

Minnesota External Ventricular Drain Grading System Kim Uy BS; David Darrow; Coridon Quinn MD; Stephen J. Haines MD, FACS [Institution]

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#### Introduction

The safety and accuracy of EVD placements remain a challenge in daily practice and publications. A need to develop a rapid and standardized EVD grading system in neurosurgical practice is desired. We developed a three-dimensional Minnesota EVD grading system that account for the number of times the catheter crosses the ependyma, the trajectory and the depth of the catheter tip with respect to Foramen of Monro (FOM). Our study aims to compare the strengths and weaknesses of Minnesota EVD grading system against previously proposed EVD grading systems.

### Methods

CT scans of 104 patients who underwent a ventriculostomy were reviewed retrospectively. Three resident physicians were chosen to be the raters. Pre-procedure CT scans were distributed to the raters to estimate the level of difficulty of a catheter placement (e.g. Easy, Intermediate, Hard). Then postprocedural CT scans were given to the raters to grade using the Minnesota EVD scale, O'Leary's, Huyette's, Karkala's and Janson's grading systems. All the scans were distributed to the raters in a randomized order. Intraclass coefficients were calculated to determine the inter- and intra-rater

# Results

Inter-rater reliability of Karkala's, Janson's and Minnesota EVD grading system were similar and higher than O'Leary's and Huyette's scales. Minnesota EVD system has the highest intra-rater reliability compared to the rest of the grading scales. Furthermore, Minnesota EVD grading system predicted 76.7% of the difficulty score which is higher than all the 4 grading scales combined.

### Conclusions

The Minnesota EVD grading system is an efficient and practical method to use to determine the accuracy of the EVD placement. It also has improved inter- and intra-rater reliabilities compared to other existing scales.

# Learning Objectives

By the conclusion of this session, participants should be able to: 1) Describe the importance of the accuracy of external ventricular drain placements, 2) Understand how to grade an EVD placement using the Minnesota EVD grading system, 3) Identify an effective method to grade an EVD placement

### References