



Developing a Fast-Track Discharge Protocol for Patients with Cerebral Aneurysms Treated via Neuroendovascular Techniques

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BACKGROUND

- COVID-19 has challenged hospital systems to maintain performance markers in an era of diminishing resources.
- The progressive scarcity of available hospital beds for elective, outpatient admissions has led to numerous waves of cutbacks in elective surgeries.
- Neuroendovascular surgeons have remained immune to many of the pressures imposed on our other surgical colleagues.
- Fast-track discharge and expedited recovery protocols (commonly referred to as ERAS: Enhanced Recovery After Surgery), are causing shifts in the traditional approach to surgical patients.
- The heart of these protocols is the optimized care of patients both pre- and post-operatively.

METHODS

- A retrospective review from medical records was performed on all patients undergoing elective cerebral aneurysm (2014-2021).
- Demographics, medical history, procedural details, and information regarding timing of discharge were collected.
- The duration of each procedure was determined from total fluoroscopy time in hours. Complications also identified including readmission rates.
- Primary outcome variable was length of stay (LOS) was calculated as the time from procedure check-in to the time of discharge, further classified into two separate groups (LOS <24 hours vs. LOS >24 hours).
- Descriptive statistics were estimated for each variable of interest by LOS. Comparisons across LOS groups were made using Chi-squared tests. Multivariable logistic regression analysis was performed to assess the relationship between predictor variables and LOS. All statistical analyses were conducted using Stata. All *p*-values refer to two-tailed tests with a significance level of 0.05.

RESULTS

- 330 patients were included
- 86 (26.1%) were discharged within 24 hours
 - 244 (73.9%) discharged after 24 hours

Variables that significantly predicted longer LOS were academic year and treatment type.

- Overall there were 73 (22.1%), 78 (23.6%), 159 (48.2%), and 20 (6.1%) cases treated with coil, stent-coil, flow-diverting stent, and WEB embolization, respectively. There were significant differences in the LOS based on treatment type ($p=0.007$).
- Patients were more likely to be discharged within 24 hours for procedures performed during years: 2019-2021 ($p=0.002$) when compared to 2014 (logistic regression).

Overall, there were 45 (13.6%) procedure-related complications, which was not significantly different by LOS ($p=0.17$). Additional multivariable analysis was conducted to determine if there were predictors of any complication, however, there were no significant predictors for any complication in this model.

There was no association between discharge timing and likelihood of readmission for complications.

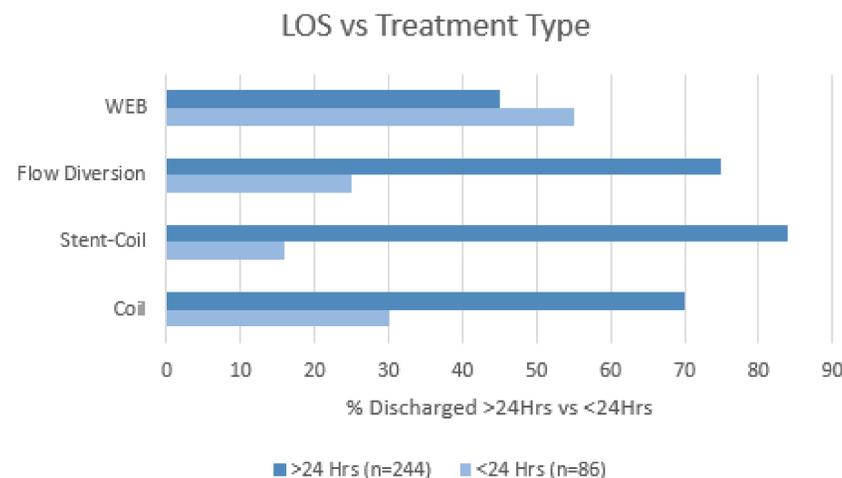


TABLE 1: Discharge checklist for future studies

No allergy to contrast.
No neurological changes from baseline following embolization.
No evidence of access site complications.
No acute intra- or peri-procedural (e.g., distal embolic, hemorrhagic) complications.
Patient lives less than 2 hours away.
Patient is independent.
Patient has family support at home.
Monitored for a minimum of 4 hours post-procedurally.
No discharges between 9:00pm and 7:00am for same-day discharge.
Patient received appropriate pre-procedural counseling on discharge planning and agrees with discharge plan.
Physician discretion post-procedurally based on findings.

SUMMARY

- Complications, hospital readmissions, age, sex, nor comorbidities were shown to correlate with prolonged post-procedural hospitalizations.
- We did notice a difference in LOS based on treatment type; patients undergoing stent-coiling and flow-diversion remained in the hospital longer. This suggest that as we develop ERAS protocols for our endovascular patients, we should either (1) exclude these patients from protocolization or (2) monitor their outcomes with earlier discharge more stringently.
- Our review allowed us to highlight the safety of earlier discharge and prepare a fast-track protocol for same-day discharge in this patient population. This protocol will be studied prospectively in the next phase of this study.
- As we gain more comfort with emerging, minimally invasive endovascular therapies, we should be able to safely achieve same-day discharge on a protocolized and routine basis, thereby reducing the demand of these elective cases on our healthcare system.

FUTURE STUDIES

- Our results lay the groundwork for the development of a fast-track protocol for patients undergoing neuroendovascular aneurysm treatment. The checklist – which is only a small part of the protocol – is provided in table 1.
- The second stage of this study will be to begin using these protocols and prospectively track these patients across multiple enlisted institutions.

REFERENCES

Available upon request.
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