COMPARATIVE STUDY BETWEEN SURAL NERVE GRAFT AND SAPHENOUS VEIN CONDUIT IN GAPPED PERIPHERAL NERVES INJURIES

Thesis

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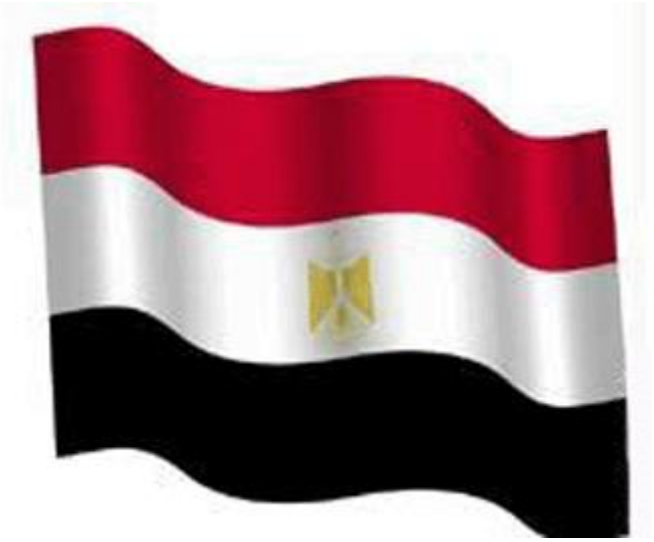
To my beloved country

Egypt



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AEDs ----------	Antiepileptic drugs anticonvulsant drugs
Apo E ----------	Apolipoprotein E
CNS ----------	Central nervous system
COX-2 ----------	Cyclooxygenase-2
CT ----------	Computed Tomography
EMG ----------	Electromyogram
GABA ----------	Gamma-Amino Butyric Acid
LMNL ----------	Lower motor neuron lesion
SSEP ----------	Somatosensory Evoked Potential
MRC ----------	Medical Research Council
MRI ----------	Magnetic Resonance Imaging
MRN ----------	Magnetic Resonance Neurography
NAP ----------	Nerve Action Potential
NC ----------	Nerve Conduction
NGF ----------	Nerve Growth Factor
NMDA ----------	N-Methyl-D-Aspartate
OR ----------	Operating Room
PNI ----------	Peripheral Nerve Injury
PNS ----------	Peripheral Nervous system
SC ----------	Schwann cell
UMNL ----------	Upper Motor Neuron Lesion

Introduction

Peripheral nerves are arranged to provide an isolated and protected region within which neurons operate. The functional parts of neurons contained within the peripheral nerve are the long processes, axons, and modified dendrites that communicate with distant end organs. **(Horowitz, 2005)**

Trauma to peripheral nerves is relatively common. Nerve injuries may be classified in various ways depending on the etiology (mechanical, thermal, ischemic, chemical) and on the way they arise (acute, chronic). The most frequent being the acute post traumatic lesions presenting an increasing incidence, due to road and work place accidents. **(Elias et al., 2007)**

The clinical appearance of an injured nerve depends on the nerve affected, as damaged nerves cannot transmit impulses in normal fashion. Injury to a motor nerve results in a loss of muscle function, and injury to a sensory nerve results in a loss of sensation to the affected nerve's sensory distribution and/or neuromatous or causalgia pain. **(Garg et al., 2003)**

Nerve injuries are classified into three categories: neuropraxia, axonotmesis, and neurotmesis. After complete axonal transection, the neuron undergoes a number of degenerative processes, followed by

attempts at regeneration. A distal growth cone seeks out connections with the degenerated distal fiber. **(Elias et al., 2007)**

Recovery of function occurs with remyelination and with the supporting perineural connective tissue sheath that provide a conduit for axonal regeneration and reinnervation of the sensory receptors, motor end plates, or both. **(Zhang et al., 2004)**

Injuries that disrupt the whole nerve, affecting both the axon and supporting connective tissue, less likely to recover by axonal regeneration; they more often require surgical repair. **(Michael et al., 2008)**

Initial therapy involves protection of the joints, including the surrounding ligaments and tendons, from further stress. Splints, slings, or both may be used in these cases to unload this joint and decrease pain. **(Cheng et al., 2001)**

Physical therapy is started in the early stages following nerve injury to maintain passive range of motion in the affected joints and to maintain muscle strength in the unaffected muscles. **(Florence et al., 2001)**

Surgical options generally include neurolysis, end-to-end closure, nerve graft in which a gap is present between the proximal and distal end of

the nerve, and conduits which can be made out of blood vessels, muscle, and occasionally a synthetic material. **(Michael et al., 2008)**

Aim of the work:

1-To review the literature of anatomy of peripheral nerves, etiology, clinical diagnosis, pathophysiology and different modalities of management of peripheral nerves injuries.

2- To compare between sural nerve graft and great saphenous vein graft (vein conduit) in management of gapped peripheral nerve injuries, using in evaluation the clinical and electrophysiological assessment of these patients.

3- To provide selection criteria whether to choose sural nerve graft or great saphenous vein graft to repair the gapped peripheral nerves injuries.

Anatomy

The human nervous system is the most complex product of biological evolution. The constantly changing patterns of activity of its billions of interactive units represent the fundamental physical basis of every aspect of human behavior and experience. **(Horowitz, 2005)**

The nervous system is divided into two major parts, the central nervous system (CNS) **(Fig.1)** and the peripheral nervous system (PNS). Another convention divides the nervous system into somatic and autonomic components. **(Kahle, 2003)**

The central nervous system (CNS) is divided into the brain, and the spinal cord. The brain in the cranial cavity is surrounded by a bony capsule; the spinal cord in the vertebral canal is enclosed by the bony vertebral column. Both are covered by meninges that enclose a cavity filled with a fluid, the **cerebrospinal fluid**. Thus, the CNS is protected from all sides by bony walls and the cushioning effect of a fluid (fluid cushion). **(Kahle, 2003)**

The peripheral nervous system (PNS) includes the cranial nerves (12 pairs), which emerge through holes (foramina) in the base of the skull, and the spinal nerves, which emerge through spaces between the