PAIN RELIEF IN ADVANCED CANCER

Essay
Submitted for Partial Fulfillment
of the Master Degree in Anesthesia

BY

Mohee El-Din Abd El-Hafiz Farghali

M.B.B.Ch.,
Faculty of Medicine, Ain Shams University

Supervised BY

Prof. Dr. Salwa Mehanna Abd El-Malek

Prof. of Anesthesia and Intensive Care
Faculty of Medicine - Ain Shams University

Dr. Adel Ahmed Fathi Mohammed

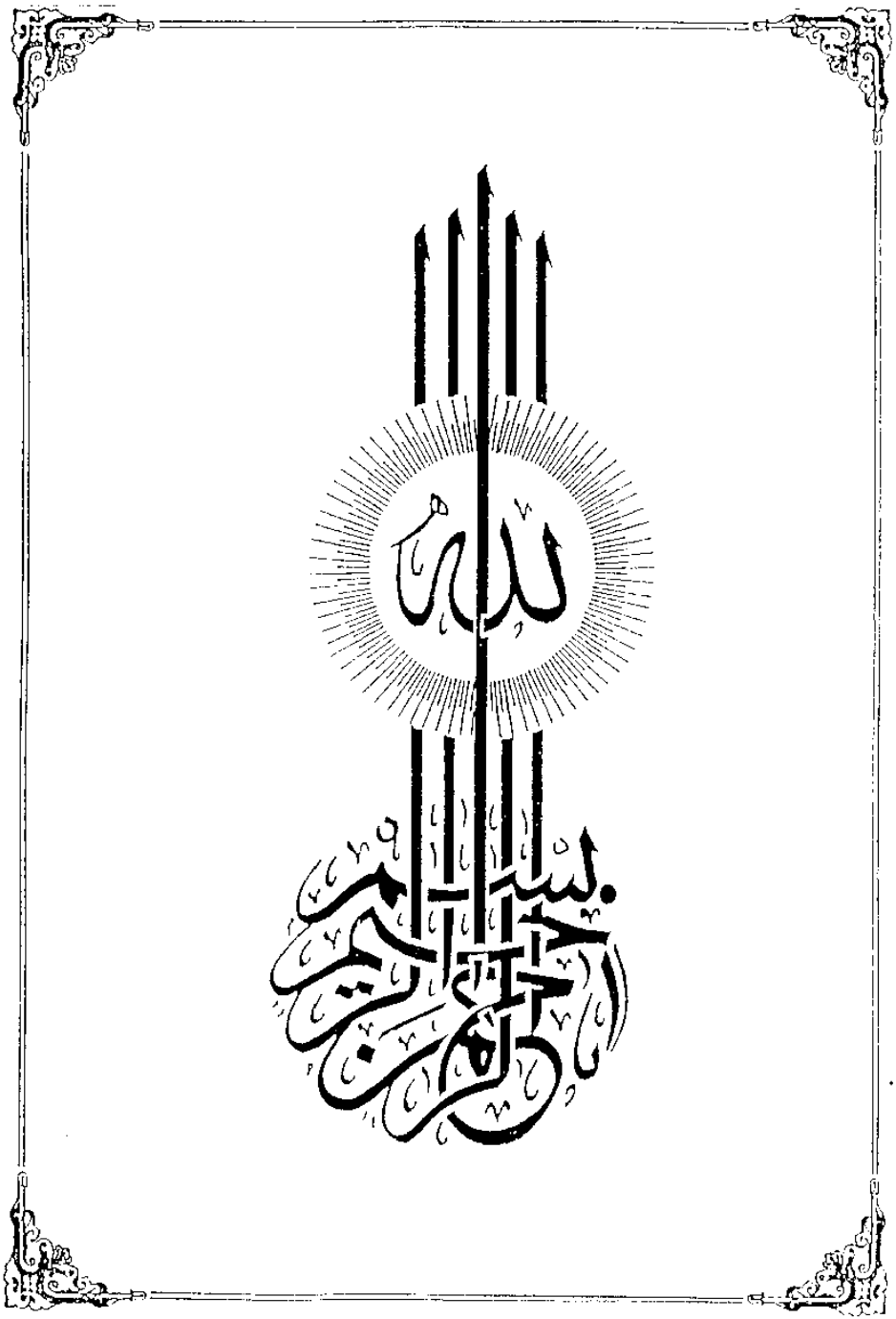
Lecturer of Anesthesia and Intensive Care
Faculty of Medicine - Ain Shams University

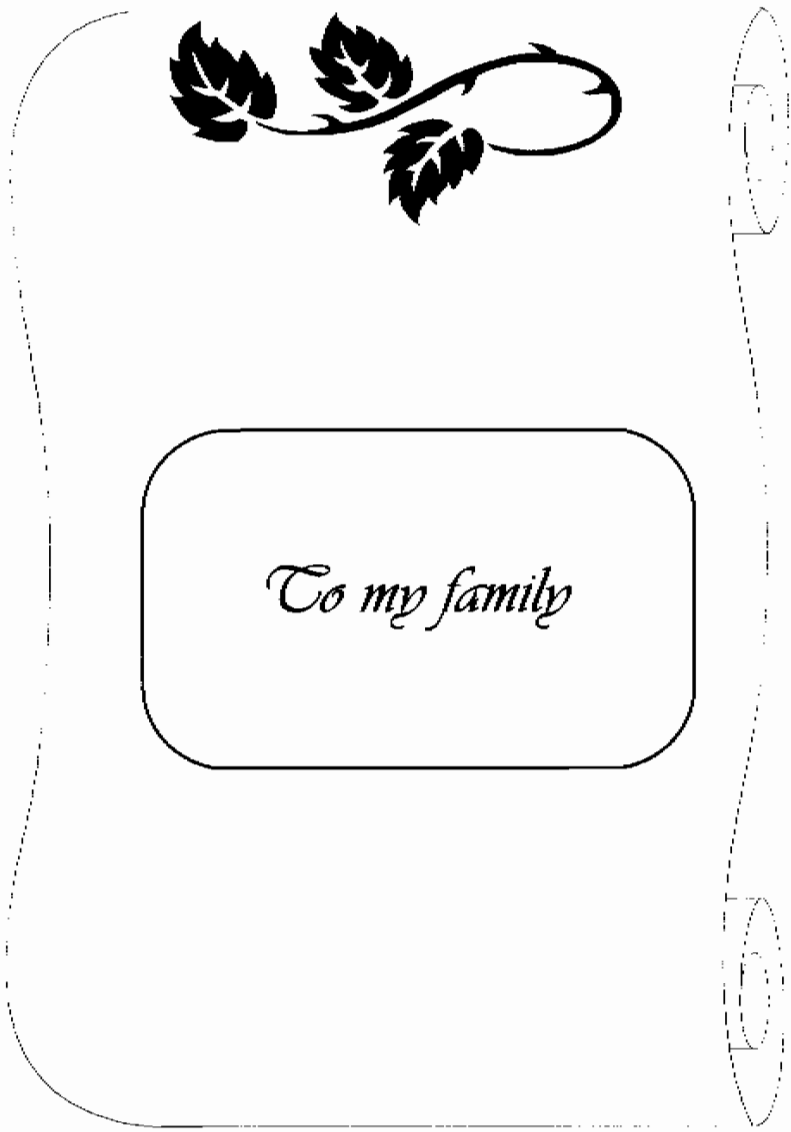
Faculty of Medicine,
Ain Shams University
***** 1996 *****

بسم الله الرحمن الرحيم

قالوا سبحانك لا علم لنا إلا ما علمتنا إنك أنت العليم الحكيم

﴿ سورة البقرة - الآية ٣٢ ﴾




To my family

Acknowledgment

First, thanks are all to God for blessing me this work until it reached its end, as a little part of his generous help throughout life.

I would like to express my sincere appreciation and deep gratitude to Prof. Dr. Salwa Mehanna Abd El-Maleh, Professor of Anesthesia and Intensive Care, Faculty of Medicine, Ain Shams University, for her kind moral support and continuous encouragement; really, it is a great honor to work under her guidance and supervision.

It gives me a great pleasure to express my deep gratitude to Dr. Adel Ahmed Fathi Mohammed, Lecturer of Anesthesia and Intensive Care, Faculty of Medicine, Ain Shams University, for his kind advice, valuable supervision and his great efforts throughout this work.

My thanks are also due to all my professors and colleagues in the Department of Anesthesia and Intensive Care, Ain Shams University for their outstanding assistance.

Mohee El-Din Abd El-Hafiz

List of Tables

List of Figures

List of Contents

Introduction

Introduction

Pain is perhaps best defined as "unpleasant sensory and emotional experience associated with actual or potential tissue damage or described in terms of such damage" ***(Merskey et al., 1979)***.

It is a personal and complex sensory experience that is difficult to describe to another person, the pain experience is even more difficult for an outsider to evaluate or judge ***(Collins et al., 1992)***.

Acute pain is a complex constellation of unpleasant sensory, perceptual and emotional experiences with associated autonomic, psychological and behavioral responses ***(Bonica, 1990)***. Chronic pain is that pain which persists a month beyond the usual course of an acute disease or a reasonable time for an injury to heal, or is associated with a chronic pathological process which causes continuous pain or pain which recurs at intervals for months or years ***(Bonica, 1990)***.

"Chronic benign pain" is a term which was introduced in the 1970s to distinguish chronic pain of non malignant origin from chronic cancer pain ***(Sternbach et al., 1976)***. It was almost immediately pointed out that benign denotes a state of gentleness, kindness, mild or favorable outcome, and therefore is not an appropriate description for any form of chronic pain ***(Boas, 1976)***.

The term chronic benign pain therefore should not be used. The term "chronic pain of non malignant origin" or "chronic non cancer pain" should be used instead.

Cancer pain is particularly manifest when pain is associated with symptoms of deterioration, such as anorexia, weight loss, decreasing exercise tolerance, and increasing physical dependence ***(Bonica, 1990)***.

After several weeks or months of pain, particularly if associated with insomnia, many cancer patients become overwhelmed by pain. Pain envelops their whole mental outlook. Such patients often find it difficult to describe the location or the nature of the pain precisely ***(Massie, 1990)***.

Pain is experienced by 20 - 50% of cancer patients at diagnosis and varies according to the primary; and by up to 75% of patients with advanced cancer ***(Kane et al., 1984)***. Pain is moderate or severe in 40 - 50% and very severe or excruciating in 25 - 30% ***(Bonica, 1990)***.

According to etiology, cancer pain falls into 3 main categories : that associated with direct tumor involvement, that associated with treatment, and that associated with neither the cancer nor its therapy. Metastatic disease is the most common cause of cancer pain in adults. In children, pain is more likely to result from therapy rather than from the cancer itself ***(Ashburn and Lipman, 1993)***.

When translated into global terms, the problem is one of massive proportions ***(WHO, 1990)***. In developed countries, 25% of the population dies from cancer. Every day, at least 4 million people globally are suffering from cancer pain. Many of these don't obtain adequate relief.

Reports of the use of the World Health Organization (WHO) method for relief of cancer pain indicate, however, that pain can be completely relieved in 80 - 90% of patients and that "acceptable relief" is possible in most of the remainder.

Management of pain in patients with cancer must address both the physical and emotional components. It must be individualized to the patient's needs. Drug therapy, particularly opioid analgesics, is the cornerstone of pain management ***(Ashburn and Lipman, 1993)***.

Basic Science of Pain

Basic Science of Pain

Pain threshold is the least experience of pain which a subject can recognize ***(IASP, 1986)***. Pain threshold varies both between and within ethnic groups even under controlled conditions in the laboratory. What some people describe merely as warmth is reported as painful by others. In one study, normal subjects from a single ethnic group could be separated into :

- hypersensitives (22%),
- normosensitives (61%),
- hyposensitives (17%) ***(Keele, 1967)***

Hyposensitive subjects experience less pain even, for example, after myocardial infarction. Differences in pain sensitivity relate partly to differences in endogenous opioid production. Ethnic and cultural factors (attitude, beliefs, emotions, psychological states) are also important ***(Bates et al., 1993)***.

Strictly speaking, it is wrong to speak of a 'painful stimulus' which is converted to 'pain signal' in 'pain fibers' and then conducted to the brain where the information is registered as 'pain'. 'Noxious stimulus' is a preferable term, with 'nociception' as the activity produced in the nervous system by potential or actual tissue damaging stimuli. Pain is the perception of nociception and, as already emphasized, its intensity is determined by an interaction between sensorineural activity and other factors ***(Portenoy, 1992)***.

Neuroanatomy

Nociceptors :

Sensory receptors which are preferentially sensitive to noxious (tissue damaging) or potentially noxious stimulus are prevalent in skin, muscles, connective tissue and thoracic and abdominal viscera ***(Willis, 1985)***. These "nociceptors" have been best studied in skin, but many of the physiological properties of cutaneous nociceptors probably apply to visceral and muscle nociceptive units as well ***(Willis, 1985)***.

Nociceptors are normally inactive but are excited by mechanical, thermal and chemical stimuli. A-delta nociceptors respond particularly well to pinching or squeezing the skin, or to a pin prick. C-nociceptors respond to noxious mechanical, thermal and chemical stimuli. They are also sensitive to many pain producing substances such as acetylcholine, bradykinin, histamine, potassium, capsaicin, and strong acids. Because of their responses to several types of noxious stimuli, C-nociceptors are known as 'polymodal nociceptors'. A common property of both A-delta and C nociceptors is sensitization when exposed to repeated noxious stimuli ***(Perl, 1984)***.

The 'first or fast' sharp pain which one experiences when stubbing a tone is mediated by A-delta fibers (which conduct impulses with a velocity of 5 - 50 m/sec. The 'second' or 'slow' diffuse, throbbing possibly burning pain which follows seconds later and lasts longer is mediated by C fibers which conduct impulses with a velocity of 0.6 - 2 m/sec ***(Perl, 1984)***.

Sensitization of nociceptors is manifested as :

a) a decreased threshold of activation after injury.

b) increased intensity of a response to a noxious injury, and

c) the emergence of spontaneous activity.

(Meyer and Campbell, 1981)

Peripheral afferent nerve fibers all have their cell bodies in the dorsal root ganglia and terminate in the dorsal horn of the spinal cord.

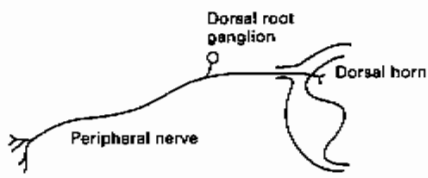


Figure (1) : A Sensory Peripheral Nerve

Dorsal Horn :

Most afferent fibers enter the spinal cord via the dorsal root. A small proportion enters via the ventral root. The dorsal horn of the spinal cord is divided into five laminae, of which lamina II is known as the *substantia gelatinosa*. The main input to the substantia gelatinosa is from the C fibers ***(Light et al., 1979)***.

These synapse predominantly with small second order neurons, most of which synapse again within the segment of entry or within two adjacent segments ***(Willis, 1985)***. Because of their short length they are sometimes called "interneurons".

A second group of second order neurons are larger and form two main subgroups. The first is situated in lamina I, which receives input from only a small number of C or A-delta fibers. These are nociceptor specific neurons. The other subgroup is confined mainly to lamina V. These neurons receive inputs from a large number of sensory nociceptive fibers and from the interneurons arising in the substantia gelatinosa. These multiceptive neurons are called "wide dynamic range