



VENTRICULO GALLBLADDER SHUNT - AN ALTERNATIVE TREATMENT FOR POST VENTRICULO – PERITONEAL SHUNT CSF – ASCITES AND RECURRENT PSEUDOCYSTS

KEYWORDS

CSF ASCITES, Post ventricular – peritoneal shunt , gallbladder shunt.

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ABSTRACT We report two cases of post ventricular-peritoneal shunt done for congenital hydrocephalus in infancy, subsequently presented to us with abdominal distension and diagnosed as CSF – ascites , both these children were evaluated . The mechanism of ascites development in one patient is due to high protein levels in the CSF and in the other, the cause remains unclear. Both of them undergone ventricular gallbladder shunt as an alternative mode of CSF drainage and they recovered well without any complications. Ventricular gallbladder shunting provided an effective receptacle for CSF in these patients.

Introduction:-

Ventricular-peritoneal shunting is the procedure of choice for congenital hydrocephalus commonly performed in our institute. However, cerebrospinal fluid shunting into peritoneal space may be complicated by ascites only in very few cases. The possible sources of shunt related ascites are due to immune reaction to the shunt and high protein levels in CSF. It is most likely that several factors interact to reduce absorption of CSF from peritoneal space. Hence, for treatment of shunt related ascites , gallbladder provides an alternative reservoir for CSF diversion.

Case reports:-

- **Case 1:-** A 3yr old Female child undergone Ventricular-peritoneal shunt for congenital hydrocephalus at 3 months of age, presented to us with fever for 20 days and abdominal distension & leg swelling for 10 days. Abdominal distension was generalised and progressively increasing in size ,which needed intermittent ascites fluid tapping to relieve pressure symptoms. Initially, child managed conservatively with intravenous antibiotics. Complete baseline investigations were normal , blood culture done along with complete ascites fluid analysis.
- Plain X-ray abdomen show gross ascites [fig. 1] & USG-abdomen show gross ascites with septations. CT brain done showed Bilateral lateral ventricles & 3rd ventricle appears dilated , VP shunt in body of Right lateral ventricle. Neurosurgeon examined and gave their opinion as Clinically and radiologically Ventricular-peritoneal shunt working adequately. So , we planned for a alternative mode of CSF-drainage .We did a laparotomy and drained ascites fluid and repositioned tip of shunt tube inside gall bladder ,child recovered well without any post-op complications [fig.3]
- Table 1 shows cerebrospinal fluid (CSF) characteristics prior to gallbladder shunt placement.CSF SAAG- serum ascitic albumin gradient, ADA-adenosine deaminase, LDH-lactate dehydrogenase.

case	CSF GLU COSE	CSF prote in	CSF album in	SAAG	LDH	Amyla se	Gene expert & ADA	Culture & sensitivity
1.	66	850	330	3.4gm	66(U/L)	14 U/L	Negative	Negative
2.	70	15	4.0	-	-	15 U/L	1.3(<30u/l) Negative	Escherichia coli

CASE 2:-

A 3 ½ Years female child, who was a known case of congenital hydrocephalus with Arnold chiari type –II malformation undergone ventricular-peritoneal shunt at 1yr of age & subsequently lipomeningocele excision after 6 month came with complaints of abdominal pain and distension for past 10 days. Plain x-ray abdomen and USG-abdomen showed CSF -pseudocyst of size 10 x 10 cm . Again this child also managed initially conservatively and then undergone laparotomy and pseudocyst drainage and intravenous antibiotics started based on ascitic fluid tap culture report. In the immediate post-op period, child developed fever and usg- abdomen showed recurrent pseudocyst formation with turbid content. Hence, emergency external ventricular drainage done and collected CSF analysed completely. Total CSF-output per day is 120-140 cc/day, which was normal to the age group of the child. Neurosurgeon opinion obtained and they advised to continue higher intravenous antibiotics and since shunt tube is functioning well, tube can be interiorised as soon as possible. All reports were normal except for positive culture & sensitivity showing Escherichia coli which was sensitive to amikacin . So, after 1 week of antibiotic therapy, re-laparotomy done and shunt tube repositioned inside gall bladder and patient recovered well without any complications.

Surgical technique:- After stabilisation of the child, abdomen opened through right subcostal /supraumbilical transverse incision. Liver surface retracted ,gall bladder identified and its dome was brought into surgical view . The wall of gall bladder is sutured with 2-rows of purse-string sutures. Gall bladder is opened in the centre of the sutures and after checking shunt tube patency, the tip of shunt catheter is inserted inside about 3 cm and the purse string sutures are ligated. Remaining redundant tube is placed above liver surface. Post-operatively USG- abdomen done mainly to look for intra abdominal fluid collection and tip of shunt tube position inside gallbladder, after a week and before discharge.

Results:- During mean follow-up of 11/2 yrs, no morbidity occurred in both these children.

Discussion:-

Children with shunt-related ascites are well represented in literature. Gil and colleagues described three possible sources of shunt-related ascites including tumor implant, immune reaction to the shunt due to peritonitis and high protein levels in the CSF. Most authors agree on the high protein content of the CSF and the inability of lymphatic

drainage in the peritoneum to effectively absorb the fluid [1,2,3]. Ventricular-gall bladder is an effective shunt alternative in children with few other shunt options. Smith described the gall bladder as a shunt site and several series have echoed the usefulness of these shunts [4,5,6,7,8].

The lytic action of bile and the concentrating capacity of biliary system most likely attributed to the success of VG shunt. The lytic action can potentially breakdown proteins present in the CSF that impair absorption. The concentrating capacity can allow a large volume of CSF to drain electrolytes and electrolytes to be re-absorbed [5,6,8]. Biliary sphincter tone and relatively high gall bladder pressure (10-20cm H2O) would function against siphon phenomenon, preventing slit ventricle. Biliary stasis can be addressed with exogenous administration of cholecystikinin [8]. The bile is normally sterile, but the infection rates related to VG shunting were reported to be as high as 24% [10] while others reported no infectious complication. Most common cause of mortality and morbidity are because of meningitis and ventriculitis due to reflux of the bile into the CSF [9,10]. Hence, it may be said that ventricular-gallbladder shunt is similar in function to the ventricular-peritoneal shunt and in long term follow-up, about 60%-70% still function correctly [11,12].

Conclusion:- The gall bladder is a good option for post shunt CSF-ascites due to its capacity for absorption, managing upto 1500ml of fluid daily, apart from being an excellent drainage through the bile duct. The procedure of inserting a ventricular-gallbladder is also simple and its treatment for non-treatable hydrocephalus has increased recently. Indications have become more definitive and it is currently considered as a second shunt option when the ventricular-peritoneal shunt fails, comparable with pleural and auricular shunts. Since because, ventricular-pleural shunt has the high risk of pleural effusion which seems to be highest in infants yet can occur at any age. Ventricular-atrial shunt have encountered multiple complications like pulmonary hypertension due to microemboli, endocarditis and ECG instability.

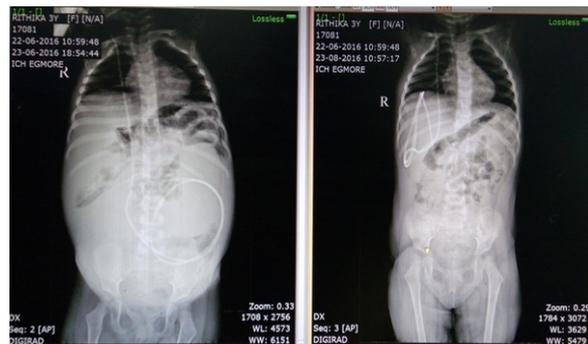


Figure 1: pre operative & post operative x-ray abdomen after gallbladder shunting



Figure 2: Pre operative picture of child with tense ascites.



Figure 3: Post-op picture at 1 year follow-up.

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