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Impact of gender and body surface area on outcome after abdominal aortic aneurysm repair

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Abdominal aortic aneurysm;
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Abstract

BACKGROUND: A gender-neutral threshold aneurysm diameter (AD) of more than 5.5 cm for surgical intervention in abdominal aortic aneurysms (AAA) ignores the fact that women have a smaller baseline AD. We hypothesized that women have a greater AD relative to body surface area (BSA) at the time of surgery and that this worsens outcome.

METHODS: The Vascular Study Group of New England database was queried for elective AAA repairs performed from 2003 to 2011 to compare BSA-indexed AD, ie, aortic size index (ASI), between men and women at the time of surgery and the impact of ASI on outcome.

RESULTS: Women were older and had higher ASI among both open-repair (n = 1,566) and endovascular repair (n = 2,172) patients ($P < .001$). Among open-repair patients, mean ASI for men undergoing repair at AD of 5.5 cm (2.75 cm/m^2) was used to subdivide women into 2 categories: women with ASI of 2.75 or more were older ($P < .001$), had a larger aneurysm size ($P < .001$), and had a higher 1-year mortality (P = .042) than women with ASI less than 2.75.

CONCLUSIONS: When indexed to BSA, women have a larger aneurysm size than men at the time of AAA repair.

A minimum aneurysm diameter (AD) of 5.5 cm or more has traditionally been used as one of the criteria for surgical intervention in abdominal aortic aneurysms (AAA) in both men and women.[1] This gender-neutral cutoff was based on randomized controlled trials on predominantly male populations.[2,3] Because of paucity of evidence on gender differences in pathophysiology of AAA disease, similar criteria were used for both men and women. Although there were data that suggested that age-adjusted mortality for both genders was comparable,[4] the observed higher rupture rates in women and that too at smaller AD[5,6] fueled scientific query into why women did worse. One of the suggested factors was that the threshold AD of 5.5 cm that is taken to differentiate safe from unsafe aneurysms[3,7] does not

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Table 1 Baseline characteristics, perioperative details, and outcomes of patients undergoing open repair

	Open repair (n = 1,566)		
	Male (n = 1,145)	Female (n = 421)	P value
Demographics			
Age (y), mean ± SD	70 ± 8	72 ± 8	<.001*
Caucasian (%)	98	98	<.836
BSA (m^2), mean ± SD	2.00 ± .21	1.74 ± .20	<.001*
BMI (kg/m^2), mean ± SD	27.4 ± 5.52	26.5 ± 5.68	.008*
ASI (cm/m^2), mean ± SD	3.10 ± .79	3.38 ± .76	<.001*
Comorbidities (%)			
Smoking	93	90	.034*
HD/CRF	.7	.5	1.000
HTN	81	87	.007*
DM	15	13	.255
CAD	35	27	.003*
CHF	6.2	6.7	.727
CABG/PTCA			
None	67	80	<.001*
<5 y ago	19	12	
≥5 y ago	14	7.6	
COPD	33	44	<.001*
Medication history (%)			
Aspirin	73	67	.016*
BB	84	83	.487
Plavix	5.1	6.7	.263
Statin	66	62	.136
Family history of AAA (%)	14	18	.121
Creatinine (mg/dL), mean ± SD	1.2 ± .48	1.10 ± .59	.001*
Perioperative details			
Maximum AP AAA diameter (cm), mean ± SD	6.2 ± 1.4	5.8 ± 1.2	<.001*
<4.5	5	7	
4.5–5.4	26	31	
5.5–6.4	36	39	.001*
6.5–7.4	16	13	
≥7.5	17	10	
Urgency (%)			
Elective	91	89	.212
Symptomatic	9.1	11	
EBL (mL), mean ± SD	1,557 ± 1,398	1,273 ± 1,024	<.001*
Crystalloids (mL), mean ± SD	5,487 ± 2,400	4872 ± 2,082	<.001*
PRBCs (units), mean ± SD	.58 ± 1.4	.84 ± 1.5	.001*
Length of stay (d, mean ± SD			
Admission–discharge	9.2 ± 11	11 ± 18	.036*
Surgery–discharge	8.9 ± 11	10 ± 18	.040*
ICU stay	3.5 ± 5.9	5.2 ± 14	.001*
Outcomes			
Complications (%)			
MI	6.1	6.9	.560
Dysrhythmia	12	17	.024*
CHF	4.0	6.7	.043*
Respiratory	12	15	.145
Renal dysfunction	12	11	.662
Leg ischemia/emboli	.97	3.8	.001*
Bowel ischemia	2.5	5.0	.014*
Wound complications	4.2	2.9	.238
Return to OR	6.5	7.1	.649
Bleeding	11	8.0	.812
Stroke	1.3	.0	1.000