



Ph.D Scholarship Programme "Heraclitus II"

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The use of Bone Morphogenetic Proteins (BMPs) for the treatment of nonunions and bone defects

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THE USE OF BONE MORPHOGENETIC PROTEINS (BMPs) FOR THE TREATMENT OF NONUNIONS AND BONE DEFECTS

In a great number of musculoskeletal surgical interventions the orthopaedic surgeon has to deal with the need to cover large bone defects. These may occur after trauma or bone infections, tumor resection or during orthopedic surgery such as hip and knee revision arthroplasties. The usual way to deal with these situations is to use bone grafts (autografts, allografts and xenografts).

Nowadays, several researches are made in order to recognize new factors that promote bone healing process and restoration of bone defects.

Bone Morphogenetic Proteins (BMPs) are low molecular weight glucoproteins, members of the TGF- β superfamily of proteins. They are well known for their osteoinductive abilities, which they exert by attaching to transmembrane proteins (receptors BMPR, BMPRI and BMPRII), activating via phosphorylation transcriptional Smad factors, which are transported to the nucleus and regulate transcription molecules associated with bone remodeling. This action has led to their use as enhancing agents for the treatment of several skeletal disorders.

The aim of this study is to evaluate the effect of BMP -7 in the treatment of nonunions and bone defects. More than 100 patients will be studied, divided in two main subgroups.

1st group: Patients with long bone defects or nonunions.

2nd group: Patients treated for Avascular Necrosis (AVN) of the femoral head.

The parameters to be studied are divided into:

A. Preoperative parameters: relating to the patient (age, gender, comorbidities), relating to the defect (size, location, chronicity, mechanism of injury), presence of infection, or presence of osteonecrosis.

B. Intraoperative parameters: relating to the affected area, the type of graft, the quantity of BMP-7 used, the method of stabilization, the intraoperative time and possible complications occurred during surgery.

C. Postoperative parameters: hospitalization time, time to union, callus size and density using the quantitative computed tomography (Q-CT), complications, possible reoperation, time to return to work.

Preoperative and postoperative assessment will be based on clinical radiological and laboratory findings, and patient satisfaction will be recorded and evaluated with the use of Visual Analog Scale for pain (VAS) and SF-12 Health Survey. The minimum follow up time for our patients has been decided to be two years.

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