

Abdominal aortic aneurysm in women in Aotearoa New Zealand

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ABSTRACT

Women with an abdominal aortic aneurysm (AAA) in Aotearoa New Zealand experience inequity at every stage of diagnosis and management. We currently treat women too late in their disease course, where increased age, comorbidities, larger AAA diameter, preventable ruptures, loss of eligibility for simple endovascular repair (EVAR) and clinical “turn down for surgery” rates all add to higher AAA mortality. There is scope for great improvements in cardiovascular risk reduction for people living with a small AAA and for considering the inclusion of women in proposals for an AAA screening programme.

An abdominal aortic aneurysm (AAA) is a weakening and expansion of the main abdominal blood vessel.¹ Women with AAA experience inequitable outcomes at every stage of management. This has long been known and should be addressed.² This inequity stems from a lack of sex-adjusted diagnostic thresholds, quadruple the risk (compared to men) of rupture prior to meeting current repair thresholds, higher clinical turn-down rates, older age at the time of repair, more frequent presentation with symptoms requiring high-risk emergency repair and higher palliation rates when their aneurysm ruptures. Inequity for women is present in Aotearoa New Zealand but has been identified worldwide and has been underpinned by a failure to adequately consider women in research, clinical practice and national planning.³

Diagnosis and prevalence

The global prevalence of abdominal aortic aneurysms has been falling due to decreasing rates of smoking, but significant disease remains.⁴ The prevalence has been thought to be much lower in women than in men, but this partly stems from a failure to use an appropriate diagnostic threshold in women. AAA should be diagnosed at 30mm in men and at 26mm in women.^{5,6} In an AAA screening trial, the crude prevalence of undiagnosed AAA in Māori men aged 60–74 years was 3.6% while in women aged 60–74 years it was 2.3%.⁷ There appears to be a particular excess risk for women who smoke.^{3,7} AAA prevalence in Māori aged 65–74 years is highest among current smokers (women 6.9%, men 7.5%). Some

ethnic groups, for example Asians, have lower AAA prevalence.^{7,8}

Surveillance and treatment thresholds

Small AAA growth rates are the same for men and women and are increased by smoking.⁹ A small “sub-threshold” AAA has a very low risk of rupture (at least in men) and patients are monitored in ultrasound surveillance programmes until reaching a predetermined size threshold for considering intervention. In non-Māori men this threshold is 55mm, based on the outcome of four randomised controlled trials, and is safe.¹⁰ In Aotearoa New Zealand a 50mm threshold is often used for Māori men, due to observation of earlier disease onset and more frequent presentation with rupture.¹¹ In the four international trials that established the size threshold for AAA repair only 9% of the participants were women and there was an inadequate sample size to recommend sex-specific treatment thresholds.^{3,12} Internationally and in Aotearoa New Zealand a 50mm threshold is often used for women, simply by subtracting 5mm off the threshold used for men. The National Institute for Health and Care Excellence (NICE) in the United Kingdom (UK) is a notable outlier in recommending a 55mm threshold for women.¹³ A meta-analysis of 15,475 people undergoing surveillance of a sub-threshold AAA found that women have a fourfold higher risk of rupture of a sub-threshold AAA, and women’s AAAs rupture at smaller diameters.^{9,14,15} The observational evidence suggests that a treatment threshold of 42mm in women would provide a comparable

rupture risk to the 55mm threshold currently used internationally in men.⁹ Importantly, in practice, the mean size at the time of intact repair in Aotearoa New Zealand women is far higher, at 59mm (versus 63mm in men).¹⁶

Medical therapy in those with AAA

Patients with AAA have a very high cardiovascular risk, rendering primary prevention risk scoring systems redundant. In a large AAA cohort, women's estimated 10-year risk of cardiovascular events was 43%.¹⁷ Full implementation of guideline-directed risk management was estimated to result in an 18.3% (8.8–25.6%) absolute 10-year risk reduction for cardiovascular events. Patients with small AAA are often monitored for many years, providing ample opportunity for interventions to improve health, but these are more poorly implemented in women.¹⁸ The major modifiable risk factor is smoking, which is associated with disease prevalence, faster aneurysm growth and increased rupture risk.⁹ Hypertension is also associated with aneurysm rupture.⁹ There is currently no effective pharmacotherapy to prevent AAA growth or rupture, but randomised controlled trials are ongoing to test the effect of metformin.¹

In Aotearoa New Zealand the population risk of AAA rupture increases with socio-economic deprivation and with smoking.^{19,20} Māori have a higher likelihood of needing high-risk emergency repairs, meaning that the opportunity for low-risk elective repair has been missed.¹¹ The higher rates of emergency repair are hypothesised to be due to greater exposure to risk factors, poorer access to primary care services and care in hospital and a lack of AAA screening in Aotearoa New Zealand.^{8,11,21} While no country has a national screening programme that includes women, it is notable that AAA prevalence in Māori women is higher than that used to justify screening in men in Europe.⁷

AAA repair

The surgical intervention is similar for intact or ruptured AAA and is either an endovascular repair (EVAR) or open repair (OAR). EVAR does not routinely require an intensive care stay, while treatment by open surgery or treatment of ruptured AAA currently places a much more substantial burden on health services in Aotearoa New Zealand.²² Randomised controlled trials demonstrate similar long-term survival after

elective EVAR and OAR, but concerns have been raised as to the long-term durability of EVAR, which has become the predominant method of elective AAA repair.^{15,19} Operative mortality from elective AAA repair in women (internationally OAR 6%, EVAR 2.3%) is higher than in men, and women have higher post-operative complication rates even after adjusting for age.^{23,24} At the current diameter treatment threshold, women in Aotearoa New Zealand (and internationally) are less likely to be selected for EVAR than men (Table 1).¹⁵ Internationally, women are more likely to be selected for conservative (palliative) management (34% versus 19%).²⁵ This is partly because eligibility for low-risk EVAR by anatomical criteria declines at significantly lower AAA diameter for women compared with men.²⁶ Overall, women are 25% less likely to receive elective AAA repair, but women are increasingly likely to present with AAA rupture, which carries ~10-fold increased mortality.¹⁹ In Aotearoa New Zealand, approximately 215 people per year are recorded as dying of ruptured AAA. Despite women's lower disease prevalence, one in three people with a ruptured AAA is a woman.¹⁹ Eighty percent of those women with a ruptured AAA do not receive any emergency repair (i.e., receive palliative care or die out of hospital), compared with 62% for men.^{19,27}

The Australasian Vascular Audit (AVA) is not compulsory but is widely used throughout Aotearoa New Zealand. Annual reports are produced but the outcomes have not previously been stratified by sex, and ethnicity data are not collected. Most patients are asymptomatic until rupture, but patients may present with acute pain prior to rupture, termed a “symptomatic aneurysm”. In-hospital mortality outcomes are provided in Table 1 and reveal that women are more likely than men to require very urgent (typically “next-day”) repair of a symptomatic AAA and that the in-hospital mortality rate from open surgery for a symptomatic AAA in women is 14%, compared with 5.3% in men. This is consistent with international data, but it is unclear why mortality is so high in women.²⁸ The discrepancy in in-hospital mortality is much smaller for an elective endovascular repair (1% compared with 0.5%).

Screening for AAA in Aotearoa New Zealand

Screening has the potential to reduce the impact of ruptured and “symptomatic” AAA on patients

Table 1: In-hospital deaths after repair of non-ruptured (intact) abdominal aortic aneurysm (AAA) in Aotearoa New Zealand 2011–2023.

		Women		Men	
Open repair (OAR)	Elective	18/315	5.7%	28/1,130	2.5%
	Symptomatic	12/85	14.1%	13/243	5.3%
	All open:	30/400	7.5%	41/1,373	3.0%
Endovascular repair (EVAR)	Elective	4/418	1.0%	11/2,020	0.5%
	Symptomatic	0/61	0%	1/171	0.6%
	All EVAR:	4/479	0.8%	12/2,191	0.5%

The table shows the number of procedures done for asymptomatic and symptomatic intact (non-ruptured) AAA repair in Aotearoa New Zealand in 2011–2023, along with the in-hospital mortality rate. The proportion of intact AAA repairs done urgently for symptoms was 17% in women versus 12% in men. These data were obtained from the prospective Australasian Vascular Audit (AVA), which is based in Australia and does not currently collect information on ethnicity. The AVA has an 80.2% AAA case-capture rate in Aotearoa New Zealand.³⁴ Using the National Minimum Dataset, the crude estimated incidence of AAA per 100,000 person-years is 30.34 (95% CI 29.84–30.85) for men and 12.44 (95% CI 12.13–12.76) for women, using a 30mm diagnostic threshold.¹⁹

and the healthcare system.²² Because Heath New Zealand – Te Whatu Ora does not yet have an AAA screening programme, planned AAA management is dependent upon incidental detection of asymptomatic AAA. This likely disadvantages Māori, who have a higher disease prevalence and are more likely to require high-risk emergency repair.¹¹ In 2016 the National Screening Advisory Committee approved support in principle for screening in Aotearoa New Zealand.^{7,19,22,29} Including women would lead to more low-risk elective EVAR and fewer presentations with high-risk and expensive symptomatic or ruptured AAA.

Information for general practitioners:

- Be aware that the medical management of small AAA is the same for men and women. Recognise that the presence of an AAA indicates very high risk of future cardiovascular events including stroke, myocardial infarction and peripheral vascular disease.³⁰
- Educate patients that an AAA is a manifestation of “sick arteries” (i.e., not just an anatomical problem) and is associated with very high cardiovascular risk.³⁰
- Encourage smoking cessation. Rupture rates double in current smokers.⁹
- Encourage regular exercise. Sex is safe.³¹
- Prescribe an antiplatelet, unless contraindicated or anticoagulation is

indicated.^{3,32}

- Prescribe a high-intensity statin (e.g., 40–80mg atorvastatin or 20–40mg rosuvastatin).^{3,32} There is no reason to use lower statin doses in women. Even after AAA repair, use of appropriate medications is associated with improved long-term survival.
- Monitor blood pressure and treat to target (systolic <130mmHg). Hypertension increases rupture risk.⁹

Information for the emergency department and radiology services:

- Be aware that in Aotearoa New Zealand one in three patients with a ruptured AAA is a woman.
- Detection of AAA by clinical examination is very poor; consider early imaging.
- Use sex-specific AAA diagnosis thresholds (women 26mm, men 30mm) and ensure that incidentally detected asymptomatic AAA are referred for consideration of surveillance.

National interventions:

- Aotearoa New Zealand does not have an AAA screening programme. The National Screening Advisory Committee should reconsider options for screening in women.²⁹
- Current guidelines recommend a treatment

threshold of 50mm in women, but further evidence is needed.³ Consideration should be given to further lowering the treatment threshold for women's AAA in the context of a randomised controlled trial. This is supported by Aotearoa New Zealand vascular surgeons, and a large international trial is underway.^{13,33}

- National tobacco control methods would further reduce the incidence of AAA and associated cardiovascular diseases.

The international women's small aneurysm trial

The international women's small aneurysm trial (known internationally as the WARRIORS trial, NCT06394271) is due to begin recruiting in Aotearoa New Zealand in 2026 and aims to reduce inequity in care and improve the survival and quality of life of women with AAA. The trial will test the hypothesis that lowering the size threshold

for AAA repair for women, while addressing their cardiovascular risk, will prevent AAA rupture and save lives. The trial intervention is early elective EVAR versus current care in women with small asymptomatic AAA who are eligible for EVAR, and the primary outcome is AAA-related mortality and AAA rupture at 5 years. All participants will be followed for clinical outcomes, quality of life and AAA-related anxiety.^{13,33}

Conclusions

We currently treat women's AAA too late in their clinical course, where increased age, comorbidities, larger AAA diameter, preventable ruptures, loss of eligibility for simple EVAR and clinical "turn down for surgery" rates all add up to higher AAA mortality. There is scope for inclusion of women in AAA screening and great improvements in cardiovascular risk reduction for people living with an AAA.

COMPETING INTERESTS

OL and SC are recipients of Health Research Council funding for the Aotearoa New Zealand arm of the international women's small aneurysm trial (WARRIORS: <https://www.imperial.ac.uk/department-surgery-cancer/research/surgery/clinical-trials/international-warriors-trial/>).

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