Does ASA Classification Impact Success Rates of Endovascular Aneurysm Repairs?

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The purpose of this study was to evaluate the technical success, clinical success, postoperative complication rate, need for a secondary procedure, and mortality rate with endovascular aneurysm repair (EAR), based on the physical status classification scheme advocated by the American Society of Anesthesiologists (ASA). At a single institution 167 patients underwent attempted EAR. Query of a prospectively maintained database supplemented with a retrospective review of medical records was used to gather statistics pertaining to patient demographics and outcome. In patients selected for EAR on the basis of acceptable anatomy, technical and clinical success rates were not significantly different among the different ASA classifications. Importantly, postoperative complication and 30-day mortality rates do not appear to significantly differ among the different ASA classifications in this patient population.

INTRODUCTION

Advantages of an endovascular aneurysm repair (EAR) over the more traditional open repair include reductions in major morbidity, blood loss, and length of hospital stay.1-3 These attributes make this technique an attractive alternative for patients with extensive comorbid illnesses that would otherwise preclude them from an open repair. In addition, some investigators report comparable success rates among low- and high-risk patients when using the endovascular technique.4 However, methods used to classify patients as either low-risk or high-risk are often vague and ambiguous.

One method of classifying patients is based on the classification system set forth by the American Society of Anesthesiologists (ASA).5,6 Although it was not originally designed to estimate operative risk, many physicians use it as a means of preoperative risk assessment and some have identified it as a predictor of postoperative morbidity and mortality.7,8 In an effort to identify outcome differences based on ASA classification, our purpose was to evaluate the technical success, clinical success, postoperative complication, and secondary procedure rates as well as mortality rates in patients undergoing EAR.

PATIENTS AND METHODS

From December 1995 through June 2001, 167 patients with either an infrarenal abdominal aortic aneurysm or a common iliac aneurysm were evaluated and scheduled for repair with an endovascular device. Four different endovascular prosthetic
grafs were used over this time period: EVT/Guidant (n = 14), AneuRx/Medtronic (n = 111), Talent/Medtronic (n = 1), and Zenith/Cook (n = 41). In addition, 116 (69.5%) of the patients were involved in phase II/III Food and Drug Administration (FDA) trials. Such patients were selected for EAR on the basis of acceptable anatomic characteristics defined by the various trials. All patients were assigned to a class preoperatively by an independent, blinded attending anesthesiologist. Patient classes were based on the physical status classification scheme defined by the ASA. Details regarding our operative team as well as specifics concerning intraoperative imaging have been published previously. Postoperative follow-up generally consisted of a 1- to 2-week, 1-month, 6-month, 12-month, then yearly clinic visit unless indications demanded otherwise. Surveillance imaging was accomplished by obtaining contrast-enhanced computed tomography (CT) scans (2.5- to 3-mm axial images) and plain abdominal radiographs prior to hospital discharge and at each follow-up visit. Measurements of aneurysm size were obtained with manual calipers. The length of the original procedure (length of case) and type of anesthesia were retrieved from the anesthesia operative report. Outcome data from each follow-up visit and subsequent hospitalizations were collected and recorded in our vascular section database. Imaging and outcome data of individuals who elected to have follow-up elsewhere were requested from the primary physician. Query of this prospectively maintained database supplemented with a retrospective review of medical records provided all patient demographics and outcome data presented here.

Definitions

ASA classification was based on guidelines set forth by the American Society of Anesthesiologists. Criteria used to define each class are as follows: class I, healthy patient; class II, mild systemic disease; class III, severe systemic disease; class IV, severe systemic disease that is a constant threat to life; class V, moribund patient not expected to survive without the operation; and class VI, brain-dead patient. Technical and clinical success was reported in concordance with the reporting standards of the SVS/ISCVS. In brief, a technical success was considered successful arterial access and deployment of the endovascular graft in the absence of an endoleak or significant twist, kink, or obstruction. However, a patient was considered a technical failure if they required an additional intervention or died within 30 days of the original procedure. Patients were classified as a clinical success if they were a technical success and did not develop an endoleak or a complication requiring an intervention by 6 months postoperatively. In addition, patients who were technical failures secondary to a postoperative endoleak that spontaneously sealed within 6 months of endograft implantation were likewise considered a clinical success. Complications were divided into two groups: those that required a secondary surgical or fluoroscopic procedure, and those that were managed without an additional procedure. No wound complication required a formal operative debridement, so these patients were included in the group that did not require a secondary procedure.

Statistics

Differences among patient age, aneurysm size, length of case, type of anesthesia, and length of hospital stay were tested for significance using an analysis of variance (ANOVA). Chi-squared analysis was used to evaluate for differences in technical success, clinical success, postoperative complications, and survival among different ASA classifications. All data are presented as the mean ± SD.

RESULTS

A total of 161 (96.4%) patients had an EAR, with a mean time from implant of 28.3 ± 15.5 months. Four patients were acutely converted to an open repair and two patients refused conversion after a failed endovascular attempt. Distribution of ASA classification among patients was II, 9 (5.4%); III, 125 (74.9%); and IV, 33 (19.8%). Acute conversions were not significantly different between ASA classes III (2/125: 1.6%) and IV (2/33, 6.0%) (p = 0.32). Regional anesthesia was used in 63.5% of patients and the distribution among ASA classes II, III, and IV was 66.7%, 61.6%, and 69.7%, respectively. Specifics concerning patient age, aneurysm size, and length of case and hospital stay are displayed in Table I. No significant differences existed among the various ASA classes in regard to patient age, length of case, type of anesthesia, or length of hospitalization. There was a trend towards progressively larger aneurysm size in higher ASA classes which did not achieve statistical significance (p = 0.08).

Technical and Clinical Success

Technical success was 87.5%, 81.1%, and 74.2% for ASA grades II through IV, respectively (p = 0.6). Mean technical success was 80%. Distribution of