Survey of management of common iliac artery aneurysms by members of the Vascular Society of Great Britain and Ireland

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ABSTRACT

INTRODUCTION The aim of this study was to determine whether the current management of common iliac artery aneurysms (CIAAs) by vascular surgeons is in tune with existing guidelines for referral.

METHODS This was a postal survey of members of the Vascular Society of Great Britain and Ireland. The main outcome measures were relative frequency of ruptured CIAA, respondents’ size threshold for surveillance versus intervention, and their management strategies for isolated unilateral CIAAs, bilateral CIAAs and aortoiliac aneurysms.

RESULTS Two hundred and eighty-four (anonymous) replies were received (48% response rate). Respondents estimated that a ruptured abdominal aortic aneurysm (AAA) was 25 times more common than a ruptured CIAA. Most surgeons (64%) would wait until a CIAA reached 4cm in diameter before considering intervention. This threshold was not affected by other scenarios such as the presence of a bilateral CIAA or a small (4cm) AAA. Eighty per cent of surgeons would treat a non-ruptured CIAA by stent-grafting, where possible. The majority of surgeons felt that ultrasonography surveillance should be commenced when a CIAA exceeds 1.5cm, with a surveillance interval of 1 year but with more frequent surveillance for CIAAs wider than 3cm.

CONCLUSIONS Existing guidelines that recommend referral for possible intervention for non-ruptured CIAAs at a diameter of 3cm are out of tune with current practice. Most surgeons in this survey would wait until the diameter was 4cm.

KEYWORDS

Iliac aneurysm – Aneurysm surveillance – Aneurysm screening – Ruptured aneurysm

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The indications for intervention on abdominal aortic aneurysms (AAAs) are agreed among most vascular surgeons. Since the UK Small Aneurysm Trial, which showed equivalence for surgery and surveillance for AAAs <5.5cm in diameter, most surgeons use this threshold for making decisions about treatment.¹ Aneurysms of the iliac arteries also have a potential for rupture, with a high mortality as a result, but the size at which they should be treated to prevent rupture is not well documented.²

Isolated iliac aneurysms occur in 1–2% of people over the age of 70 years and are more common in men than women.³ They were recognised as long ago as 1827⁴ but have received little scientific attention despite the fact that they accounted for approximately 1 in 5,000 of the deaths recorded in England and Wales in 2011,⁵ a prevalence higher than previously reported in large autopsy series.⁵,⁶ They usually occur in the common iliac artery (89%). Internal iliac aneurysms account for only 10% and external iliac artery aneurysms are very rare (1%).⁶ Iliac aneurysms are bilateral in a quarter of cases.⁶

Most iliac aneurysms are asymptomatic but their profile has been raised as a result of the more frequent use of diagnostic imaging and the commencement of AAA screening programmes. This increased recognition of iliac aneurysms has exposed the uncertainties that exist about surveillance regimens and the size at which they should be treated. A number of specialist vascular societies have produced guidelines for the management of iliac artery aneurysms; most recommend referral to a vascular specialist to consider intervention once the aneurysm has reached 3cm in diameter but these recommendations are based on scanty evidence.⁹,¹⁰

Traditionally, treatment of iliac aneurysms is by open surgery but some patients are excluded from surgical treatment because of co-morbidities and 30-day mortality rates for elective surgery as high as 10% have been reported.¹¹,¹² The ready availability of endovascular aneurysm repair has changed the capacity to offer treatment quite radically. Endovascular repair of iliac aneurysms is relatively low risk, with a 30-day mortality rate of less than 2%¹³–¹⁶ and durable results documented for up to 4 years.¹⁷,¹⁸
The aim of this study was to evaluate the current management of iliac artery aneurysms by vascular surgeons in the UK and Ireland. Since internal and external iliac artery aneurysms are rare, the study focused on common iliac artery aneurysms (CIAAs).

Methods

A survey questionnaire was devised consisting of 14 multiple choice questions about the management of CIAAs in different clinical scenarios (Fig 1). Respondents were asked to estimate the relative frequency of ruptured CIAAs compared with ruptured AAAs in their practice. They were also asked to describe elective intervention criteria for a number of different aneurysm sizes and scenarios, and describe their policies for surveillance. Each question had an open text box for respondents to qualify or expand their answers. The questionnaire was revised after a pilot version was tested on ten experienced vascular surgeons.

The questionnaire was sent by post to all consultant and trainee members of the Vascular Society of Great Britain and Ireland (VSGBI) using adhesive address labels provided by the Society itself. Recipients were asked to record their responses on the questionnaire and return it in a reply-paid envelope. A single mailing was done, without any follow-up, and all responses were anonymous. Surgeons who reported that they did not treat iliac aneurysms were excluded.

The main outcome measures were: how frequently respondents treat patients with ruptured CIAAs compared with ruptured AAAs, their management strategies for isolated non-ruptured unilateral and bilateral CIAAs and aortoiliac aneurysms (Fig 1), and their size threshold for recommending surveillance versus intervention. Results were expressed as summation of responses in the completed forms received. No statistical analysis was required.

Results

A total of 595 VSGBI members were invited to contribute by post. There were 284 replies (48% response rate), 282 of which were included in the analysis. Two were excluded because those respondents did not treat iliac aneurysms. The majority of surgeons (204/207, 99%) had dealt with at least one ruptured CIAA in the past three years. Respondents estimated that ruptured iliac aneurysms are uncommon compared with ruptured AAAs, with an estimated relative frequency of 1:25 (range: 1:5–1:50).

**Isolated common iliac artery aneurysm**

Most respondents would consider intervention for an isolated non-ruptured CIAA when it reaches 4cm in diameter (mean: 5.9cm, range: 5–6cm). The most common answer was 4cm (178/276, 64%) followed by 5cm (66/276, 24%) and 5cm (27/276, 10%). Only five respondents (2%) stated that they would usually wait until a CIAA is over 5cm in diameter before considering intervention (Fig 2).

The majority of surgeons (220/276, 80%) would opt for intervention by endovascular stenting, if possible. Only five surgeons opt routinely for open repair. A large proportion of the surgeons who ticked the box marked 'other' preferred to consider each patient individually, with the intervention depending on their age, fitness, preference and anatomy of the iliac vessels. Many mentioned the need for discussion both with radiologists about the feasibility of an endovascular procedure and with the patient about his or her treatment preferences before making a final decision. In the open comments, a large proportion of surgeons mentioned that if the patient is young and fit, an open repair might offer improved durability. Other occasional suggestions included laparoscopic repair, ligation of the vessel if the contralateral iliac artery is patent (followed by a crossover graft) and using a graft limb extension, with coil embolisation of the ipsilateral internal iliac artery.

**Bilateral common iliac aneurysms**

For patients with bilateral CIAAs, most surgeons would still offer intervention when the larger aneurysm reaches 4cm in diameter (mean: 5.9cm, range: 5–6cm). Responses regarding the size for intervention were almost identical for isolated CIAAs: 5cm – 69/270 (26%), 4cm – 175/270 (64%), 5cm – 23/270 (9%), >5cm – 5/270 (2%). Again, stenting was the preferred method.
preferred option of the majority of respondents (196/270, 73%). A slightly higher proportion (17/270, 6%) of surgeons would prefer to treat bilateral aneurysms by open surgery. A total of 25% (61/270) of surgeons ticked ‘other’ for reasons similar to those described above for unilateral CIAAs.

Surgeons suggested in the open comments that the morphology of the aneurysm, the size of the aneurysm neck and the patency of the internal iliac arteries were variables that would potentially modify their treatment. The age and fitness of the patient appeared in the comment boxes most frequently as a reason for factors affecting the decision. Younger patients who were fit for abdominal surgery were frequently as a reason for factors affecting the decision. The age and fitness of the patient appeared in the comment boxes most frequently as a reason for factors affecting the decision. Younger patients who were fit for abdominal surgery were frequently as a reason for factors affecting the decision. The age and fitness of the patient appeared in the comment boxes most frequently as a reason for factors affecting the decision. Younger patients who were fit for abdominal surgery were frequently as a reason for factors affecting the decision.

**Unilateral iliac aneurysm and small aortic aneurysm**

For patients with a CIAA and a concomitant small (4cm) aortic aneurysm, surgeons did not significantly change their responses. With a unilateral CIAA, the presence of a small aortic aneurysm did not influence when the CIAA should be treated: 2cm – 2/272 (1%), 3cm – 68/272 (25%), 4cm – 168/272 (62%), 5cm – 27/272 (10%), >5cm – 7/272 (3%). The themes in the open comments were similar, with stenting being the preferred intervention option for almost two-thirds (180/272, 66%) of respondents.

**Surveillance**

For patients found to have a small iliac aneurysm, most surgeons would recommend ultrasonography surveillance of a CIAA of 1.6–2cm in diameter (127/273, 47%) (Fig 3). Nevertheless, 73/272 (27%) would not start until the iliac artery diameter exceeded 2cm and another 21% (56/273) until it was over 2.5cm. Most surgeons favour annual ultrasonography surveillance for small CIAAs. They usually recommend increasing the frequency of surveillance imaging when the CIAA diameter is 2.6–3cm (89/229, 39%) or 3.1–5.5cm (70/229, 31%).

**Discussion**

This survey presented vascular surgeons in the UK and Ireland with a variety of typical scenarios to discover their usual principles for management of common iliac aneurysms. An important finding was that existing guidelines, which recommend referral to a specialist to consider intervention for non-ruptured CIAAs at a diameter of 5cm, are out of tune with current practice.5,10 The basis for elective repair of a CIAA is to prevent rupture and it was clear that three-quarters of surgeons thought that this risk was not sufficient to justify intervention until the diameter of a CIAA reaches 4cm. The threshold for intervention was not affected by the presence of a coexisting contralateral CIAA or a small AAA.

There is very little information to guide decisions about the size at which CIAAs should be treated. Relatively few studies exist that specifically document the natural history of iliac aneurysms and much of what is believed is an extrapolation of knowledge about AAAs. Santilli et al followed over 500 people with iliac aneurysms <5cm in diameter over 4 years and found their expansion rate was slow (average 1mm per year).10 The expansion accelerated when the iliac artery diameter exceeded 5cm; iliac aneurysms between 5cm and 5cm expanded at a rate of 2.6mm per year. The expansion rates of isolated iliac aneurysms were similar regardless of laterality and whether they were in the common, external or internal iliac artery: they were similar for isolated iliac aneurysms and for those associated with a 4cm AAA. Other natural history studies also suggest that iliac aneurysms have similar characteristics and growth rates to AAAs.5,11,20

Any information about growth rates of CIAAs needs to be interpreted in the context of the knowledge about their risk of rupture and that too is scanty. Existing information is based on series of large, symptomatic iliac aneurysms or autopsy studies that measured the diameter of CIAAs that had ruptured.5,10 Experts who designed current guidelines appeared to have consensus that the risk of rupture became significant once a CIAA reached 3cm in diameter, which is therefore recommended as the indication for intervention.5,10 From their clinical experience, surgeons in the present survey reported that they saw ruptured CIAAs far less frequently than ruptured AAAs, which is indirect evidence that their risk of rupture is lower.

While textbook definitions vary on the size at which an iliac artery becomes aneurysmal, the majority of surgeons in the survey commence ultrasonography surveillance once the iliac artery exceeds 1.5cm in diameter. Once no formal recommendations for surveillance of iliac aneurysms exist, most clinicians have adapted schedules used for small AAAs. The documented slow expansion rate of iliac aneurysms <5cm in diameter would seem to support a policy of annual monitoring.21 With increasing size of CIAAs, surgeons monitor them more frequently; the majority opted to monitor CIAAs more frequently than

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**Figure 3** Recommended iliac artery diameter for commencing ultrasonography surveillance (n=273).

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**Table:**

| Size of aneurysm | Number of surgeons |
|------------------|--------------------|
| ≤1.5cm           | 17                 |
| 1.6–2cm          | 127                |
| 2.1–2.5cm        | 73                 |
| 2.6–3cm          | 92                 |
| ≥3.1cm           | 4                  |

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**References:**

5. Santilli et al

10. Current practice

11. Natural history studies

20. Experts' consensus

21. Clinical experience.
annually when they reached 2.6–3 cm. New research into surveillance intervals for AAAs, however, has suggested that current schedules remain overcautious and could be significantly longer without increasing the rate of rupture.22

Just as for AAAs, endovascular stenting has become the intervention of choice for elective treatment of CIAAs, regardless of the presence of a contralateral iliac aneurysm or a coexisting AAA.13–18 Different methods may be needed owing to the various anatomical characteristics but endovascular repair of iliac aneurysms has been shown to be moderately low risk and durable for at least four years of follow-up.18,19 No controlled comparison between open and endovascular repair for CIAAs exists and, once again, data from AAAs are extrapolated. There remains concern over the durability of endovascular stent repair for AAAs in the long term, especially in young patients at low risk from open surgery, although recent data from North America are more reassuring.20,21 Many respondents suggested open repair should be considered in younger patients.

A variety of endovascular strategies exist depending on whether there are bilateral CIAAs or whether there is an associated AAA. Stenting of a unilateral CIAA is an option but there is a risk that the contralateral iliac artery will continue to expand. Consideration is therefore given to treating the entire aortoiliac system using conventional bifurcated stent grafting for a unilateral CIAA, particularly if there is early sign of dilation in these vessels.

Decisions about the optimal intervention may be complex and many respondents observed they are best made with expert interventional radiological input through a multidisciplinary team (MDT) meeting.22 Furthermore, the views of each individual patient should be taken into account before a decision is finalised.23 Patients with a CIAA unsuitable for stenting should be considered for open repair if they are at low operative risk.24 Another group where open surgery is indicated is those with compressive symptoms from their CIAA since the slow reduction in size of the residual aneurysm sac after endovascular treatment makes it a less suitable intervention.25

**Conclusions**

The findings of this questionnaire survey cannot be used to change clinical practice but they provide a potentially useful benchmark. They raise the possibility that current guidelines on management of CIAAs result in overtreatment. Respondents to this survey were more cautious than current guidelines suggest before recommending intervention and emphasised the importance of decisions made by the MDT with a full review of detailed information. This study should act as a stimulus to undertake further research on the natural history of iliac artery aneurysms and review of the existing specialist Society guidelines may be warranted.

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