

**THE VALUE OF CT SCAN
IN DIAGNOSIS AND OUTCOME
OF SEVERE CLOSED HEAD INJURIES**



THESIS

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بسم الله الرحمن الرحيم

« قالوا سبحانك لا علم لنا إلا ما علمتنا

إنك أنت العليم الحكيم »

صدق الله العظيم

(سورة البقرة آية ٢٢)

To...

***My wife who shared with me
every step of this work***

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***INTRODUCTION
AND AIM OF THE WORK***

INTRODUCTION AND AIM OF THE WORK

The advent and continuing sophistication of CT has revolutionized the neurological diagnosis and management of head trauma. Cranial computed tomography has become the diagnostic examination of choice for assessing the intracranial consequences of head trauma. The roles of conventional skull radiography and cerebral angiography have significantly declined. The exquisite demonstration of post-traumatic alternation of the skull and brain by cranial computed tomography is now commonplace. Clinical and laboratory research have paralleled the advances in CT technology and have increased our understanding of head trauma as it related to brain anatomy and physiology, including brain swelling, the blood brain barrier, the cerebral interstitial space, CSF dynamics, cerebrovascular autoregulation, and cerebral blood circulation (*Shalen et al.*, 1985).

Head injuries can be divided into primary and secondary injuries. The primary injuries are those that occur at the moment of impact (intracranial haematomas, contusions, lacerations and shearing injuries).

The secondary injuries are those that occur after that moment and in large part can be prevented. These include anoxia from low PO₂ and ischaemia as a result of either systemic hypotension, or intracranial hypertension.

Any approach to a patient with head injury should aim to minimize the occurrence of these secondary insults (*Jennett et al.*, 1975).

A number of investigators have explored the possibility that CT scan data may be helpful in estimating outcome from head trauma. CT scan can often differentiate between epidural, subdural, intracerebral lesion, information that has important implication for outcome.

The aim of the present work is to study the value of CT scan in diagnosis of closed head injuries, also to assess its validity in revealing the nature of the lesion in correlation to clinical examination and operative finding. We hope from this study to point out the reflection of CT scan pictures on the prognosis and outcome.

Anatomy

ANATOMY

Scalp

The scalp covers the vault of the skull and extends between the right and left temporal lines, and eyebrows and superior nuchal lines. It consists of skin and superficial fascia adherent to a flat aponeurotic sheet, the epicranial aponeurosis is the tendon uniting the frontal and occipital bellies of the occipitofrontalis muscle (*Murray et al.*, 1983).

Bones of the Skull

The skull consists of a brain-box or cranium and a facial skeleton. The cranium surrounds the brain and its coverings (meninges) and depends from before backwards and accommodate them. The facial skeletons is slung beneath the shallow frontal part of the cranium, the anterior wall of which forms the bones of the forehead (frontal bone), while the floor (frontal and ethmoid bones) forms the roofs of the orbits and of the nasal cavities, and sends a wall (nasal septum) downwards between these cavities.

The external surfaces of the skull are described according to the following scheme:

Norma verticales (seen from above), **norma frontalis** (seen from front), **norma lateralis** (seen from the side), **norma occipitalis** (seen from the back) and **norma basalis** (seen from the base of the skull).

Cranial Cavity

It is divided into three cranial fossae:

- Anterior.
- Middle.
- Posterior.

A. Anterior Cranial Fossa

Median part shows the frontal crest, crista galli, foramen caecum, cribriform plate of ethmoid.

Lateral part formed of orbital plate of frontal bone (anteriorly), lesser wing of sphenoid (posteriorly).

B. Middle Cranial Fossa

Median part is formed by the body of sphenoid and shows the optic groove, optic foramen and sella turcica.

Floor of the lateral part is formed by greater wing of the sphenoid (anteriorly), and surface of the petrous temporal bone (posteriorly) and squamous temporal bone (laterally).

C. Posterior Cranial Fossa

Median part shows clivus, foramen magnum and external occipital crest (*Roman, 1981*).

The Membranes of the Brain (Meninges)

Dura Matter

It is a thick fibrous layer, fuses externally with endocranium of the skull except where it forms rigid folds between the major parts of the brain and where the venous sinuses of the dura matter lie between the dura and endocranium (*Last, 1985*).

The internal surface of the dura matter is smooth and glistening. It is separated from the equally smooth external surface of the arachnoid by the subdural space which is a capillary space acts as bursa which allows movement between the dura and the structures it encloses.

Folds of the dura matter are:

— Falx cerebri.