

## The decreasing incidence of ruptured abdominal aortic aneurysm in Wales

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### Aims

Prior to the introduction of the NHS Abdominal Aortic Aneurysm (AAA) Screening Programme some authors have reported a decline in incidence of clinically-relevant AAAs. The aim of this study was to identify the changing pattern of, and mortality from, ruptured AAA (rAAA) in patients reaching hospital alive in Wales.

### Methods

Data was obtained from the Public Health Wales Observatory retrieved Patient Episode Database submitted by all seven Welsh Health Boards of patients admitted alive with a rAAA over a five year period from 2007 - 2012. This data was compared to an historic publication of similar data (Basnyat et al.) for Wales in 1997.

### Results

For 1996-1997 233 patients (158 males) presented to Welsh hospitals with a rAAA, in comparison to 115 (78 male) in 2012-13. Furthermore in 1996-1997 133 patients underwent emergency surgery with 48 (36%) surviving compared to 66 (51%) operated and 21 (19%) surviving in 2012-13.

### Conclusions

Over a 16 year period prior to the introduction of a national screening program the number of patients presenting with a rAAA has more than halved in Wales. Unfortunately, outcomes for patients undergoing emergency repair of a rAAA remains poor.

**Key words:** Rupture, Aneurysm, Screening

## Introduction

Rupture of an abdominal aortic aneurysm (rAAA) can be prevented by identifying asymptomatic aneurysms and performing elective Abdominal Aortic Aneurysm (AAA) repair.

National screening programmes for AAA have been shown to reduce the incidence of rAAA (1,8,10,14) whilst screening has been shown not to adversely affect quality of life parameters among participants (12). In 1999 Basnyat et al. (9) reported the incidence of rAAA in Wales. In this publication 233 patients were admitted to 13 hospitals over a 12 month period with a confirmed rAAA (defined as the presence of free intraperitoneal or retroperitoneal blood). Those admitted with rAAA had a mortality of 84%. If the current impression is to be believed we would expect the number of rAAAs to have decreased. Since this publication a national screening programme has been initiated in the United Kingdom.

The aim of this study was to identify the changing incidence of, and mortality from, rAAA in patients reaching hospital, alive in Wales prior to the national screening programme starting in 2013.

## Methods

Patient Episode Database for Wales (PEDW) was retrieved for the financial year 2012-13. Data collection included information submitted by all 7 Welsh health boards. Inclusion criteria were patients admitted alive with a rAAA and this data was compared with the 1997 data compiled by the All Wales Audit Resource

and published by Basnyat et al. (9) Patients were excluded if they were admitted electively.

Patients data was included if they had any mention of rAAA on their admission, as documented on the Patient Episode Database. Diagnoses were coded using the International Classification of Diseases (ICD). Ruptured AAA was strictly defined in the same fashion as Basnyat et al. with “the presence of free intraperitoneal or retroperitoneal blood” as stated in either operative note, autopsy report or computed tomography finding in the absence of any identifiable cause for bleeding other than the aneurysm. Survival to discharge was defined as the patient surviving to time of discharge from hospital to place of residence. A combination of Cramér’s V and Fisher’s Exact Tests were incorporated to determine differences in the cumulative frequency (expressed as a percentage of the sample population interrogated) of rAAA incidence, emergency surgery and corresponding survival rates. Significance for all two tailed tests was established at an alpha level of  $P < 0.05$ .

## Results

From April 2012 to March 2013, 113 patients were admitted alive with a diagnosis of rAAA, 79 male, (69.9%) 34 female, 46% were over the age of 80 with 2.7% under 60. (see fig 1)

All Wales Data	1996-7	2012-13	% decrease	p value
Number of rAAA	233	113	42.92%	<0.05
Males	158	79	50%	<0.05
Number of operations	133	72	45.86%	<0.05
Number survived to discharge	48	21	56.25%	<0.05

Fig.1- All Wales data showing number of ruptures, number of ruptures in men, total operations and survival to discharge in both 1996-7 and 2012-13.

Data from patients admitted to hospital with rAAA that went on to have surgery shows that in 20012-13, 58.1% (72 Of 124) of patients admitted alive underwent attempted surgical repair. This compares to the 57% of admissions who went on to have surgery in 1996-7.

The survival rate of these patients to discharge was 21 from 72, (29.2%) 18 males (85.7%) 3 females. These results compare with 1996-97 (September to August), 233 patients 158 male (67.8%) who presented to Welsh hospitals with a rAAA.

In 1997, 133 (57%) patients underwent emergency surgery for rAAA with 48 (36%) patients surviving to be discharged from hospital. In 2012-13 29 patients over 85 years of age were admitted alive with a rAAA, 6 (21%) went on to have surgery, with 50% survival to discharge. This compares with the 89% operative mortality seen in patients over the age of 80 in 1996-7.

### Discussion

These data suggest there has been a significant reduction in the incidence of rAAA in the male population. The observations made in this study in Wales are comparable to other studies that show a decrease in incidence of AAA, particularly in those patients less than 75 years of age (6,7,13,). The decreasing incidence of rAAA has also been supported by a recent meta-analysis for individual patient data, showing that the rate of rupture of small aneurysms is declining (5), along with a diminishing number of AAAs detected in the population screening programme (4). This fact may also be explained by the decreased incidence of smoking, particularly among the male population. The decrease in smoking may be due to recent governments promoting public health campaigns to reduce smoking, educating the public on risks associated with the habit and raising taxes, along with banning advertising.

This study suggests clinically-relevant aneurysms are more prevalent in patients over 75 years of age. This increasing age means an increase in both the incidence and variety of co-morbidities, which will impact on operative risk for mortality and morbidity. This may be offset by the increasing practice of endovascular repair of rAAA, which, due to the short-term benefits and avoidance of laparotomy, is strongly favoured in this group (11). However, complications after endovascular repair also increase with age (2,3), which is likely to increase the costs of treatment.

The proportion of patients with rAAA selected for surgery has changed very little, with 63.7% in 2012-13 undergoing surgery comparing to 57% in 1996-7. Interestingly 84% of rAAA in 2012-13 presented over 70 years of age. The age of presentation with rAAA shown in our study raises the question, as to the most

appropriate age to screen for AAA? The MASS trial has shown an increase in aneurysm ruptures in the screened group 8 years after screening (4) suggesting that some aneurysms might only have become significant after the age of 65 years. This may be relevant and have a significant impact if, as is likely, males surviving longer.

### **Conclusion**

This study suggests the incidence of rAAA is falling in Wales. rAAA patients are presenting older, with over 80% of admissions for rAAA occurring in patients over the age of 80. Despite advances in surgical, anaesthetic and post-operative care, mortality is still very high. Furthermore, it is too early to say if the screening programme is having an effect, however, reduced incidence of smoking in men, risk factor control with medical management and incidental AAA findings during other radiological investigations have likely had some influence.

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