Table I. Mortality and freedom from major adverse events (*MAEs*) comparison between AORFIX and Pythagoras open control group

Outcome	*Aorfix<60°* (*n* = 67), %	*Aorfix 60-133°* (*n* = 151), %	*PYTHAGORAS open*, %	*SVS control group* (*n* = 323), %	P *value Aorfix vs open control* <60°	>60°
Freedom from SVS MAE, 30 days	92.5	81.5	57.9	56.3	<.001	<.001
Mortality						
30 days	1.5	2.0	1.3	2.8	.928	.717
1 year	3.0	7.3	6.6	6.5	.320	.845

SVS, Society for Vascular Surgery.

Table II. Sac shrinkage, endoleaks, and migration comparison between low and high angle abdominal aortic aneurysm treated with AORFIX

Variable	*Aorfix* <60°, %	*Aorfix* >60°, %	P *value*
Outcome at 1 year			
Sac shrinkage (5 mm)	36.7	44.1	.7335
Sac expansion (5 mm)	0	1.8	1.000
Type I/III leak	0	1.9	1.000
Migration (10 mm)	0	1.9	1.000

and similar to trials with less severe anatomy. The results encourage the use of AORFIX in patients with highly angulated neck anatomy who may otherwise have no endovascular option.

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Improved Trends in Patient Survival and Decreased Major Complications After Emergency Ruptured Abdominal Aortic Aneurysm Repair From 2005 to 2011

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Introduction: Emergency abdominal aortic aneurysm (AAA) repair carries a high risk of morbidity and mortality. This study seeks to examine morbidity and mortality trends from the National Surgical Quality Improvement Program (NSQIP) database, and identify potential risk factors.

Table. Patient mortality from 2005 to 2011

Operative year	*No mortality, No. (%)*	*Death ≤24 hours after surgery, No. (%)*	*Death >24 hours after surgery, No. (%)*
2005	38 (70.4)	8 (14.8)	8 (14.8)
2006	127 (65.1)	34 (17.4)	34 (17.4)
2007	260 (71.4)	36 (9.9)	68 (18.7)
2008	343 (68.1)	64 (12.7)	97 (19.2)
2009	359 (71.7)	57 (11.4)	85 (17.0)
2010	402 (73.2)	59 (10.7)	88 (16.0)
2011	452 (76.1)	63 (10.6)	79 (13.3)

Chi-squared test statistic for Pearson's correlation coefficient of trend: $P = .002$.

Methods: All emergency AAA repairs were identified using the NSQIP database from 2005-2011. Univariate analysis (using Student's *t*-test, Chi-squared, and Fisher's exact test) and multivariate logistic regression was performed to examine trends in mortality and morbidity.

Results: Out of 2761 patients who underwent emergency AAA repair, 321 (11.6%) died within 24 hours of surgery. Of the remaining 2440 patients, 1133 (46.4%) had major complications and 459 (18.8%) died during the postoperative period. From 2005 to 2011, there was a significant decrease in patient mortality, particularly in patients who survived the perioperative period ($P = .002$; Fig; Table). Total complications increased overall ($P < .0001$); however, major complications decreased from 58.7% in 2005 to 42.6% in 2011 ($P < .0001$) in the patients who survived beyond 24 hours. The use of endovascular repair increased over the study period ($P < .0001$). On multivariate analysis of patients who survived past the initial 24-hour period, age (odds ratio [OR], 1.050), open repair (OR, 1.8), and presence of a major complication (OR, 3.3) were significantly associated with death ($P < .001$).

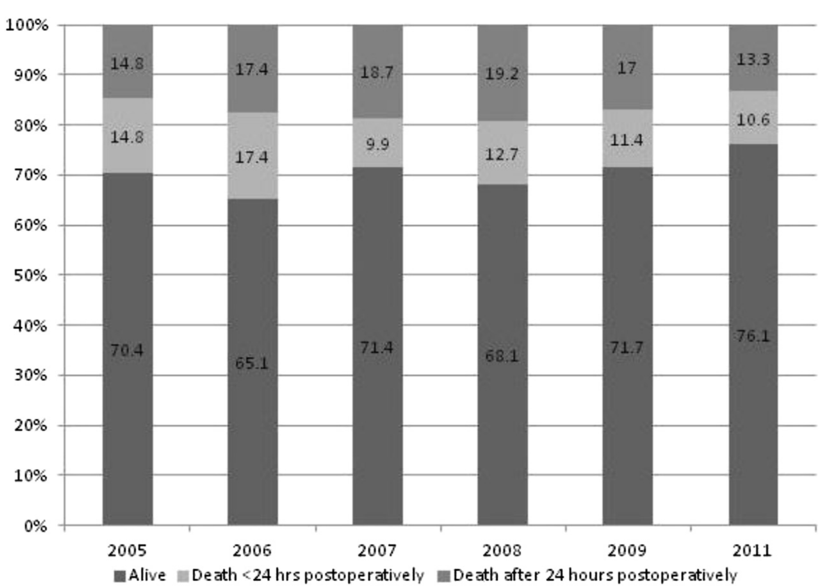

Fig. Patient mortality from 2005 to 2011 (data labels represent percentage mortality).

Conclusions: Patient survival has increased from 2005 to 2011 after emergency AAA repair, with a significant improvement particularly in patients who survive past the first 24 hours. Though total complications increased, major complications decreased over the study period, suggesting newer techniques and patient care protocols may be improving outcomes.

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Comparison of Endovascular and Open Repair for Juxtarenal and Pararenal Aneurysms

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Introduction: Endovascular aneurysm repair (EVAR) for infrarenal aortic aneurysms has largely become the standard of care for patients with appropriate anatomy. However, the use of endovascular repair of juxtarenal and pararenal aortic aneurysms often falls outside the instructions for use (IFU) of the associated devices. We assessed the short-term mortality and morbidity of EVAR for juxtarenal and pararenal aneurysms vs open aortic repair (OAR).

Methods: We queried the American College of Surgeons National Surgical Quality Improvement Program public use file from 2012, which included the first year of reported data from select centers tracking additional "procedure-targeted" variables for repair of abdominal aortic aneurysms. This data specifically listed the proximal extent of the aneurysm if documented in the operative note. We selected open or endoluminal repair of juxtarenal or pararenal aneurysms for analysis. Juxtarenal aneurysms were defined as those that approached the renal artery origin, and pararenal aneurysms were those that involved the renal artery origin. We excluded cases that were for failed prior repairs.

Results: A total of 284 juxtarenal (n = 234) and pararenal (n = 50) aneurysm repairs were identified, with 113 repaired by EVAR and 171 by OAR. Preoperative characteristics were equivalent, except that EVAR patients were significantly older, had a lower American Society of Anesthesiologists class, smoked less, and had a higher baseline creatinine. More than 35% of the EVAR procedures required renal stents. Only 16.8% were repaired using fenestrated devices, implying that the other 83.2% were repaired outside the device IFU. There was no difference in 30-day mortality between EVAR and OAR (2.7% vs 3.5%). The 30-day morbidity was significantly higher for OAR compared with EVAR (76.0% vs 26.5%), with the highest contributing morbidities including the need for perioperative transfusion (72.5% vs 15.9%), a return to the operating room (11.7% vs 1.8%), and cardiac or respiratory failure (17.5% vs 7.1%). The median intensive care unit and hospital length of stay significantly favored EVAR over OAR (Table).

Conclusions: Unlike traditional infrarenal aneurysm repair with favorable anatomy, there is no advantage for EVAR over OAR in juxtarenal and pararenal aortic aneurysm repair in terms of 30-day mortality. Advantages of EVAR regarding decreased short-term morbidity and length of stay must be weighed against the increasing evidence showing long-term challenges with the outcomes for endoluminal repair of juxtarenal and pararenal aneurysm repairs occurring outside device IFU. Our data do not support the use of EVAR as the primary modality in the approach of juxtarenal and pararenal aneurysms, and we suggest that OAR should remain the gold standard.

Table. Selected postoperative outcomes up to 30 days after the operation

Variable	*EVAR*	*OAR*	P *value*
Procedures, No.	113	171	
Length of stay, median (IQR), days			
Intensive care unit	0 (0-1)	3 (2-5)	<.001
Hospital	3 (1-5)	6 (8-11)	<.001
30-day mortality, %	2.7	3.5	1.000
30-day morbidity (any of the following), %	26.5	76.0	<.001
Transfused ≤72 hours of operation, %	15.9	72.5	<.001
Return to the operating room, %	1.8	11.7	.002
Cardiac or respiratory failure, %	7.1	17.5	.012
Renal insufficiency or failure, %	7.1	9.4	.664

EVAR, Endovascular aneurysm repair; *IQR,* interquartile range; *OAR,* open aneurysm repair.

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Low Mortality in Elective and Emergency Abdominal Aortic Aneurysm Repair in Octogenarians

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Introduction: Abdominal aortic aneurysm (AAA) repair in octogenarians is thought to be associated with excess mortality, but an increasing number of patients fall into this group. We sought to establish mortality rates for elective and emergency repair by open and endovascular techniques in our center.

Methods: Data from consecutive patients aged ≥80 years undergoing AAA repair between April 2005 and January 2014 were examined. Aneurysms were classed as ruptured, symptomatic, or elective. Demographics, procedure type, 30-day mortality, and overall survival rates were recorded and analyzed.

Results: Ruptured AAAs were repaired in 65 patients (53 males; median age, 83 years). Open surgical repair (OSR) was performed in 32.3% (n = 21) and endovascular repair (EVAR) in 67.7% (n = 44). Combined 30-day mortality was 35.4% (n = 23), and was significantly higher after OSR (52.4% vs 27.3%; $P = .048$). Median survival was 6 months (interquartile range [IRQ], 0-22 months), increasing to 19 months (IQR, 6-42 months) when deaths ≤30 days were excluded. Median survival in patients who lived >30 days was significantly higher in those who had undergone OSR (42.5 vs 11 months; $P = .019$). Symptomatic AAAs were repaired in 30 patients (23 males; median age, 84.5 years). OSR was performed in one (3.3%), and 29 (96.7%) underwent EVAR. Thirty-day mortality was 3.3% (n = 1); the only death was in the EVAR group. Median survival was 29 months (IQR, 5-36.5 months). Elective AAA repair was performed in 131 patients (median age, 82 years; 116 males), EVAR in 107 (81.7%, and OSR in 24 (18.3%. Combined 30-day mortality was 2.3% (n = 3), with no significant difference between EVAR and OSR (1.9% vs 4.2%; $P = .458$). Median survival of patients undergoing elective repair was 19 months (IQR, 10-35 months). No difference was seen between EVAR and OSR groups ($P = .113$).

Conclusions: In this cohort of patients, AAA repair in both elective and emergency settings was associated with low mortality and good survival rates in the medium-term. For ruptured AAA, 30-day mortality rates are significantly lower in those undergoing EVAR, but >30 days, OSR is associated with significantly increased survival. No significant difference between EVAR and OSR was seen in the 30-day mortality rate or medium-term survival in elective patients.

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Poststent Ballooning Increases Postoperative Stroke and Death Rate in Carotid Artery Stenting

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Introduction: Stroke remains the fourth leading cause of death and the leading cause of disability in the United States. Carotid endarterectomy (CEA) has been proven superior to medical therapy alone in decreasing the risk of stroke in patients with high-grade stenosis of the internal carotid artery. Although CEA remains the gold standard, with low perioperative stroke risk, carotid artery stenting (CAS) has seen progressively improved outcomes. Operators follow general guidelines in intraoperative techniques in CAS. However, few of those are evidence based. We believe that an outcome-driven examination of the effect of prestent and poststent deployment ballooning is warranted.

Methods: We performed a retrospective analysis of all patients who had CAS between 2005 and 2014 in the Vascular Quality Initiative (VQI) database. Logistic regression analyses of the effect of different prestent and poststent ballooning combinations on hemodynamic instability and the 30-day stroke and death rate were constructed. We excluded patients who had no protection device, those who received any ballooning prior to protection device deployment, and those who had no ballooning. The model(s) controlled for patient age, sex, comorbidities, smoking status, symptomatic status, history of previous ipsilateral CEA, preoperative medications (statin, aspirin, and β-blockers), lesion site (common carotid artery, internal carotid artery, or both), and ipsilateral degree of stenosis.

Results: A total of 5379 patients had undergone CAS between 2005 and 2015, and 4166 patients remained after applying the exclusion criteria mentioned above. Patients were a mean ± standard deviation age of 69.7 ± 9.6, men represented 63% of the data set. The overall perioperative stroke/death rate was 3.1%. Compared with only prestent ballooning technique, the combined prestent ballooning and poststent ballooning technique had a 2.2-fold increase in hemodynamic instability (odds ratio, 2.2; 95% confidence interval, 1.6-3.1; $P < .000$) and 2.5-fold increase in the perioperative