Introduction

Intraoperative Indocyanine green (ICG) angiography is a commonly utilized technique in the identification of arteriovenous malformation nidus at the Barrow Neurological Institute. Evidence based data on the utility of this commonly used imaging modality in reducing return to the operating room by identifying deep residual disease has yet to be fully elucidated.

Methods

A retrospective chart review was performed on patients undergoing microsurgical resection of arteriovenous malformations by the senior author (RFS) between 2008-2011. Utilization of intraoperative ICG was reviewed from dictated operative reports. All intraoperative and/or postoperative angiograms and Magnetic Resonance Imaging (MRI) were analyzed for location, deep venous drainage, size, residual AVM. Incidence of return to the operating room for residual AVM was recorded from clinical and operative notes. Clinical outcomes were recorded when available from clinical notes at post-op, 6 weeks, and last follow up.

Results

A total of 97 arteriovenous malformations were resected by the senior author between 2008-2011. Seven patients with post-operative/intra-operative angiograms purged from the radiological database were excluded from the study. Of the 90 remaining patients, 43 patients (47.7%) underwent intraoperative ICG during surgical excision whereas in 47 patients (52.2%) ICG was not utilized. A total of 15 patients (16.6%) required either intraoperative/postoperative return for resection of residual AVM. Among patients who had ICG during the operative resection, 6 required reoperation as compared to 9 patients who had not undergone intraoperative ICG (p=0.57).

Conclusions

There is no statistically significant difference in return to OR for residual disease among patients undergoing AVM resection with or without the aid of ICG. Surgeon experience in identifying residual disease is critical. Formal angiography remains the gold standard.

Learning Objectives

ICG is an important tool to assist the surgeon in identifying residual disease during AVM surgery. However, this diagnostic modality does not obviate the importance of surgeon experience. Digital Subtraction Angiography remains the diagnostic gold standard, and should be performed in all patients undergoing surgical resection.

References