



# Endoscopic Evacuation of Basal Ganglia Hemorrhage via Keyhole Approach Using an Expendable Cannula in Comparison with Craniotomy

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## Introduction

Neuroendoscopic (NE) surgery as a minimal invasive treatment for basal ganglia hemorrhage is a promising approach. The present study aims to evaluate the efficacy and safety of NE approach using an adjustable cannula to treat basal ganglia hemorrhage. In this study, we analysed the clinical and radiographic outcomes between NE group (21 cases) and craniotomy group (30 cases). The results indicated that NE surgery might be an effective and safe approach for basal ganglia haemorrhage, and it is also suggested that NE approach may improve good functional recovery. However, NE approach only suits the selected patient, and the usefulness of NE approach needs further randomized controlled trials (RCTs) to evaluate.

## Methods

In this study, we analysed the clinical and radio-graphical outcomes between NE group (21 cases) and craniotomy group (30 cases). The clinical and radio-graphical outcomes included Mortality, hematoma volume, evacuation rate, infection rates, Glasgow Coma Scale (GCS) scores, Modified Rankin Scale (mRS), and Glasgow Outcome Scale (GOS).

## Results

Mortality rate between the 2 groups did not show statistically significant differences ( $P=0.27$ ). The evacuation rate was significantly higher in the NE group compared to the craniotomy group ( $P=0.02$ ), and the rate of infection was lower in the NE group compared to the craniotomy group ( $P=0.04$ ). Operation time ( $P<0.00001$ ) and mean NICU stay ( $P=0.005$ ) were significantly shorter in the NE group than in the craniotomy group. Patients in the NE group had good functional outcomes (GFO) than patients in the craniotomy ( $P=0.04$ ).

## Conclusions

In conclusion, applying the NE approach using adjustable cannula might be an effective and safe approach for basal ganglia hemorrhage. The results of this study suggested that NE approach may improve good functional recovery. However, NE approach only suits the selected patient, and our study has several potential limitations. This study involved a relatively small patient group. It is our hope that a larger randomised control trial will be performed to evaluate the usefulness of the NE approach for the treatment of basal ganglia haemorrhage.

A 4 cm long linear skin incision is shown and 2.5 cm keyhole craniotomy in diameter was used in patient.

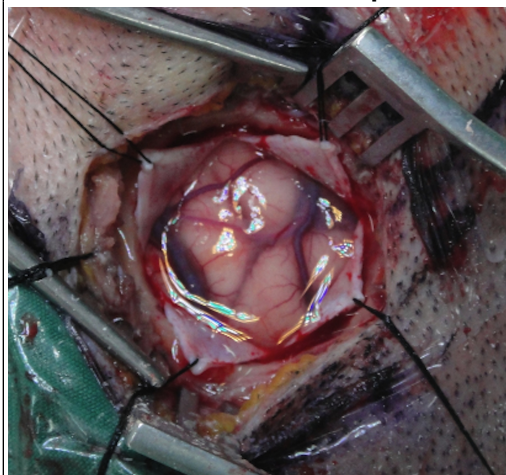


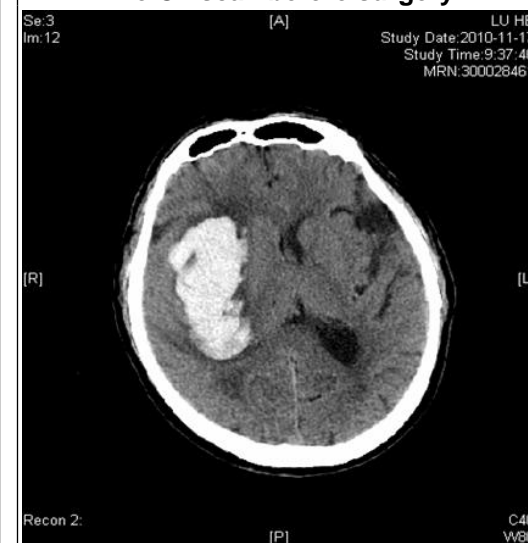
Figure 4

Photograph of an adjustable cannula with metal stylet.



Figure 1

The CT scan before surgery



The repeated CT scan 24 hours after surgery

