

Risk Scores for Ruptured AAA: Are They Practical?

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DISCLOSURE

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- No relevant financial relationship reported

Epidemiology of ruptured AAA

- 15,000 deaths per year
- Peri-operative mortality 30%-50% and overall mortality 80%-90%.
- Preventing rupture is the best way to prevent death from rupture
 - Screening at-risk US population is under-utilized.
 - 1/3 of treated ruptured aneurysms are previously diagnosed¹
 - Surveillance gaps increase the likelihood of rupture 6-fold²
- Causes of death after rupture:
 - Sudden death
 - Decline treatment
 - Treatment not offered or is delayed

¹Mell MW et al. J Vasc Surg 2013;57:1519-23

²Mell MW et al. J Vasc Surg 2014; 59:583-8

Epidemiology of ruptured AAA

- One in five are transferred for care
- One in six of those transferred died without receiving treatment

	<u>OPERATIVE Mortality*</u>			<u>OVERALL Mortality*</u>		
	AOR	95% CI	P	AOR	95% CI	P
Inter-facility Transfer	0.81	0.68 – 0.97	0.02	1.30	1.05 – 1.60	0.01

*Adjusted for age, sex, race, insurance, comorbidity, state, year, and hospital characteristics

- Improved patient selection and treatment efficiency will improve outcomes

Risk Scores

- For >20 years, scoring systems have been created to predict mortality following rAAA and identify which patients should undergo surgery.
- They have not been universally adopted for a variety of reasons
 - Complex, out-dated, not validated
- An effective scoring system:
 - Externally validated and locally validated
 - Simple
 - Easy
 - Applicable to open surgery and EVAR for rAAA
 - Clinically useful
- We sought to determine whether adoption of these algorithms would validate our clinical decision-making and outcomes during a 10-year period.

Predicted versus Actual Mortality

(n=64)

Algorithm	Number (%) Classified highest-risk
Glasgow	23 (35)
Vancouver	8 (13)
Edinburgh	10 (16)
VSGNE	2 (3)
ANN	3 (5)

Predicted versus Actual Mortality

(n=64)

Algorithm	Number (%) Classified highest- risk	Predicted Mortality (%)
Glasgow	23 (35)	80
Vancouver	8 (13)	85
Edinburgh	10 (16)	80
VSGNE	2 (3)	87
ANN	3 (5)	89

Predicted versus Actual Mortality

(n=64)

Algorithm	Number (%) Classified highest- risk	Predicted Mortality (%)	Actual Mortality (%)
Glasgow	23 (35)	80	70
Vancouver	8 (13)	85	63
Edinburgh	10 (16)	80	60
VSGNE	2 (3)	87	50
ANN	3 (5)	89	67

Predicted versus Actual Mortality

(n=64)

Algorithm	Number (%) Classified highest- risk	Predicted Mortality (%)	Actual Mortality (%)	% Mortality Overestimated by Scoring Systems
Glasgow	23 (35)	80	70	10
Vancouver	8 (13)	85	63	22
Edinburgh	10 (16)	80	60	20
VSGNE	2 (3)	87	50	37
ANN	3 (5)	89	67	22

Predicted versus Actual Mortality

(n=64)

Algorithm	Number (%) Classified highest- risk	Predicted Mortality (%)	Actual Mortality (%)	% Mortality Overestimated by Scoring Systems
Glasgow	23 (35)	80	70	10
Vancouver	8 (13)	85	63	22
Edinburgh	10 (16)	80	60	20
VSGNE	2 (3)	87	50	37
ANN	3 (5)	89	67	22
Hardman	5 (8)	100	60	40
HMC	2 (3)	100	50	40

Discussion

- Since rAAA has a 100% mortality with a non-operative approach, predicting futility is far more clinically important than predicting *increased* risk of death.
- Aggressive approach to repair can prevent mortality in even the highest risk patients.
- Unmeasured variables (dedicated CV ICU, CV trained anesthesia, and intraoperative advances) may have an impact on scoring systems that limits reliability and reproducibility.
- Improvements in medical care over time will likely result in over-estimations of mortality

UK versus USA Overall Mortality for rAAA

Turn-down Rates

	UK	USA	p value
Any intervention offered	58.5%	80.4%	<.0001
Overall mortality	66%	53%	<.0001
Operative mortality	41.8%	41.7%	.9
Received rEVAR	8.5%	20.9%	<.0001

Lancet 2014;383: 963-9

Harborview Medical Center Risk Scoring Algorithm

Variable	OR	Points
Age >76 years	2.11	1 point
Creatinine concentration >2.0 mg/dL	3.66	1 point
SBP ever <70 mm Hg	2.70	1 point
pH <7.2	2.58	1 point

OR, Odds ratio; SBP, systolic blood pressure.

Preoperative risk score	0	1	2	3	4
Total cohort					
Deaths, No. (%)	18 (27)	18 (22)	48 (70)	25 (80)	5 (100)
No. of patients	62	83	70	32	5



Summary:

- Algorithms for predicting mortality after rAAA have limited clinical utility:
 - Most patients were not classified in the highest risk group by the clinical decision models.
 - Among patients identified as highest risk, actual mortality may be lower than predicted mortality
 - Futility is predicted in very few patients (2% - 3%)
 - May be helpful for discussions of prognosis, practicality of transfer
- Low turn-down rates and increased use of EVAR improves outcomes
- Currently published clinical decision algorithms should be used with care in selecting individual patients for whom to offer palliative care over repair

THANK YOU!

