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Endovascular treatment of obstructive lesions of the popliteal artery with dynamic Angiography

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- **Disclosure**
- Speaker name:
- Minyi Yin
- 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



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Original Article

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Korean Journal of Radiology

KJR

The Primary Patency and Fracture Rates of Self-Expandable Nitinol Stents Placed in the Popliteal Arteries, Especially in the P2 and P3 Segments, in Korean Patients

Il Soo Chang, MD¹, Hyun Keun Chee, MD², Sang Woo Park, MD³, Ik Jin Yun, MD⁴, Jae Joon Hwang, MD⁵, Song Am Lee, MD⁶, Jun Seok Kim, MD⁷, Seong-Hwan Chang, MD⁸, Hong Geun Jung, MD⁹

- Retrospective, single arm
- From 2003 to 2009
- First generation nitinol stent
- **50% Stent fracture and 44% restenosis @ 6 months**

Circulation

JOURNAL OF THE AMERICAN HEART ASSOCIATION



Stent Placement Versus Balloon Angioplasty for the Treatment of Obstructive Lesions of the Popliteal Artery: A Prospective, Multicenter, Randomized Trial

Aljoscha Rastan, Hans Krankenberg, Iris Baumgartner, Erwin Blessing, Stefan Müller-Hulsbeck, Ernst Pilger, Dierk Scheinert, Johannes Lammer, Martin Giffler, Elias Noory, Franz-Josef Neumann and Thomas Zeller

Circulation. 2013;127:2535-2541; originally published online May 21, 2013;
doi: 10.1161/CIRCULATIONAHA.113.001849

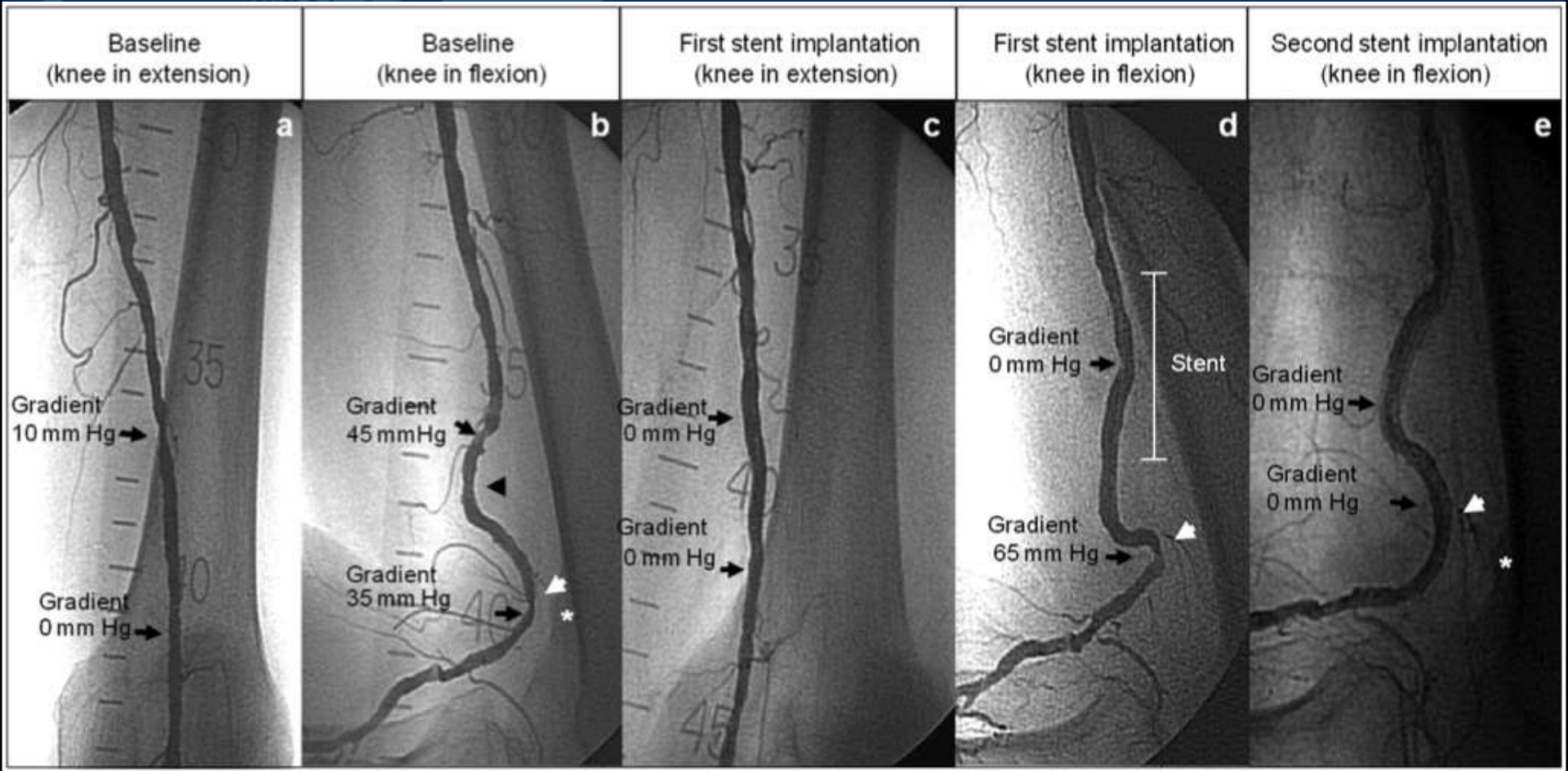
- Prospective, randomized, multicenter
- New generation nitinol stent
- **3.4% Stent fracture and 67.4% restenosis @ 12 months**
- No significant correlation between stent fracture and restenosis

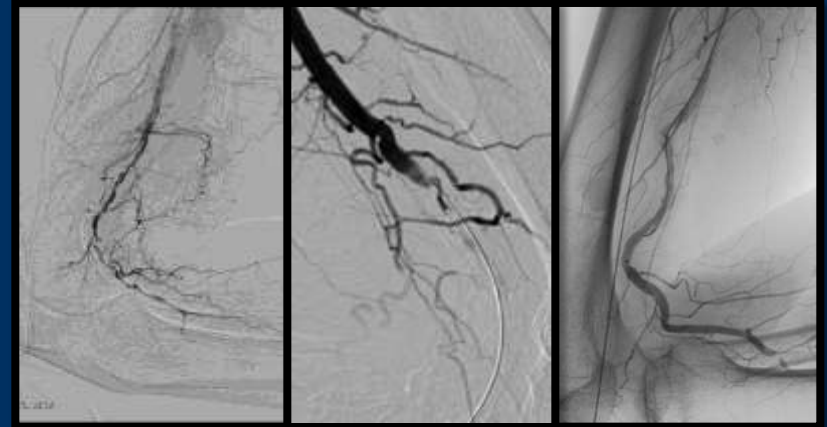
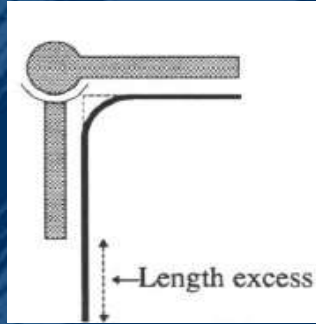


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Why Popliteal PTA+STENT
have relatively low patency rate?

Dynamic Angiography (Flexion position)





- Favorable flexibility and good retractility
- Relative motion in the Hunter's canal

- Calcified lesions lead to decreased arterial compliance and impaired systolic function
- The PA was fixed by fibrotic Hunter's canal

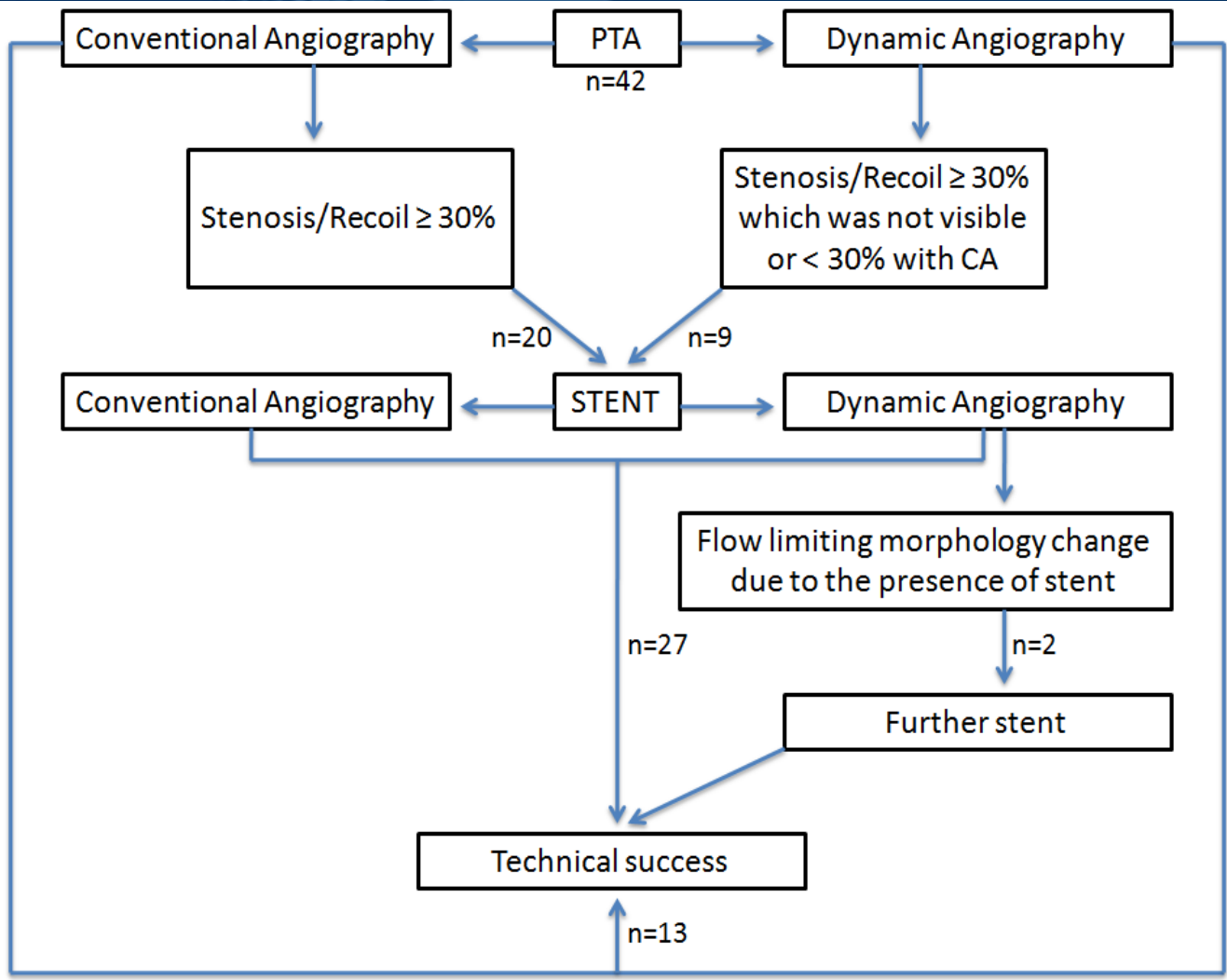


Study Design

- To evaluate efficacy, safety, and midterm patency of endovascular treatment of obstructive PA
- Retrospective evaluation from June 2011 to June 2014
- 43 patients were included
 - lack of adequate autogenous conduit (44.2%, 19/43)
 - without suitable runoff (32.6%, 14/43)
 - severe comorbidity (23.3%, 10/43)
- Exclusion criteria
 - acute limb ischemia
 - endovascular intervention for aneurysm, compression, or traumatism of the PA



Flow chart of treatment



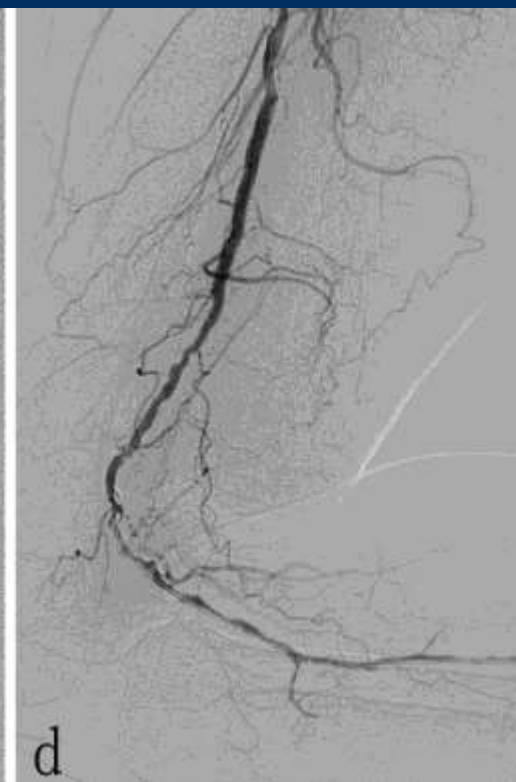
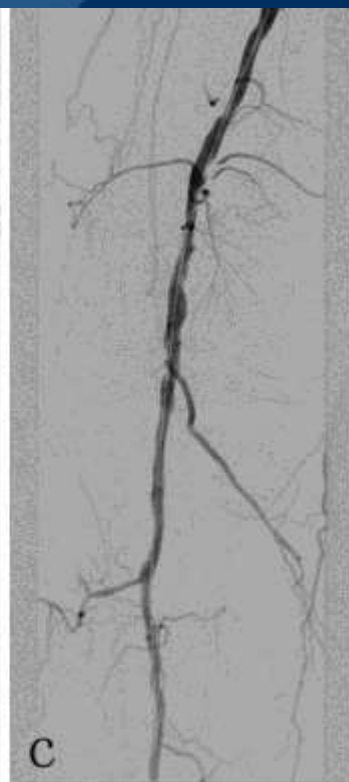
No significant stenosis after PTA in 13 cases with CA & DA

Significant stenosis after PTA in 20 cases with CA

No significant stenosis with CA, but significant stenosis with DA after PTA in 9 cases



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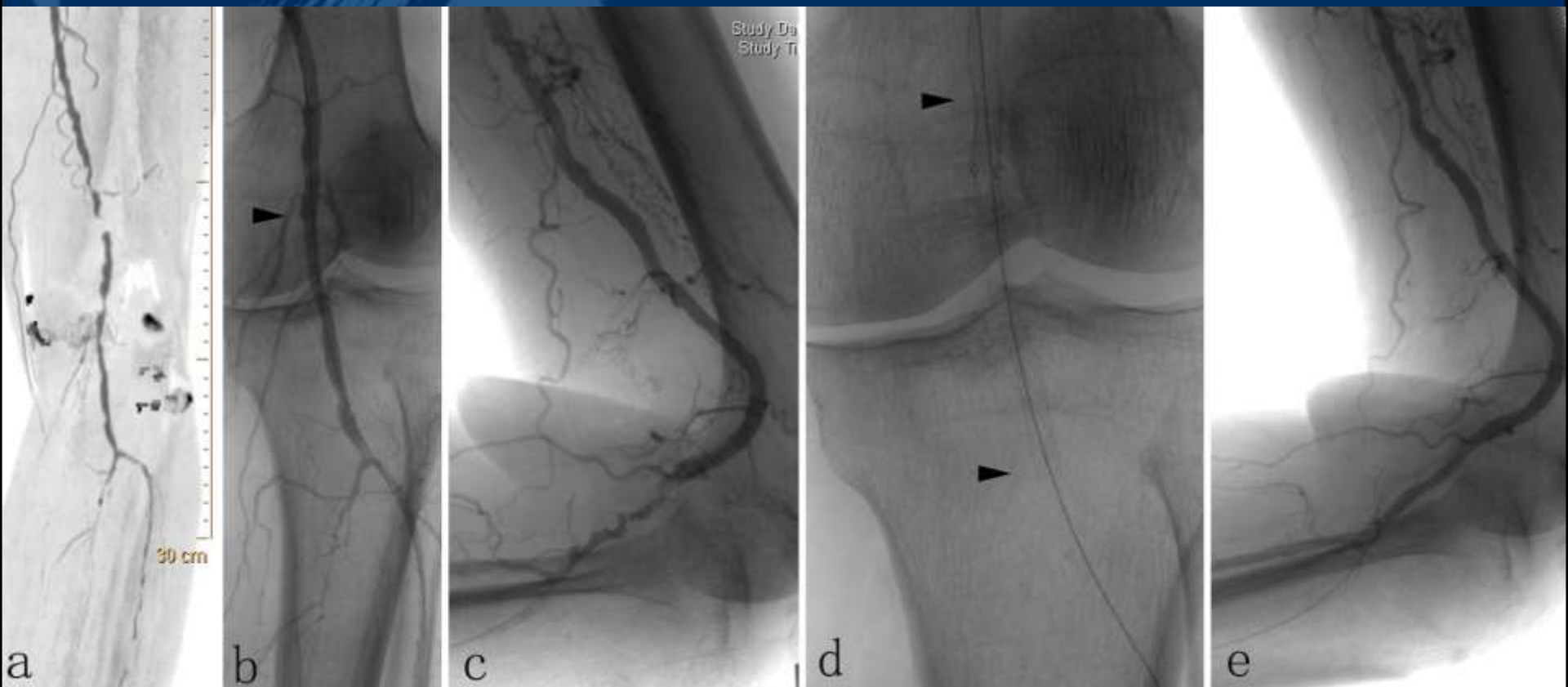
No significant stenosis after PTA with CA

**Significant stenosis
with DA**

Stenting



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**No significant stenosis after
PTA+STENT with CA,
but significant stenosis of P3 with DA**

P3 Stenting

Final angio

**Table 1. Demographic characteristics and comorbidities**

Variable	Median or n	Range or %
Age (y)	76	65–84
Male sex	29	67.4%
Left lower limb	23	53.5%
Comorbidities		
CAD	27	62.8%
Hypertension	36	83.7%
Hyperlipidemia	21	48.8%
Diabetes mellitus	20	46.5%
CKD	12	27.9%
Stroke/TIA	14	32.6%
COPD	11	25.6%
History of smoking	25	58.1%
Obesity	13	30.2%

CAD, Coronary artery disease; CKD, Chronic kidney disease; TIA, Transient ischemic attack; COPD, Chronic obstructive pulmonary disease

**Table 2. Anatomic and symptomatic descriptions of the lesions**

Variables	Median or n	Range or %
Critical limb ischemia	30	69.8%
Chronic total occlusion	31	72.1%
Lesion length (cm)	5	4-16
Type of popliteal artery lesions		
P1	13	30.2%
P2	10	23.3%
P3	4	9.3%
P1 + P2	6	14.0%
P2 + P3	7	16.3%
P1 + P2 + P3	3	7.0%

P1, popliteal artery lesions extending from the adductor hiatus to the superior border of the femoral condyle; P2, extending from the superior border of the femoral condyle to the joint line; P3, extending from the joint line to the bifurcation of the anterior tibial artery and tibioperoneal trunk

**Table 3. Procedural results and complications**

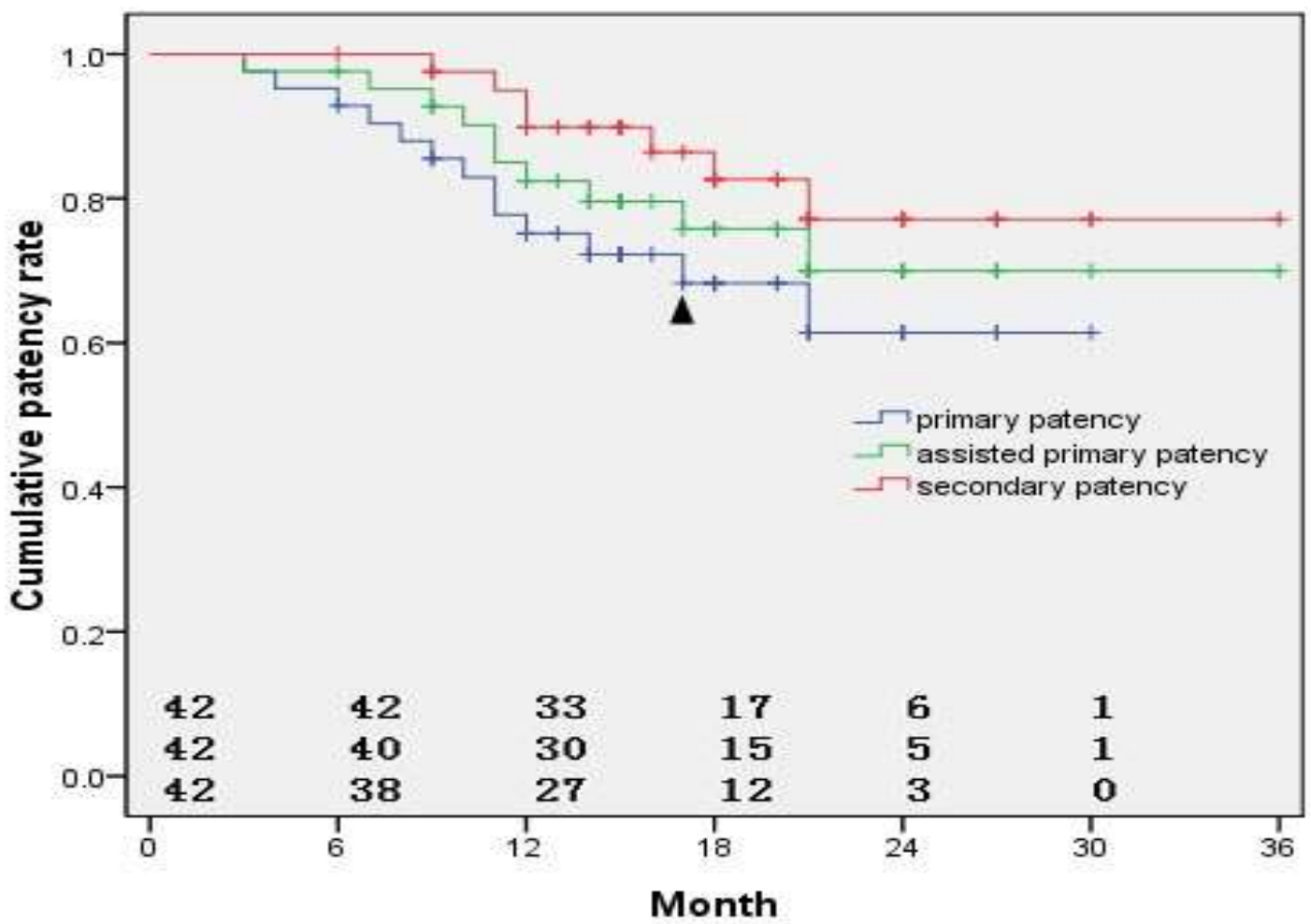
Variables	n (%)
Technical success	42 (97.7)
Recanalization method (n = 42)	
Intraluminal angioplasty	26 (61.9)
Subintimal angioplasty	16 (38.1)
Intervention procedure (n = 42)	
Balloon angioplasty	13 (31.0)
Balloon + stent (based on conventional angiography)	20 (47.6)
Balloon + stent (based on dynamic angiography)	9 (21.4)
Balloon + stent + stent (morphological change due to the presence of stent, based on dynamic angiography)	2 (4.8)
Stent location (n = 29)	
P1	8 (27.6)
P2	6 (20.7)
P3	2 (6.9)
P1 + P2	5 (17.2)
P2 + P3	6 (20.7)
P1 + P2 + P3	2 (6.9)
Number of stents implanted per patient (n = 29)	
1 stent	24 (82.8)
2 stents	4 (13.8)
3 stents	1 (3.4)

**Table 4. RBC before and after the intervention**

RBC	Baseline (n = 42)	6-month follow-up (n = 42)	12-month follow-up (n = 37)
1	0 (0.0%)	22 (52.4%)	19 (51.4%)
2	0 (0.0%)	11 (26.2%)	10 (27.0%)
3	13 (31.0%)	6 (14.3%)	7 (18.9%)
4	18 (42.9%)	1 (2.4%)	0 (0.0%)
5	11 (26.2%)	2 (4.8%)	1 (2.7%)
6	0 (0.0%)	0 (0.0%)	0 (0.0%)
Mean \pm SD	3.95 \pm 0.76	1.81 \pm 1.09*	1.76 \pm 0.95*

RBC, Rutherford-Becker class

* $p < 0.01$, compared with the baseline



Primary patency rate was 75.2%, secondary patency rate was 89.9% @ 1 year, and the stent fracture was detected in 3 cases (7.1%)



Conclusions

- PTA with provisional stent based on dynamic angiography is a feasible, safe, and effective therapy for PA
- Although stent fracture is still inevitable, patients with CLI who have limited surgical options may get more benefits from the endovascular treatment PA



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Thank you



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