

Neuroendoscopic Application of the Seldinger Technique for Intraventricular/Intracystic Catheters

Positioning

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Introduction

Patients with symptomatic isolated fourth ventricle, multiloculated hydrocephalus or intraventricular cystic lesions may benefit from the placement of intraventricular or intracystic catheters by image-guided neuroendoscopic approach.

The aim of this study is to describe an original technique of intraventricular/cystic catheter placement by the application of the Seldinger technique through a neuroendoscopic approach.

Methods (1)

The technique was applied at our Institution from 2008 in 5 cases of symptomatic isolated IV ventricle, 2 cases of multiloculated hydrocephalus, and 3 cases of cystoventriculostomy/cystocysternostomy. Through a rigid endoscope, usually by a frontal burr-hole, with or without the help of the peel-away, a standard neuroendoscopic image-guided approach was initially performed. After aqueductoplasty (isolated IV ventricle) or membrane fenestration (multiloculated hydrocephalus, intraventricular cystic lesions), the round-tipped guidewire of a usual Seldinger catheter, slightly modified by drawing a centimeter scale, was inserted by the assistant surgeon into the working channel of the rigid endoscope. The guidewire is therefore placed through a direct endoscopic view into the selected cavity (isolated IV ventricle, loculation, cyst, or cistern) when possible leant...see column 3

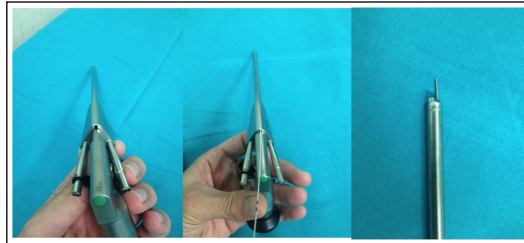


Figure 1. Picture showing how to insert the guidewire of a Seldinger Catheter into the working channel of a rigid Aesculap Endoscope

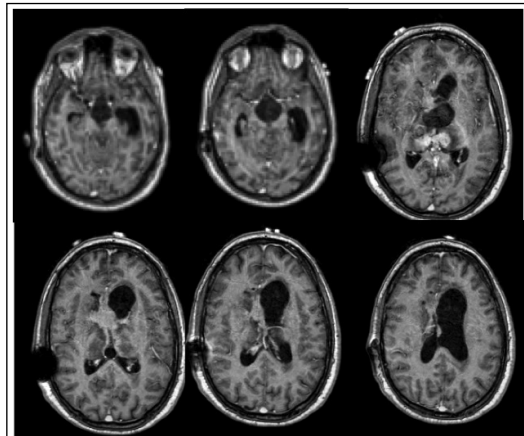


Figure 2. Pre-operative axial T1 post-contrast MR images in a case of intraventricular germinoma with multiloculated hydrocephalus

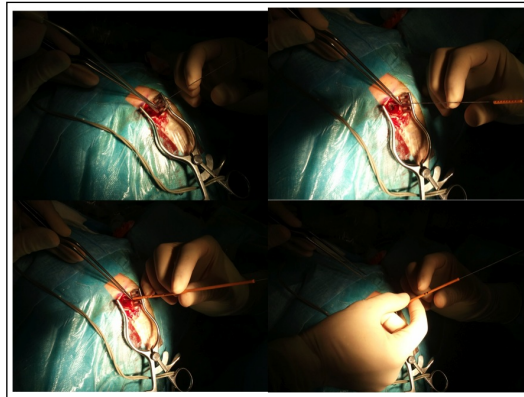


Figure 3. Initial insertion of the multifenestrated catheter through the guidewire

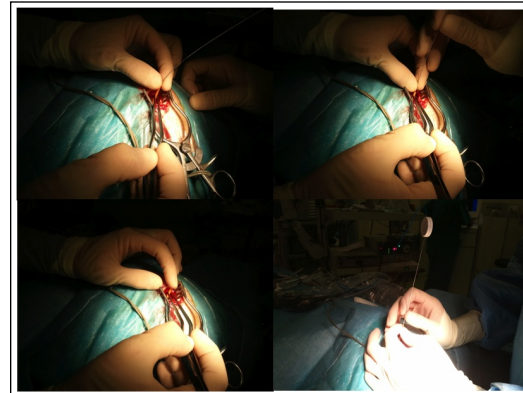


Figure 4. Final catheter positioning verified by magnetic neuronavigation

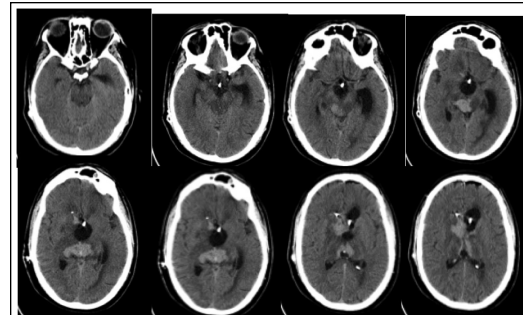


Figure 5. Post-operative CT-scan showing the correct placement of a multifenestrated catheter into the ventricular system in the same cases with the Seldinger Technique.

Methods (2)

...from column 1 on the floor of the cyst or ventricle or to the dorsum sellae in cases of cystocysternostomy.. The endoscope was then withdrawn by the first surgeon, while the assistant maintains the guidewire in the same position. Therefore, a multiperforated shunt catheter is passed over the guidewire to reach the target cavity, through the aid of the centimeter scale and by verifying the trajectory length with the neuronavigation system. The catheter was then connected to a shunt or a reservoir.

Results

The technique was successful in all cases, with correct catheter placement verified by post-operative CT scan and/or MRI.

Conclusions

The application of the Seldinger technique may help in correct placement of shunt catheter during difficult neuroendoscopic approaches.

Learning Objectives

By the conclusion of this session, participants should be able to:

1. Describe how to perform this technique.
2. Know in which cases it may be useful.