Biomedical Research 2018; Special Issue: S276-S280 *ISSN 0970-938X*
www.biomedres.info

Therapeutic effect of bone decompression needle on the knee osteoarthritis in rabbit.

Wanli Yan[1], Xiaofang Chi[2], Huadao Li[3*]

[1]Department of Rehabilitation, Yantai Hospital of Traditional Chinese Medicine, Yantai, PR China

[2]Department of Traditional Chinese Medicine, Penglai People's Hospital, Yantai, PR China

[3]Department of Spine Surgery, Qilu Hospital of Shandong University (Qingdao), Qingdao, PR China

Abstract

Objective: Osteoarthritis is a progressive disease of the joints which often cause increased intraosseous pressure in the tibia bones and reduced blood flow. Bone decompression needle is a newly developed osteoarthritis treatment device.

Methods: To investigate the effectiveness of bone decompression needle on osteoarthritis, we constructed an osteoarthritis model with Japan white rabbits, and used bone decompression needle for decompression treatment.

Results: It showed that the decompression treatment reduced the intraosseous pressure in tibia bones. In hemorheology measurement, the decompression also dropped all the hemorheology indexed including whole blood viscosity, plasma viscosity, hematocrit, and erythrocyte sedimentation rate, therefore the blood flow was greatly increased. We also showed that two needle decompression treatments could almost bring all these indicators back to the level as in the normal condition.

Conclusion: Therefore the decompression with bone decompression needle has clear protection and therapeutic effect on knee osteoarthritis.

Keywords: Osteoarthritis, Bone decompression needle, Rabbits, Hemorheology.

Accepted on May 25, 2017

Introduction

Millions of people around the world are affected with arthritis [1]. Most common arthritis is the Osteoarthritis (OA) or degenerative arthritis which is defined by deterioration of articular cartilage, pain in joints and tenderness, and dysfunction among old people [2]. Largest part of the body weight affects the knee joints leading to the risk of OA. The occurrence of OA is high and it is progressive and global economy is adversely affected due to this [3]. Factors which trigger OA in people are age, weight, Body Mass Index (BMI), genetics, occupational activities, history of trauma, and physical work activities [4,5]. The triggering factors and mechanism for OA quiet remains unclear.

Report states that in OA patient's bone-related cause of pain because the blood flow is decreased and intraosseous pressure gets elevated [6]. OA has early vascular components that modify the primary bone perfusion in the affected bone [7]. Though phlebographic studies in OA reveals that pain is due to impaired vascular clearance from bone and raised intraosseous pressure in the bone marrow near the painful joint. But the detailed change of pathophysiology remains unclear [6-8]. These preceding studies demonstrates higher intraosseous pressure in hip and knee in OA patients compared to people without OA or pain consists of a normal intraosseous pressure. Osteotomy of the proximal femur reduces both intraosseous pressure and the consequent pain with hip OA [6-8].

Investigations are carried out on animal OA models. In October, 2010, Osteoarthritis and Cartilage published the OAC histopathology supplement, [9] published models and guidelines for histopathologic assessment of osteoarthritis progression in the mouse, rat, guinea pig, rabbit, dog, sheep, goat, and horse. Rabbit model of OA consists of ACL tear, meniscectomy and chemically tempted. Even some limitations were identified; e rabbit model has been used to evaluate the efficacy of various compounds. Efficacy mechanisms are studied which would be impossible in humans.

Bone decompression needle is a newly developed device to reduce the intraosseous pressure in OA patients. Despite its wide application in clinics, there are very few systematic studies on the mechanism and application of this new technique. Here we used Keen Osteo Arthritis (KOA) model with Japanese white rabbit to study the effect of needle decompression. We found that needle decompression can reduce the intraosseous pressure in tibia bones, and increase the blood flow. These studies suggest that bone needle decompression is a very effective treatment for OA.