Pituitary Hormonal Changes In Pediatric Brain Tumor

THESIS

Submitted for Partial Fulfillment of Master Degree

(M.Sc) in Pediatrics

BY

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2008

Acknowledgment

Thanks Allah for granting me the ability to complete this work till it comes to an end.

I wish to express my cordial appreciation and everlasting gratitude to ***Prof.Dr. Isis Mahmoud Ghaly.*** *Professor of Pediatrics .Faculty of Medicine, Cairo University, under whose supervision I had the honor to proceed with this work, for her continuous help and encouragement in initiating and completing it.*

I am also profoundly grateful to ***Prof.Dr.Fatma El Mogy****. Professor of Clinical and Chemical Pathology, .Faculty of Medicine, Cairo University. For her keen supervision, continuous guidance, generous help, useful suggestions and valuable advice throughout the whole work.*

I do feel greatly indebted to ***Assistant Prof.Dr. Lobna Fawaz*** *Assistant Professor of Pediatrics. Faculty of Medicine, Cairo University for her great effort, generous advice, continuous help and encouragement during every step of this work.*

Abstract

Tumors of the central nervous system constitute the largest group of solid neoplasms in children and are second only to leukemia in their overall frequency during childhood. Children with brain tumors may subsequently have deficits in neuroendocrine function a patient may have a deficiency of one hormone or any combination of hormones .The present work aimed to define the hypothalamo-hypophseal axis in patients presenting with intracranial tumors. This included cases that presented before and after treatment. A thirty cases of children suffering from brain tumors were investigated, to define the hypothalamo-hypophseal axis in patients presented with intracranial tumors, this included cases which presented pre or post-operatively.

Key Words

- Pituitary hormonal changes In pediatric brain tumor
- Pituitary Hormonal changes
- Hypothalamo-hypophseal axis
- Brain tumors
- Tumors of the central nervous system
- Solid neoplasms in children

TO MY PARENTS

TO WHOM I OWE ALL MY SUCCESS.

TO MY LOVING WIFE

THE GREATEST SUPPORT IN MY LIFE.

TO MY BELOVED DAUGHTER & SON

TO WHOM THIS WORK TOOK ME AT THIER EXPENSE.

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List of Abbreviations

ACTH: Adrenocorticotropic Hormone
ADH : Antidiuretic hormone
CNS : central nervous system
CRH : Corticotropin-releasing hormone
CT : Computed tomography
DI : Diabetes Insipidus
DPC : Diagnostic Product Corporation
DSL : Diagnostic Systems Laboratories
E2 : Estradiol
FSH : Follicular-stimulating hormone
GH : Growth hormone
GHRH: Growth Hormone Releasing Hormone
GnRH: Gonadotrophin Releasing Hormone
HPA: Hypothalamic-pituitary-adrenal
ICP : Intracranial pressure
IRMA: Immunoradiometric assy
LH : Luteinizing hormone
MPNST: Malignant peripheral nerve sheath tumor
MRI : Magnetic resonance imaging
mRNA: Messenger ribonucleic acid
PNET: Primitive neuroectodermal tumor
PRL : Prolactin
PVN : Paraventricular nuclei
RIA : Radioimmunoassay
SON : Supraoptic nuclei
SRIF : Serotonin Releasing Inhibitory Factor
FT3 : FreeTriiodothyronine
FT4 : FreeTetraiodothyronine (Thyroxin)

TSH : Thyroid stimulating hormone

TRH: Thyroid-stimulating hormone

WHO: World Health Organization

β-END: Beta- Endorphin

Introduction

Tumors of the central nervous system constitute the largest group of solid neoplasms in children and are second only to leukemia in their overall frequency during childhood. Each year, brain tumors develop in approximately 1500 to 2000 children in the United States; the number of tumors appears to have increased slightly from 1974 to 1988. ***(Astrakas et al., 2004)***

Children with brain tumors may subsequently have deficits in neuroendocrine function. Although deficiency of growth hormone is common, hypothyroidism including (lethargy, intolerance to the cold, dry hair and pronounced weight gain, and constipation) and gonadal disturbances are reported and are presumed to occur only after particularly high doses of radiation***. (Gurney et al., 2003).***

Most of the hypothalamic-pituitary-target-organ axes are tightly coordinated systems in which hormonal signals from the hypothalamus stimulate or inhibit secretion of anterior pituitary hormones; these hormones, in turn, act on specific organs. These axes are frequently described as closed-loop or negative-feedback systems, since circulating hormones secreted by target organs modulate hypothalamic and pituitary activity ***(Gold, 1998).***

A patient may have a deficiency of one hormone or any combination of hormones, although deficiencies of corticotropin and thyrotropin may occur ***(Sauder et al., 1984).***

Aim of work

The present work aimed to define the hypothalamo-hypophyseal axis in patients suffering from brain tumors investigated to define hypothalamo-hypophseal axis, this includes cases that presented pre or post operatively to Diabetes, Endocrine and Metabolism Pediatric Unit (DEMPU) of Cairo University Children's Hospital or referred to it from the Neurosurgery Clinic – Children's Hospital – Cairo University.presenting with intracranial tumors. This includes cases that presented before and after treatment. Whether the different treatment modalities surgery, chemotherapy, radiotherapy alone or in combination affect the hypothalamic-pituitary axis were investigated.