MANAGEMENT OF ACUTE HYDROCEPHALUS DUE TO ANEURYSMAL SUBARACHNOID HEMORRHAGE.

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3DRA	three-dimensional rotational angiography
ACoA	Anterior communicating artery
aSAH	Aneurysmal subarachnoid hemorrhage
C	Celsius
CBF	Cerebral blood flow
cm	Centimeter
$CMRO_2$	Cerebral metabolic rate of oxygen
CPP	Cerebral Perfusion pressure
CSF	Cerebrospinal fluid
CT	Computed tomography
CTA	CT angiography
DACA	Distal anterior cerebral artery
DSA	digital subtraction angiography
EVD	External ventricular drainage
FLAIR	Fluid-attenuated inversion recovery
GCS	Glasgow coma scale
h	hour
Hg	Mercury
ICA	Internal cerebral artery
ICP	Intracranial pressure
ICU	Intensive care unit
Kg	Kilogram
L	Litre
MCA	Middle cerebral artery

mg	milligram
min	minute
mL	milliliter
Mm	millimeter
Mm^3	Cubic millimeter
MRA	Magnetic resonance angiography
MRI	Magnetic resonance imaging
PCoA	Posterior communicating artery
SAH	Subarachnoid hemorrhage
VP	Ventriculoperitoneal
WFNS	World Federation of Neurosurgical Societies

Abstract

Acute hydrocephalus can cause neurological deterioration following aneurysmal subarachnoid hemorrhage. Management of acute hydrocephalus was studied in 20 patients with aneurysmal subarachnoid hemorrhage. Forty-five percent of the patients were successfully managed conservatively and 55% required CSF diversion. Close monitoring of the level of consciousness remains crucial in the management plan. The bicaudate index on admission can predict the need for CSF diversion.

(Key Words: Management, hydrocephalus, subarachnoid, hemorrhage, aneurysmal)

Introduction

Acute hydrocephalus is considered a condition that can cause early neurological deterioration after aneurysmal subarachnoid hemorrhage (SAH), but can possibly be treated. Incidence is about 20% to 30%, within 48 hours after SAH (1).

The pathogenesis of hydrocephalus is multifactorial and is related to the obstruction of cerebrospinal fluid (CSF) circulation either within the ventricular system (aqueduct of Sylvius, outlets of the fourth ventricle) or in the subarachnoid space (tentorial incisura or basal cisterns) related to increased resistance to outflow of CSF at the arachnoid granulations. Posterior circulation aneurysms have a higher incidence of hydrocephalus. Middle cerebral artery aneurysms are associated with a low incidence of hydrocephalus (2).

Early detection of its signs and symptoms and accurate analysis of computed tomography (CT) studies are important for the management of patients with SAH. Although pathophysiology of this condition is not fully understood, hydrocephalus after SAH can be treated effectively using current technology**.** Ventricular drainage may be required on an emergency basis as a lifesaving measure to relieve acute hydrocephalus and decrease intracranial pressure (ICP) in patients with a depressed level of consciousness. If ventricular drainage is needed, it is probably best to lower ICP just enough to maintain adequate cerebral perfusion pressure (3). The use of this procedure remains controversial and its risks, including intracranial haemorrhage and infection, cannot be ignored. If a drain is not in place before surgery for aneurysms, one can be inserted intraoperatively to achieve adequate brain relaxation. The catheter is left in place postoperatively to monitor ICP, drain

CSF as necessary. Some surgeons change the catheter or convert it to a permanent shunt if it cannot be removed within 5 to 7 days, unless persistent intraventricular blood is present (4).

Microsurgical fenestration of the lamina terminalis during aneurysm clipping may decrease the incidence of shunt-dependent hydrocephalus. Opening the lamina terminalis produces an anterior ventriculostomy that may facilitate CSF circulation and reduce leptomeningeal reaction and subarachnoid fibrosis (5).

This study evaluated the development of acute hydrocephalus following aneurysmal SAH and examined the clinical prognosis and various treatment options.