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The effect of static magnetic field of mid-shaft femoral fractures healing in Rabbits

LMAL.Rashid¹; A. A. Alfars¹

C. A. Emskary²

¹ Department of internal, preventive medicine and surgery
College of veterinary medicine

² Department of physics, College of education
University of Basrah, Basrah, Iraq

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Summary

This study was done on eighty rabbits to investigate the effect of static magnetic field on the transverse femoral fracture fix by intramedullary pinning. Experimental animals were divided into two main groups, control group contain twenty rabbits, while the treated group were divided into three subgroups as the following.

Control group induce mid-shaft fracture and fixation by intramedullary pinning.

Treated groups which divided into three subgroups, induces fracture similar as in control group and treated as the following:

1. Treated subgroups one (T1), expose to magnetic field (5 gauss).
2. Treated subgroups one (T2), expose to magnetic field (75 gauss).
3. Treated subgroups one (T3), expose to magnetic field (300 gauss).

The radiographic and Histopathological findings at 7, 14, 21, 28 and 35 days after operation indicated that the magnetic field accelerates the fracture healing, however, there are differences among treated subgroups, which revealed that T1 and T2 group have somewhat similar results, while T4 best results. The intramedullary pins did not show any side effect on the treatment with magnetic field therapy.

Key words: Magnetic field, bone, healing, physiological reactions.

Introduction

Bone is an essential component in the body described as a connective tissue helping to support and bind together various parts of the body, bone acts as a structural building allowing tendons and ligament attachment and facilitating kinematics motion, also supports and provide protection to the soft and vital internal organs [1]. All bones serves as storage for inorganic matrix such as calcium and phosphor release these substances when demands. In addition, these substances give the bone strength [2]. Bone consists of two types of cells osteoblast and osteoclast and organic matrix formed by the osteoblast in which characteristic bone mineral is deposited in ordinary arrangement.

Their functions are different from one type to another, the first and second to building the bone, while the third to destroy the fragment bone [3&4].

Fracture of bone is an abnormal structure of bone that means discontinuity of the bone tissue, may be broken into two or more parts. And their etiology is

external trauma or pathology, but both types of fractures have same stages, these stages are hematoma stage, inflammatory stage, granulation tissue stage, soft callus stage, hard callus stage, and remodeling stage [5]. But the quality and speed of the processing healing depend on some factors [6].

To facilitate and quicker make the fracture healing, we should be inducing modern technique. One of these techniques is called Biomagnetotherapy. Biomagnetotherapy is one of the modern techniques to treat the fracture bone healing and faster healing. Essentially, the researchers depended on nature magnets in the beginning [7].

After that, magnetic coil was used to generate magnetic field and use oscillators to generate frequent magnetic field according to special calculations and equations to calculate exposure magnetic field. Magnetic field therapy is safe, has multiple uses, simplified using, and significant results [8]. The aim of this study was to investigate