Strategic Treatment for the Below the Knee Critical Limb Ischemia (BTK-CLI)



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Objective

- Natural history of patients with critical limb ischemia (CLI)
- Challenging in treatment the patients with below the knee critical limb ischemia (BTK-CLI)
- Strategy for revascularization in BTK-CLI
- Strategy to keep vessel patency: device, parameter for wound healing
- Strategy to reduce mortality

Fate of patient with Critical Limb Ischemia (CLI)

Fate of Patients With CLI After Initial Treatment Summary of 6-month outcomes from 19 studies





Critical limb ischemia is defined as ischemic rest pain, nonhealing wounds, or gangrene.

Dormandy JA, Rutherford RB. J Vasc Surg. 2000;31:S1-S296.

Angiographic Findings in Thai pts with critical Limb involved below the knee disease



- Isolated infrapopiteal diseases
 SFA diseases
- Iliac diseases

Wongpraparut et al, Oral presentation EuroPCR 2010

Anatomy

- 1. CIA
- 2. EIA
- 3. Deep iliac circumflex
- 4. Superficial iliac circumflex
- 5. Inferior epigastric
- 6. CFA
- 7. PFA
- 8. Medial femoral circumflex
- 9. Lateral femoral circumflex
- 10. descending branch of PFA
- 11. SFA
- 12. Descending geniculate
- 13.Popiteal artery
- 14. Lateral superior genicular
- 15. Medial superior genicular
- 19. anterior tibial
- 20. Tuberoperoneal trunk
- 21. Posteior tibial
- 22. Peroneal
- 24. DP



Below the Knee Diseases





Challenging problem when dealing with BTK-CLI

- Surgical outcome
- Concomitant coronary artery disease in BTK-CLI

Durability of Surgical Procedures



TASC II- European Journal Vascular Endovascular Surgery 2007; 33: S1-73

Overlap in Vascular Disease Affecting Different Territories



Wattanakit K., et al., JACC, 45(suppl A), 417A, 2005

Concomitant coronary artery disease in BTK-CLI

Male	30 (60%)		
Age (years)	71.8 <u>+</u> 12.3		
Comorbid disease			
Diabetes mellitus	41 (82%)		
Hypertension	46 (92%)		
Dyslipidemia	34 (68%)		
CAD	37 (72%)		
SVD	6 (12%)		
DVD	8 (16%)		
LM or TVD	22 (44%)		
Chronic renal failure	17(34%)		

Wongpraparut et al, oral presentation at Euro-PCR, May 2010 Paris, France

Endovascular Treatment for Critical Limb Ischemia



For individuals with combined inflow and outflow disease with CLI, inflow lesions should be addressed first.



For individuals with combined inflow and outflow disease in whom symptoms of CLI or infection persist after inflow revascularization, an outflow revascularization procedure should be performed.

Strategic for a challenging cases

- 1. Access
- 2. Strategy for revascularization: Tip and tricks
 - 1. Find the micro-channel
 - 2. Use calcified vessels as a road map
 - 3. Use retrograde techniques
 - 1. Via dorsalis pedis
 - 2. Via posterior tibia
 - 3. Via peroneal
 - 4. Knuckle wire with the microcatheter
- 3. Strategy to keep vessel patency: Device and Parameter for wound healing
- 4. Strategy to reduce mortality

Access: Antegrade approach



Tip and Tricks 1: Finding the Micro-channel



Tip and Tricks 2: Use calcium as a roadmap



Tip and Tricks 3: Retrograde via Dorsalis pedis









Tip and Tricks 4: Loop wire technique











Device

- PTA
- Bare metal stent
- Drug eluting stent
- Drug eluting balloon

Bare Metal stent in Treatment of Below-the-Knee Critical Limb Ischemia



Feiring A.et al.JACC 2004;44:2307-2314

Is long term patency needed for ulcer healing ?



DES placement for infrapopiteal disease at Faculty of Medicine Siriraj Hospital between October 2006 and November 2009



Wogpraparut et al. oral presentation at Euro-PCR, May 2010 Paris, France

Baseline demographic of 50 patients (56 limbs)

Male	30 (60%)	
Age (years)	71.8 <u>+</u> 12.3	
Symptom		
Critical limb ischemia	34(68%)	
Comorbid disease		
Diabetes mellitus	41 (82%)	
Hypertension	46 (92%)	
Dyslipidemia	34 (68%)	
CAD	37 (72%)	
SVD	6 (12%)	
DVD	8 (16%)	
LM or TVD	22 (44%)	
Chronic renal failure	17(34%)	
Smoking	14/42(33%)	

Wongpraparut et al, Abstract published in Eurointervention 2010; Volume 6: supplement H

Baseline Angiographic Characteristics

Lesion distribution	
Anterior tibial a.	44(78.6%)
Posterior tibial a.	37(66.1%)
Peroneal a.	27(48.2%)
Severity of disease: stenosis/occlusion	33 (58.8%)/ 27(41.2%)
Numberof stent vessel	
1 vessel	43(76.8%)
2 vessels	11(19.6%)
3 vessels	2(3.6%)
Mean number of stent/patient	2.16 <u>+</u> 1.57(1-8)
Mean diameter of stent (mm)	2.88 <u>+</u> 0.34(2-4)
Mean length of stent(mm)	63.5 <u>+</u> 47.3(12-230)

Wongpraparut et al, Abstract published in Eurointervention 2010; Volume 6: supplement H

ABI pre and post intervention



Wongpraparut et al, Abstract published in Eurointervention 2010; Volume 6: supplement H

In-Hospital and 1 year Outcome

	Total (50 pts/56 limbs)	
In hospital		
Amputation	0	
Procedure related death	0	
Complication Perforate Hematoma CIN Dissection	1(1.8%) 0 0 2(3.6%)	
At 1 year		
Repeat revascularization	1 (1.8%)	
Limb salvage	94.6%	

Wongpraparut et al, oral presentation at Euro-PCR, May 2010 Paris, France

Drug eluting Balloon for BTK critical Limb Ischemia



Liistro F.et al. Circulation 2013; 128: 615-21

Drug eluting Balloon for BTK critical Limb Ischemia



Liistro F.et al. Circulation 2013; 128: 615-21

Drug eluting Balloon for BTK critical Limb Ischemia: Restenosis PTA vs DEB



Liistro F.et al. Circulation 2013; 128: 615-21

Device: Pro-Con

Device	Bare Metal Stent	Drug Eluting stent	Drug eluting balloon
Better than PTA	~	~	~

Outcome Measurement

- Ankle brachial index (ABI)
- Transcutaneous Oxygen tension(Tc PO2)

Pre and Post-procedural Transcutaneous oxygen tension (TcPO2) measurement after DES placement



Junprapap, Wongpraparut et al. Abstract published in Atheriosclerosis, Thrombosis and Vascular Biology 2013; 33(5): A504



Do not Forget

- Work up for concomitant coronary artery disease: stress imaging
- Atherosclerotic Medicine for mortality reduction
 - Aspirin, Statin, ACE-I,
 Betablocker



Conclusion

- Patients with critical limb ischemia (CLI) only half alive without amputation
- Treating patients with BTK-CLI is challenge by poor surgical outcome due to concomitant CAD, difficult anatomy
- Applying coronary CTO-technique make a successful strategy for revascularization in BTK-CLI
- DES ± DEB is prefer device to keep long-term patency for wound healing
- Not only focus on the limb but also treatment atherosclerotic for mortality reduction