



Context

An abdominal aortic aneurysm (AAA) is a permanent and localized increase in size of the main blood vessel in the abdomen. A ruptured aneurysm can cause severe internal bleeding leading to shock or even death.

Early detection and treatment of an AAA can avoid the life-threatening risk of rupture.¹ The condition is frequently silent and rupture can be the first symptom.² A ruptured AAA is associated with a mortality rate of about 80%.³ AAA is a significant cause of death in Canada; and it is especially common in men over the age of 65.¹ Each year, physicians diagnose approximately 20,000 people in Canada with an AAA; of those, nearly 2,000 may have an AAA that is threatening enough to cause death from a rupture, if not treated.⁴

The two most common treatment options for AAA include an open surgery option or an endovascular aortic repair (EVAR). Approximately 25% of patients with an AAA requiring surgery are not considered good candidates for open surgical repair.³ In the US, EVAR has replaced open repairs as the most commonplace procedure for treating AAAs.⁵ In Canada, open repair is still the most frequently practiced approach.

Individuals with non-urgent cases that require elective repair are associated with better outcomes than those treated for aortic rupture. Elective surgical repair is available across Canada and is usually recommended for all aneurysms greater than 5 cm to 6 cm in diameter, unless patients are judged as medically unfit for surgery.² There are no treatments for smaller, earlier-stage AAAs beyond basic

monitoring of progression and blood pressure management.⁶ Surgical intervention for AAAs that are 5 cm in diameter or larger is typically advised, as they grow at an average rate of 5 mm per year.⁷

The recently published results of two long-term randomized studies comparing EVAR with open repair (EVAR 1 and DREAM trials),^{8,9} found that short-term mortality outcomes (30 days post-surgery) favoured EVAR. The initial advantage of EVAR, however, dissipated over the long term, with no demonstrated statistical difference in overall survival rates after five to six years between the two groups. Additionally, the EVAR procedure was associated with higher rates of graft-related complications and reinterventions. EVAR was also the more costly intervention.

The use of EVAR in lower-risk patient populations has also been reviewed in Ontario.⁶ Recommendations from this review suggest that for patients at low operative risk for open surgical repair, EVAR cannot be supported from a health system perspective because it is not cost-effective and provides no overall advantage in terms of survival or complication rates.⁶

Given current recommendations and new evidence from the EVAR 1 and DREAM trials, there is some interest in current practice patterns and what represents optimal clinical practice. There is evidence that patients perceive the EVAR approach as attractive compared with open repair as it is less-invasive. However, EVAR may not be a sustainable approach for every patient requiring AAA repair.

Objective

The purpose of this report is to provide a current status of the utilization of open surgical repair and EVAR for the management of AAAs, grouped by calendar year and Canadian jurisdiction. Results of this report are based on data from the Canadian Institute for Health Information's (CIHI) Discharge Abstract Database. Information includes calendar year data from 2006 to 2008 and is based on the International Classification of Diseases procedure code (ICD-10-CA).

Results

Overall, 2,948 AAA procedures (open repair and EVAR) were performed in nine provinces across Canada in 2008 (data for Quebec are not included). Of these

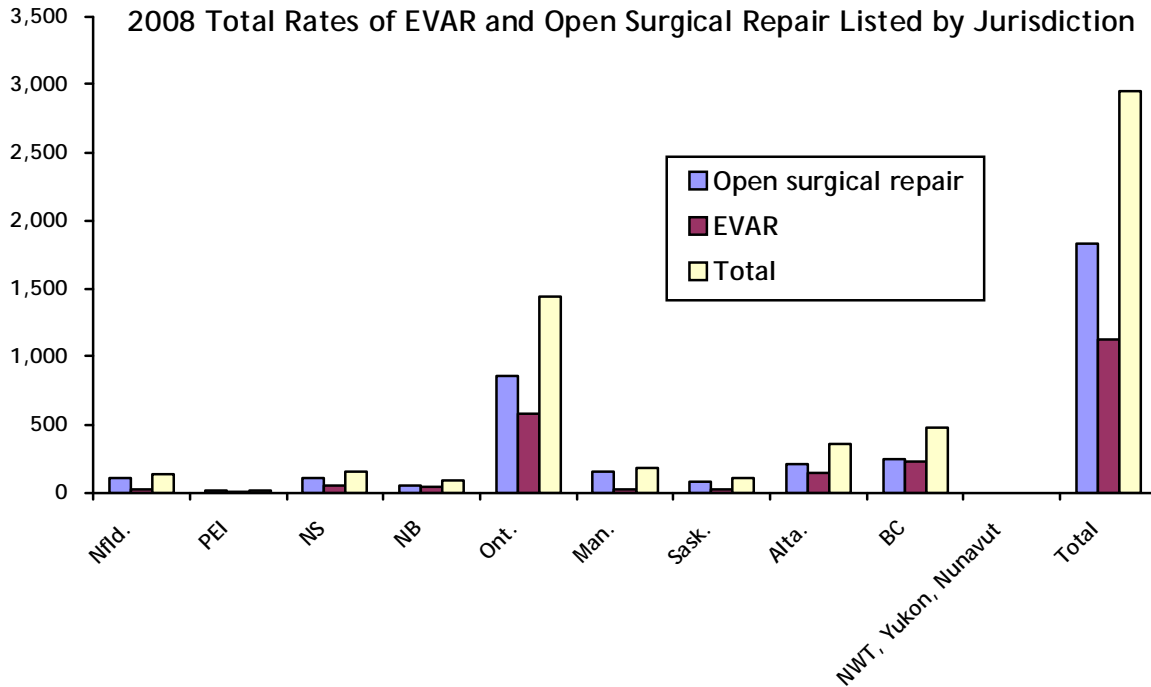
procedures, 62% were for open surgical repair and 38% were for EVAR. Ontario accounted for almost 50% of all national AAA procedures; 60% of Ontario's AAA interventions were for open surgery and 40% were for EVAR. British Columbia carried out the second highest amount of AAA procedures; accounting for 16% of the national total. While British Columbia carried out fewer total procedures than Ontario, it performed relatively more EVAR procedures (47% versus 40%) relative to the number of total procedures performed compared with Ontario (Table 1). Figure 1 provides a pan-Canadian comparison of EVAR and open repair surgical procedures for 2008.

Table 1: Total Number of Cases for Open Surgical and EVARs of AAAs across Provinces in Canada, 2006 to 2008

Year	Procedure	Nfld.	PEI	NS	NB	Ont.	Man.	Sask.	Alta.	BC	All
2008	Open	108	11	104	50	857	157	81	210	250	1,828
	EVAR	23	4	51	39	582	24	24	149	224	1,120
Total		131	15	155	89	1,439	181	105	359	474	2,948
% EVAR		17	27	33	44	40	13	23	42	47	38
2007	Open	101	9	110	78	890	118	67	182	273	1,828
	EVAR	27	3	42	30	446	44	22	161	191	966
Total		128	12	152	108	1,336	162	89	343	464	2,794
% EVAR		21	25	28	28	33	27	25	47	41	35
2006	Open	96	5	133	93	990	132	100	196	308	2,053
	EVAR	8	0	23	24	346	21	13	139	158	732
Total		104	5	156	117	1,336	153	113	335	466	2,785
% EVAR		8	0	14	20	26	14	11	41	34	26

AAA = abdominal aortic aneurysm; Alta. = Alberta; BC = British Columbia; EVAR = endovascular aortic repair; Man. = Manitoba; NB = New Brunswick; Nfld. = Newfoundland and Labrador; NS = Nova Scotia; Ont. = Ontario; NWT = Northwest Territories; PEI = Prince Edward Island; Sask. = Saskatchewan.

Figure 1: Number of Total Cases, Open Surgical and EVARs Listed per Province and Territory in 2008



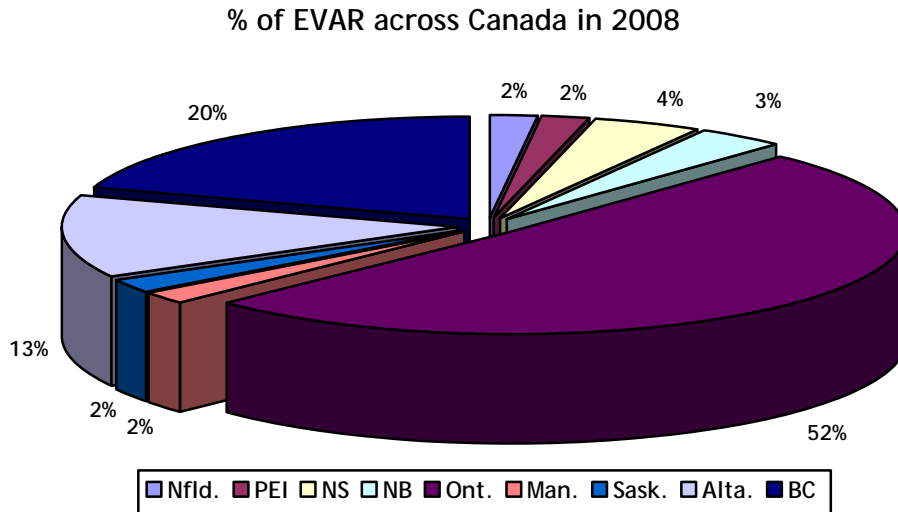
(This figure was based on a similar figure previously published by Forbes et al. in: Forbes T, et al. *J Vascular Surg* 2005;42(3):410-414.)

Alta. = Alberta; BC = British Columbia; EVAR = endovascular aortic repair; Man. = Manitoba; NB = New Brunswick; Nfld. = Newfoundland and Labrador; NS = Nova Scotia; Ont. = Ontario; NWT = Northwest Territories; PEI = Prince Edward Island; Sask. = Saskatchewan.

Figure 2 shows that in 2008, Ontario performed 54% of the total number of EVAR procedures across Canada. British Columbia and Alberta performed the next largest amount (20% and 13% of total procedures performed respectively). Newfoundland

and Labrador, Prince Edward Island, Nova Scotia, New Brunswick, Manitoba, and Saskatchewan collectively performed approximately 14% of the total number of EVAR procedures for that year.

Figure 2: Percentage of Total EVAR Procedures in Canada by Province in 2008

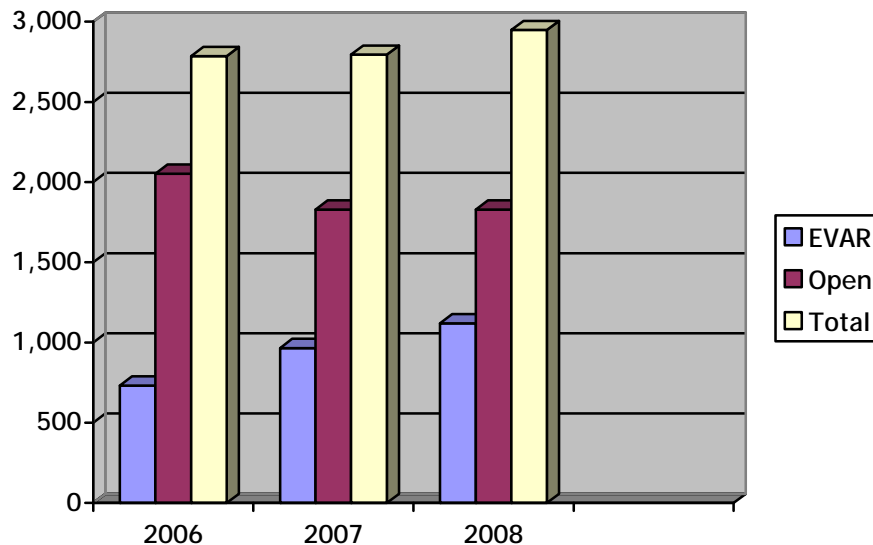


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In 2006, 2,053 open AAA surgeries were performed, compared with 1,828 respectively in 2007 and in 2008. During this three-year period, this represents a 9% decline in the number of open surgeries. During this same period, the number of

EVAR procedures grew from 732 in 2006 to 966 in 2007 and there were 1,120 in 2008, representing a 35% increase in EVARs during these three years. Figure 3 provides a graphical display of this information.

Figure 3: Total EVARs and Open Surgeries by Year in Canada, 2006 to 2008

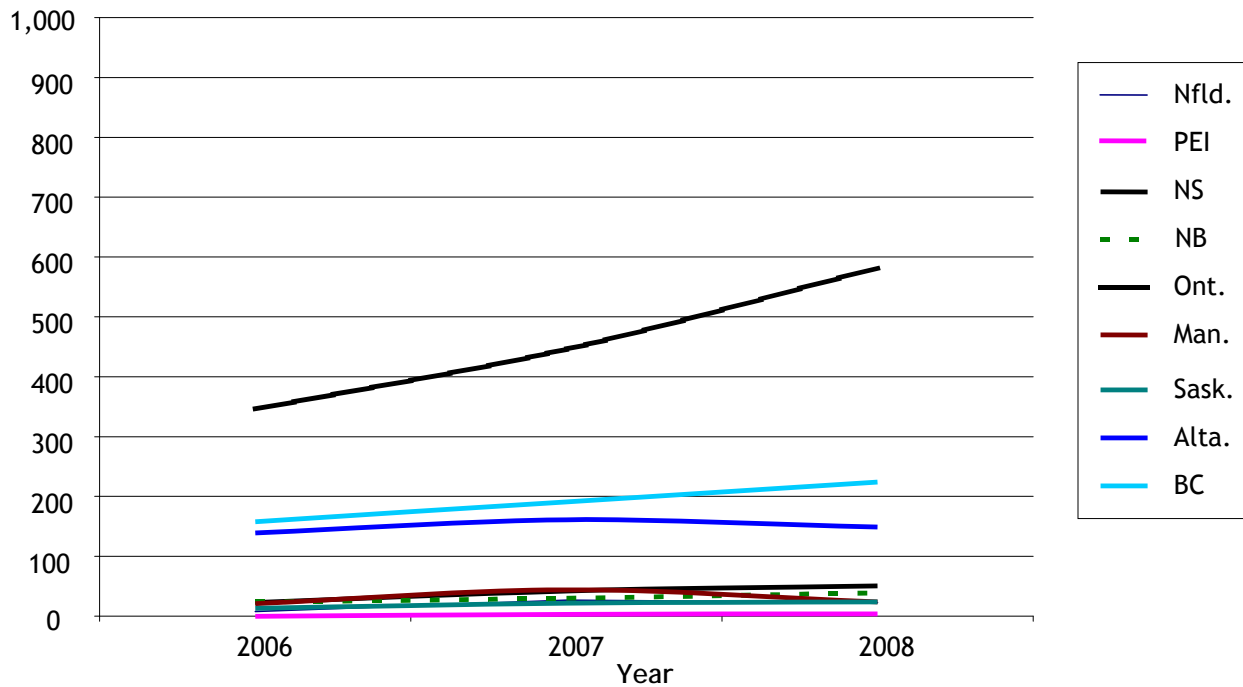


EVAR = endovascular aortic repair.

Figure 4 depicts the trends in the number of cases of EVAR procedures between 2006 and 2008 by province. Overall, there were 4,911 open procedures conducted during the three years, compared with 2,818 EVAR procedures. During this period, Ontario performed the most open surgical procedures (2,737 cases) and EVAR

procedures (1,374 cases). Prince Edward Island produced the least open surgical procedures (25 cases) and EVAR procedures (seven cases). In addition, Prince Edward Island was not conducting any EVARs in 2006, but by 2008, four EVAR procedures were carried out in the province. These trends can be seen in Figure 4.

Figure 4: Trends in the Recent Number of Cases of EVARs by Province, 2006 to 2008



Alta. = Alberta; BC = British Columbia; EVAR = endovascular aortic repair; Man. = Manitoba; NB = New Brunswick; Nfld. = Newfoundland and Labrador; NS = Nova Scotia; Ont. = Ontario; NWT = Northwest Territories; PEI = Prince Edward Island; Sask. = Saskatchewan.

Limitations

This analysis is a preliminary analysis and does not attempt to show the number of cases by type of patient, provincial demographics, or number of surgeons and programs available. For example, the number of procedures performed on an urgent basis or those performed in low-risk patients is not analyzed. A more thorough examination might be of interest to those involved in setting clinical or public policy benchmarking.

Conclusion

The practice of EVAR is increasing in Canada, particularly in Ontario, British Columbia, and Alberta. It remains to be seen if current recommendations and emerging evidence will have an impact on future practice patterns.

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