

Original Research Article

Unusual complications of Ventriculo-Peritoneal Shunt: 15 years experience

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Abstract

Ventriculo-Peritoneal shunt is the most commonly performed surgery for hydrocephalus, universally. Many complications are reported, of which the shunt malfunction and infection are most commonly encountered. These common complications can be minimized, by precautions like – senior surgeons operating shunt cases, as the first case in the operation, with minimal personnel in the operation and thoroughly scrubbing the part for minimum five minutes. However, in few cases, – even in the experienced hands and with all precautions, some rare complications like extrusion of the lower end through anus, vagina, into scrotum were described. In our experience of over 15 years, wide range of complications was seen apart from malfunction and infection. Exposure of the part of shunt system, with excoriation of overlying skin, peritubal leaks, disconnection of shunt system with CSF leaking out, loculation in between the loops of bowel/ omentum, extrusion of the lower end through anus etc. were encountered and probable factors for these unusual complications were discussed.

Key words

Exposed shunt system, Extrusion through anus, Inter loop collection, Peritoneal end, Peritubal leak, Ventriculo-Peritoneal Shunt, Ventricular end.

Introduction

Ventriculo-Peritoneal shunt is still the most commonly performed surgery for hydrocephalus, in spite of availability of recent endoscopic procedures at some centres. Infection and malfunction (mechanical) complications are most

commonly observed. Abdominal complications account for about 10--30% of VP shunt procedures [1, 2]. Uncommon and unusual complications, (pertaining to lower end) which were encountered during last 15 years were reviewed and probable factors analysed, to prevent such complications.

Material and methods

Study period: From May 2000 to April 2015, for a total period of 15 years.

An average of 50 cases of VP shunt was done in a year - totalling over 750 cases in 15 years. Common complications of infection, malfunction (obstruction), ventricular end complications were excluded and not considered for present study. Chabra shunts were used in all cases. Only the unusual complications pertaining to distal tube were taken into consideration. (**Photo – 1 to 6**)

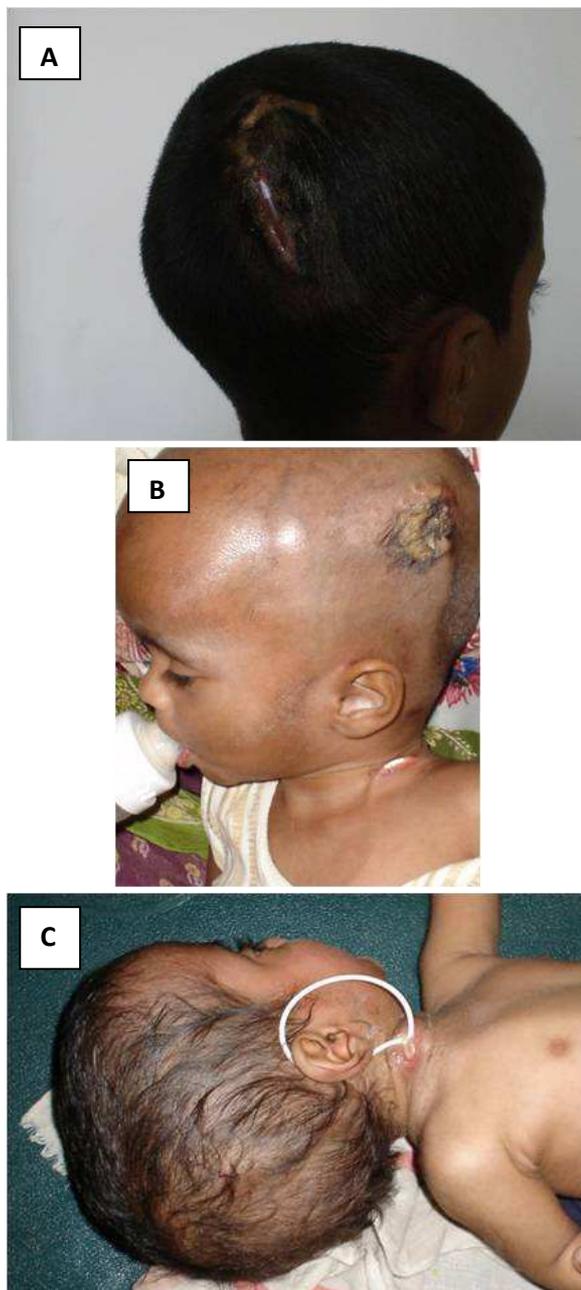
Photo – 1A, 1B: Peritubal leak with superficial infection.



Photo – 2: Shunt tube extruded through chest wall.



Photo – 3A, 3B, 3C: Exposed shunt system.



Results

All the cases were operated, and a Chabra system with a proximal ventricular tube and a distal tube (with spring valve and a reservoir proximally and a slit valve distally) was used for Ventriculo-Peritoneal shunt. Few cases got routine complications - mechanical obstruction and shunt infections, which were not considered in present study. 4 cases of peritubal leaks were observed after a span of 4-6 weeks. Three cases presented with a white tube coming out of anus during

defecation, and brought by mothers immediately to Emergency room. One case presented with a recurrent pain abdomen with clinically a partial block of distal end. Ultra sound revealed no significant pathology, but a diagnostic laparoscopy revealed distal tube got entangled in bowel loops and was kinked between adhesions. An adhesionolysis done and free flow of CSF checked through distal slit valve. One tribal adolescent, came to casualty with clear fluid leaking through tubular end, through skin of the chest wall. (Table – 1)

Table – 1: Frequency of unusual complication.

Type of unusual complication	No. of cases
Peritubal leak	4
Extruded through skin of thorax with clear CSF	1
Exposed to exterior at various places (scalp, over mastoid, in the neck)	3
Extruded through anus	3

Photo – 4A, 4B: Extrusion of shunt tube through anus.

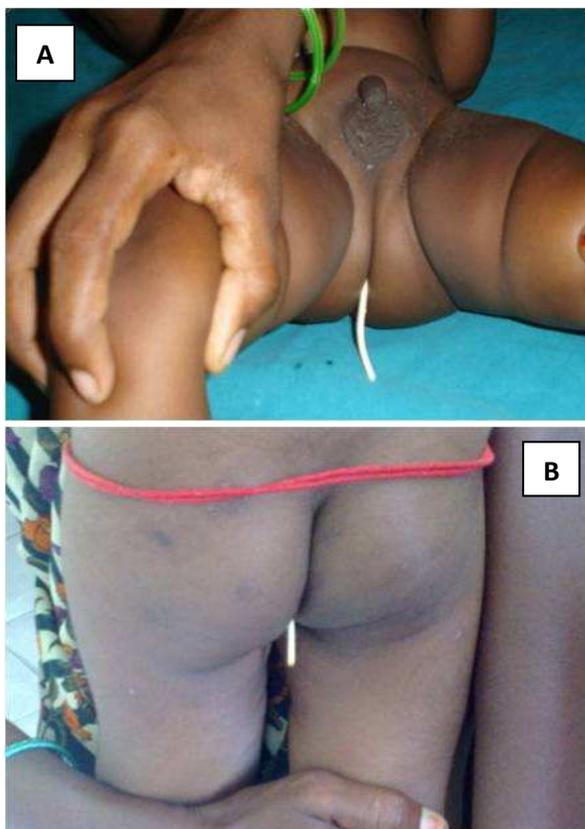


Photo – 5: Anal extruded tube.



Photo – 6: Removed shunt system.



Discussion

Peritubal leaks

All the cases of peritubal leaks occurred after 4-6 weeks of shunt surgery. 3 were children (Post TB meningitic hydrocephalus), one adult. There was no specific cause, but the probable cause was when the distal end is blocked, due to kink near the point of entry into rectus sheath or blockage of distal end with inflammatory debris and the pressure in the ventricle is more. These cause gradual leaking of CSF along the tube and trickling along the tube. An additional factor of peritubal leak may be the stab incision over the dura might be initially small, but with more pressure in the ventricles, with each pulsation, the CSF leaks around the ventricular catheter, propelled down along the distal tube. More cases might have occurred, but since the peritubal leak

also helps in partial draining of CSF and once the intra ventricular pressure decreases, the peritubal leak/ swelling may subside and not a concern for patient. In all the four cases of Peritubal leak, they presented with some inflammation/ or mild superficial infection without any frank ventriculitis/ systemic infection. The shunt systems were removed, in all 4 cases, and a revision shunt carried on opposite side, with antibiotic coverage [3-6].

Extrusion through thorax

This was seen in a tribal adolescent. Actually the boy was brought by his father, because they came on some other work to the city. Except for a small part of a tube coming out of his chest wall skin and with occasional clear fluid on straining, there were no complaints, by either the patient or his father. When asked repeatedly, the patient told he has got some itching over the chest wall skin, and on scratching, redness appeared after 3- 4 days. Then he noted a white tube like thing and tried to pull out. That resulted in a small pipe coming out which was periodically draining small clear fluid. The patient ignored it, however. On examining closely, there was a grey connector present at the end of the white tube. He was operated 2-3 years ago. So, it was thought that, as the shunt was done in an adolescent, for convenience and as the length of the tunneler was not adequate to pass whole abdomen, the shunt tube might have been cut and connected after passing separately. It is at this site, the patient developed a local skin reaction, resulting in the sequence of events described- itching, scratching, excoriation and finally disconnection of the connector, resulting in leaking CSF through open end, whenever there was a raised ventricular pressure in straining. The tube was opened behind mastoid, disconnected, ventricular end pulled out. The thoracic exposed part was pulled down. The distal tube was left behind. There were no signs of either ascending infection or features of raised ICP. Moreover, the patient and father were reluctant to stay in hospital and left against medical advice [7-11].

Partially exposed/ extruded shunt system

In one case, a 17 year old female patient came with some abnormal part seen through the scalp, while combing hair and little spotting of blood was noted by her mother. Patient was brought by mother, and on examination, the shunt reservoir was exposed. There was no leak. The shunt was done more than a decade back and there was no record. Immediate antibiotic was started, and the system was removed, through the opening seen. Patient observed for any development of local leak at wound site/ raised ICP. However, she was totally asymptomatic and hence deferred for a revision of shunt opposite side [12].

In two other cases, the patients were infants, with red skin and an exposed white tube like structure, noted by mothers. They were initially pulled for few centimetres, but left behind and brought to Emergency room. Both ventricular and peritoneal ends were disconnected and removed separately to prevent secondary infection. One baby required a revision shunt, done on opposite side [13].

In none of these cases, there was any ascending infection. In the later two cases, probably, the very thin skin of the infants, with almost no subcutaneous fat, the pressure of the overlying skin resulted in gradual thinning out, by reduced blood supply, in addition, the local infection, erythema have added to exposure and partial extrusion of the shunt system [14].

Extrusion through anus

Extrusion of the shunt tube through rectum/ anus was reported by many, as case reports. A case also has been reported for extrusion through vagina of a baby. We had, in our series, 3 cases of such anal extrusion of the shunt system. The proposed mechanism is the stiff, hard end of the lower peritoneal end of shunt system, pulsating and thrusting onto the delicate/ inflamed bowel, leading to perforation and ultimately coming out on straining during defecation. Surprisingly, none of the cases presented with meningitis/ ventriculitis or fecal peritonitis [15, 16].

Conclusion

Exposure of part of shunt system through skin, total disconnection of shunt system with CSF leaking out, migration of abdominal catheter of the VP shunt through the anus are unusual complications. The treatment of these complications includes removal of the extruded shunt, control of infection, and alternative CSF diversion procedure wherever it is required. In spite of common complications like infection, shunt malfunction, such unusual complications are rare complications. Hence still the Ventriculo-Peritoneal shunt surgery is still a standard procedure for hydrocephalus.

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