Triple Course Radiation In Patients With Astrocytoma Grade III & IV

In Ain Shams University & Eastern Virginia Medical School

Thesis
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Of M.D. Degree In
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By

Mohamed Essam Saleh El-Sayed

M.B., B.Ch., M.S.

Supervisors

Prof. Dr. Laila Faris
Prof. & Head of Radiotherapy Department
Faculty of Medicine, Ain Shams University

Prof. Dr. Mamdouh Salama
Prof. & Head of Neurosurgery Department
Faculty of Medicine, Ain Shams University

Prof. Dr. Anas El-Mahdi
Prof. & Chairman of Radiation Oncology Department
Eastern Virginia Medical School

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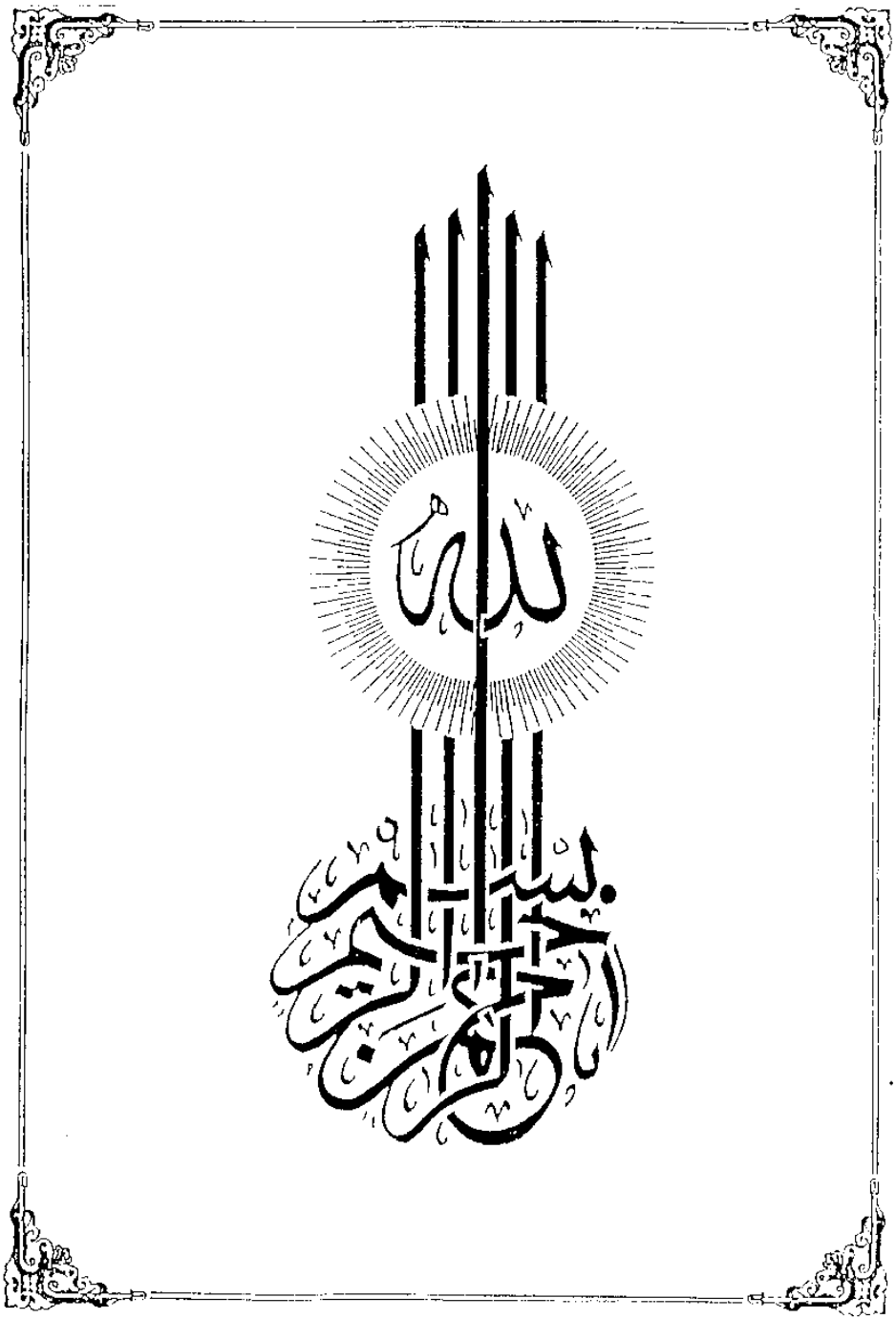
بسم الله الرحمن الرحيم

"سنريهم آياتنا في الآفاق وفي أنفسهم حتى
يتبين لهم أنه الحق ۞ أولم يكف بربك أنه على
كل شيء شهيد" فصلت الآية ٥٣

صدق الله العظيم



Affectionately
Dedicated
To

My Mother,
My Wife
And
My Son

Acknowledgment

First and foremost, Thanks are To **ALLAH.**

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Introduction & Aim of Work

Introduction

Neuro-oncologists confront a paradox in the treatment of high grade gliomas. As these tumours do not disseminate outside the central nervous system, they might be considered the ideal localized tumours for treatment with surgery and radiotherapy. This is the theory, but it has not been born out in practice (Broda et al., 1989).

Why does the present treatment fail to eradicate highly grade gliomas?. The unacceptable nature of permanent neurological deficits makes it possible to excise critical or large regions on normal brain. It is similarly not acceptable to irradiate normal brain beyond radiation tolerance to doses that cause damage to CNS, which has little hope of recovery.

Limited radiation tolerance of the CNS coupled with relative radio-resistance of glial tumours (Steal et al., 1989) results in a poor therapeutic ratio and ultimately failure of tumour control. Yet, radiotherapy remains the most effective treatment modality in high grade gliomas and it is reasonable to exploit it further.

Aim Of Work

Aim of Work:

Is the study of cases of high grade astrocytoma presented to Radiotherapy and Nuclear Medicine Department, Ain Shams University in the period 1988-1991 with reference of incidence, clinical features, staging system and the therapeutic modalities involved in management, with using the triple course radiation technique and comparison results with conventional radiotherapy and comparison of our results with results of patients of high grade astrocytoma were treated in Virginia Medical School form 1976-1989.

Review

Of

Literature

Histology

Neuron:

The nerve cell consists of a nucleus and a cell body. The perikaryon, with one or more processes known as dendrites and a single larger processes, an axon. The larger cells have a single, large, round to oval, usually vesicular nucleus with a well-defined nuclear membrane and a large nucleolus.

The cytoplasm, except at the base of axon, contains basophilic, granular to block-like material called nissl substance, which is identified by electron microscopy, represent the ribosomes and the rough endoplasmic reticulum, which are the sites of protein metabolism.

Dendrites and axons of variable lengths are cytoplasmic extensions of the neurons. Coursing from a dendrite to the axon through the perikaryon are microtubules and neurofilaments (Anderson et al., 1985).

Neuroglia: (Neuroectodermally derived supporting cells of C.N.S.):

The astrocytes are the principal supporting cells of the central nervous system. Astrocytes supply structural support to

the central nervous system, their foot processes from an important part of the blood brain barrier, and they may be the route for transport of nutrients to nerve cells from blood vessels and for the reverse transport of metabolites. The more common is the fibrillar astrocytes located predominantly in the white matter and on the cortical surface and has long, thin, and usually non branching fibrillary processes.

Protoplasmic astrocytes present in the grey matter have shorter, wider, and branching processes. Some astrocytes with both types of processes, as well as the ability to convert from one to the other have been described.

The ependymal cells are cuboid to columnar cells which line the ventricles, the choroid plexuses and the central canal of the spinal cord (Anderson et al., 1985).

Microglia (Mesodermal Glia):

of mesodermal origin, the microglial cells represent a portion of the reticuloendothelial system. These cells are scattered irregularly in both grey and white matter and among the astrocytes and oligodendrocytes (Anderson et al., 1985).

Vasculature:

The blood vessels of the central nervous system, in addition tc their usual functions help through their contribution to the blood brain barrier (B.B.B.) to maintain fluid to the veins across the perivascular space.

The movement of water and lipid soluble substances across this barrier is relatively unrestricted, the transfer of other substances such as glucose, amino acids, and inorganic ions is inhibited to varying degrees. It has been stated that the large size of some molecules and the nonutilization by the nervous system of many smaller molecules determine the degree of their exclusions by B.B.B. (Anderson et al., 1985).

Pathology

Epidemiology:

Astrocytoma represents 30% of primary intracranial brain tumours (Office of Biometry and Epidemiology 1977).

Astrocytomas are more common in male (Monfardini, et al., 1987).

As regard to the frequency of astrocytomas as a function of age range,

- ❑ Low grade peak incidence 0-9 years.
- ❑ Anaplastic peak incidence 0-9 years.
- ❑ Mixed type peak incidence 30-39 years.
- ❑ Glioblastoma peak incidence 60-74 years.

(SEER program search 1978-1984).

Etiology:

I- Genetics:

A spectrum of gliomas from well-differentiated astrocytomas to glioblastoma multiforme have been observed in families with neurofibromatosis. (Seizinger B.R., Rouleau G, Ozelius L.J. et al., 1987). Another phakomatosis associated with brain tumours is