Biological therapies for the treatment of early stage pre-collapse osteonecrosis of the femoral head

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ABSTRACT

The pathogenetic mechanism for non-traumatic osteonecrosis of the femoral head (ONFH) remains elusive. It is known, that an important part of the underlying pathology in ON is cell deficiency, hence, it is rational to consider the use of cell-based treatments to supplement more established surgical interventions. This chapter will focus surgically on Core Decompression (CD) and discuss a number of its technical advancements and variations. It will also focus on cell-based therapies that attempt to improve simple CD outcomes and argue their variability and safety.

KEY WORDS: osteonecrosis, femoral head, core decompression, cell therapy, stem cells

Introduction

Non-traumatic osteonecrosis of the femoral head (ONFH) typically affects relatively young, active patients and frequently results in considerable loss of function [1]. Osteonecrosis is derived by the Greek words osteo-bone and necrosis-death. The exact pathophysiology of non-traumatic ON is not thoroughly understood and various 'incriminating' factors such as vascular insult, fat emboli and increased intraosseous pressure have been proposed. If left untreated, the final outcome is the adjacent to the necrotic bone femoral head and articular cartilage to collapse resulting in arthritic changes approximately in 60-70% of the patients [2, 3].

Treatment is based on a number of parameters, such as lesion characteristics (size, the presence of collapse at the time of diagnosis, acetabular involvement), patient's age and comorbidities [2, 4]. The optimal treatment modality has not yet been identified. Several algorithms of medical and surgical treatments have been developed to delay its progression, with variable success [5]. Surgically, total hip replacement (THR) is the most frequent intervention for post-collapse treatment, and core decompression (CD) is the most common performed procedure for symptomatic, pre-collapse cases [6]. Historically, THR for osteonecrosis (ON) had poor results, attributed to the young and ac-

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