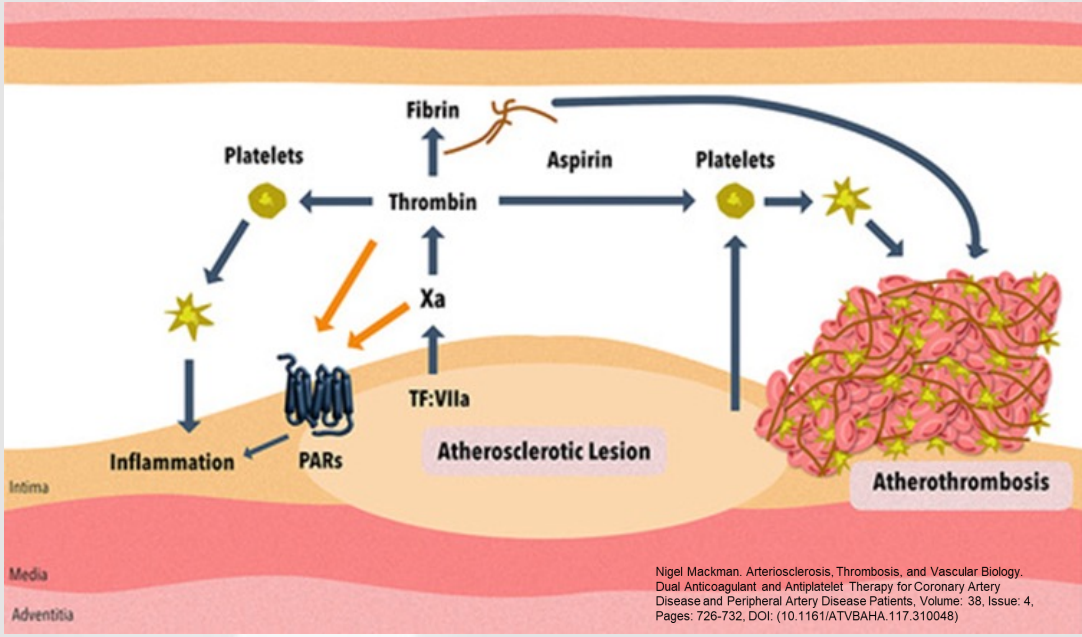
Lifestyle Changes

Medical Therapy
*Thrombin
*Platelets

Open or Endovascular Therapy

Wound palliation or healing goals

Patient Expectations



Nigel Mackman. Arteriosclerosis, Thrombosis, and Vascular Biology. Dual Anticoagulant and Antiplatelet Therapy for Coronary Artery Disease and Peripheral Artery Disease Patients, Volume: 38, Issue: 4, Pages: 726-732, DOI: (10.1161/ATVBAHA.117.310048)

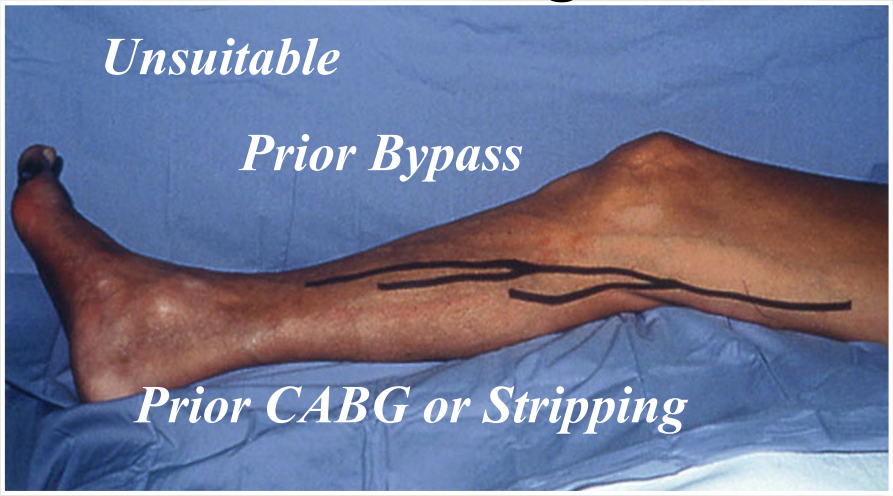
Evolution of Open Vascular Surgery

- France – 1948, Kunlin reversed vein Fempop bypass
- Boston – 1962, Linton/Darling took it to mainstream
- London – 1959, Rob in-situ bypass (too time consuming)
- Norway – 1962 Hall adjusted in situ and it took off
- USA – 1963 Techniques and equipment changes to help lyse valves/bypass with vein
- USA – 1976 Johnson, ePTFE
- Netherlands 1995 – Moll, Remote Endarterectomy

Why the evolution of open surgery?

???? What would patency rate for GSV bypasses be if intention to treat analysis was used in all trials and 40% of patients don't have vein????

Vein shortage



Vein morbidity

The Wound Infection Problem

1. SVS VQI data reveals infection rate just for femoral endarterectomy is much higher than the “textbook”.
2. More publications are looking at prophylactic muscle flaps in groin
3. We have wound vacs, silver dressings, antibiotic dressings, etc…about as many atherectomy devices and this tells me nothing works as a one size fits all big government approach

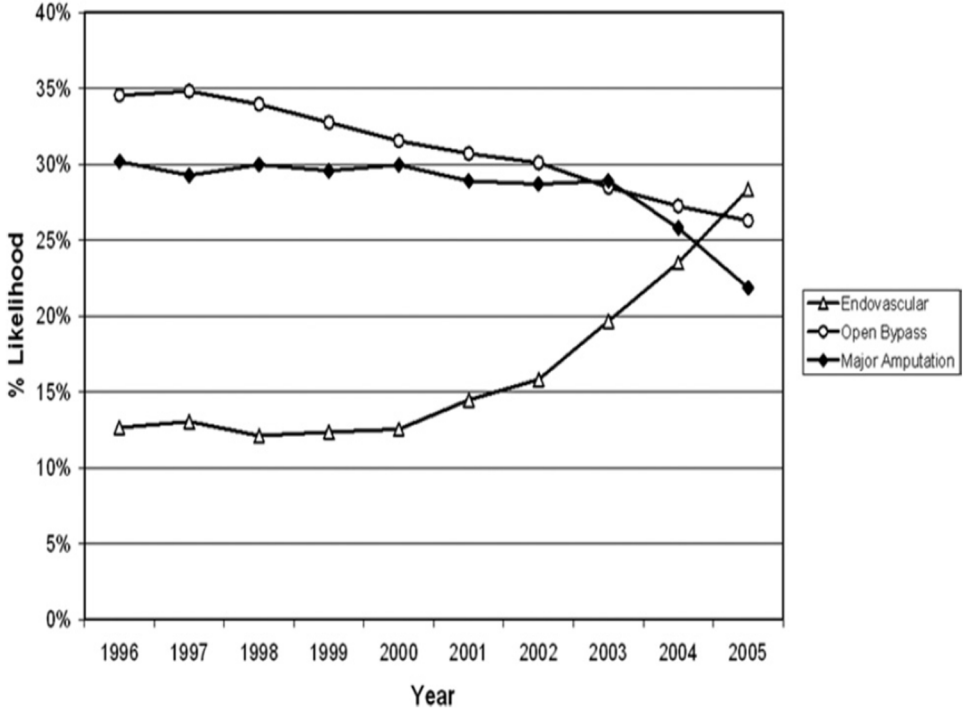
Endovascular Evolution

- We all have seen one form or another of this
- *The next 2 papers are during this time period*

From the Western Vascular Society

Patterns of treatment for peripheral arterial disease in the United States: 1996-2005

Vincent L. Rowe, MD,[a] William Lee, MD,[a] Fred A. Weaver, MD,[a] and David Etzioni, MD, MSHS,[b,c]
Los Angeles, Calif



Patient recovery after infrainguinal bypass grafting for limb salvage

Alexander D. Nicoloff, MD, Lloyd M. Taylor, Jr., MD, Robert B. McLafferty, MD, Gregory L. Moneta, MD, and John M. Porter, MD, *Portland, Ore.*

(J Vasc Surg 1998;27:256-66.)

Ideal Outcomes

1. **Uncomplicated Procedure / Survival**
2. **Elimination of Ischemia**
3. **Prompt Healing**
4. **Rapid Return to premorbid functional status**
5. **Absence of disease recurrence or repeat surgery**

Conclusions: Most patients who undergo infrainguinal bypass surgery for limb salvage require ongoing treatment and have persistent or recurrent symptoms until their death. A significant minority have major tissue loss despite successful initial surgery. Clinically important palliation is frequently achieved by bypass surgery, but ideal results are distinctly infrequent. (J Vasc Surg 1998;27:256-66.)

Great Patency Data, But…

Table III. Life table analysis of conventional measures in the 112 study-group patients

	Assisted primary patency(SE)	*Limb salvage (SE)*	*Survival (SE)*
6 mo	93.1% (0.03)	94.9% (0.02)	81.3% (0.04)
3 yr	87.6% (0.04)	93.5% (0.03)	61.8% (0.05)
5 yr	77.3% (0.05)	86.9% (0.04)	49.0% (0.05)

24% Surgical Site Wound Complication

Table V. Time to wound healing of operative and ischemic wounds in those patients that did heal

	Operative wounds (mo)	*Ischemic wounds (mo)*	*All wounds (mo)*
Mean	1.9	5.2	4.2
Median	1.3	3.4	2.7
Range	0.4 to 10.1	0.4 to 48.3	0.4 to 48.3
SD	1.7	7.7	6.3

27% Living at home - Became Non-Independent
30% of Ambulators - Became Non-Ambulatory

Table IV A. Patient functional status—ambulation

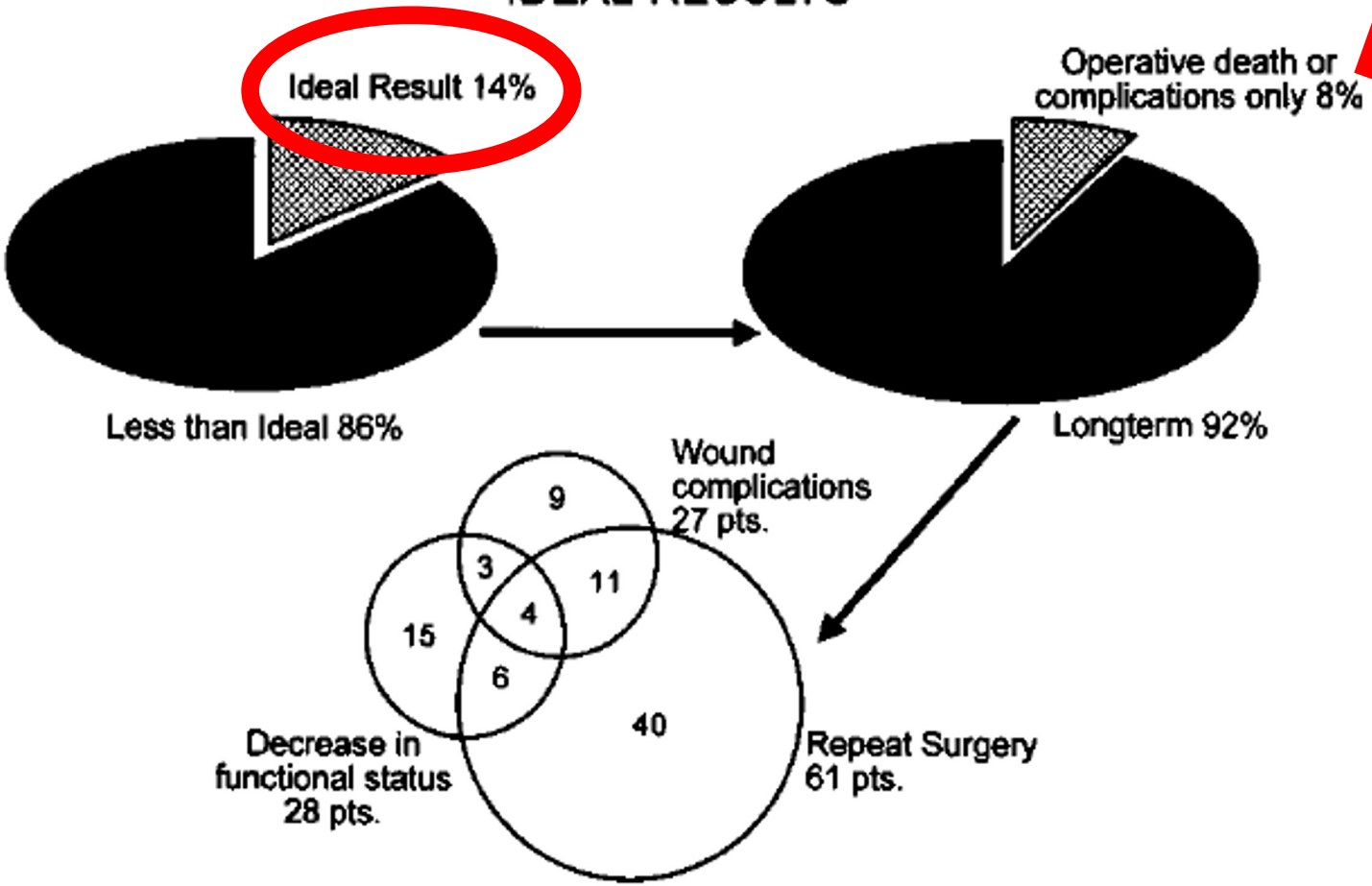
	Preoperative status	*Operative death*	*Postoperative status*		*Status at last follow-up or late death*	
			Amb	*Nonamb*	*Amb*	*Nonamb*
Ambulatory	103 (92%)*	5 (5%)	87 (84%)	11 (11%)	72 (70%)	26 (25%)
Nonambulatory	9 (8%)*	2 (22%)	3 (33%)	4 (44%)	3 (33%)	4 (44%)
Total	112 (100%)	7 (6%)	90 (80%)	15 (14%)	75 (67%)	30 (27%)

Table IV B. Patient functional status—living

			Independ.	*Assisted*	*Depend.*	*Independ.*	*Assisted*	*Depend.*	*No info*
Independent	99 (88%)*	7 (7%)	65 (66%)	17 (17%)	10 (10%)	72 (73%)	4 (4%)	14 (14%)	2 (2%)
Assisted	10 (9%)*			6 (60%)	4 (40%)	6 (60%)	3 (30%)	1 (10%)	
Dependent	3 (3%)*				3 (100%)			3 (100%)	
Total	112 (100%)	7 (6%)	65 (58%)	23 (21%)	17 (15%)	72 (64%)	10 (9%)	20 (18%)	3 (3%)
Independent and ambulatory	96 (86%)*			54 (56%)			65 (68%)		

Amb, Ambulatory, *Nonamb,* nonambulatory (wheelchair, bedbound, or transfer only); *Independent,* home and independent; *Depend,* dependent; *No info;* information not available.
*Percentages refer to total of 112 study patients.

INFRAINGUINAL BYPASS FOR LIMB SALVAGE
IDEAL RESULTS



Cost of 5-yr limb salvage rate of 87%

- **7% Periprocedure Mortality**
- **26% Periprocedure Complication Rate**
- **24% Wound Complication Rate**
- **54% Require Reoperation**
- **23% Still Require MAJOR Amputation**
- **27% Couldn't live at home anymore**
- **30% relegated to wheelchair or bedbound who walked prior to operation**
- **~ 2 months to heal surgical wound**
- **~ 5 months to heal ischemic wound**

Wound healing and functional outcomes after infrainguinal bypass with reversed saphenous vein for critical limb ischemia

Jayer Chung, MD,[a] Becki B. Bartelson, PhD,[b] William R. Hiatt, MD,[b] Brian D. Peyton, MD,[a] Robert B. McLafferty, MD,[c] Charles W. Hopley, BA,[b] Kelli D. Salter, MD, PhD,[a] and Mark R. Nehler, MD,[a] *Denver, Colo; and Springfield, Ill*

(J Vasc Surg 2006;43:1183-90.)

- **Summary: <u>ONLY 5.6% Achieved "IDEAL OUTCOME"</u>**

1. **Primary Patency 63% 1 yr / Limb Salvage 85% 1 yr**
2. **10% Died before wounds healed**
3. **42% Healed Ischemic wounds by 6 month**
4. **Ambulatory Status decreased 19% / 5% loss of independence**
5. **1.2% Mortality Rate and 32% Periop Complication Rate**
6. **45% Reoperation Rate**

Conclusions: Despite achieving the anticipated graft patency and limb salvage results, 25% of patients did not realize wound healing at 1 year of follow-up, 19% had lost ambulatory function, and 5% had lost independent living status. Prospective natural history studies are needed to further define the functional outcomes and their predictors after infrainguinal bypass for CLI. (J Vasc Surg 2006;43:1183-90.)

The need for evolution to endovascular

Risk of MI, CVA, Wound Infection, Death, Hospital Stay, Skilled Nursing Facility or Rehab

vs

Risk of Access Site Bleeding, CIN, Failure of Endo, Need Repeat “Same Day” Procedure, Admit 23 hr obs or go home.

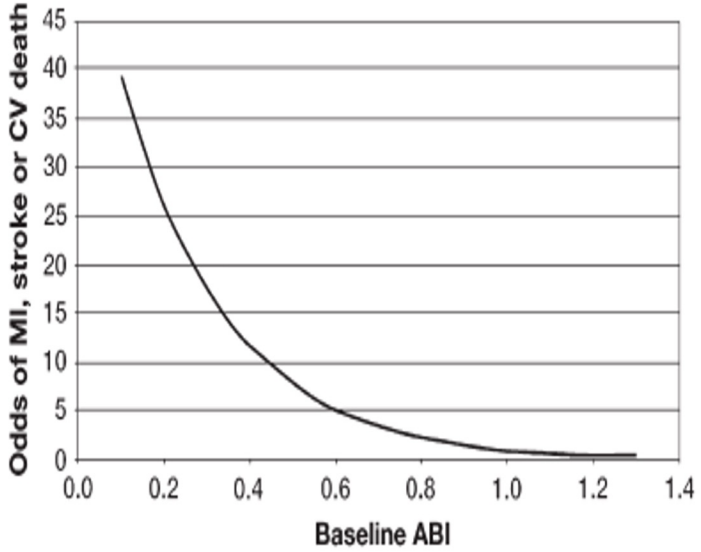


Fig. A9. Adjusted odds of a cardiovascular event by ankle-brachial index.[29] Data from the placebo arm of the Appropriate Blood Pressure Control in Diabetes study[29] show an inverse correlation between ABI and odds of a major cardiovascular event. ABI – ankle-brachial index; CV – cardiovascular; MI – myocardial infarction. Reproduced with permission from Mehler PS *et al. Circulation* 2003;107:753–756.

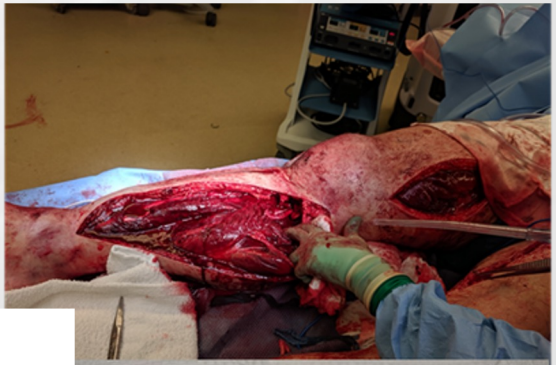
Transluminal atherectomy for occlusive peripheral vascular disease. Simpson JB, et al. Am J Cardiology. 1988.

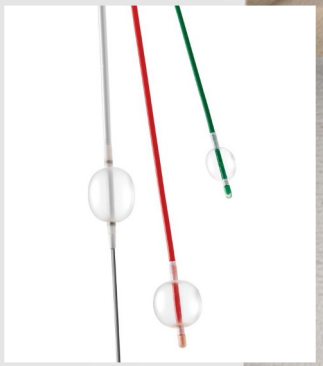
- **Atherectomy**
  - Directional, Rotational, Orbital, Archimedes Screw, Photoablative
- **Angioplasty**
  - Plain Old, drug, cryo, infusion, cutting, wire, soft, hard
- **Stent**
  - INFINITY and BEYOND!!!!

Evolution of acute vascular Rx helping us treat CLI and Endocomplications

EMBOLECTOMY CATHETER Patent Filed May 27, 1964 INVENTOR. THOMAS J. FOGARTY

Lysis/*Suction Thrombectomy/Mechanical Thrombectomy/Perc Catheters/etc…1990's*





VS

https://patents.google.com/patent/US3435826A/en?q=thrombectomy&inventor=Thomas+J+Fogarty&oq=inventor:(Thomas+J+Fogarty)+thrombectomy

Summary: Primum Non Nocere

- Medical Therapy Evolving

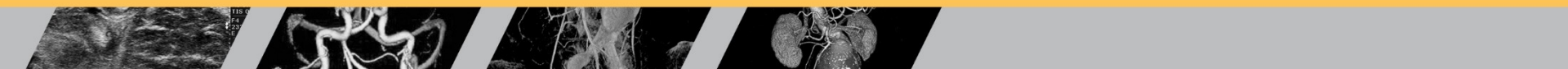
  -*Antiplatelets and Thrombin Inhibitors Important*
- Open Surgery Evolving

  -*Wound and Patient expectations Important*
- Endovascular Interventions Evolving

  -*Multiple devices = Complex disease → One size fits all does not work*

  -Complications can be managed by endovascular options most of the time

- We must work closely with our primary care specialist, wound care specialist, podiatrist, and IC/IR colleagues to benefit the patient



Thank-you

Ozark Regional
VEIN & ARTERY CENTER