Failure of bone grafting in trauma- causes, solutions

Post-traumatic bone defects become increasingly frequent due to high energy traumatic agents, producing severe injuries, with primary or secondary bone defects; filling the bone gaps is mandatory for the successful recovery of the patients, most of them young, active people, requiring long and complicate treatments, thus increasing the social costs of these trauma.

Regardless if the bone defect is primary (due to bone loss during complex injuries of the limbs) or secondary, resulting from devascularisation and necrosis, or infection, bone grafting must restore not only the continuity of the bone, but also its' function, that is the ability to sustain forces during daily activities .

Successful integration of the graft are similar to those of bone healing, described by the " diamond concept" introduced by P. Giannoudis, and include local and general conditions which can enhance or inhibit the processes by which the osteogenic, osteoconductive or osteointegrating properties of the graft are activated, leading form bone graft to normal bone. Any circumstance with a negative influence upon these processes will result in failure of grafting, sometimes even worsening the initial condition.

Analysing the causes of grafting failure is particularly important for orthopaedic surgery, in order to prevent future similar cases; based on the experience of a Level 1 Trauma Centre, the most frequently identified causes for non-integration are presented; they include general conditions (diabetes and arteritis) and local circumstances, the most frequent being persistent infection and improper local vascularity.

Resistant septic conditions are common after post-traumatic osteitis , due to its characteristics and failure to control it due to insufficient debridement and sequestrectomy will definitely result in grafting failure; as for insufficient vascularity, it can result from trauma or from poor healing especially in complex injuries with severe soft tissue involvement; in all these cases, the assessment of the patient is crucial, as most often it is difficult to evaluate all the factors; more than that, cellular and molecular response mechanisms cannot be yet quantified so as to establish their involvement .

Considering these, for a successful bone grafting , a complex algorithm must be established and applied, in order to avoid not only economical loses, but also the negative consequences of an invasive procedure upon the patient, any potential cause of failure must be identified and corrected before surgery.

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