Ain Shams University
Faculty of Medicine

Postoperative Complications of Ventriculoperitoneal Shunt

Thesis
Submitted for partial fulfillment of master degree
In **Neurosurgery**

By
Ahmed Sabry Abdelkader
M.B.B.Ch

Under Supervision of
Prof.Dr./ Mohamed Ashraf Ghobashy
Professor of Neurosurgery
Faculty of Medicine -Ain Shams University

Dr. / Mohamed Alaa El-Din Habib
Assist. Professor of Neurosurgery
Faculty of Medicine -Ain Shams University

Dr. / Ahmed Faisal Toubar
Lecturer of Neurosurgery
Faculty of Medicine -Ain Shams University

2013

First of all, thanks to ***Allah****, the most merciful, the most graceful for his great care, support and guidance every step of the way.*

I would like to express my deep gratitude to, ***Prof. Dr. Mohamed Ashraf Ghobashy*** *Professor of Neurosurgery, Ain Shams University, for his kindness, guidance and continuous encouragement. I consider myself fortunate to work under his supervision.*

It is very difficult for me to express, in words, my gratitude to ***Dr. Mohamed Alaa El-Din Habib****; Assistant professor of Neurosurgery, Ain Shams University, for his time, continuous help and encouragement, his concern will always be remembered.*

I'm also very grateful to ***Dr. Ahmed Faisal Toubar;*** *Lecturer of Neurosurgery, Ain Shams University, for his support and help to have this work fulfilled.*

Ahmed Sabry

Dedication

First of all I'd like to dedicate this work to ***my wife & my family*** *for their continuous help & support.*

And to my all professors, senior staff, and ***colleagues in the department of neurosurgery, Nasr City Hospital for Health Insurance****, for their sympathetic help.*

Last, but not least, to professor ***Dr. Mohamed Ashraf Ghobashy*** *for giving me the honour of working under his supervision, for his valuable criticism & kind guidance.*

Ahmed Sabry
2013

CONTENTS

List of Abbreviations

CHW	:	*Cerebral hemisphere width*
CNS	:	*Central nervous system*
CSF	:	*Cerebrospinal fluid*
CT	:	*Computed tomography*
ICP	:	*Intracranial pressure*
INPH	:	*Idiopathic normal pressure hydrocephalus*
ISF	:	*Interstitial fluid*
LVW	:	*Lateral ventricles width*
MRI	:	*Magnetic resonant imaging*
NPH	:	*Normal pressure hydrocephalus*
SNPH	:	*Secondary normal pressure hydrocephalus*
TCD	:	*Transcranial Doppler*
TST	:	*Transsystolic time*
VA	:	*Ventriculoatrial*
VP	:	*Ventriculoperitoneal*

****

List of Figures

List of Figures (Cont.)

List of Figures (Cont.)

List of Tables

Introduction

The term hydrocephalus is derived from the Greek words "hydro" meaning water and "cephalus" meaning head. As the name implies, it is a condition in which the primary characteristic is excessive accumulation of fluid in the brain. Although hydrocephalus was once known as "water on the ventricles," the "water" is actually cerebrospinal fluid (CSF) — a crystal clear fluid that surrounds the brain and spinal cord. The excessive accumulation of CSF results in an abnormal widening of the cerebral ventricles. This widening creates potentially harmful pressure on the tissues of the brain (***Aschoff et al., 1999***)**.**

Hydrocephalus may be congenital or acquired. Congenital hydrocephalus is present at birth and may be caused by either events or influences that occur during fetal development, or genetic abnormalities. Acquired hydrocephalus develops at the time of birth or at some point afterward (***Rekate and Cherney, 1996).***

Hydrocephalus may also be communicating or non-communicating. Communicating hydrocephalus occurs when the flow of CSF is blocked after it exits the ventricles while Non-communicating hydrocephalus "obstructive" hydro-cephalus occurs when the flow of CSF is blocked along one or more of the narrow passages connecting the ventricles (***David and Nalin, 2006).***

Symptoms of hydrocephalus vary with age, disease progression, and individual differences in tolerance to the condition. (***David and Nalin, 2006).***

In infancy, the most obvious symptom of hydrocephalus is often a rapid increase in head circumference.

Other symptoms may include vomiting, sleepiness, irritability, downward deviation of the eyes and seizures**.**

Older children and adults may experience different symptoms because their skulls cannot expand to accommodate the buildup of CSF. Symptoms may include headache followed by vomiting, nausea, papilledema, blurred or double vision, disturbed conscious level, problems with balance, poor coordination, gait disturbance, urinary incontinence, slowing or loss of developmental progress, lethargy, drowsiness, irritability, or other changes in personality or cognition including memory loss(***Rekate and Cherney, 1996)*.**

Hydrocephalus is diagnosed through clinical neurological evaluation and by using cranial imaging techniques such as ultrasonography, computed tomography (CT), magnetic resonance imaging (MRI), or pressure-monitoring techniques.

Hydrocephalus is almost always treated successfully with surgical diversion of CSF pathway (either by third ventriculostomy or placement of a shunt system) or treatment of the cause as excision of underlying tumours (***Rush et al., 1985; Chris et al., 2003)*.**

Ventriculoperitoneal shunt is one of the most commonly performed neurosurgical procedures for the management of hydrocephalus. A wide range of complications, neurological as well as nonneurological, has been reported following this procedure.

Complications can be encountered either in the immediate perioperative or in postoperative follow-up period. VP shunt-related complications may occur anywhere along its course from the ventricle cranially to the peritoneal cavity caudally.

Commonly encountered complications include: mechanical obstruction of distal peritoneal catheter by omentum or other structures leading to shunt malfunction, formation of abdominal pseudo cyst, spontaneous bowel perforation, intestinal obstruction, inguinal hernia and development of liver abscess. Rare complications consist of migration of the peritoneal catheter into the stomach, gallbladder, urinary bladder, vagina, liver, bowel, colon, scrotum and diaphragm. However, extrusion of components of shunt apparatus is very unusual (***Metin et al., 2007).***

Shunt systems are not always perfect devices. Complications may include infections, obstructions, and the need to lengthen or replace the catheter. Generally, shunt systems require monitoring and regular medical follow up. When complications occur, the shunt system usually requires some type of revision.

Although the early symptoms of shunt malfunction or infection in children: fever, irritability are similar to many childhood illnesses; we must determine the symptoms associated with shunt failure in a particular individual. If we suspect there is a problem with the shunt, it is wise to have it checked rather than ignore it. It is better to have a false alarm checked than to leave it unattended.

Remember, although shunt complications can be very serious and become life threatening, they can almost always be treated successfully when they are discovered early.

The prognosis for individuals diagnosed with hydrocephalus is difficult to predict, although there is some correlation between the specific cause of the hydrocephalus and the outcome. Prognosis is further complicated by the presence of associated disorders, the timeliness of diagnosis, and the success of treatment. The degree to which relief of CSF pressure following shunt surgery can minimize or reverse

damage to the brain is not well understood (***Tamburrini G; et al., 2008)***

Affected individuals and their families should be aware that hydrocephalus poses risks to both cognitive and physical development. However, many children diagnosed with the disorder benefit from rehabilitation therapies and educational interventions and go on to lead normal lives with few limitations. Treatment by a multidisciplinary team of medical professionals, rehabilitation specialists, and educational experts is critical to a positive outcome. Left untreated, progressive hydrocephalus may be fatal.

Ventriculoperitoneal shunt operation should be done just for patients can not be treated either by medical or surgical methods as before, due to its frequent and variable serious complications.

Neurosurgeons hope that future has solutions for treatment of hydrocephalus other than ventriculoperitoneal shunt**.**

Aim of The Work

The aim of this work is to document and study the complications in individuals with hydrocephalus and managed by surgical insertion of a V-P shunt in the period from October 2011 to September 2012.