

# IMAGES: VENTRICULAR CATHETER MISPLACEMENT

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## Introduction

Misplacement of a ventricular catheter into brain parenchyma, the choroid plexus, or the temporal horn leads to early shunt failure. Patients usually have postoperative evidence of raised intracranial pressure or fluid around the shunt, or both. Rarely, a misplaced shunt will be identified incidentally on follow-up imaging.

## Case Report

We report here three cases of ventricular catheter misplacement which were discovered incidentally by radiological follow-up. The tip of one of them was seen in the interhemispheric fissure, the second one in the brain parenchyma and the third was noted in the basal cistern (Fig. 1-3). The patients either presented with headache or fever with blocked shunt tips.



Figure 2: Patient with tip of the VP shunt in the Interhemispheric fissure

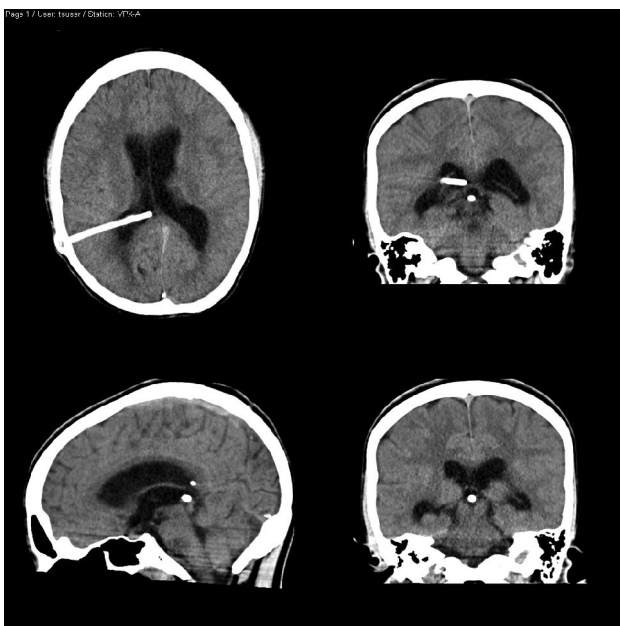


Figure 1: Patient with aberrant location of the VP shunt in the cistern

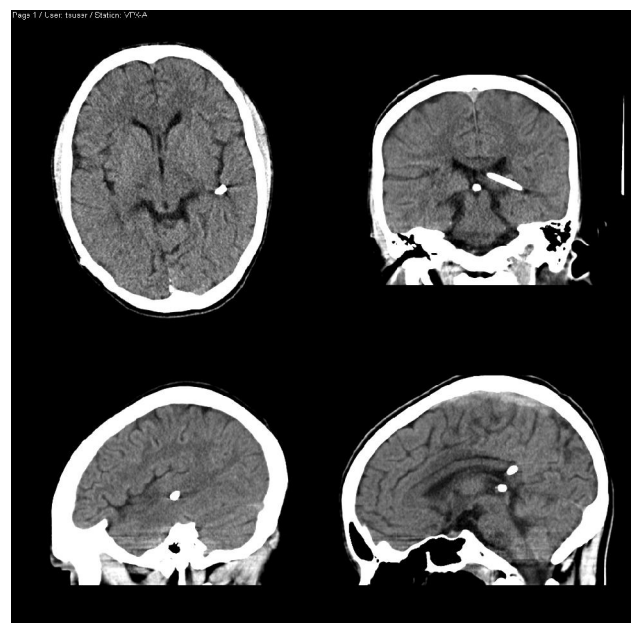


Figure 3: Patient with tip of the VP shunt in the brain parenchyma on the left side

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## Discussion

Often during shunt revision, the existing catheter track is used for replacement. It is assumed that shunt catheters that have been indwelling for extended periods will have tracks surrounded-by gliotic brain that would facilitate the passage of a new catheter along the same tract. Inaccurate placement of the catheter without a stylet can happen when the tract is either less mature, if there is brain shift, or under circumstances where the brain is compressed.<sup>1</sup>

Additionally, inappropriate catheter selection can lead to misplacement. Catheters that are too short will often lead to shunt failure. As the ventricular system responds to a working shunt, the size of the ventricles decreases and a catheter that is marginal in length initially will be pulled back into parenchyma as the ventricular system collapses.<sup>2</sup> Computed tomography (CT) imaging will demonstrate the aberrant position of the ventricular catheter with concurrent ventricular dilatation.

Management of the misplaced catheter depends on the patient's presentation. When a suboptimal ventricular catheter tip is identified incidentally, it should not be revised unless the patient is symptomatic. There is small risk of hemorrhage and infection with shunt revision. Repeat misplacement should be suspected when there is under-drainage or complete failure.<sup>3</sup>

One of our patients presented with fever and the others with headache and abdominal pain. In all the cases the catheter tip was either infected or blocked and therefore revised. Once the decision to replace the intraventricular catheter has been made, a number of techniques may optimize ventricular catheter placement. No significant advantage has been shown placing shunts using endoscope (1-year shunt survival: 58% for endoscopic assisted and 66% non endoscope group).

Ultrasound can be used through an open fontanelle or by placing an extra burr hole to allow visualization with ultrasound as the catheter is passed. The advantage of ultrasound is the real-time guidance, but this technique has not been formally assessed. Stereotactic guidance for shunt placement has been

reported in the literature. The use of stereotactic guidance is not in common practice, but its popularity is increasing because of newer accessories that make stereotactic placement easier and less time-consuming.<sup>4</sup>

## References

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