

Effect of autologous G-CSF-mobilized CD34+ cell transplantation in hemodialysis patients with critical limb ischemia



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Introduction

Peripheral arterial disease (PAD) is highly prevalent in hemodialysis (HD) patients. Critical limb ischemia (CLI), seriously advanced stage of PAD, has strong impact on mortality in HD patients. To date, however, there has been no effective treatment for CLI in HD patients with no optional treatment.

Methods

Subjects: HD patients with CLI without indication of re-vascularization treatment (endovascular therapy or surgical bypass), or without clinical improvement by re-vascularization treatment.

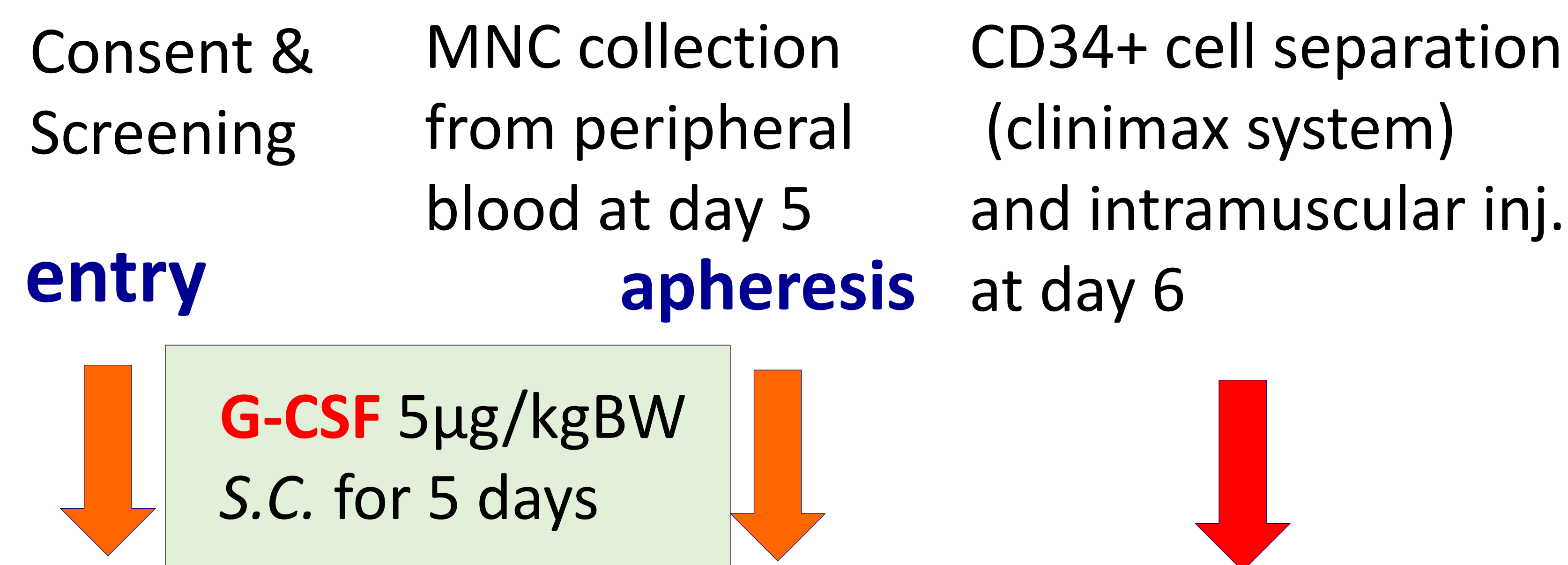
Treatment: Figure 1

Endpoint: safety and efficacy for 12 months after treatment

Conclusion

This is the first clinical study which aimed to register only HD patients with CLI as the subject. Intractable foot ulcer and severe resting pain dramatically improved by cell therapy. Autologous G-CSF-mobilized CD34+ cell transplantation for ischemic limb is safe, feasible, and extremely effective for no optional HD patients with CLI.

Figure 1. treatment protocol



Results Six patients were registered. Cells were injected in one lower limb in 5 pts and in bil. limbs in one pt.

Table 1. Baseline characteristics

Age (years)	70.8 ± 7.9
Male, n (%)	6 (100)
HD vintage (months)	69.7 ± 37.6
Cause of ESRD, n (%)	
diabetic nephropathy	4 (66.6)
nephrosclerosis	2 (33.3)
Comorbidity, n (%)	
coronary artery disease	5 (83.3)
cerebral artery disease	1 (16.6)
hypertension	6 (100)
dyslipidemia	1 (16.6)
diabetes mellitus	5 (83.3)
Fontaine category	
III : IV	2 : 4
Rutherford category	
4 : 5	2 : 4
Ulcer size (mm)	6-35
Pain score (visual analogue scale)	3-7 / 10

Table 2. apheresis product and final cell product

apheresis product	final product by clinimax system		injected cells/kg/limb
total MNC	CD34+ cell	viability (%)	CD34+ cell purity (%)
(10 ¹⁰)	(10 ⁷)	(%)	(%)
2.52 ± 0.45	2.51 ± 3.35	96.4 ± 1.4	79.0 ± 20.4
			(10 ⁵)
			4.0 ± 5.1

Figure 2. Change of VAS and ulcer size by cell therapy

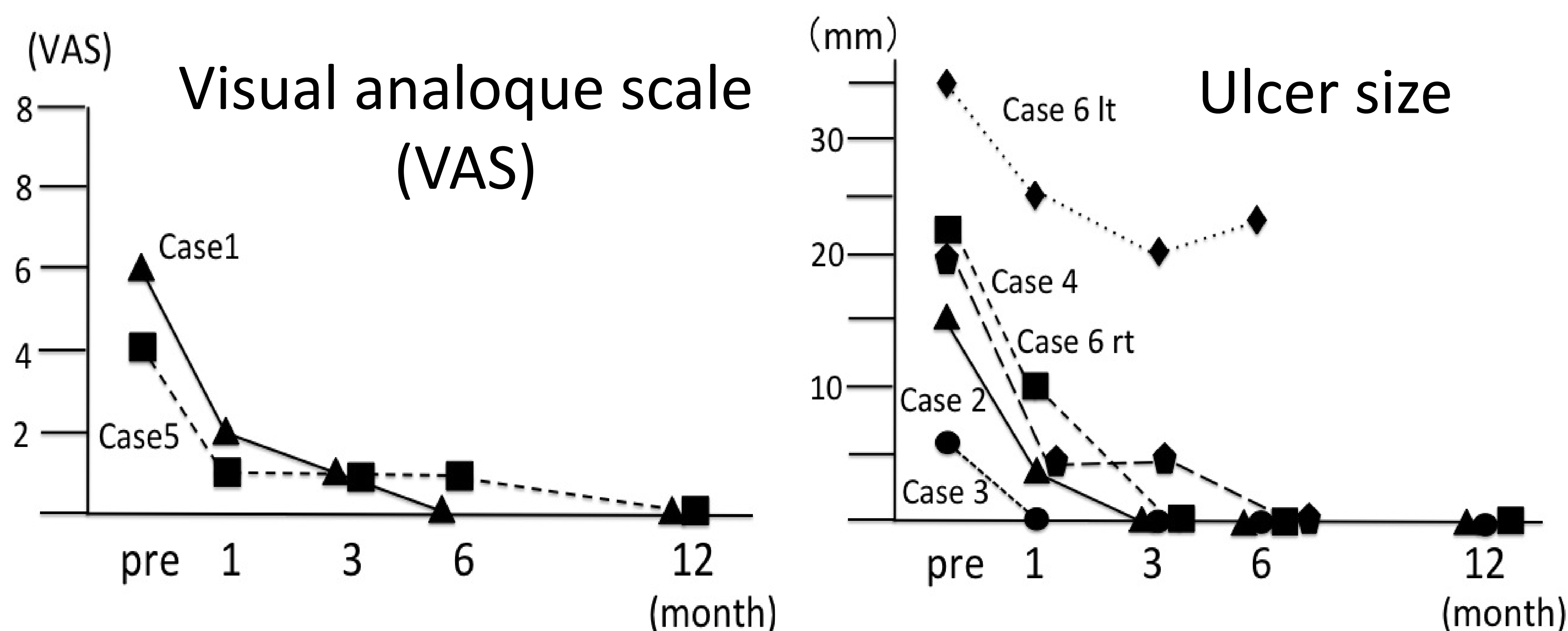
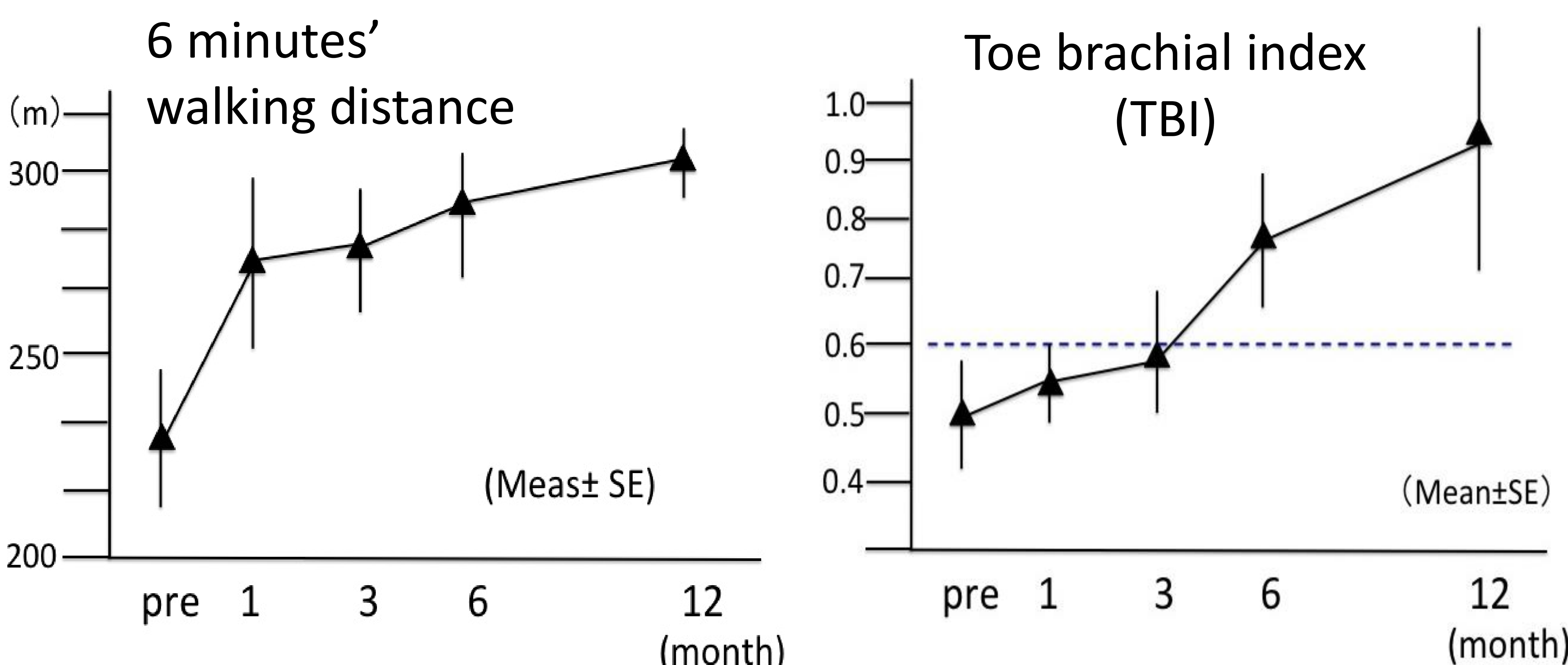


Figure 3. Walking distance, SPP, and TBI by cell therapy



Summary of Results

- 4 out of 5 intractable ulcers completely healed (80.0%).
- Resting pain in 2 pts (Rutherford 4) completely resolved (100%).
- Both walking distance and TBI improved.
- 5 pts (83%) improved from CLI to non-CLI.
- No major adverse event was found.

