Experience With >1500 Retrograde Recanalizations For Chronic Total Occlussions (CTOs); What Predicts Technical Success And What Predicts Periprocedural Complications: Are Re-entry Devices Ever Helpful?

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Retrograde Recanalizations: Predictors of Technical Success and Complications?

Retrograde recanalizations are increasingly performed in complex lower extremity occlusions

High technical success and acceptable access-related complication rates were shown in large, multicenter registries[1, 2]

Little is known about predictors of technical success and access-related complication rates

[1] Schmidt et. al., JACC Cardiovasc Interventions, 2019
[2] Korosoglou…Blessing, JACC Cardiovasc Interventions, 2021

Retrograde Recanalizations: Technical Success, Safety?

Retrograde Access for the Recanalization of Lower-Limb Occlusive Lesions

A German Experience Report in 1,516 Consecutive Patients

SRH Klinikum Karlsbad
Universitätsklinikum Leipzig
GRN Klinikum Weinheim
Fürst Stirnum Klinik Bruchsal
Franziskus Krankenhaus Münster
Klinikum Hochsauerland Arnsberg

Korosoglou…Blessing, JACC Cardiovasc Interventions, 2021

Retrograde Recanalizations: Technical Success, Safety?

Successful punctures	1,494 (98.5)
Successful retrograde wire passage	1,389 (91.6)
Successful recanalization	1,410 (93.0)

Korosoglou…Blessing, JACC Cardiovasc Interventions, 2021

Retrograde Recanalizations: Technical Success, Safety?

Periprocedural complications	
Distal vessel occlusion	2 (0.1)
Distal hematoma	25 (1.6)
AV-fistulae	17 (1.1)
Compartment syndrome	3 (0.2)
Major amputation, procedure-related	1 (0.1)
Complications during 30 d of follow-up	
Minor amputations	42 (2.8)
Major amputations	27 (1.8)

3.1 %

Korosoglou…Blessing, JACC Cardiovasc Interventions, 2021

Retrograde Recanalizations: Predictors of Technical Success and Complications?

- Prospective single center registry
- 604 consecutive CTO cases
- Failed antegrade recanalization attempts
- 4 experienced interventionalists

Technical success: successful wire passage through occlusion, delivery of adjunctive therapy, residual stenosis <30 % at final angiogram

Complications: access-related events (bleeding, perforation, vessel closure, major amputation) <30 days after the intervention

Multivariate analysis for predictors of technical success and complications

Retrograde Recanalizations: Baseline characteristics

Baseline Characteristics	
Age, y	73.45 ± 11.1
Sex, male	393 (65.5)
Cardiovascular risk factors	
Hypertension	520 (86.2)
Hyperlipidemia	312 (51.7)
Diabetes	249 (41.3)
Smoking (previous or current)	173 (28.7)
Comorbidities	
Renal insufficiency (GFR<30 ml/min)	43 (7.0)
Coronary artery disease	209 (34.7)
Heart failure	58 (9.6)
Previous vascular surgery index leg	223 (37.2)
Bypass	145 (24.2)
Thrombendarterectomy	137 (22.9)
Other	12 (2.0)
Missing information	4 (0.7)
Clinical presentation	
Rutherford classificaton	
2	8 (1.3)
3	297 (49.3)
4	51 (8.5)
5	212 (38.5)
6	15 (2.5)

Claudicants: 50.5 %
CLTI: 49.5 %

Previous open vascular surgery at index leg: 37.2 %

Retrograde Recanalizations: Baseline characteristics

Target lesion location	
Iliacal	21 (3.5)
Femoro-popliteal	504 (83.6)
Below the knee	229 (38.0)
Kombination (femoro-popliteal + BTK)	130 (21.6)
Target lesion characteristics	
Lesion length	300.8 ± 146
0-190 mm	162 (26.9)
190-400 mm	294 (48.8)
> 400 mm	147 (24.4)
TASC (II)	
A	7 (1.2)
B	89 (14.8)
C	99 (16.5)
D	406 (67.6)
missing	2 (0.3)
PACSS	
0	255 (42.2)
1	30 (5.0)
2	74 (12.4)
3	29 (4.9)
4	212 (35.5)
missing	3 (0.5)

Lesion length: 300.8 mm

TASC C and D: 84.1 %

PACCS 3 and 4: 40.4 %

Sheathless: 84.7 %

Retrograde Recanalizations: Technical success and complications

Retrograde Interventions (n: 604)	
Successful retrograde puncture	591 (98.0)
Successful retrograde wire passage	547 (90.7)
Successful retrograde recanalization	543 (90.0)
Final Run-off	
0	15 (2.7)
1	226 (40.4)
2	193 (34.5)
3	125 (22.4)
missing	44 (7.3)
Adjunctive therapy	
POBA only	74 (12.3)
Drug-coated balloon	226 (37.5)
Baremetal Stent	359 (59.5)
Scoring balloon Angioplastie	7 (1.2)
DE-Stent Implantation	98 (16.3)
Covered Stents	30 (5.0)
Thrombektomie/Atherektomie	7 (1.2)
Lysis	11 (1.8)

Technical success: 90.0 %

Complication rate (access related): 3.0 %

Retrograde Recanalizations: Predictors of technical failure

Predictors of technical failure	Technical success n: 544	Technical failure n: 60
Sex		
female	36.6	18.3
male	63.4	81.7
Cardiovascular risk factors		
Hypertension	86.4	85.0
Hyperlipidemia	51.6	53.3
Diabetes	40.5	48.3
Smoking (previous or current)	29.3	23.3
Comorbidities		
Renal insufficiency (GFR<30 ml/min)	7.0	8.3
Coronary artery disease	34.4	36.7
Heart failure	9.0	15.0
Previous vascular surgery index leg	35.5	51.7
Bypass	23.0	30.0
Thrombendarterectomy	15.8	20.0
Other	1.9	3.4
Clinical presentation		
Rutherford Classification		
2	1.4	1.7
3	51.0	33.3
4	8.5	8.3
5	27.4	48.3
6	1.8	8.3
Claudicants	52.3	35.0
CLTI	47.7	65.0
Fontaine-Stadium		
IIa	1.3	1.7
IIb	50.6	33.3
III	8.5	8.2
IV	39.6	56.7

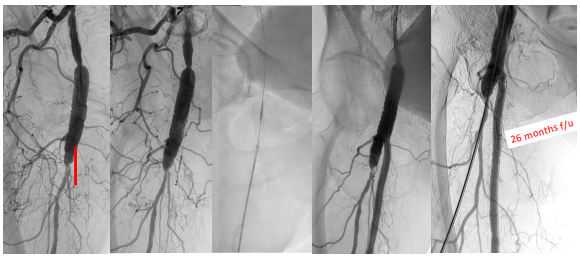
Retrograde Recanalizations: Predictors of technical failure

Predictors of technical failure	p-Value	Odds-Ratio	95 % Confidence interval
Sex: male vs. female	0.006	2.577	1.310 - 5.070
Previous open vascular surgery index leg	0.015	1.939	1.134 - 3.313
CLTI vs. Claudicants	0.012	2.036	1.167 - 3.553

Retrograde Recanalizations: Predictors of complications

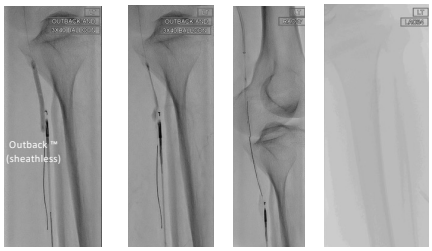
	No complication: n: 585	Complications: n: 19
Male sex	65.0 %	69.2 %
CLTI	49.4 %	50.1 %
Lesion length >200 mm	73.0 %	77.8 %
TASC C or D	83.9 %	88.9 %
PACS 3 or 4	39.9 %	50.0 %
Retrograde access:		
Femopopliteal	37.8 %	38.9 %
BTK	64.3 %	66.7 %
Both	2.7 %	5.6 %
Retrograde sheath usage	14.7 %	33.3 %

Case 1 Retrograde Recanalizations: Are re-entry devices ever helpful?



Images: Blessing

Case 2 Retrograde Recanalizations: Are re-entry devices ever helpful?



Courtesy of L. Patrone

Retrograde Recanalizations: Are re-entry devices ever helpful?

Retrograde use of the Outback re-entry catheter in complex infrainguinal arterial recanalizations

Lorenzo Patrone, MD,[a] Braham Dharmarajah, MD,[a,b] Grigorios Korosoglou, MD,[c] Selva Theivacumar, MD,[a] Muliadi Antaredja, MD,[d] Ralph Oberacker, MD,[d] Lisa Tilemann, MD,[d] *and* Erwin Blessing, MD,[d] *London, United Kingdom; and Weinheim and Karlsbad, Germany*

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Article

Target Balloon-Assisted Antegrade and Retrograde Use of Re-Entry Catheters in Complex Chronic Total Occlusions

Lorenzo Patrone [1,†], Nada Selva Theivacumar [1,†], Brahman Dharmarajah [1,2], Narayanan Thulasidasan [3], Athanasios Diamantopoulos [4], Luis Mariano Palena [4], Muliadi Antaredja [4], Lisa Tilemann [4] and Erwin Blessing [4,*]

Retrograde Recanalizations: Are re-entry devices ever helpful?

Outcomes. Successful infrainguinal, retrograde re-entry using the Outback re-entry catheter was achieved in 41 of 45 patients (91%). In all 41 patients, adjunctive therapy could be performed successfully with a documented patency and <30% residual stenosis at final angiogram.

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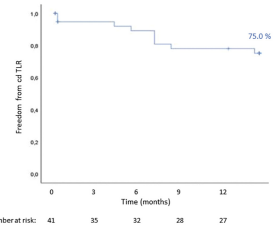
Retrograde Recanalizations: Are re-entry devices ever helpful?



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Conclusions

Our prospective registry confirms high acute technical success and acceptable access-related complication rates of retrograde recanalizations of complex CTOs

Male sex, CLTI and previous open vascular surgery of the index leg are predictors of technical failure of retrograde recanalization attempts

Sheath usage for retrograde access is the only significant predictor of retrograde access-related complications

Retrograde use of re-entry devices enhances technical success and enables wire passage even in cases previously not considered suitable for endovascular repair

Lack of long term follow up data after retrograde recanalizations