

Wifi classification does not predict limb  
amputation risk in dialysis patients  
following critical limb ischemia  
revascularization

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# Disclosure

Speaker name:

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I have the following potential conflicts of interest to report:

- Consulting
- Employment in industry
- Stockholder of a healthcare company
- Owner of a healthcare company
- Other(s)
  
- I do not have any potential conflict of interest

# Background

- The Society for Vascular Surgery's (WIFI) classification:
  - Wound (0-3)
  - Ischemia (0-3)
  - foot Infection (0-3)
- Predicts amputation risk and revascularization benefit in patients affected by Critical Limb Ischemia(CLI).

**a, Estimate risk of amputation at 1 year for each combination**

	Ischemia - 0				Ischemia - 1				Ischemia - 2				Ischemia - 3			
W-0	VL	VL	L	M	VL	L	M	H	L	L	M	H	L	M	M	H
W-1	VL	VL	L	M	VL	L	M	H	L	M	H	H	M	M	H	H
W-2	L	L	M	H	M	M	H	H	M	H	H	H	H	H	H	H
W-3	M	M	H	H	H	H	H	H	H	H	H	H	H	H	H	H
	f-0	f-1	f-2	f-3	f-0	f-1	f-2	f-3	f-0	f-1	f-2	f-3	f-0	f-1	f-2	f-3

**b, Estimate likelihood of benefit of/requirement for revascularization (assuming infection can be controlled first)**

	Ischemia - 0				Ischemia - 1				Ischemia - 2				Ischemia - 3			
W-0	VL	VL	VL	VL	VL	L	L	M	L	L	M	M	M	H	H	H
W-1	VL	VL	VL	VL	L	M	M	M	M	H	H	H	H	H	H	H
W-2	VL	VL	VL	VL	M	M	H	H	H	H	H	H	H	H	H	H
W-3	VL	VL	VL	VL	M	M	M	H	H	H	H	H	H	H	H	H
	f-0	f-1	f-2	f-3	f-0	f-1	f-2	f-3	f-0	f-1	f-2	f-3	f-0	f-1	f-2	f-3

fI, foot Infection; I, Ischemia; W, Wound.

Very low = VL = clinical stage 1  
 Low = L = clinical stage 2  
 Moderate = M = clinical stage 3  
 High = H = clinical stage 4  
 Clinical stage 5 would signify an unsalvageable foot

\*Mills et al, J.Vasc Surg. 2014

# Purpose of study

To verify the capacity of WIfI classification to predict limb amputation risk in dialysis patients treated for CLI by any revascularization technique.



# Methods

- January-2011 to December-2015
- Retrospective study of prospectively maintained data base.
- **Inclusion criteria:**
  - Dialysis patients with CLI (Rutherford 4-6)
  - Treated by any type of revascularization (Surgical, Endovascular or Hybrid)
  - Presence of complete data about wound characteristics, ischemia degree and extent of foot infection
- Patient's demographics and characteristics were assessed.
- Arterial disease extension was evaluated on available angiograms, CT-Angio and Duplex reports.
- Statistics: Descriptive, frequency statistics were used for population characteristics. Kaplan-Meier analysis with Log-Rank test was performed to compare LS between risk stages. Cox regression Univariate and Multivariate analyses were used to define risk factors.



# Methods

Limbs were stratified according to WIfI clinical stage

<i>Risk of amputation</i>	<i>Proposed clinical stages</i>	<i>WIfI spectrum score</i>
Very low	Stage 1	W0 I0 f0,1 W0 I1 f0 W1 I0 f0,1 W1 I1 f0
Low	Stage 2	W0 I0 f2 W0 I1 f1 W0 I2 f0,1 W0 I3 f0 W1 I0 f2 W1 I1 f1 W1 I2 f0 W2 I0 f0/1
Moderate	Stage 3	W0 I0 f3 W0 I2 f1,2 W0 I3 f1,2 W1 I0 f3 W1 I1 f2 W1 I2 f1 W1 I3 f0,1 W2 I0 f2 W2 I1 f0,1 W2 I2 f0 W3 I0 f0,1
High	Stage 4	W0 I1,2,3 f3 W1 I1 f3 W1 I2,3 f2,3 W2 I0 f3 W2 I1 f2,3 W2 I2 f1,2,3 W2 I3 f0,1,2,3 W3 I0 f2,3 W3 I1,2,3 f0,1,2,3

\*Mills et al, J.Vasc Surg. 2014



# Methods

## Endpoints:

- **Primary endpoint:**  
WIFI classification capability to differentiate **very low** and **high** limb amputation risk at 12 months.
- **Secondary endpoints:**
  - Limb Salvage (LS)
  - Primary (PP), Assisted (AP) and Secondary Patency (SP)
  - Patient Survival (S)
  - Risk factors for LS



# Results

<b>Limbs</b>	<b>142</b>
Patients	108
Bilateral disease	31.5%
Male	77.8%
Age	71.4 ± 8.8 yrs

<b>Comorbidities</b>	<b>(%)</b>
Coronary artery disease	60.2
Hypertension	85.4
Diabetes mellitus	56.6
Dyslipidemia	43.5
COPD	26.5
Active smoker	6.6
ASA 4	<b>45.4</b>

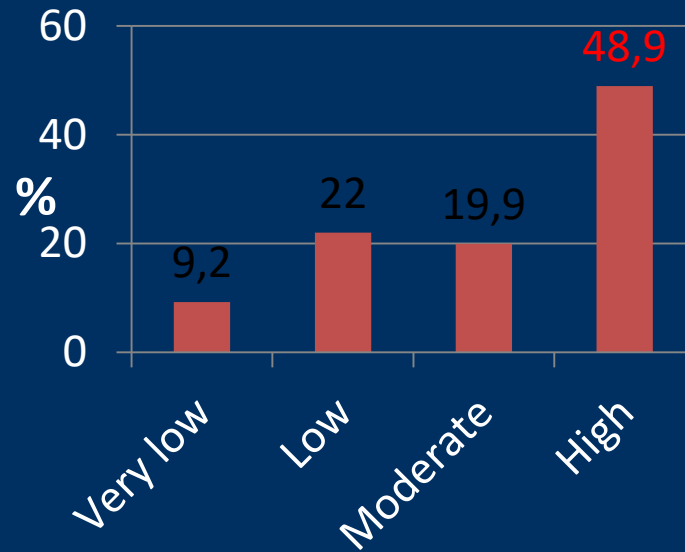




# Results

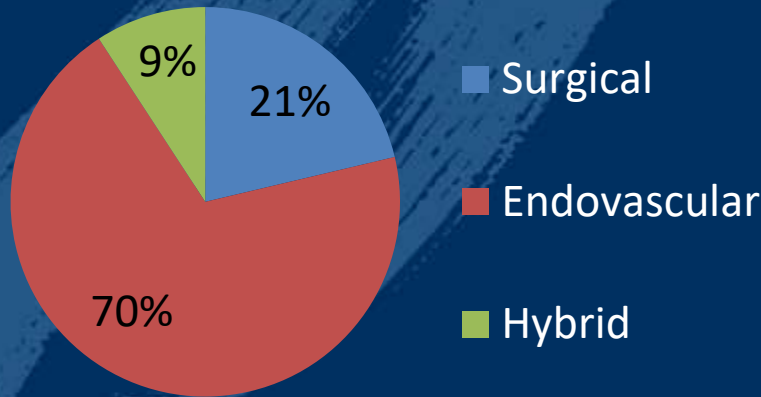
Arterial disease distribution	%
Superficial femoral artery	65.2
Popliteal artery	45.4
<b>Tibial arteries</b>	<b>95</b>

## Wifl Clinical stage distribution

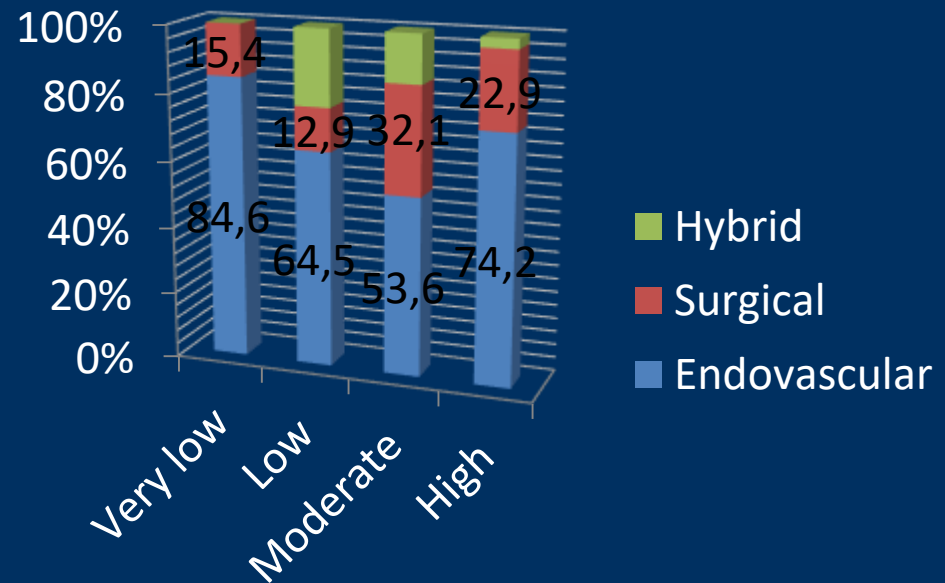


# Results

## Revascularization type



## Revascularization type and Wifl clinical stage



Technical success was 93.6%



# Results

Mean follow-up 15.7 months

	Limb salvage	Patient survival	Primary patency	Secondary patency
12-month	84.2%	53.3%	68.2%	86.9%
24-month	82.4%	29.6%	58.6%	83.9%

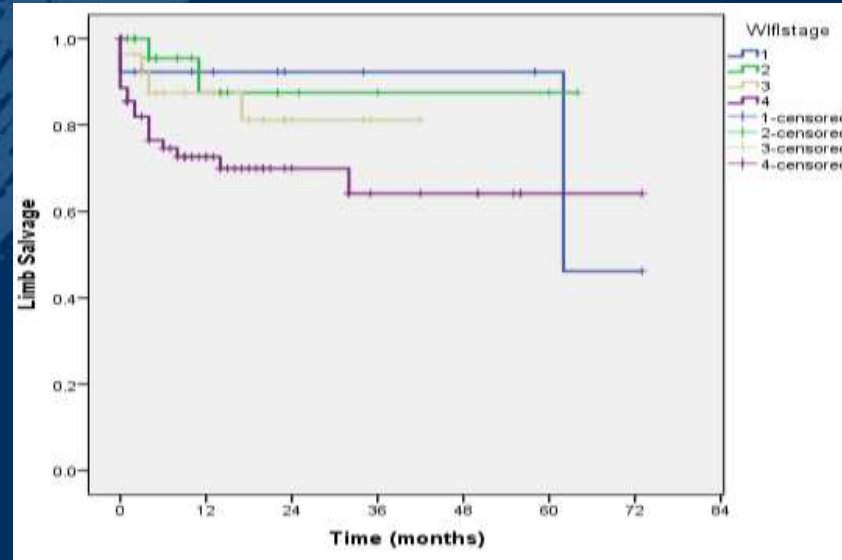
WIFI clinical stage effect at 12-month

	Limb salvage	Patient survival	Primary patency	Secondary patency
Stage 1	92.3%	61.5%	77.8%	88.9%
Stage 4	79.2%	45.8%	65.8%	86.6%



# Results

At 12 months there was **no significant difference** between very low and high risk Wifl stages in terms of Limb Salvage



- There was **no significant global difference** between Wifl stages in terms of Limb Salvage (Log-Rank  $P=0.49$ ).
- Even at 1-month and 24-month evaluation **no significant difference** between very low and high risk Wifl stages.



# Results

## Risk factors for Limb salvage:

### *Univariate analyses:*

#### **Negative predictors**

- wound extension  $P=0.015$
- popliteal artery disease  
 $P=0.047$

#### **Protective factors**

- arterial hypertension  
 $P=0.048$
- primary and assisted patency ( $P < 0.001$  and  $< 0.001$  respectively)

### *Multivariate analyses:*

#### **Negative predictor**

- wound extension confirmed  
( $P=0.003, HR=2.3$ )

#### **Protective factor**

- primary patency confirmed  
( $P=0.002, HR=8.7$ )



# Conclusions

- Wifl classification could not predict limb amputation risk in dialysis patients with CLI who underwent revascularization.
- Dialysis patients present very poor survival.
- A specific predictive model that considers patient survival and revascularization status is needed in this subgroup of patients.





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