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Treatment of ruptured abdominal aortic aneurysms in the Amsterdam area

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Supporting information Chapter 2

Search strategy systematic review

Pubmed

((((aneurysm abdomen aortic) OR aortic abdominal aneurysms OR aortic abdominal aneurysm OR abdominal aortic aneurysms OR abdominal aortic aneurysm OR abdominal aneurysms aorta OR abdominal aneurysm aorta) AND (acute OR rupture OR ruptures OR ruptur*) AND (mortality OR fatal* OR autopsy OR death OR survival OR surviv*)) AND ((population) OR (incidence) OR (prevalence))

(last search January 2013)

Embase

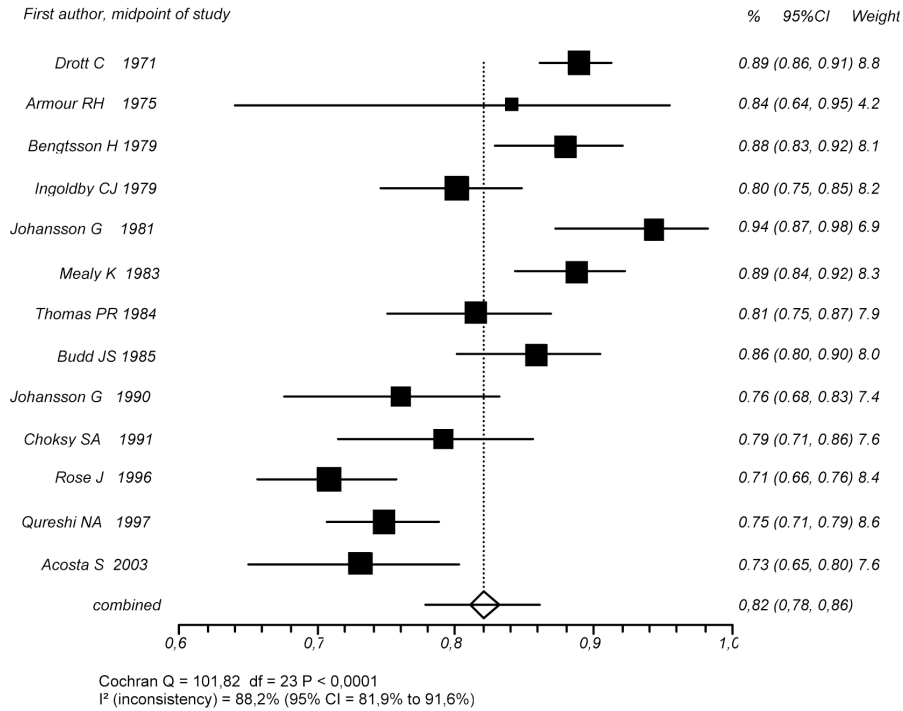
((abdominal aorta aneurysm.mp. or exp abdominal aorta aneurysm/ AND (exp RUPTURE/ or exp AORTA RUPTURE/ or exp ANEURYSM RUPTURE/ or rupture*.mp. or acute.mp. or exp emergency/ or emergen*.mp.) OR ((aorta rupture.mp. or exp aorta rupture/ or acute aneurysm.mp. or acute aorta.mp. or aneurysm rupture.mp. or exp aneurysm rupture/) AND abdomen.mp. or exp ABDOMEN/ or abdom*.mp.)) AND

(mortality.mp. or exp MORTALITY/ or fatal*.mp. or exp fatality/ or exp autopsy/ or death.mp. or exp DEATH/ or exp survival rate/ or exp survival/ or surviv*.mp.) AND

(population.mp. or exp POPULATION/ or exp POPULATION RESEARCH/ or exp INCIDENCE/ or incidence.mp. or prevalence.mp. or exp PREVALENCE/ or exp EPIDEMIOLOGY/ or ep.fs.)

(last search January 2013)

Supporting Figure 1 chapter 2 Mortality of high-quality studies



Total mortality in studies graded as high quality (score at least 4). Studies are listed according to midpoint of the study interval. The point estimate of total mortality for each study and the pooled estimate are shown with 95% confidence intervals (CI) A random effects model was used.

Supporting information Chapter 5

Table S1. Propensity adjusted logistic regression models. A propensity score is a single score per patient ranging between 0 and 100% and is used to adjust for selection by caregivers. In our analysis, the score was calculated with a logistic regression model which included age, SBP, resuscitation and year of intervention. Hence the propensity score of a single patient was a weighted summary of these variables. The complete cohort model included all patients to assess the influence of hospital setting (vascular centre or referring hospital) on survival. In the complete cohort, the endpoint of the propensity model was 'intervention at a referring hospital' to adjust for allocation of treatment in a referring hospital. The centre cohort included only patients treated in a vascular centre to assess the influence of patient transfer (to transport from a referring hospital to a center or not) on survival.

In the centre cohort, the endpoint of the propensity model was 'patient transfer' to adjust for transport to a vascular centre.

Variable	Complete cohort odds ratio (95% CI)	Centre cohort odds ratio (95% CI)
Propensity score continuous in %	-	1.119 (1.079 – 1.159)*
Propensity score 1.4 – 5.8% (n=98)	reference category	
Propensity score 5.8 – 10.2% (n=99)	1.708 (0.874 – 3.341)	-
Propensity score 10.2 – 13.6% (n=95)	1.401 (0.678 – 2.896)	-
Propensity score 13.6 – 25.0% (n=100)	1.139 (0.527 – 2.465)	-
Vascular centre	2.290 (1.159 – 4.524)*	-
Patient transfer	-	0.892 (0.498 – 1.599)

The complete cohort included 392 patients and 244 survivors. The propensity score was categorized because of no linearity in the logit. Performance: chi-square statistic 7.2 – 14.4 (4 degrees of freedom) P = .008 - .13, Hosmer and Lemeshow test P = .54 - .99, area under the receiver operating characteristics curve .56 – .61. The centre cohort included 352 patients and 226 survivors. Performance: chi-square statistic 51.6 – 59.8 (2 degrees of freedom) P < .001, Hosmer and Lemeshow test P = .18 – .84, area under the receiver operating characteristics curve .72 – .74. P < .05

Table S2. The baseline characteristics of patients in the complete cohort stratified for hospital setting (vascular centre or referring hospital). The results in the imputed datasets are shown.

	Vascular centres	Referring hospitals	p
Age in years, mean (±SD) ^a	74.6 ±8.5	72.7 ±9.9	0.203†
Male/female, % (No.)	81.5/18.5 (287/65)	32/8	0.831‡
Cardiac comorbidity *1, % (No.)	44.9 (158/352)	14/40	0.132 – 0.502‡
Pulmonary comorbidity *2, % (No.)	19.6 (69/352)	6/40	0.296 – 0.671‡
Renal comorbidity *3, % (No.)	11.7 (41/352)	2/40	0.287 – 0.786‡
Cerebrovascular comorbidity *4, % (No.)	13.6 (48/352)	6/40	0.469 – 0.812‡
Lowest in-hospital SBP ^b , median (IQR) ^c	90 (70 – 120)	90 (55 – 129)	0.260 – 0.965¶
Resuscitation, % (No.)	12.8 (45/352)	4/40	0.332 – 1.000‡
No CTA ^d made, % (No.)	12.2 (43/352)	25/40	<0.001‡
Year of intervention, % (No.)			
2004	11.7 (41/352)	4/40	0.036¥
2005	12.8 (45/352)	13/40	
2006	17.9 (63/352)	7/40	
2007	17.1 (60/352)	5/40	
2008	15.1 (53/352)	1/40	
2009	13.4 (47/352)	4/40	
2010	11.1 (39/352)	5/40	
2011	1.1 (4/352)	1/40	

*1 previous history of arrhythmia, cardiac surgery or myocardial infarction *2 previous history of chronic obstructive pulmonary disorder (chronic obstructive pulmonary disorder) *3 previous history of chronic kidney failure or dialysis *4 previous history of transient ischemic attack or stroke † unpaired students t-test, ‡ range of chi-square test, ¶ range of Mann-Whitney U test, ¥ chi-square test for trend. ^aSD = standard deviation, ^bSBP = systolic blood pressure in mmHg, ^cIQR = inter-quartile range,

Table S3. The baseline characteristics of patients in the centre cohort stratified for patient transfer (to transport from a referring to a vascular centre or not). The results in the imputed datasets are shown.

	No transport	Transport	P
Age in years, mean (\pm SD ^a)	74.6 \pm 8.6	74.4 \pm 8.4	0.205†
Male/female, % (No.)	80.1/19.9 (214/53)	85.9/14.1 (73/12)	0.238‡
Cardiac comorbidity *1, % (No.)	43.1 (115/267)	50.6 (43/85)	0.113 – 0.306‡
Pulmonary comorbidity *2, % (No.)	17.6 (47/267)	24.7 (21/85)	0.069 – 0.232‡
Renal comorbidity *3, % (No.)	9.0 (24/267)	18.8 (16/85)	0.006 – 0.024‡
Cerebrovascular comorbidity *4, % (No.)	12.0 (32/267)	18.8 (16/85)	0.039 – 0.134‡
Lowest in-hospital SBP ^b , median (IQR ^c)	86 (68 – 114)	104 (80 – 140)	0.001 – <0.001¶
Resuscitation, % (No.)	15.4 (41/267)	4.7 (4/85)	0.004 – 0.029‡
No CTA ^d made, % (No.)	15.4 (41/267)	2.4 (2/85)	0.001‡
Year of intervention, % (No.)			
2004	12.7 (34/267)	8.2 (7/85)	0.842¥
2005	12.4 (33/267)	14.1(12/85)	
2006	18.0 (48/267)	17.6 (15/85)	
2007	15.4 (41/267)	22.4 (19/85)	
2008	15.4 (41/267)	14.1 (12/85)	
2009	13.9 (37/267)	11.8 (10/85)	
2010	11.2 (30/267)	10.6 (9/85)	
2011	1.1 (3/267)	1.2 (1/85)	

*1 previous history of arrhythmia, cardiac surgery or myocardial infarction *2 previous history of chronic obstructive pulmonary disorder (chronic obstructive pulmonary disorder) *3 previous history of chronic kidney failure or dialysis *4 previous history of transient ischemic attack or stroke † unpaired students t-test, ‡ range of chi-square test, ¶ range of Mann-Whitney U test, ¥ chi-square test for trend ^aSD = standard deviation, ^bSBP = systolic blood pressure in mmHg, ^cIQR = inter-quartile range, ^dCTA = computed-tomographic angiography

Table S4. Combined multivariable and propensity adjusted logistic regression models. The complete cohort model included all patients to assess the influence of hospital setting (trial centre or referring hospital) on survival. The centre cohort included only patients treated in a vascular centre to assess the influence of patient transfer (to transport from a referring hospital to a centre or not) on survival.

Variable	Complete cohort odds ratio (95% CI)	Centre cohort odds ratio (95% CI)
Male sex	1.356 (0.786 – 2.338)	1.432 (0.773 – 2.650)
Cardiac comorbidity	0.518 (0.362 – 0.933)*	0.667 (0.398 – 1.116)
Pulmonary comorbidity	0.578 (0.332 – 1.008)	0.398 (0.211 – 0.750)*
Renal comorbidity	0.628 (0.307 – 1.284)	0.531 (0.244 – 1.156)
Cerebrovascular comorbidity	0.648 (0.346 – 1.214)	0.824 (0.397 – 1.712)
Type of surgery (OR ^a)	0.590 (0.314 – 1.107)	0.639 (0.323 – 1.262)
Propensity score continuous in %	-	1.124 (1.083 – 1.167)*
Propensity score 1.4 – 5.8% (n=98)	reference category	-
Propensity score 5.8 – 10.2% (n=99)	1.898 (0.926 – 3.890)	-
Propensity score 10.2 – 13.6% (n=95)	1.421 (0.657 – 3.077)	-
Propensity score 13.6 – 25.0% (n=100)	1.066 (0.482 – 2.355)	-
Vascular centre	2.405 (1.187 – 4.873)*	-
Patient transfer	-	1.066 (0.575 – 1.978)

The complete cohort model included 392 patient and 244 survivors. The propensity score was categorized because of no linearity in the logit. Performance: chi-square statistic 29.5 – 38.5 (10 degrees of freedom) $P < .001$ – 0.004, Hosmer and Lemeshow test $P = .09$ – .96, area under the receiver operating characteristics curve .65 – .70.

The centre cohort included 352 patient and 226 survivors. Performance: chi-square statistic 72.7 – 81.3 (8 degrees of freedom) $P < .001$, Hosmer and Lemeshow test $P = .23$ – .66, area under the receiver operating characteristics curve .76 – .78. $P < .05$ ^aOR = open surgery

Table S5. Multivariable logistic regression models to calculate the propensity score. In the complete cohort model, the endpoint was ‘intervention a referring hospital’. In the centre cohort model, the endpoint was ‘patient transfer’.

Variable	Complete cohort	Centre cohort
	odds ratio (95% CI)	odds ratio (95% CI)
Age (per year)	0.982 (0.946 – 1.019)	0.994 (0.965 – 1.024)
Lowest in-hospital SBP ^a (per 10 mmHg)	0.952 (0.869 – 1.044)	1.087 (1.020 – 1.159)*
Resuscitation	1.915 (0.474 – 7.741)	2.008 (0.647 – 6.234)
Year of intervention (2007 or 2008)	0.334 (0.131 – 0.852)*	1.339 (0.750 – 2.392)
Year of intervention (2009 or 2010 or 2011)	0.337 (0.308 – 1.497)	0.958 (0.505 – 1.819)

The complete cohort model included 392 patients and 40 interventions in a referral hospital. Performance: chi-square statistic 8.0 – 10.3 (5 degrees of freedom) P = .07 - .16, Hosmer and Lemeshow test P = .05 - .91, area under the receiver operating characteristics curve .63 – .65.

The centre cohort model included 352 patients and 85 transferred patients. Performance: chi-square statistic 13.1 – 18.4 (5 degrees of freedom) P = .003 – .02, Hosmer and Lemeshow test P = .009 – .32, area under the receiver operating characteristics curve .63 – .66.

* P < .05 ^aSBP = systolic blood pressure

Supporting information Chapter 6

Scanning protocol suspected rAAA

Centre A

Sliding gantry Siemens Somatom Sensation 64, Erlangen, Germany. Slice thickness 3 mm, collimation 0.6mm, reconstruction increment 0.75 mm, pitch 1.2. Contrast protocol: power injection 100 ml Ultravist 300 (Bayer Healthcare Pharmaceuticals, Germany), 5 ml/s ,bolus tracking, 50 ml NaCl saline chase 5 ml/s.

Centre B

Siemens Somatom Sensation 64, Erlangen, Germany slice thickness 1.5 mm, collimation 0.6 mm, reconstruction increment 1 mm, pitch 1.2. Contrast protocol: power injection 100 ml Ultravist (Bayer Healthcare Pharmaceuticals, Germany) 300, 5 ml/s, bolus tracking.

Supporting information chapter 7**Table 6.** Comparison between Bern study³ and the Amsterdam acute aneurysm cohort assessing the influence of aortic anatomy on outcomes after OR.

	Bern	Amsterdam
Number of patients included	233 consecutive patients	279 selected patients
Assessment suitability	Retrospective by a vascular surgeon and an interventional radiologist independently under corelab-conditions	Prospective by a vascular surgeon and an interventional radiologist together in the acute setting
Categorisation of patients	Suitable vs. borderline (including debatable patients) vs. unsuitable based on anatomy and hemodynamic stability	Friendly vs. hostile (=suitable vs. unsuitable) based on anatomy (no debatable category included)
Type of study	Single centre	Multicentre
Transfer from regional hospital, % (number)	69 (172 of 248)	37 (104 of 279)
Rejection rate, % (number)	9 (24 of 274)	12 (66 of 533)
Age in years, median (IQR)	73 – 74 (66 – 80)	76 (69 – 80)
Male, % (CI)	89 (207 of 233)	79 (59 of 279)
Lowest in-hospital SBP, median (IQR)	92 – 95 (70 – 122)*	100 (75 – 128)
Cardiopulmonary resuscitation, % (number)	4 (10 of 248)*	8 (23 of 279)
GAS without cerebrovascular score, median (IQR)	79 – 83 (72 – 95)*	86 (76 – 96)
Hemoglobin in mmol/L, median (IQR)	5.7 – 5.9 (4.5 – 7.0)	6.9 (5.9 – 8.1)
In-hospital death rate, % (number, CI)	16 (39 of 248, 12 – 21)	32 (90 of 279, 27 - 38)

* provided by authors of Bern study, included in table with permission