



Combining antibiotic-loaded bone cement-based free vastus lateralis muscle-sparing flap with split-thickness skin grafts: A reliable strategy for reconstructing diabetic foot ulcers at non-weight-bearing areas

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Abstract

Diabetic foot ulcers (DFUs) present significant challenges due to their associated amputation rates, mortality, treatment complexity and excessive costs. Our earlier work introduced a wound surgical integrated treatment (WSIT) for DFUs, yielding promising outcomes. This study focuses on a specific WSIT protocol employing antibiotic-loaded bone cement (ALBC) in the first Stage, and free vastus lateralis muscle-sparing (VLMS) flaps and split-thickness skin grafts (STSGs) in the second stage to repair non-weight-bearing DFUs. From July 2021 to July 2023, seven DFU patients (aged 47–71 years) underwent this treatment. Demographic data, hospital stay and repair surgery times were collected. Histological and immunohistochemical analyses assessed angiogenesis, collagen deposition and inflammation. SF-36 questionnaire measured pre- and post-operative quality of life. Preoperative ultrasound Doppler showed that the peak blood flow velocity of the recipient area artery was significantly >30 cm/s (38.6 ± 6.8 cm/s) in all patients. Muscle flap sizes varied from $8 \times 3.5 \times 1$ to $18 \times 6 \times 2$ cm. The operation time of the repair surgery was 156.9 ± 15.08 minutes, and the hospital stay was 18.9 ± 3.3 days. Histological analysis proved that covering DFUs with ALBC induced membrane formation and increased collagen, neovascularization and M2 macrophages fraction while reducing M1 macrophages one. All grafts survived without amputation during

Shusen Chang, Yang Jian and Chenxiaoxiao Liu contributed equally to the work and are co-first authors.

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