Frontal Ventriculoperitoneal Shunt : Technical Note

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Abstract

Cerebrospinal fluid shunt placement is one of the most commonly performed procedures in neurological surgery. The author describes a technique to avoid an additional skin incision in the frontal ventriculoperitoneal shunt procedure without the purchase of new instruments or prolongation of surgical time.

Key word : Ventriculoperitoneal Shunt, Frontal Burr Hole

Shunt placement is one of the most common procedures performed in neurosurgery. The aim of shunting is to establish a communication between the cerebrospinal fluid and a drainage cavity. Ventriculoperitoneal (VP) shunt has become the standard method for management of hydrocephalus worldwide(1). However, despite a long history since the first introduction in 1908 and its apparent simplicity, the use of shunts continues to be fraught with multiple complications(2-4). A surgical technique that may minimize the likelihood of complications without the purchase of new instruments or prolongation of surgical time may be of value.

Surgical technique

The operation is performed under general anaesthesia with the patient supine and the neck hyperextended with a shoulder roll. Unless the left lateral ventricle is markedly more dilated than the right, the right ventricle is chosen and the patient's head is turned to the left. It is important that the line joining the parietal prominence and the abdominal incision is linear. This will accomodate the safe passage of the shunt catheter between them.

The skin is prepped with an antiseptic solution, the incisions are marked and a narrow, continuous field is draped from the burr hole site to the right subcostal region. The curved incision for the frontal burr hole is made, keeping the distance between the burr hole site and incision at about 2 cm. Malleable catheter passer (Codman & Shurtleft, Inc.) is passed subcutaneously from a small abdominal incision; subcostal incision is prefered, directly to the parietal area. (Fig. 1) The curved

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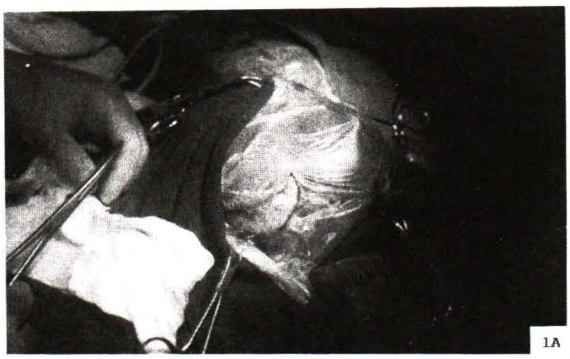


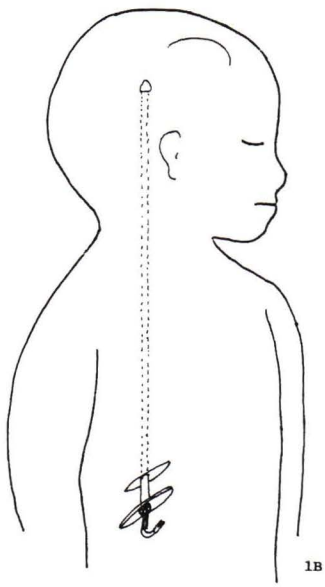


Fig. 1. (1A, 1B) Malleable Catheter Passer was passed through the abdominal incision until the tip reached the parietal region.

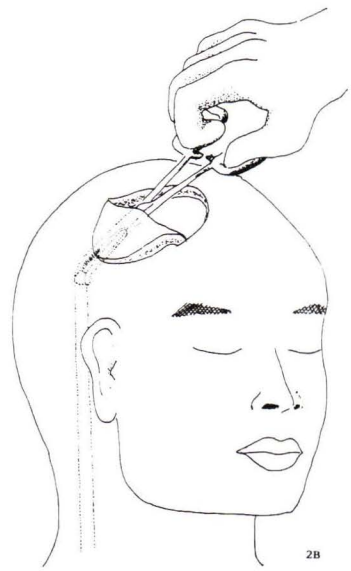


Fig. 2. (2A, 2B) Forceps was subgaleally tunneled to hold the Passer's tip.

hemostatic forceps are subgaleally tunneled from the scalp incision to hold the tip of the passer. (Fig. 2) Meanwhile, a peritoneal catheter is connected to the end of the passer's stylet by an assistant surgeon. A tightening of the connection with silk 3-0 is suggested. When the forceps pull the tip of the passer the peritoneal catheter will follow (Fig. 3, 4). Therefore, no additional incision is needed for ventriculoperitoneal shunt at the frontal burr hole.

The peritoneal catheter is connected to the reservoir and ventricular catheter. After insertion of the catheters in the proper position, ventricle and peritoneal cavity, the skin incisions are closed by layers.

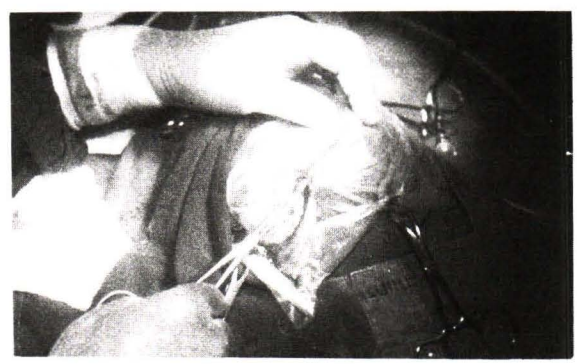
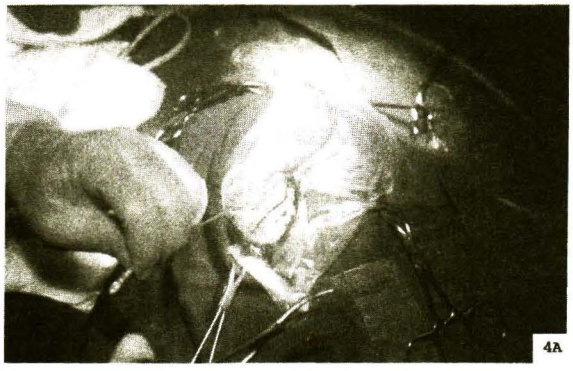


Fig. 3. The tip was pulled by forceps until reaching the scalp wound.



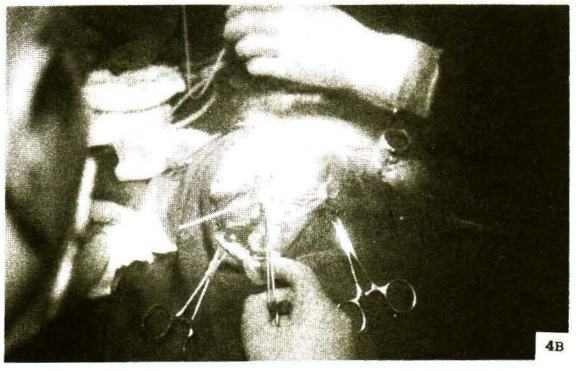


Fig. 4. (4A, 4B) After connecting the peritoneal catheter to the stylet of the Passer, the stylet was pulled until the peritoneal catheter was seen at the scalp wound.

DISCUSSION

There is general agreement that it is technically advantageous to place the ventricular catheter anterior to the foramen of Monro to avoid proximal catheter obstruction by choroid plexus[5]. Two approaches are acceptable and the choice between frontal or parietooccipital burr hole sites is based on individual preference[4-6]. The frontal approach has an advantage in that the pass is a shorter distance through the brain and does not traverse the eloquent area of the brain. Albright et al demonstrated a better survival for frontal shunts: At 5 years an estimated 55 per cent of frontal shunts continued to function compared to only 33 per cent of parietal shunts[7]. One shortcoming of the frontal approach is that there is a long distance between the frontal and abdominal incisions, an additional incision is needed in passing the peritoneal catheter to the burr hole site[6,8,9]. Malleable catheter passer is very helpful in making a subcutaneous tunnel from the abdomen to the scalp, usually reaching the parietal region. For further advancement to the frontal region, changing direction by this rigid catheter passer is not possible. Formerly, a scalp incision had to be done at this point which may increase the infection risk by exposing the shunt to bacteria residing within the skin appendage[10,11]. By this new technique, the tip of the passer is able to pass through the subgaleal space to the frontal burr hole site.

Care should be taken at the level of the neck to avoid vascular injuries and skull perforation (especially in an infant's skull). In reducing the risks of skin perforation, the track of the shunt passer must never become too superficial.

Forceps that hold the tip of the passer is also important. In children, non-tooth curved hemostatic forceps can be properly used, but in adults, another long curved forceps is needed. The author found the Rochester - Pean hemostatic forceps (185 mm length) suitable for most adult cases.

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วิธีการผ่าตัดใส่ท่อระบบน้ำหล่อสมองจากกลีบสมองฟรอนตัล

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ผู้เขียนได้แสดงวิธีการผ่าตัดฝังท่อระบายน้ำหล่อสมอง จากรอยเจาะกะโหลกศีรษะส่วนฟรอนตาล ไปยังช่องท้อง โดยไม่ต้องใช้เครื่องมือพิเศษ ไม่เพิ่มเวลาการผ่าตัดและบาดแผลผ่าตัดมีเพียง 2 แห่งเท่านั้น คือที่ศีรษะและท้อง

คำสำคัญ : ท่อระบาย, น้ำหล่อสมอง, กลีบสมองฟรอนตัล

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