The Influence of the TASC Classification on Outcomes of Pedal Amputations

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Statement of Purpose

The purpose of this study is to examine the correlation and influence of arterial lesions based on TransAtlantic Inter-Society Consensus (TASC) aortoiliac and femoropopliteal classifications and the rate of healing in various pedal amputations post endovascular intervention.

Methodology & Procedures

Study Design:
The electronic health records were reviewed for patients who had undergone distal fore-foot amputation and also received endovascular intervention within 90 days prior to amputation throughout the Kaiser Permanente Northern California region between January 2008 and December 2014.

Inclusion Criteria:
- Patients who underwent a distal forefoot amputation (toe, ray or TMA) preceded by endovascular intervention (percutaneous transluminal angioplasty, stenting or combination) within 90 days prior to pedal amputation.

Exclusion Criteria:
- Did not have continuous follow up or had open revascularization.

Comparison Groups Based on Level & Type of Arterial Lesions:
- Femoropopliteal (TASC I) and aortoiliac (TASC II) lesion categories:
  - Group 1 (TASC A and B)
  - Group 2 (TASC C and D)

Primary Outcomes:
- Healing of distal amputation.
  - Optimal: healed surgical site with suture removal within 2-4 weeks postoperatively.
  - Delayed: surgical site dehiscence which ultimately healed by secondary intention within 3 months with local wound care.
  - Failure: amputation that required either a revision surgery, surgical bypass, or a more proximal amputation within 12 months from the index amputation.

Analyses:
Chi-square or Fisher's exact tests to compare categorical variables.

Financial Disclosures: none

Literature Review

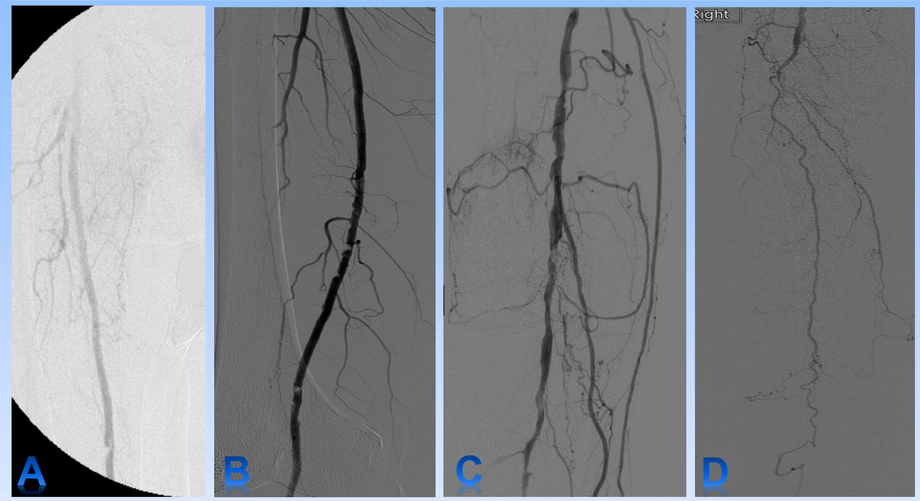
In 2000, 14 medical societies ranging from cardiology, vascular surgery, and interventional radiology published the TransAtlantic Inter-Society Consensus (TASC I) which included guidelines for the overall management and treatment of peripheral arterial disease (PAD).[1-3] The anatomic artery lesion classification, described within the consensus, provides surgeons with a treatment algorithm correlating the location and diverse patterns of PAD to the two types of revascularization, open versus endovascular repair. TASC A lesions, simple and short-segmented stenoses, are treated endovascularly compared to the open repair of TASC D lesions, which are described as multiple, complex occlusions.[1,4] The surgical management of TASC B and C lesions are primarily based on external factors such as patient comorbidities and surgeon experience.[2] In 2007, the document was updated and further differentiated the anatomic location of lesions into aorto-iliac (TASC II) and femoral-popliteal (TASC I).[1] It has been previously reported that TASC II A/B lesions in patients with critical limb ischemia have greater three-year freedom from amputation and vessel patency at 1 year after revascularization.[5]

To date, no studies have examined the relationship of TASC to healing various pedal amputations.

Table 1: Demographics

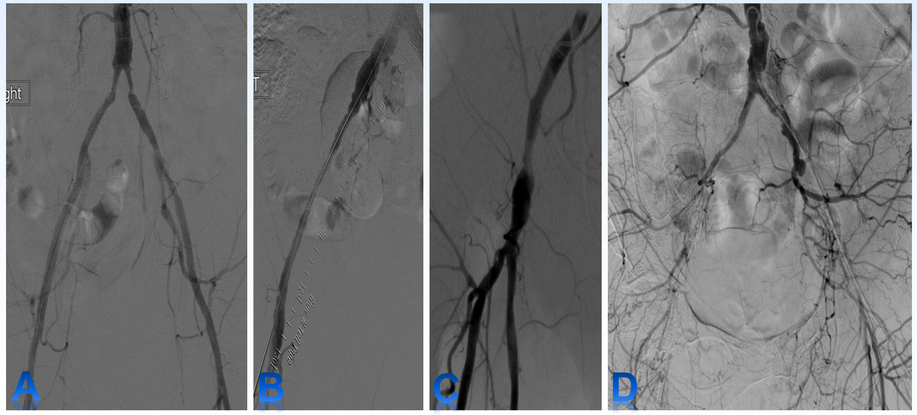
	N (%)
Gender	
Female	109 (35)
Male	201 (65)
Comorbidities	
Hypertension	296 (96)
Diabetes	277 (89)
ESRD	82 (27)
Current tobacco use	36 (12)
Cardiovascular disease (CVD, CAD, CHF)	228 (74)
Level of Amputation	
Toe	147 (47)
Ray	83 (27)
TMA	80 (26)

Figures 1. Femoropopliteal TASC A-D Lesions



A: Single stenosis < 3cm. **B**: Single stenosis / occlusion 3-10 cm. **C**: Single stenosis / occlusion > 5 cm. **D**: Complete CFA / SFA / pop or trifurcation occlusion.

Figures 2. Aortoiliac TASC A-D Lesions



A: Single stenosis < 10cm. **B**: Single stenosis / occlusion <15cm. **C**: Multiple stenosis / occlusion > 15cm. **D**: Chronic total occlusion > 20cm involving CFA / SFA / popliteal or trifurcation.

Results

- There were 256 patients with TASC I lesions and 68 patients with TASC II lesions.

	TASC	
	I Fem-Pop N (%)	II Aorto-Iliac N (%)
Group 1 (A & B)	154 (60.1)	61 (89.7)
Group 2 (C & D)	102 (39.9)	7 (10.3)
Total	256	68

- Figure 1 & 2 demonstrate femoropopliteal and aortoiliac TASC lesions A-D, respectively.
- There were no significant differences between optimal/delayed healing and failure in aortoiliac (**p=0.17**) or femoropopliteal (**p=0.72**) groups 1 (A & B lesions) and 2 (C & D lesions).
- Within the femoropopliteal cohort, 59% of group 1 lesions healed pedal amputations post endovascular intervention compared to 41% of group 2 lesions.
- No difference was found between optimal versus delayed healing in aortoiliac (**p=0.0529**) or femoropopliteal (**p=0.97**) groups 1 (A & B lesions) and 2 (C & D lesions).

Table 2: Comparison of TASC lesions with optimal/delayed healing to failure

Level of Lesions	Optimal/ Delayed N (%)	Failure N (%)	P value
TASC I (Fem-pop)	122 (47.6)	134 (52.4)	0.72
TASC II (Aorto-iliac)	36 (52.9)	32 (47.1)	0.17

Table 3: Comparison of TASC lesions optimal versus delayed healing

Level of Lesions	Optimal N (%)	Delayed N (%)	P value
TASC I (Fem-pop)	71 (58.2)	51 (41.8)	0.97
TASC II (Aorto-iliac)	23 (63.9)	13 (36.1)	0.0529

Analysis & Discussion

The aim of this study was to determine whether arterial lesions in patients with PVD, stratified by the TASC classification, are correlated with healing of various fore-foot amputations. Wound complications increase the mortality rate three-fold for lower extremity amputations.[6] Identifying the presence of PVD with non-invasive vascular studies coupled with revascularization prior to performance of pedal amputations is critical for successful wound healing. Lo and colleagues demonstrated that the TASC classification was a strong predictor of primary patency, restenosis and limb salvage rates.[7] Singh *et al.* recently analyzed the relationship between TASC II and limb outcomes in patients with critical limb ischemia.[5] It was concluded that the three year freedom from amputation and major adverse limb events as well as technical success and patency of vessel at 1 year was greater for TASC A/B lesions than TASC C/D. Recent literature emphasizes the importance of classifying the complexity of arterial lesions for prediction of limb salvage outcomes.

In contrast, our results conclude that there is no difference between revascularization of a TASC A & B short-segmented focal stenosis versus multiple, complex occlusions of TASC C & D lesions and its relationship with healing of pedal amputations.

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