AIM OF THE WORK

The aim of this study was to assess the role of multidetector computed tomography (MDCT) in early follow up for post endoscopic third ventriculostomy in hydrocephalic patients.

PATIENTS

This study was conducted on 20 patients diagnosed as having hydrocephalus and underwent endoscopic third ventriculostomy presented to the radiodiagnosis department at Alexandria university hospital.

METHODS

All patients were subjected to:

- Full history taking.
- Thorough clinical examination.
- Follow up CT brain with contrast within one month after endoscopic third ventriculostomy, in comparison with CT done before ETV.

The medical ethics were considered, the patients could be aware of examination, written informed consent was obtained and the patient had to get benefit from the research.

Measurements

- **Ventricular index** was measured in CT brain of patients before and one month after ETV and then comparison was done.
- Axial CT brain done on TOSHIBA 16 slice in Abo Keer speciality hospital and SIEMENS 6 slice in the radiodiagnosis department at Alexandria university hospital.
- **Ventricular index** (VI): is the distance between the frontal horns of the lateral ventricle at the level of the head of the caudate nucleus and the widest distance along the surfaces of the frontal lobes, in the same plane of the lateral ventricles.
- Peri ventricular CSF permeation and effaced sulci were also followed.

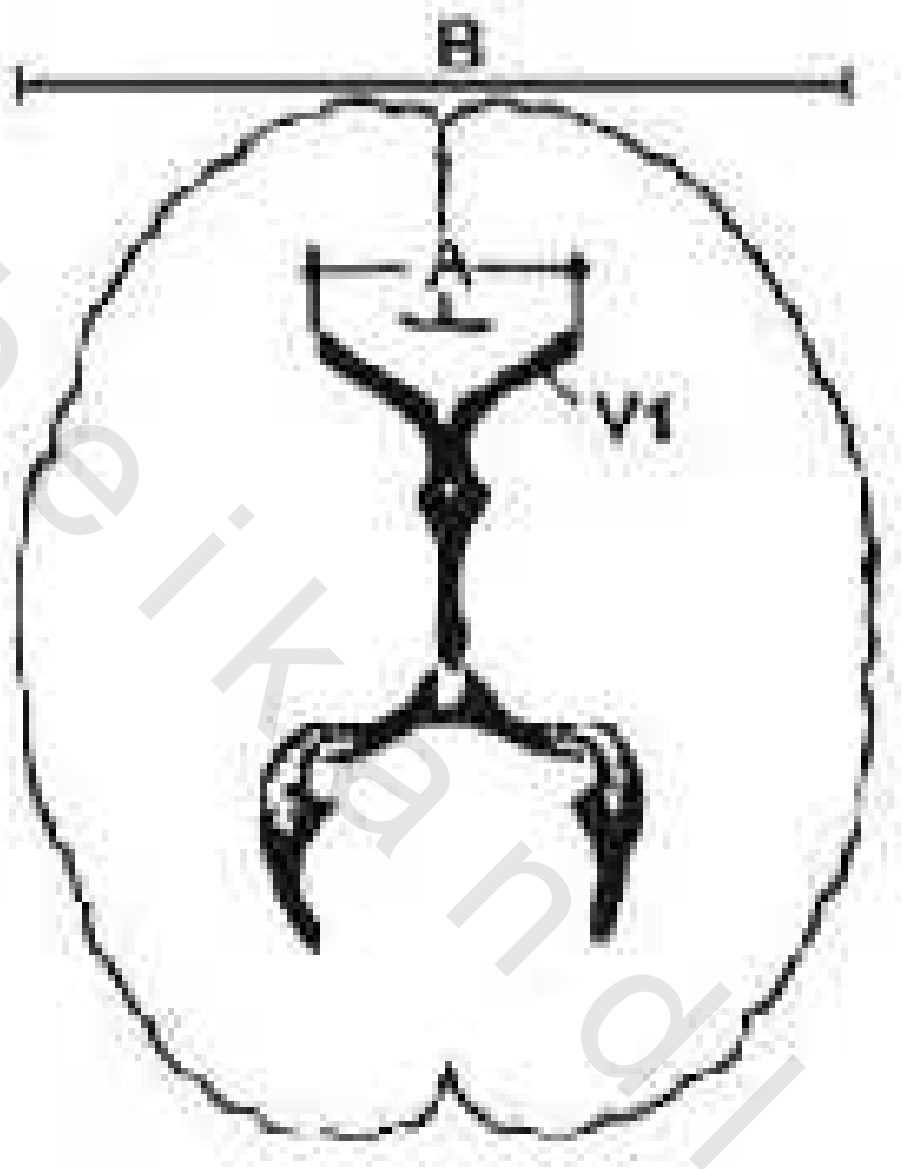


Figure (12): Schematic drawing representing the axial cerebral section and the distances A (between the frontal horns of the lateral ventricles, and B (brain width) representing the ventricular index. [47]

RESULTS

A total of 20 patients with hydrocephalus were subjected to endoscopic procedure. There were nine males and eleven females with age ranging from two months to 52 years and a mean age of 26 years showed in (tables I and II). The causes of hydrocephalus are outlined in (table III). Successful outcome results are presented in (tables IV and V) with success rate reaching 70% of patients (14 cases). Number of previously shunted patients is shown in (table VI). Presence of complications is demonstrated in (table IX).

Table I: Age of patients

Age of patients in decades	Number of patients
First decade (0-9)	14
Second decade (10-19)	3
Third decade (20-29)	1
Fourth decade(30-39)	1
Fifth decade(40-49)	0
Sixth decade (50-59)	1

Table II: Gender of patients

Gender of patients	Number of patients
Male	9
Female	11

Table III: Causes of hydrocephalus in patients undergoing endoscopic third ventriculostomy.

Cause of hydrocephalus	Number of patients
Brain tumour	7
Post meningitic hydrocephalus	2
Congenital infection	4
Arachnoid cyst	2
Congenital aqueduct stenosis	3
Normal pressure hydrocephalus	2

Twenty cases of obstructive hydrocephalus were collected from department of neurosurgery, they were diagnosed by clinical examination and imaging. 35% of patients were diagnosed as brain tumours. 20 % of patients were diagnosed as congenital infection like rubella and cytomegalo virus infection. 15 % of patients were diagnosed as having congenital aqueduct stenosis, other causes were post meningitic, arachnoid cyst and normal pressure hydrocephalus each presents 10 %.(Table III)

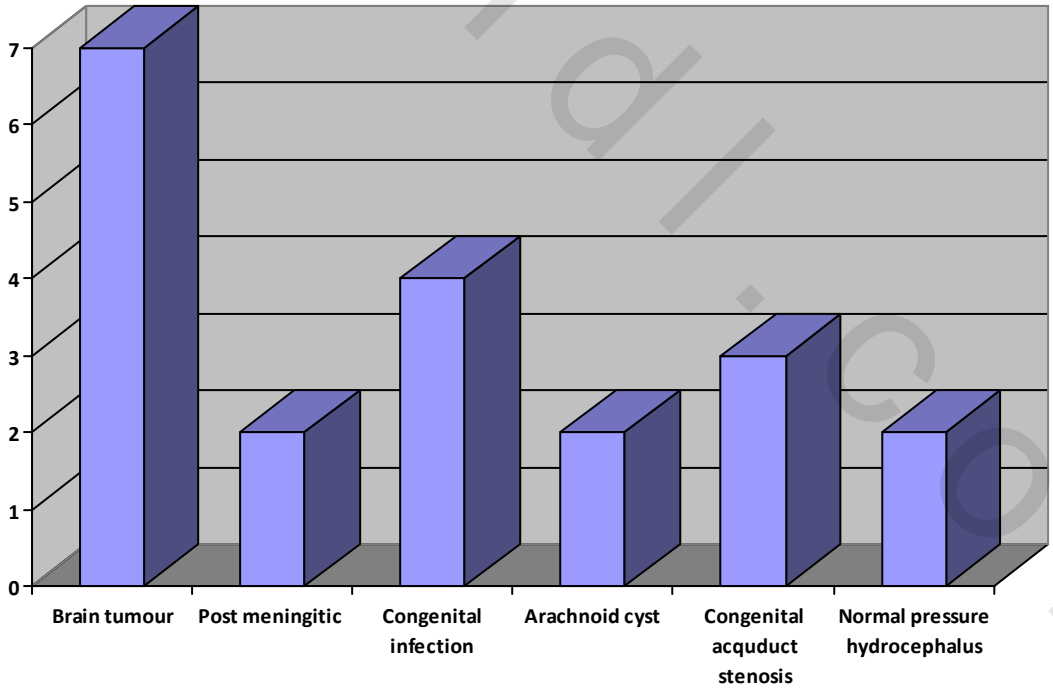


Figure (13): Causes of hydrocephalus.

Table IV: Classification of brain tumours confronted in the study.

Classification of brain tumours	Number of patients
Ependymoma	3
Posterior fossa tumour	2
Pineal body tumour	2

Table V: Outcome of ETV.

Outcome results	Number of patients	percentage
Radiological improvement	14	70%
No improvement	6	30%

Follow up of patients was done one month after ETV radiologically by CT brain. Assessment was by comparing ventricular index before and after ETV .Improvement seen in70% of patients while 30 % shows no improvement. (Table IV)

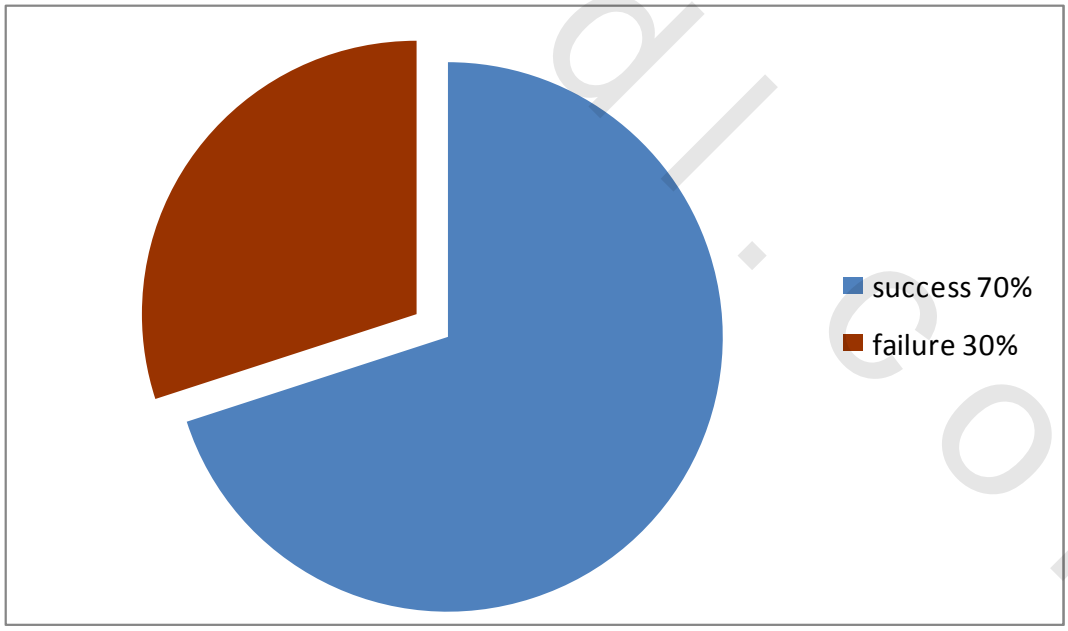


Figure (14): Outcome of ETV.

Table VI: Periventricular CSF permeation.

Improvement of permeation in successful cases	Number of patients
improved	5
No improvement	9

Fourteen patients had successful ETV with reduction of ventricular size plus clinical improvement, 5 of them only showed improvement of periventricular CSF permeation while 9 patients showed no improvement of CSF permeation. (Table V)

Table VII: Number of patients having previous VP shunt.

Presence of shunt	Number of patients
Previously shunted patients	12
No previous shunt	8

By history taking and imaging 60 % of patients were found to have previous VP shunt operation which were either blocked or complicated while 40 % had no previous shunt. (Table VI).

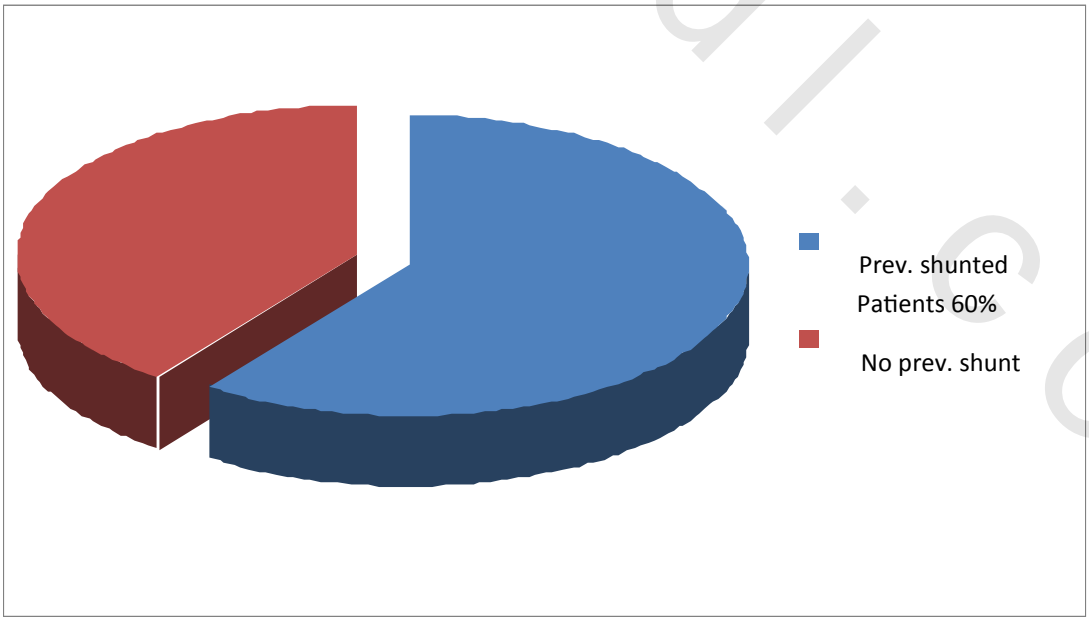


Figure (15): Percentage of previous VP shunts.

Table VIII: Outcome in previously shunted patients.

Outcome in previously shunted patients	Number of patients	Percentage
Successful	8	66%
Failure	4	34%

Table IX: Outcome in patients having no shunts.

Outcome in patients having no shunts	Number of patients	percentage
Successful	6	75%
Failure	2	25%

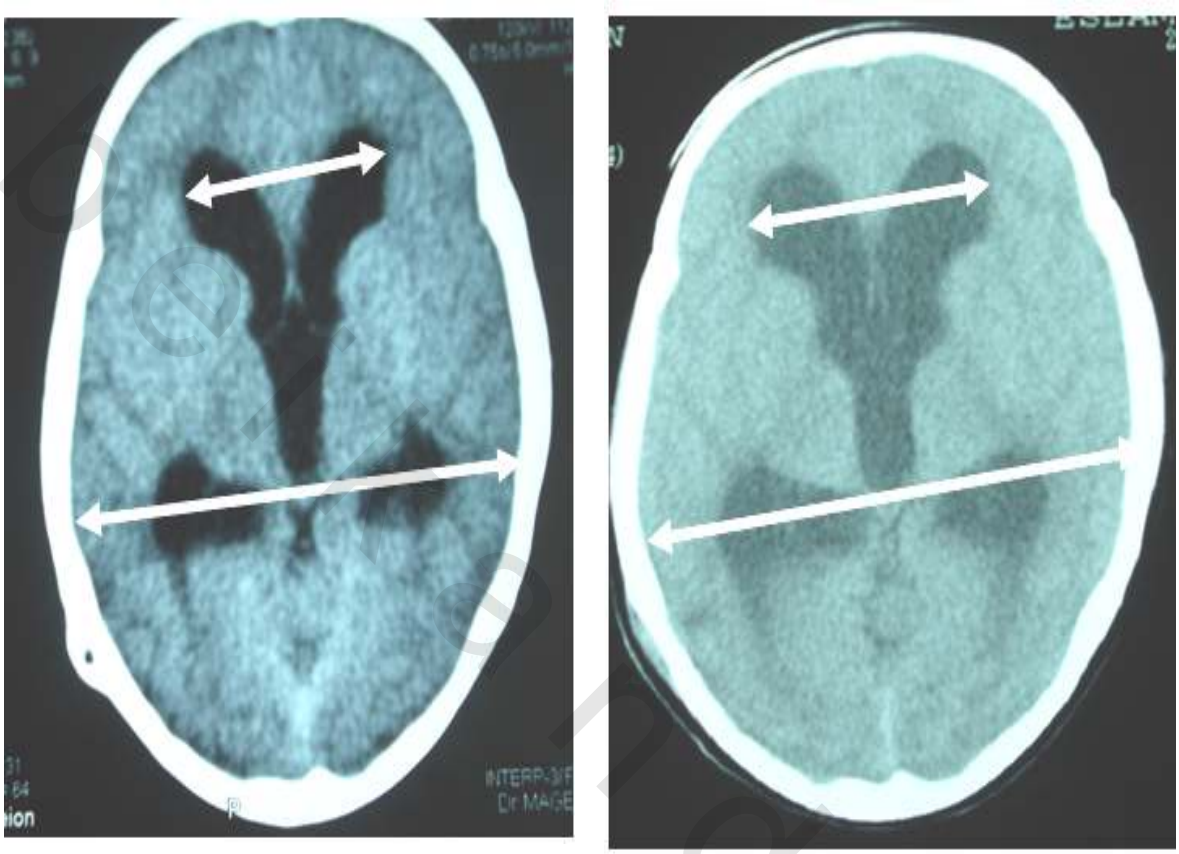
In tables VII and VIII we followed patients subjected to shunt operation before ETV was done and patients had an ETV from the start with no previous history of previous shunt operation, we found that patients with previous shunt operation had lower success rate than other patients with no previous shunt operation.

Table X: Complications.

Complications	Number of patients
Post-operative infection	1
Fever	1

Most common complications were followed .Post-operative infection and fever were found in 10 % of patients. Post-operative infection presented clinically by fever, shills and generalized body aches. Radiologically their CT brain showed air foci and brain edema. They showed improvement after treatment by antibiotics after few days. (Table IX)

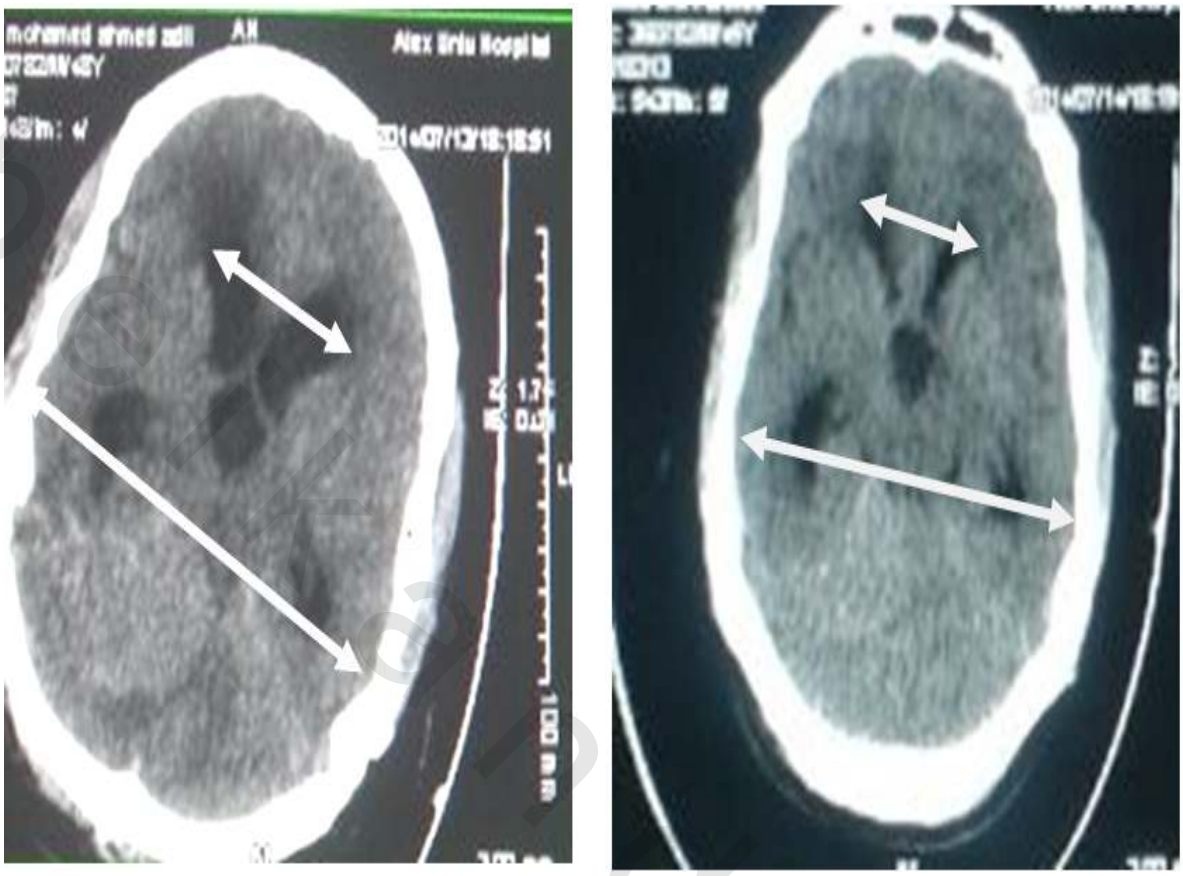
CASE 1



(A) (B)

Figure (16): A 6 years old patient diagnosed as congenital aqueduct stenosis having malfunctioning catheter shunt so had the chance for ETV.
A) Axial CT brain of the case before ETV shows dilated both lateral and third ventricle, ventricular index was measured as seen = 3 / 6.5 = 0.46 also peri ventricular haze is seen.
B) Axial CT brain of the patient after ETV was done with ventricular index = 3.2 / 6 = 0.53 indicating ETV failure in this case, no complications could be detected.

CASE 2



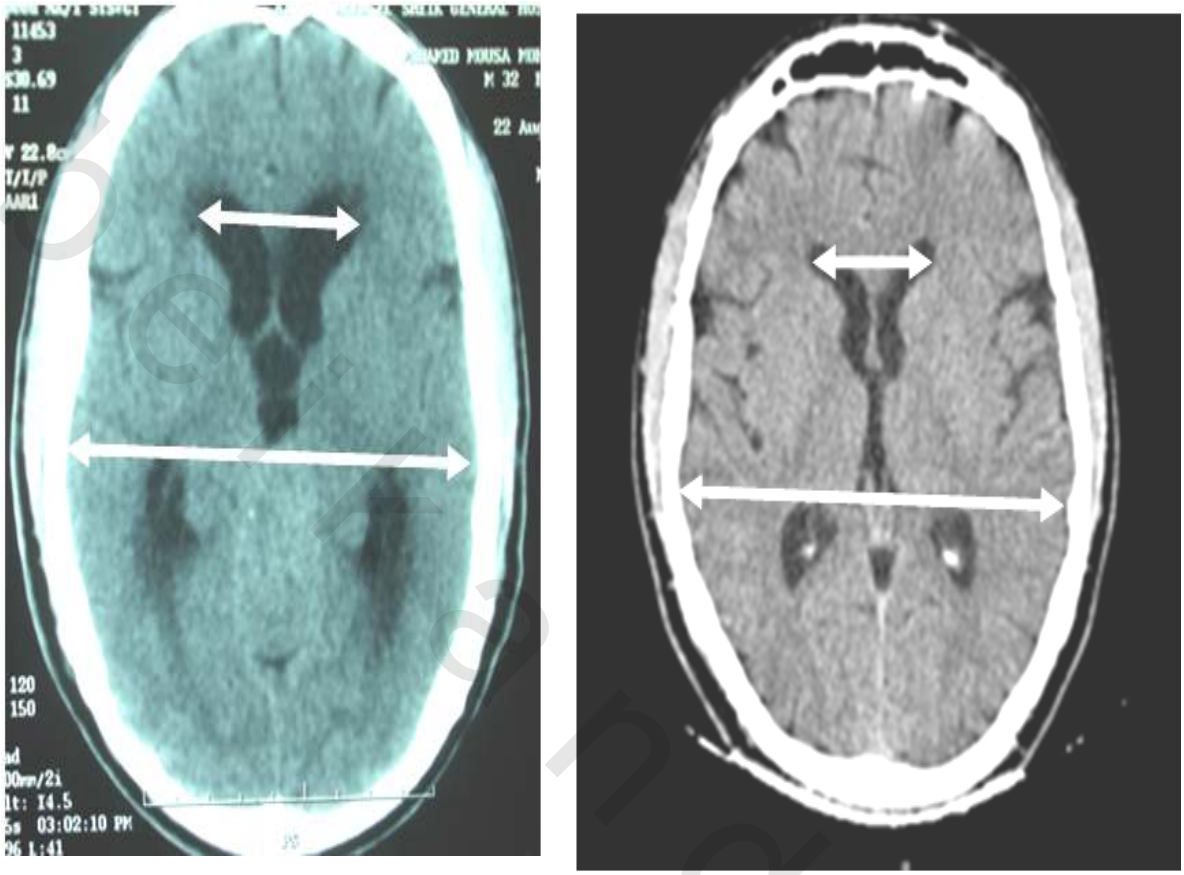
(A) (B)

Figure (17): 48 years male patient having posterior fossa brain tumor with obstructive hydrocephalus managed by ETV.

A) Axial CT brain showed a posterior fossa tumour with supratentorial ventricular system dilatation, ventricular index = 2/5= 0.4.

B) Follow up Axial CT brain post ETV with ventricular index = 1.5/4.5=0.33 indicating good improvement.

CASE 3



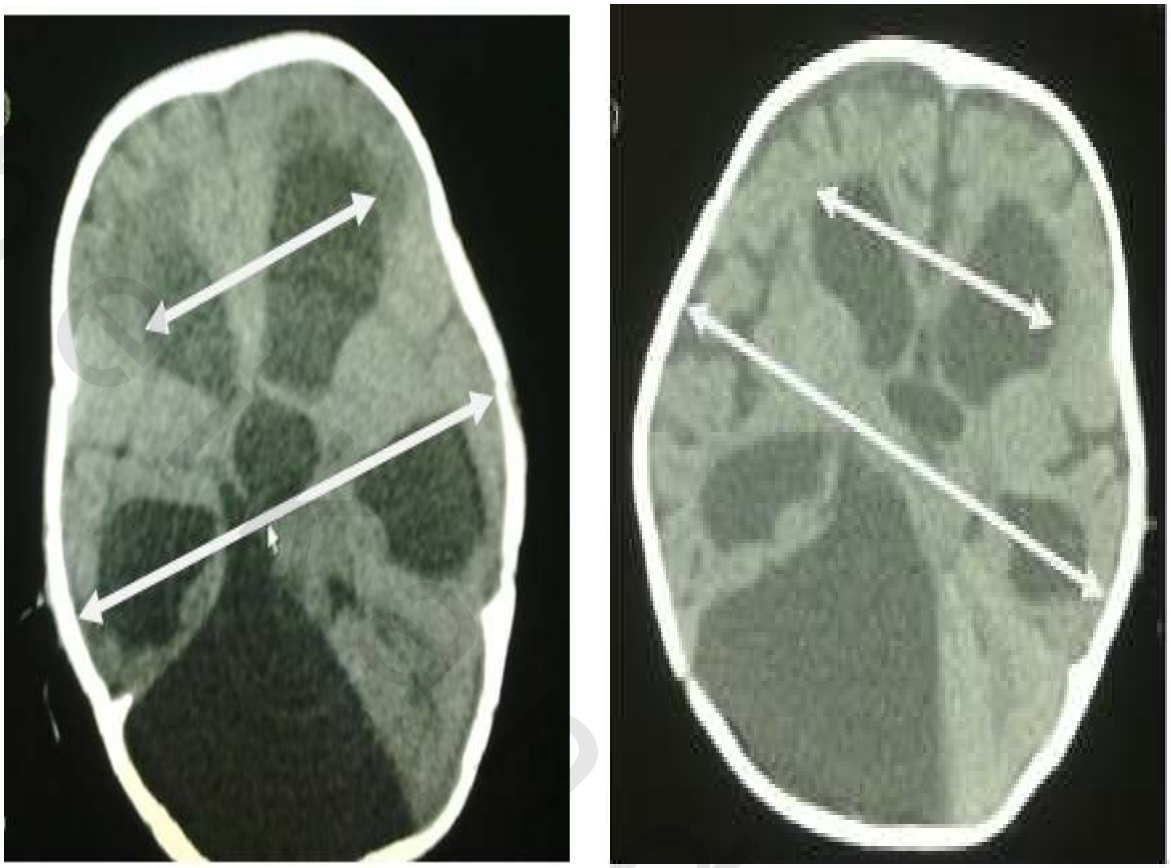
(A) (B)

Figure (18): 32 years old male proved to have pineal body tumour with consequent supratentorial ventricular dilatation was managed by ETV.

A) Axial CT brain showing the supratentorial ventricular dilatation and pineal body tumour with periventricular CSF permeation. ventricular index = 4/10.5 = 0.38.

B): Axial CT brain after 1 month showing improvement of hydrocephalus. Moderate improvement is seen in terms of reduction of the periventricular CSF permeation and reduction of ventricular index to 2/6.5 = 0.3, reaching normal size, note the great reduction in tumour size occurred after patient had surgical removal of the tumour and multiple sessions of chemotherapy.

CASE 4



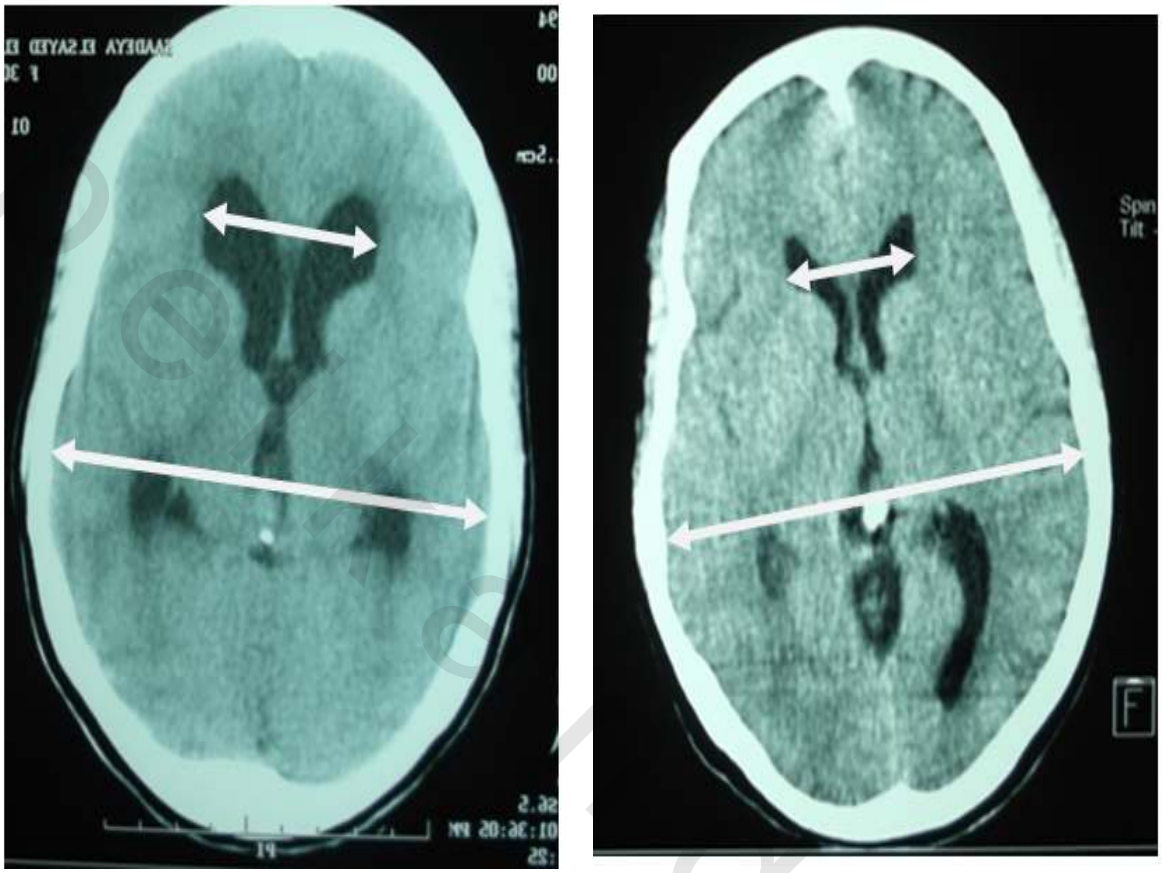
(A) (B)

Figure (19): 10 months old female patient diagnosed as right posterior fossa arachnoid cyst with 4th ventricular compression and obstructive supra tentorial ventricular dilatation.

A) Axial CT brain showing obstructive hydrocephalus caused by large arachnoid cyst with ventricular index = 7/12.5 = 0.56.

B) Axial CT brain following ETV by 1 month shows nearly the same degree of ventricular dilatation, ventricular index = 6.3/11.5 = 0.54 indicating failed ETV.

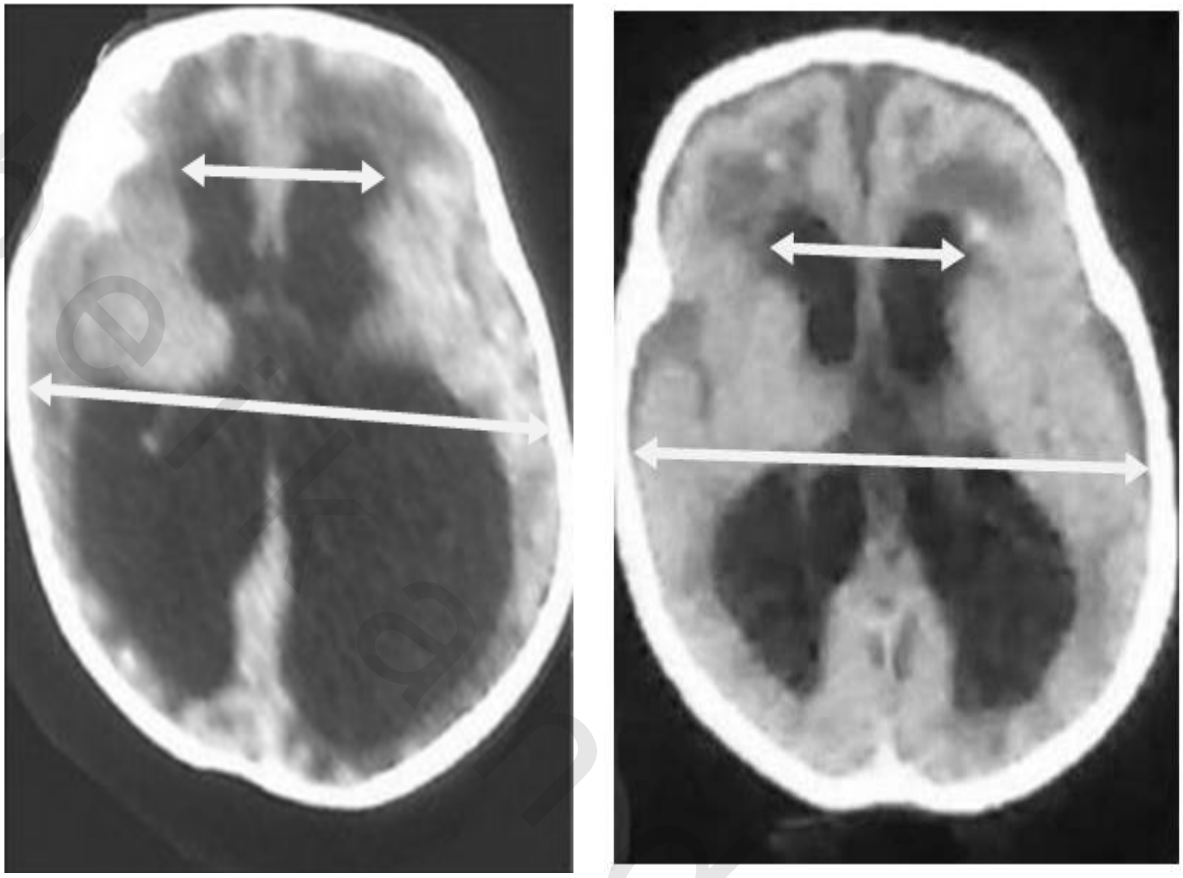
CASE 5



(A) (B)

Figure (20): 28 years old female was diagnosed as late onset aqueductal stenosis.
A) Axial CT brain shows the ventricles which are symmetrically dilated with sulcal effacement, ventricular index = 3.8/9.6 = 0.39.
B) Post ETV axial CT brain was done after 1 month. Improvement is noted with reduction of ventricular index = 2.6/8.5 = 0.3.

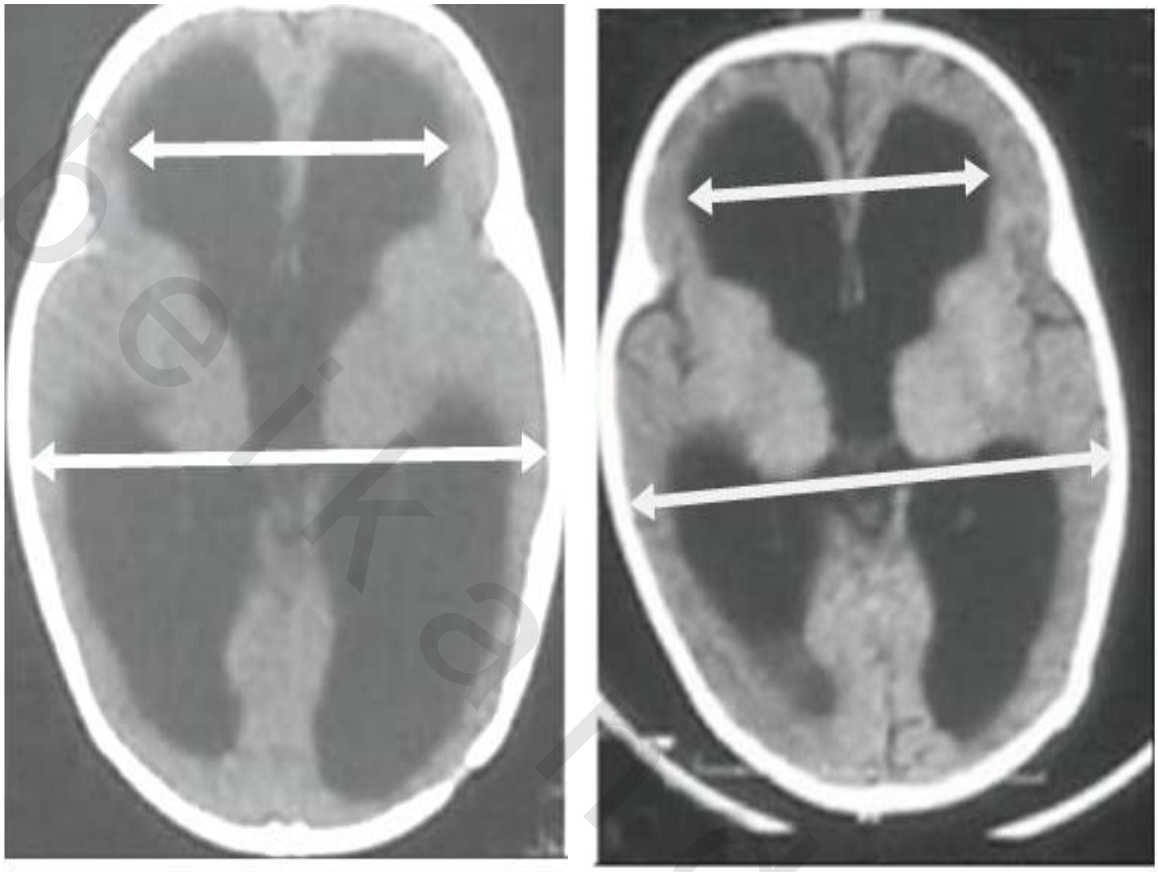
CASE 6



(A) (B)

Figure (21): A young female patient 2 months old diagnosed as post meningitic hydrocephalus.
A) Axial CT brain showing marked supratentorial asymmetrical ventricular dilatation as well as periventricular edema and haze, attributed to post meningitic insult, VI = 4/9.5 = 0.42 .
B) Axial CT brain obtained after ETV revealing VI = 3.5/9.6 = 0.36, indicating partial improvement.

CASE 7



(A) (B)

Figure (22): 4 months old female patient had progressive head enlargement and was diagnosed as congenital aqueduct stenosis.
A) Preoperative axial CT brain showed dilated lateral and third ventricle with effaced sub arachnoid spaces and marked periventeicular permeation, VI= 6/9.4 = 0.63.
B). In follow up CT one month after ETV there was minimal improvement presented by decrease ventricular size, normal subarachnoid spaces and disappearance of CSF permeation, VI = 5.5/9 = 0.61.