

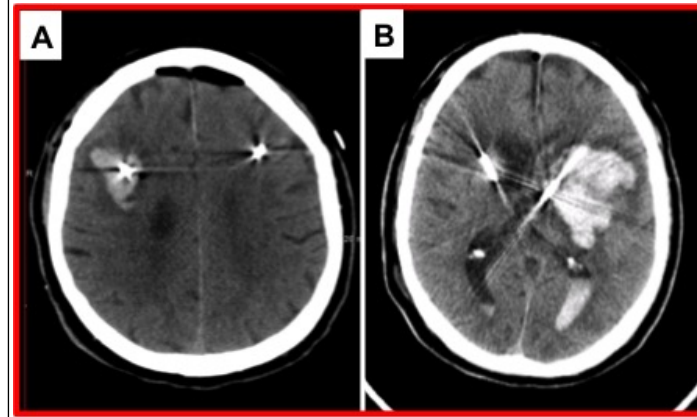
Introduction

Hemorrhage is one of the most prominent risks of the DBS surgery. The estimated risk of hemorrhage in DBS surgery varies between 0.2 to 6.9% in the available literature. The hemorrhage risk can be calculated per patient and/or per electrode insertion.

Methods

We analyzed the risk of intracerebral hemorrhage (ICH) per insertion and per patient over a period of 15 years from the data gathered from three affiliated centers. In addition, we investigated the effect of single-electrode versus multiple-electrode guided DBS and the effect of different imaging modalities for trajectory planning (single-dose versus double-dose gadolinium T1 weighed MR imaging to visualize vessels) on the risk to develop an ICH. We also analyzed the

Examples of intracranial bleedings from our series



Results

We found complete sets of information of 220 patients. Mean number of microelectrodes per patient was 5.8. Total number of final electrodes was 425, which results overall 1701 brain penetrations in sum with the microelectrode insertions. This sum is equal to 7.73 brain penetrations per patient. Four patients had intracerebral hemorrhage in our series (1.81%). We found an overall 0.31% hemorrhage risk per microelectrode and 0.24% per brain penetration. We didn't encounter any patient with additional postoperative neurological deficit without relevant radiological complication.

Conclusions

In the context of surgery related complications, even though the most feared complication is an intracerebral hemorrhage (ICH) in DBS surgery, the risk was found as low as 1.8% in our series.

Learning Objectives

- 1) The incidence and importance of hemorrhage in DBS surgery
- 2) Risk factors associated with intracerebral hemorrhage in DBS surgery
- 3) Discussion on avoidance of hemorrhage in DBS surgery