

Autologous bone marrow concentrate: review and application of a novel intra-articular orthobiologic for cartilage disease. Sampson S1, Botto-van Bemden A, Aufiero D. *Phys Sportsmed.* 2013 Sep;41(3):7-18.

Abstract

Younger adults, aged < 65 years, increasingly present to their physicians with advanced cartilage disease or post-traumatic osteoarthritis. A number of treatments exist for lessening patient pain and improving patient function. However, many patients are becoming aware of the potential of regenerative therapies and are now seeking solutions to the impaired biology underlying their conditions rather than addressing only their symptoms. Patients do not want to merely lessen their symptoms temporarily with a surgical procedure that replaces damaged tissue, but instead seek correction and repair of the underlying biology to regenerate damaged tissue and alleviate their symptoms altogether. Current therapies for patients with cartilage disease or osteoarthritis range from non-surgical intra-articular injections with biologics, such as hyaluronic acid (HA), to total joint arthroplasty for advanced stages of disease. Total joint arthroplasty is a successful procedure for patients aged > 65 years; however, the limited long-term durability of implanted prostheses decreases the preference of using such methods in more active patients aged < 65 years. The potential of cell-based orthobiologic injection therapies (pertaining to therapeutic injectables that aim to restore the biologic environment and/or structural components of diseased or damaged musculoskeletal tissue) is of tremendous interest for younger, more active patients, and is even more appealing in that such therapy can be delivered at point-of-care in the clinic during an office visit. Notably, the exponential rate of progress in biotechnology has allowed for immediate application of myriad novel therapies prior to clear evidence of benefit from randomized clinical trials. Orthobiologic intra-articular injection therapies include HA and platelet-rich plasma (PRP). We report on current, available findings for a third-generation intra-articular orthobiologic injectable therapy for cartilage disease, bone marrow concentrate (BMC). Bone marrow concentrate contains mesenchymal stem cells (MSCs), hematopoietic stem cells, platelets (containing growth factors), and cytokines. The anti-inflammatory and immunomodulatory properties of bone marrow stem cells (BMSCs) can facilitate regeneration of tissue. Additionally, BMSCs enhance the quality of cartilage repair by increasing aggrecan content and tissue firmness. Following bone marrow aspiration (BMA), BMC is easily prepared using centrifugation, and is available for a same-day procedure with minimal manipulation of cells, thus complying with US Food and Drug Association (FDA) restrictions. To date, there are no published randomized controlled trials on the efficacy of use of autologous BMC intra-articular injections performed as a same-day in-office procedure for treating patients with cartilage disease; however, several publications have reported the ease of use of this method, its strong safety profile, and the fundamental science suggesting great therapeutic potential.

PMID: 24113698 [PubMed - indexed for MEDLINE]