

Available online at [www.sciencedirect.com](http://www.sciencedirect.com)

ScienceDirect

journal homepage: [www.JournalofSurgicalResearch.com](http://www.JournalofSurgicalResearch.com)

# Contemporary outcomes of open thoracoabdominal aneurysm repair: functional status is the strongest predictor of perioperative mortality



Tammam Obeid, MBBS, Caitlin W. Hicks, MD, Kanhua Yin, MBBS, Iisbor Arhuidese, MD, Bisma Nejm, MD, Arman Kilic, MD, James H. Black, MD, and Mahmoud Malas, MD, MHS, FACS\*

Department of Surgery, Johns Hopkins Medical Institutions, Baltimore, Maryland

## ARTICLE INFO

### Article history:

Received 5 December 2015

Received in revised form

19 May 2016

Accepted 9 June 2016

Available online 29 June 2016

### Keywords:

Thoracoabdominal

DTA

Open repair

Functional status

Mortality

Aneurysm

## ABSTRACT

**Background:** Open repair of thoracoabdominal and descending thoracic aneurysm (TAA) carries significant operative morbidity and mortality. Despite evolving operative techniques patient-level risk factors affecting mortality after open TAA repair, including patient functional status, remain to be fully understood.

**Materials and methods:** We identified all open TAA repair cases in the National Surgical Quality Improvement Program database between 2005 and 2013. Multivariable logistic regression was used to evaluate the effect of patients' age, gender, race, body mass index (BMI), comorbid conditions, functional status, ASA class, smoking, rupture, descending thoracic aneurysm versus Crawford types, dissection, and preoperative: transfusion, creatinine levels, on perioperative (30-d) mortality after open TAA repair.

**Results:** A total of 1048 patients underwent open TAA repair during the 9-y study period. Mean patient age was (mean  $\pm$  SEM)  $67 \pm 0.4$  y, mean BMI was  $27 \pm 6$  kg m<sup>2</sup>, and most patients (60%) were male. Perioperative mortality was 14.0% (nonruptured 11.4% versus ruptured 34.2%,  $P < 0.01$ ) and patients with postoperative renal failure requiring dialysis comprised 12.6%. On multivariable analysis, dependent status had the highest effect on operative mortality, tripling the risk of death (odds ratio [OR] = 3.18, 95% confidence interval [CI] = 1.49–6.81,  $P < 0.01$ ). Ruptured aneurysms had more than double the operative mortality risk (OR = 2.49, 95% CI = 1.42–4.38,  $P < 0.01$ ). Preoperative renal insufficiency added 23% mortality risk per unit increase in creatinine (OR = 1.23, 95% CI = 1.01–1.50,  $P = 0.04$ ), whereas each year in patient age or unit increase in BMI increased the risk of death by 4% (OR = 1.04, 95% CI = 1.02–1.07,  $P < 0.01$ , OR = 1.04, 95% CI = 1.00–1.07,  $P = 0.04$ , respectively).

**Conclusions:** Patients' functional status is the strongest independent predictor of perioperative death. Other patient-level factors, including increasing age, BMI, and renal dysfunction, also play a role. Appropriate patient selection for open TAA repair is essential for achieving good outcomes.

© 2016 Elsevier Inc. All rights reserved.

\* Corresponding author. Johns Hopkins Medical Institutions, 4940 Eastern Ave, Bldg A, Fl 5, Baltimore, MD 21224. Tel.: +1 410 550 4546; fax: +1 410 550 1274.

E-mail address: [bmalas1@jhmi.edu](mailto:bmalas1@jhmi.edu) (M. Malas).

0022-4804/\$ – see front matter © 2016 Elsevier Inc. All rights reserved.

<http://dx.doi.org/10.1016/j.jss.2016.06.051>

## Introduction

Thoracoabdominal aneurysms (TAAs) are estimated to occur at a rate of 10 aneurysms per 100,000 person-years.<sup>1</sup> Left untreated, some TAAs will progress to rupture.<sup>2</sup> The estimated 5-y cumulative risk of rupture is 20%, including 0% in patients with TAA <4 cm, 16% for patients with TAA between 4–5.9 cm, and 31% for TAA ≥6 cm.<sup>1</sup> Operative repair is indicated when the TAA becomes symptomatic, rapidly increases in size or reaches a diameter of >6.5 cm, with the goal being to reduce risk of rupture and death.

Successful surgical repair of TAAs can restore affected patient life expectancy to normal.<sup>3</sup> However, open TAA repair is technically challenging, both from surgical and circulatory standpoints and accordingly carries a significant risk of operative morbidity and mortality. Although evolving measures with adjunctive techniques, including cardiopulmonary bypass, hypothermia, sequential aortic cross-clamping, and branch grafting, are reducing postoperative complications,<sup>4,5</sup> the mean estimated mortality after open TAA in single-center series is still 12.5%.<sup>6</sup> National estimates of mortality after TAA repair are even higher approaching 20%.<sup>7</sup>

Risk factors associated with mortality after TAA repair have been previously reported and commonly include patient age, preoperative, and/or postoperative renal dysfunction, postoperative paralysis, and operative acuity (elective versus urgent or emergent).<sup>8–10</sup> In addition, hospital and surgeon experience with open repair techniques have also been shown to predict mortality after TAA repair.<sup>11</sup> However, the association between patient-level factors, including patients' baseline functional status, and death after open TAA repair are currently poorly understood. In this study, we sought to evaluate intrinsic patient risk factors affecting operative mortality after open TAA repair in a nationally validated, multispecialty data set.

## Material and methods

We performed a retrospective analysis of all open TAA cases in the National Surgical Quality Improvement Program (NSQIP) database between years 2005–2013. *International Classification of Diseases—9 codes* (ICD-9: 441.1; 441.2; 441.6; 441.7; 441.01; 441.03; 901.0) and *Current Procedural Terminology* (CPT: 33875; 33877) codes were used to identify all open TAA repairs in the database. All Crawford type aneurysms and descending thoracic aneurysms were included. Patients undergoing endovascular TAA repair were excluded. Only de-identified information was used in this article; patient data were obtained from institutes participating in NSQIP which is approved by the American College of Surgeons. The Johns Hopkins Institutional Review Board approved this study. Informed consent was waived as the data are publically available through NSQIP.

The primary outcome of interest for the study was perioperative mortality, which was defined as death within 30 d of surgery. Baseline characteristics were compared using Pearson chi-squared test or Fisher exact test for categorical variables, and the student t test or analysis of variance test

for continuous variables. A multivariable logistic regression model was then constructed to evaluate the risk of patients' age, gender, race, body mass index (BMI), comorbid conditions (any diabetes type, Chronic Obstructive Pulmonary Disease (COPD), bleeding diathesis disorders—not including medication as a cause), preoperative functional status (independent, partially dependent, totally dependent), American Society of Anesthesiologists (ASA) class, smoking status (current smoker or quite within 1 year versus else), rupture status, descending thoracic aneurysm (DTA) versus combined Crawford type, concomitant dissection versus none, preoperative blood transfusion (≥1 unit) and preoperative creatinine levels on 30-d perioperative mortality.

Patient baseline functional status is defined in NSQIP as (1) Independent: The patient does not require assistance from another person for any activities of daily living (ADL). This includes a person who is able to function independently with prosthetics, equipment, or devices. (2) Partially dependent: The patient requires some assistance from another person for ADL. This includes a person who uses prosthetics, equipment, or devices but still requires some assistance from another person for ADLs. (3) Totally dependent: The patient requires total assistance for all ADLs.

A total of 22 variables were included in the initial model. Likelihood ratio testing and clinical judgment were used to select variables; models with lowest Akaike information criterion were consistently chosen. STATA 14.1 was used for all calculations (Stata-Corp LP, College Station, Tex), and  $P < 0.05$  was considered statistically significant.

## Results

A total of 1048 patients underwent open TAA repair during the 9-y study period. Patient age ranged from 20–90 y (mean ± SEM = 67 ± 0.4 y), and most patients were Caucasian (79%) and male (60%). Mean BMI was 27 ± 6 kg/m<sup>2</sup> with most patients being classified as normal or overweight (31% and 35%, respectively).

Rupture was present in 11.5% of all aneurysms, whereas concomitant dissection complicated 12.7% of all cases. Aneurysm type (TAA versus DTA) was 89.4% versus 10.6% in the data set (Table 1).

Overall perioperative mortality was 14.0% (nonruptured group 11.4% versus ruptured group 34.2%,  $P < 0.01$ ), and the total proportion of patients with postoperative renal failure requiring dialysis was 12.6% (nonruptured group 11.8% versus ruptured group 19.2%,  $P < 0.01$ ). Postoperative cerebrovascular accidents occurred in 3.9% of patients.

Compared to patients who survived, those who died in the perioperative period were older (71 versus 67 y); more likely to have a ruptured aneurysm (28% versus 9%); and be of TAA (versus DTA) aneurysm type (95% versus 88%). Patients who died also tended to have a higher ASA class (ASA 4.69% versus ASA ≤3.52%); and a lower baseline functional status (11% versus 3% dependent status) (Table 1).

A multivariable logistic regression model was constructed to determine independent predictors of operative mortality within 30 d of open TAA repair (Table 2). Each additional year

Download English Version:

<https://daneshyari.com/en/article/4299067>

Download Persian Version:

<https://daneshyari.com/article/4299067>

[Daneshyari.com](https://daneshyari.com)