

Occurrence of Postoperative Complications Doubles 1-Year Mortality After Open and Endovascular AAA Repair

Daniel J. Badia DO, Eleftherios S. Xenos MD, Daniel L. Davenport PhD, Eric Endean MD

Department of Surgery; Division of Vascular Surgery, College of Medicine, University of Kentucky; Lexington, KY



Introduction

Abdominal aortic aneurysm (AAA) repair is a common clinical entity, with over 35,000 operations performed each year in the United States. Despite the large number of procedures performed, morbidity and mortality remain problematic. In order to improve outcomes, we have attempted to identify patients with risk factors associated with morbidity and mortality, identify complications that correlate with increased morbidity and mortality, and identify patients who are at highest risk for adverse events. In this analysis we hypothesize that the occurrence of a perioperative complication will have an adverse effect on one-year survival in patients undergoing AAA repair.

Methods

A retrospective review was performed of prospectively collected Vascular Quality Initiative (VQI) data for patients undergoing endovascular (EVAR) and Open AAA repair from 2012 to 2016. Primary outcomes were in-hospital complications, 30-day mortality, and 1-year mortality. Multivariable logistic regression was performed to assess the impact of complications on 1-year mortality with adjustment for patient and operative risk factors. The results from the regression analysis were verified with a case-matched analysis of patients with and without complications.

Results

A total of 32,501 aneurysm repairs were done: 26,166 EVAR (80.5%); 6,335 Open (19.5%). After adjustment for multiple pre- and perioperative variables, patients who had a postoperative complication and were 30-day survivors had a significant risk for death at one year (OR 2.2, 95% CI 1.9-2.6, p<0.001 for EVAR; OR 2.0, 95% CI 1.5-2.7, p<0.001 for Open). The case-matched analysis yielded similar results for 1-year mortality (OR 2.3, 95% CI 2.0-2.8, p<0.001 for EVAR; OR 2.1, 95% CI 1.5-3.0, p<0.001 for Open). After adjustment, each complication predicted increased 30-day and 1-year mortality.

All AAA patients		30-day mortality		OR for 30-day mortality	OR for 30-day mortality	1-year mortality (in 30-day survivors N=31368)		OR for 1-year mortality	OR for 1-year mortality
All patients N=32,501		No complication	Complication			No complication	Complication		
Outcome	Incidence							N=25,593	N=5,775
Any complication	17.0%	1.3%	13.9%*	5.2	2.0	3.8%	10.7%*	2.2	2.0
Renal	8.2%	2.2%	18.1%*	4.4	1.9	4.1%	14.2%*	2.9	2.5
Cardiac	7.6%	2.4%	17.2%*	3.6	2.2	4.4%	11.0%*	1.8	1.6
Respiratory	5.4%	2.2%	26.1%*	6.3	2.8	4.4%	15.7%*	2.4	2.8
Wound	1.1%	3.4%	10.3%*	NS	NS	4.7%	17.7%*	3.4	3.0
Stroke	0.5%	3.4%	25.9%*	4.2	NS	4.8%	21.4%*	3.8	2.7

*P<0.001 (No complication vs. Complication)

Analysis

Respiratory complications had the greatest impact on 30-day mortality, and had a significant impact on 1-year mortality. This study demonstrates that a postoperative complication was associated not only with increased 30-day mortality but also a two-fold increase risk of death at one year in patients who had an AAA repair. These findings are independent from the patients' perioperative comorbid conditions.

Improvement Strategies

Due to the preponderance of evidence showing the correlation between respiratory complications and 30-day mortality, The University of Kentucky Chandler Hospital has implemented strategies for reducing postoperative respiratory complications. Such strategies include: aggressive pulmonary toilet, early mobilization and physical therapy evaluation, and modest use of intravenous fluids. Future analysis will focus on, not only reduction of complications after AAA repair, but also the identification of patients with modifiable risk factors and their respective adjustment.