ORIGINAL RESEARCH

To evaluate the risks associated with ventriculoperitoneal shunting

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ABSTRACT

Background: When Walther Kausch utilised a rubber tube to drain the lateral ventricle into the peritoneal cavity in 1908, he pioneered the ventriculoperitoneal (VP) shunt as a treatment for hydrocephalus. In a tertiary neurosurgery centre, 14% of cases included the placement of shunts for hydrocephalus. Shunt-related issues place a major strain on the healthcare system. **Aim:** To evaluate the risks associated with ventriculoperitoneal shunting. **Materials and methods:** 100 Patients of both sexes who have previously had treatment for ventriculoperitoneal shunt (VPS). After admission, all patients had a thorough clinical evaluation that included a thorough history and examination, as well as a neurological examination. Each patient received a Chhabra "slit n spring" hydrocephalus shunt. comprehensive blood count (CBC), erythrocyte sedimentation rate (ESR), comprehensive urine analysis, X-ray chest, and head NCCT scan or MRI scan were all performed on all patients. **Results:** Most of the patients were belong to 10 -20 years (28%) followed by 1-10 years (16%),30-40 years(14%), below 1 years(12%),40-50 years(10%) and above 50 years (9%). Most common etiology was aqueductal stenosis seen in 22 patients followed by CPA mass in 16 patients, congenital in 13, postcraniectomy in 11, posterior fossa mass in 10, Dandy– Walker in 9, suprasellar mass in 8, postcraniectomy in 6, ventricular massin 4 and Supratentorial mass in 3 patients. **Conclusion:** We found that the most occurrences occurred between the ages of 10-20 years, along with the most issues associated with the aetiology of aqueductal stenosis.

Key words: Acqueduct stenosis, Ventriculoperitoneal shunt, hydrocephalus

INTRODUCTION

As a consequence of insufficient cerebrospinal fluid flow from its place of generation inside the cerebral ventricles to its point of absorption into the systemic circulation, hydrocephalus (HCP) is an active distension of the ventricular system of the brain.[1] It is a common childhood disorder that is linked to a wide range of illnesses, including meningitis, spina bifida and other congenital abnormalities, brain tumours, head injuries, brain haemorrhages, and congenital deformities including spina bifida. The incidence of congenital HCP is 316 per 100,000 births in Latin America and 68 per 100,000 births in the United States and Canada.[2] In South-East Asia, the incidence is 76 per 100,000 live births.[2] When Walther Kausch utilised a rubber tube to drain the lateral ventricle into the peritoneal cavity in 1908, he pioneered the ventriculoperitoneal (VP) shunt as a treatment for hydrocephalus.[3] In a tertiary neurosurgery centre, 14% of cases included the placement of shunts for hydrocephalus.[4] Shunt-related issues place a major strain on the healthcare system. It has undergone a number of changes, but despite this, it is still fraught with difficulties and may need several surgeries over the course of a patient's lifetime.[5] There are two categories of problems related to VP shunt surgery: mechanical complications and infective complications. A shunt system's migration, disconnection, or occlusion at the ventricular or peritoneal end are examples of mechanical problems. infection-related side effects, including ventriculitis, shunt tract abscess, and skin necrosis on the shunt device's surface. Subdural collection, inguinal hernia, hydrocele, ascites, creation of pseudocysts, perforation of a viscus, and extrusion of the shunt are examples of further problems.[6]

AIM

To evaluate the risks associated with ventriculoperitoneal shunting

MATERIALS & METHODS

This study was conducted between March 2020 and February 2021 in the Department of Neurosurgery at Rama Medical College and Research Centre in Kanpur, Uttar Pradesh, India. The institute's ethics committee granted its approval for the current study.The sample size for this research was 100. Patients of both sexes who have previously had treatment for ventriculoperitoneal shunt (VPS). After admission, all patients had a thorough clinical evaluation that included a thorough history and examination, as well as a neurological examination. Each patient received a Chhabra "slit n spring" hydrocephalus shunt. comprehensive blood count (CBC), erythrocyte sedimentation rate (ESR), comprehensive urine analysis, X-ray chest, and head NCCT scan or MRI scan were all performed on all patients. Numerous specialized tests were also carried out, including CSF analysis, CSF culture and sensitivity, blood culture and sensitivity, urine culture and sensitivity, pus culture and sensitivity, abdominal ultrasound, shunt series X-rays, and brain MRI. Clinical findings were used to make a definitive diagnosis, and each patient's particular tests and treatment were organised in accordance with that diagnosis. For proper inference, the results were combined and statistically analysed. P value under 0.05 was regarded as significant.

RESULTS

Table 1 shows that out of 100 patients, males were 58% and females were 42%. Most of the patients were belong to 10 -20 years (28%) followed by 1-10 years (16%),30-40 years(14%), below 1 years(12%),40-50 years(10%) and above 50 years (9%).

Figure 1 Gender of the patients

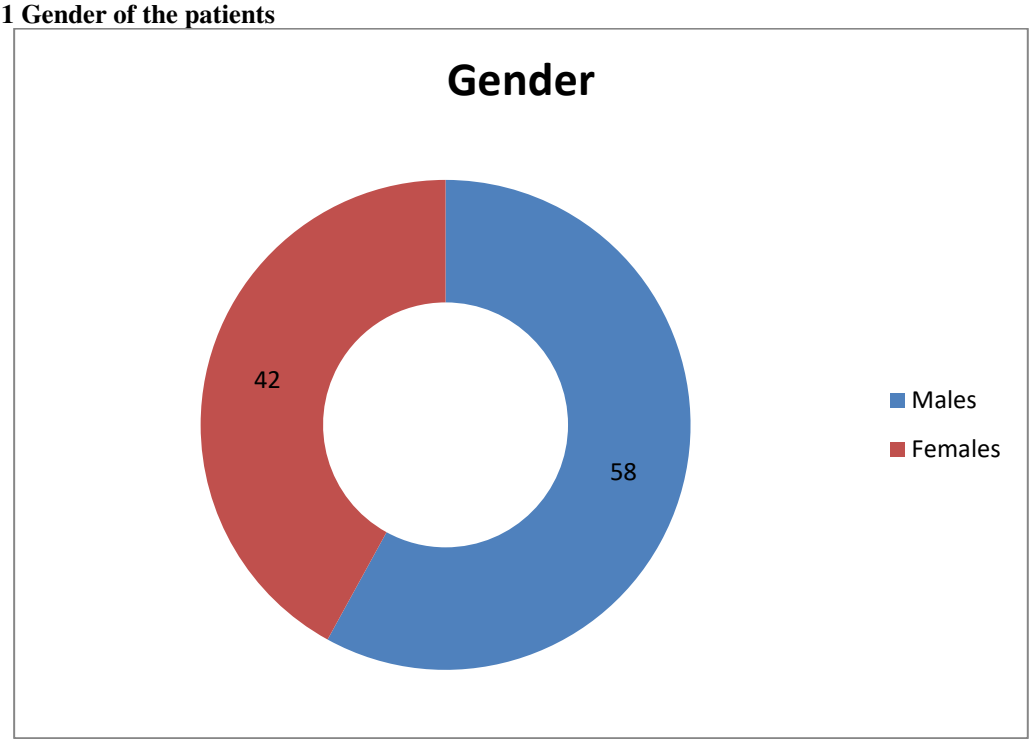

Table 1: Basic parameters of the patients

Gender	Number	Percentage
Male	**58**	**58**
Female	**42**	**42**
Age group		
Below 1 years	12	12
1-10	16	16
10-20	28	28
20-30	11	11
30-40	14	14
40-50	10	10
above 50	9	9

Figure 2: Distribution of complications in patients of hydrocephalus with various etiology

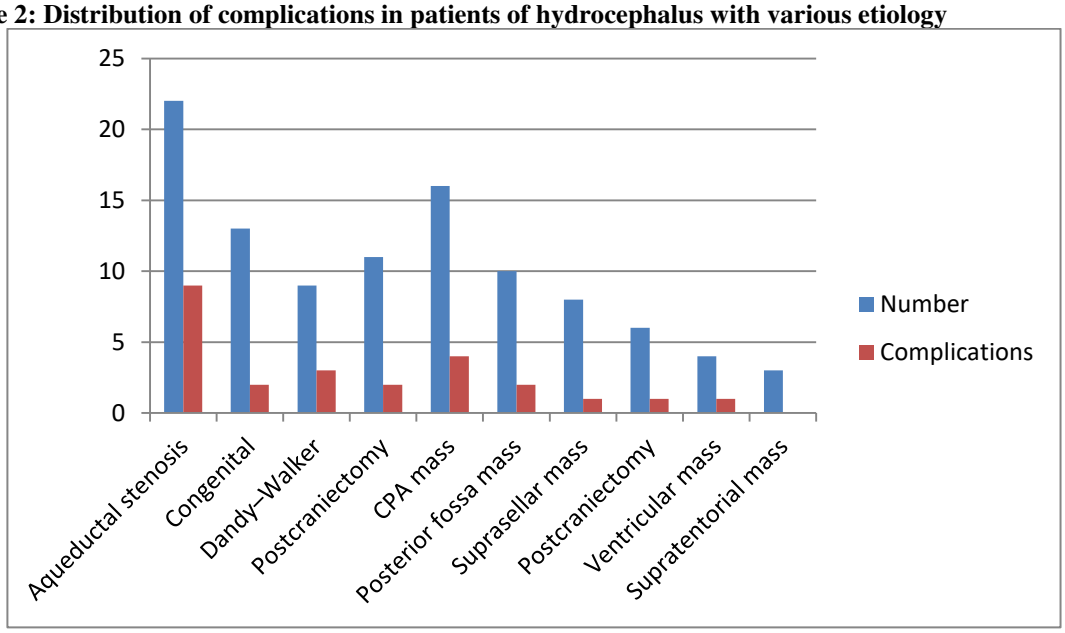

Table 2: Distribution of complications in patients of hydrocephalus with various etiology

Causes	Number	Complications
Aqueductal stenosis	22	9
Congenital	13	2
Dandy–Walker	9	3
Postcraniectomy	11	2
CPA mass	16	4
Posterior fossa mass	10	2
Suprasellar mass	8	1
Postcraniectomy	6	1
Ventricular mass	4	1
Supratentorial mass	3	0
Total	100	25

Table 2 and Figure 2 shows that most common etiology was aqueductal stenosis seen in 22 patients followed by CPA mass in 16 patients, congenital in 13, postcraniectomy in 11, posterior fossa mass in 10, Dandy– Walker in 9, suprasellar mass in 8, postcraniectomy in 6, ventricular massin 4 and Supratentorial mass in 3 patients.

DISCUSSION

In spite of developments in shunt system and valve design, as well as improvements in sterile methods, there has not been a discernible improvement in the prevention of shunt malfunction over the course of the previous several decades. Data from a large sample of 1015 patients who were treated at a single institution between the years 1970 and 2010 were analysed by Reddy et al.[7] The great majority of patients were treated between the years 1990 and 2010, according to the findings of the study. This research team discovered that age, having a prior operation before shunt installation, the aetiology of hydrocephalus, and the kind of hydrocephalus are all independent risk factors for shunt malfunction. The purpose of this research was to investigate the potential risks associated with ventriculoperitoneal shunting (VPS). In present study, out of 100 patients, males were 58% and females were 42%. Most of the patients were belong to 10 -20 years (28%) followed by 1-10 years (16%),30-40 years(14%), below 1 years(12%),40-50 years(10%) and above 50 years (9%). Children had a greater risk of shunt problems than adults at 5 years in a research by Yvonne et al.[8] (48 vs. 27%, p 0.0001). Due to the high rates of complications and failure associated with VPS, the introduction of endoscopic third ventriculostomy has become more common. Being a foreign substance and being prone to issues such mechanical obstruction, shunt infection, shunt migration, and, in rare cases, shunt protrusion, are the main drawbacks of VPS.

We found that most common etiology was aqueductal stenosis seen in 22 patients followed by CPA mass in 16 patients, congenital in 13, postcraniectomy in 11, posterior fossa mass in 10, Dandy– Walker in 9, suprasellar mass in 8, postcraniectomy in 6, ventricular massin 4 and Supratentorial mass in 3 patients. Aqueductal stenosis and CPA mass were the causes of the greatest number of problems. After a period of two years, Kumar al[9] discovered that 126 (23.3%) of the 541 patients who had a VP shunt implanted had difficulties. These patients were treated

throughout the course of the study. After tuberculous meningitis (39.3%), ventriculitis (12.38%), congenital hydrocephalus (8.87%), and aqueductal stenosis (5.54%), congenital hydrocephalus was shown to be the most prevalent cause of hydrocephalus for which VP shunt surgery was performed. The occlusion of the proximal end of the catheter by debris was the most prevalent complication that we found in our research; it occurred in 50 patients, or 39.68% of the total. Poor peritoneal absorption or occlusion of the lower end was the second most prevalent consequence, accounting for 21.43 percent of all cases. Abscesses along the shunt were seen in 21 individuals, which represent a prevalence of 16.67%. The majority of patients with hydrocephalus that were recorded to have complications were those caused by tuberculous meningitis (TBM) (39.3%) and ventriculitis (12.38%). Other problems included overdrainage of the ventricles, which led to persistent subdural hematoma (11.11%), hyperemia with superficial ulceration or total exposure of skin covering the tube (11.9%), and infection surrounding the distal catheter (4.76%).

CONCLUSION

We found that the most occurrences occurred between the ages of 10-20 years, along with the most issues associated with the aetiology of aqueductal stenosis.

SOURCE OF SUPPORT

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