Autologous bone marrow stem cell transplantation combined with long balloon angioplasty improve lower extremity ischaemia in patients with diabetic foot

Mingliang Sun^{1,3}, Mo Wang², Wenchi Liu¹, Ping Li¹, Yan Liu⁴, Qiu Li¹, Jiajun Zhao¹

1.Department of Endocrinology, Shandong Provincial Hospital affiliated to Shandong University, JiNan ShanDong, China;2.Vascular Surgery of Shandong Provincial Hospital, JiNan ShanDong, China;3.Shandong University of Traditional Chinese Medicine, JiNan ShanDong, China;4.Department of Endocrinology, School of Medicine and Life Science, University of Jinan-Shandong Academy of Medical Science, JiNan ShanDong, China

Objective

To assess the effect of autologous bone marrow stem cell transplantation combined with long balloon angioplasty in treatment of diabetic foot lower extremity vascular disease.

Methods

Forty cases of diabetic foot patients admitted in the Department of Endocrinology and Vascular Surgery of Shandong Provential Hospital from July 2008 to August 2013 were recruited. Patients were randomly divided into autologous bone marrow stem cell transplantation combined with long balloon angioplasty treatment group (combined treatment group, n=20) and long balloon angioplasty therapy only group (control group, n=20).Foot skin temperature, arterial pulse, ankle brachial index (ABI) and other markers were compared.Two sample t test was used for continuous data. Before and after surgery comparison with different time points were analyzed using analysis of variance. Categorical data was compared by χ^2 test.

Results

(1) Skin temperature, rest pain and other subjective indicators had improved significantly($\chi^2=4.710-5.855, P<0.05$) in the 2 groups after treatment. (2)The ankle brachial index, walking distance, skin oxygen partial pressure and other objective indicators were significantly improved($t=2.302-23.643, P<0.05$) in the 2 groups after treatment. (3)In the control group, 7 cases were restenosis or occlusion,the restenosis rate was 46.15% (12/26) . In the treatment group, 4 cases developed restenosis or occlusion,the restenosis rate was 16.67% (4/24) . The restenosis rate of the two groups was statistically significant ($\chi^2=4.987, P<0.05$).

Conclusion

Autologous bone marrow stem cell transplantation combined with prolatespheroidal balloon angioplasty surgery can significantly improve the clinical symptoms of ischaemia in patients with diabetic foot, combined treatment shows greater reduction in the rate of restenosis and overall improvement of clinical therapeutic effect.

Two groups of patients were compared in the preoperative after surgery

Group		Ankle brachial index	Walking distance (m)	Percutaneous oxygen partial pressure (mmHg)	The maximum velocity of the lower extremity arterial blood flow(cm/s)		
					Plantar artery	Tibial artery before	Peroneal artery
Control group	preoperative	0.49±0.32	301±24	25±15	9.6±1.0	23.5±2.5	18.3±0.8
	After one month	0.67±0.28	470±44	32±12	10.9±2.4	23.5±1.2	19.1±0.1
	After six month	0.70±0.27	720±86	35±10	11.7±0.9	24.6±2.1	19.8±1.0
The treatment group	preoperative	0.51±0.36	316±40	26±10	9.5±0.5	22.9±0.5	18.7±1.4
	After one month	0.71±0.12	784±75	34±16	10.3±2.6	23.1±1.6	19.2±0.3
	After six month	0.89±0.13*	1380±104*	38±6*	13.3±1.3*	26.4±1.0*	20.4±1.0

1 mmHg=0.133 kPa, Six months after surgery compared with control group, *P<0.05