

# 3<sup>rd</sup> International Conference on Translational Medicine

November 03-05, 2014 Las Vegas, USA

## Stem cells in the treatment of peripheral arterial diseases. Clinical results and new frontiers

Alessandro Schiavetta<sup>1</sup>, Vittoria Raffa<sup>2</sup> and Serena Zacchigna<sup>3</sup>

<sup>1</sup>S Corona Hospital, Italy

<sup>2</sup>Università degli Studi di Pisa, Italy

<sup>3</sup>International Centre for Genetic Engineering and Biotechnology, Italy

Critical limb ischemia (CLI) is a vascular disease affecting lower limbs, which is going to become a demanding challenge because of the aging of the population. Despite advances in endovascular therapies, CLI is associated with high morbidity and mortality. Patients without direct revascularization options have the worst outcomes. To date, 25%-40% of CLI patients are not candidates for surgical or endovascular approaches, ultimately facing the possibility of a major amputation. The multicenter, non controlled NAPLES Study conducted in Italy (Naples University and Pietra Ligure Hospital) aimed to assess the safety and efficacy of autologous bone marrow (BM) transplantation performed in “no-option” patients, in terms of restoring blood perfusion by collateral flow and limb salvage. We decided to set a non-randomized phase II trial because the majority of enrolled subjects were “no-option” patients, in whom the progression of the disease is well-defined and amputation is the only treatment option available, as previously reported. Therefore, on the basis of observations done by us and others, we believed that an untreated control group was unnecessary. Written informed consent for participation was obtained from all patients.

Patients were subjected to intra-arterial infusion of autologous bone marrow and followed for 12 months after the treatment. A total volume of 105 ml of bone marrow (BM) aspirate was obtained from all patients from posterior iliac crest puncture with a 15-gauge needle, under local anesthesia and smooth conscious sedation. Five millilitres of BM aspirate was kept for research purposes. The remaining BM aspirate (100 ml) was immediately added to sodium heparin (2,000 units) in 20 ml of normal saline and filtered (bone marrow collection kit 4R2104; Fenwal Inc., Lake Zurich, IL, to remove large particulate matter, such as fat, bone chips, and clots. The BM aspirate was then ready for intra-arterial direct infusion ipsilateral to the affected leg through a 4 French introducer or a 20 Gauge arterial catheter kit placed through common femoral artery into external iliac artery under the control of a peristaltic pump at 150 ml/hour or slowly by direct hand injection. Forty-five days later all the patients underwent a second procedure exactly like the first one. Patients were discharged on the first postoperative day; scheduled for 3, 6, 12, and 24 months follow-up; and given oral L-arginine, 3 g/day, to take for 4 months after the first transplant. Follow-up consisted of clinical evaluation and laser Doppler flowmetry or transcutaneous oximetry. Variation of blood perfusion parameters, evaluated by laser Doppler flowmetry or transcutaneous oximetry, was set as the primary endpoint at 12 months after treatment and amputation-free survival as the secondary endpoint. Sixty patients were enrolled and treated with BM transplantation, showing improvement in objective and subjective measures of perfusion. Furthermore, survival analysis demonstrated improved amputation-free survival rates (75.2%) at 12 months after the treatment. So far, autologous bone marrow transplantation seems to be well tolerated by CLI patients without adverse effects, demonstrating trends toward improvement in perfusion and reduced amputation rate, confirming the feasibility and safety of the procedure.

### Biography

Alessandro Schiavetta, MD, specialized in Cardiac Surgery in 1992 at Verona University and in Vascular Surgery in 2001 at Pavia University. He works as a vascular surgeon c/o S. Corona Hospital. Since 2009, he is the Head of the Innovative Therapies Unit c/o the Department of Vascular Surgery, S. Corona Hospital, Pietra Ligure (Savona) in Italy. His interest in stem cells therapy for peripheral arterial disease began in 2008. The NAPLES Study (Naples and Pietra Ligure Evaluation of Stem Cells), in order to set the efficacy and safety of stem cells for the treatment of peripheral arterial disease, critical limb ischemia and diabetic foot started in 2008 in collaboration with Naples University and ended in 2011.

[aleschiavetta@libero.it](mailto:aleschiavetta@libero.it)