

ORIGINAL RESEARCH

## Multidisciplinary Team Decisions in Management of Abdominal Aortic Aneurysm: A Service and Quality Evaluation

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**Objective:** To investigate whether decisions made by the multidisciplinary team (MDT) were implemented and review the MDT process to identify areas for improvement.

**Methods:** This was a retrospective service evaluation project. Consecutive cases of abdominal aortic aneurysm (AAA) from vascular surgery MDT meetings were reviewed. MDT outputs were extracted and compared with implemented clinical management obtained from the electronic health record (EHR) to determine concordance. Cases were re-reviewed to understand reasons why planned management was not implemented.

**Results:** From 42 MDT meetings, 106 patients were identified. Twenty four patients were discussed at two MDTs and four patients were discussed three times. Of the 106 patients, 91 (85.8%) were treated as planned, seven (6.6%) declined planned management and opted for conservative management, four (3.8%) patients died before treatment, and four (3.8%) had alternative management for individual reasons. Of the patients discussed multiple times, 15 (53.6%) needed review by a consultant anaesthetist or additional investigations.

**Conclusion:** This service evaluation found a similar proportion of cases as in existing oncology literature where the MDT decision was not implemented. However, the natural history of AAA brings nuance to this finding. Facilitating patient preference is an important problem that will require future study. This evaluation resulted in local improvements to the MDT process for AAA.

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### INTRODUCTION

Multidisciplinary team meetings (MDTs) were introduced in cancer services in the context of an increasing diversity and complexity of treatment options.<sup>1,2</sup> The MDT has expanded into other areas of healthcare, including vascular surgery.<sup>3</sup> The UK Abdominal Aortic Aneurysm Quality Improvement Programme (AAAQIP 2008 and 2012) led to reduced UK mortality from abdominal aortic aneurysm (AAA) repair. Among its recommendations was that all patients being considered for AAA repair should be reviewed by a formally constituted MDT.<sup>4</sup> Discussion by an MDT is not mandated in the UK, but following the AAAQIP it is recognised as best practice and attendance is recorded in the national vascular registry.<sup>5</sup>

The Vascular Society of Great Britain and Ireland Standards for Service Provision state that multidisciplinary teams are “a key component in delivering quality outcome”.<sup>6</sup> The AAAQIP was a complex multifaceted intervention with changes in both clinical practice and systems. In the work reported here, the focus is specifically on the working of the vascular MDT. While it is accepted that MDTs can improve patient care by enhancing clinical decision making, much of the evidence for this derives from the cancer setting.<sup>7</sup> It is unclear whether the same processes, and advantages, of the MDT are observed in vascular services. Existing literature notes the time and resource demanded by MDTs and suggests a need for robust underpinning evidence.<sup>8,9</sup>

It is a challenge to study the direct impact of MDTs on clinical outcomes because of concurrent advances in clinical practice.<sup>2,9</sup> Blazeby and colleagues studied the efficacy of cancer MDTs by analysing the extent to which meeting decisions were implemented. They hypothesised that if decisions are made, with relevant information and experts, treatment decisions will be implemented in almost all cases.<sup>1</sup> They found that in practice 15% of decisions made

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were not implemented as planned and sought to identify the reasons for this. The present authors make the same hypothesis and apply similar methodology to the vascular MDT. The primary aim was to determine whether decisions made by the MDT were implemented, with the secondary aim of examining resource use by analysing patient flow through the MDT.

## MATERIALS AND METHODS

This service evaluation project was approved by the Vascular Institute of the Leeds Teaching Hospitals NHS Trust. The methodology was adapted from that used by Blazeby and colleagues to study cancer MDTs.<sup>1</sup>

Consecutive new cases of abdominal aortic aneurysm (AAA), discussed at the MDT in a large UK teaching hospital taking regional vascular surgery referrals, were identified retrospectively between October 2017 and August 2018. The MDT (Fig. 1) considers cases from the regional centre (the hub) and a district (spoke) hospital. It meets weekly and generally considers a total of eight to 10 vascular cases at each meeting, two to three of which are new aortic cases. The core membership required for the meeting to be quorate is one vascular surgeon, one vascular radiologist, one vascular anaesthetist, and the MDT co-ordinator. In practice the meeting is generally attended by two or three colleagues from each specialty.

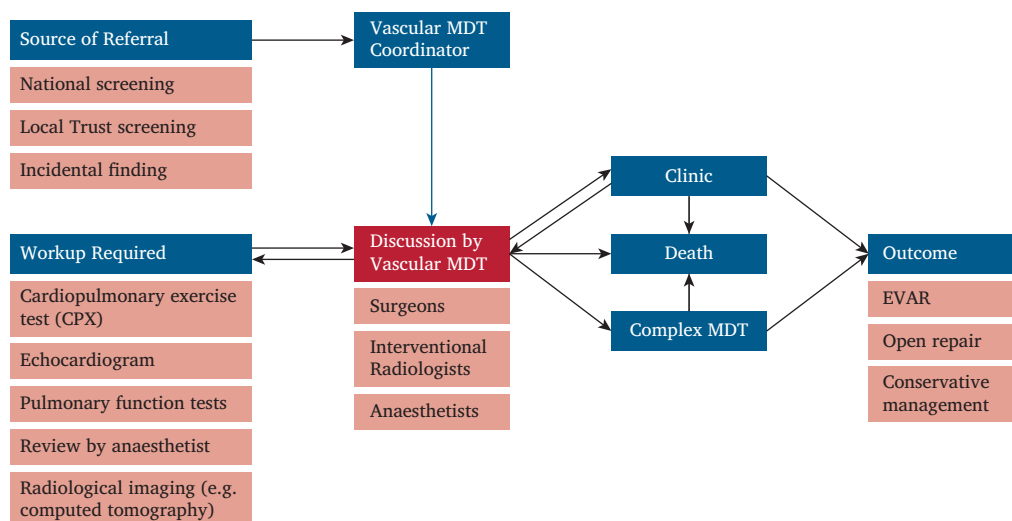
Cases for discussion are collated by the coordinator and a list circulated at least 24 hours in advance of the meeting, although late additions including acute cases are allowed. The meeting is led by a vascular radiologist who has reviewed the cases in advance, the surgical aspects of each case are presented by one of the surgeons, and information on medical assessment and pre-operative testing by the anaesthetist. The expectation is that this information will have been prepared in advance of the meeting.

At the time of this service evaluation, patients had generally undergone CT scanning and surgical review prior to the meeting. The performance of investigations including blood tests, echocardiography, and cardiopulmonary exercise (CPX) testing was variable. Some, but not all, patients had been seen by an anaesthetist in advance of the meeting. There was no single agreed protocol for the work up of patients prior to the meeting.

Included cases were identified using the MDT minutes and records. It was planned that 100 cases would be examined. This was a pragmatic decision balancing the time and resources available for the work and the need to review sufficient cases to obtain a true representation of the work of the unit. Cases were excluded if they had also been discussed at the complex AAA MDT (a meeting specifically designed for cases unsuitable for standard EVAR or infrarenal/juxtarenal open repair), if the question posed to the MDT was unrelated to the AAA (e.g., another vascular pathology), or if patients had previously undergone intervention for their AAA. All MDT discussions related to each case were included in the analysis.

Data were collected by two authors (DJD and SH). Patient characteristics were extracted from the electronic health record (EHR). The hospital EHR includes clinical notes, correspondence, and results of tests and investigations. For each MDT meeting, the minutes are transcribed and then uploaded to the EHR. Data were collected on age, gender, and aneurysm size. Where patients were discussed at more than one MDT the reasons for this were recorded. Details of planned and actual management were also extracted from the EHR. Where the actual management of the patient differed from that planned in the MDT, the reasons for this were determined from the clinical records and correspondence.

All data were recorded and analysed using Microsoft Excel (Microsoft Corporation, 2010) and stored securely on



**Figure 1.** Structure of the multidisciplinary team (MDT) prior to the service evaluation. The pathway was non-linear with several loops resulting in re-discussion by the MDT.

Trust computers. Excel was used to calculate summary statistics and the pivot table function was used to calculate counts, proportions, and averages.

## RESULTS

One hundred and six patients were included in the final analysis as six patients were initially excluded from the review but identified as candidates for inclusion on further review. They were identified from 42 MDT meetings. The median (range) number of clinicians from different specialties present according to the meeting register was interventional radiologists three (1–6), surgeons six (4–11), and anaesthetists one (0–1). The attendance register was missing for two of the MDT meetings.

Patient characteristics are presented in Table 1. The median (range) age of the patients was 78 (56–96) years and 85 (80%) were male. The median (range) aneurysm size was 6.0 (3.0–9.5) cm. The most common route of presentation to the MDT was aneurysms detected incidentally when imaging was performed for other reasons ( $n = 27$ , 25%). Patients reaching threshold ( $\geq 5.5$  cm) from the local aneurysm surveillance programme within the Trust were the second most frequently discussed at the MDT ( $n = 25$ , 24%). Other reasons for discussion in the MDT included referrals from the national AAA screening programme ( $n = 14$ , 13%) or a partnered Hospital Trust ( $n = 13$ , 12%). The referral route was not clearly documented in 13 (12%) cases.

Fig. 2 illustrates the MDT pathway for the 106 patients. Eighty two patients were only discussed once. Of those, 73 were managed as planned, three died after the MDT discussion but before a treatment plan had been made, four declined the planned treatment and opted to have no intervention, and two were lost to follow up. Specific causes of death were not available to collect from the EHR; however, to the present authors' knowledge, none of them died of their aortic disease.

Of the 24 patients who were discussed at a second MDT, additional investigations or review by a consultant anaesthetist were requested in 14 cases. The additional investigations usually requested were a CPX test and an

**Table 1.** Characteristics of the cohort

Characteristics	
Gender, male	85 (80)
Age – years	78 (56–96)
Aneurysm diameter – cm	6.0 (3.0–9.5)
Route to presentation	
Acute admission	9 (8)
Incidental finding	27 (25)
External hospital MDT	13 (12)
National screening ( $>5.5$ cm)	14 (13)
Local surveillance ( $>5.5$ cm)	25 (24)
Not recorded	13 (12)
Other	5 (5)

Data are presented as  $n$  (%) or median (range). MDT = multidisciplinary team. Characteristics reported for patients were derived from the first MDT they attended. Percentages are rounded to the nearest whole number.

echocardiogram. In four cases, a second discussion was undertaken to address technical queries related to stent graft planning. Two patients were referred for specialist cardiology review and one for an oncology opinion as to the prognosis of a known malignancy. Two patients were considered potential candidates for EVAR but were not suitable for an “off the shelf” device so the possibility of a bespoke endovascular graft being manufactured was explored. A consultation to further explore the patient's understanding and views on the risks and benefits of AAA repair to inform decision making was arranged in one case.

Of the 24 patients discussed at the second MDT, 20 left the MDT process at this point. Of these, 15 were treated as planned. In two cases the patient declined the planned management and in one the decision for AAA repair was changed to conservative management in light of an anaesthetic review. Two patients declined planned AAA repair, opting instead for conservative management. One patient died of a cause unrelated to the AAA before treatment. One patient broke off contact with the hospital and declined further review.

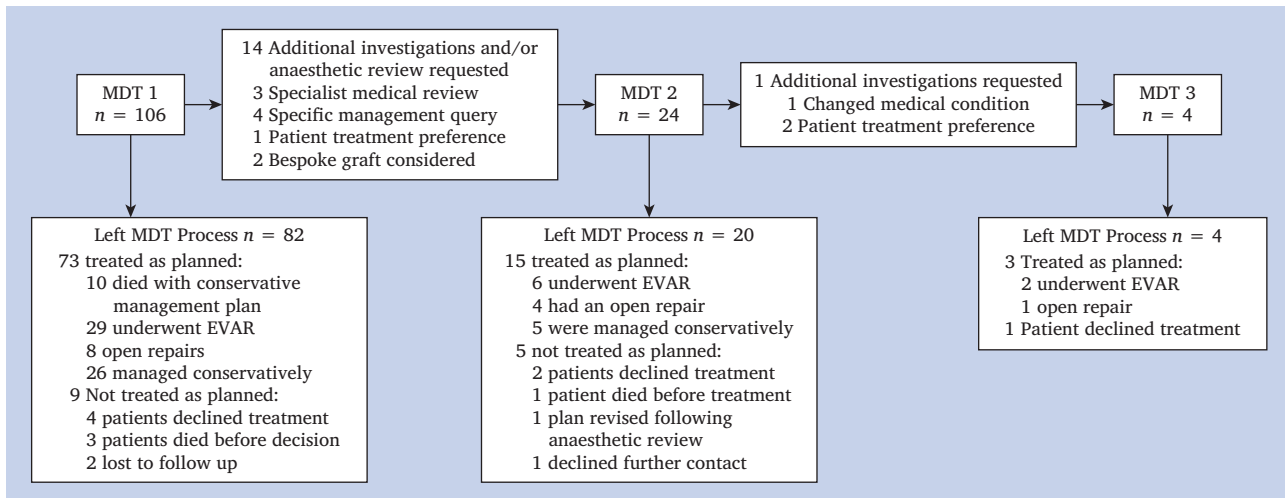
Four patients were discussed at a further MDT. In one case further lung function tests were needed to inform treatment, in one case the patient developed a new medical condition potentially altering the surgical risk benefit balance. In two cases, consultations to further explore the patient's understanding and views on the risks and benefits of AAA repair were arranged. Of these four patients, three were treated as planned and one declined planned AAA repair.

Overall, of the 106 patients included in the study 91 (85.8%) were treated as planned, seven (6.6%) declined planned treatment and opted for conservative management, and four (3.8%) patients died of unrelated causes before treatment was undertaken. In the remaining four cases, two were lost to follow up, one patient broke off contact with the vascular service, and in one case the treatment plan was revised to conservative management following an anaesthetic review.

Of the 28 times patients were discussed at more than one MDT, there were 15 (53.6%) instances of patients needing additional investigations or a review by a consultant anaesthetist to support MDT decision making. A specialist medical review was sought to support a second discussion on three (10.7%) occasions. Further discussion took place for technical reasons related to the planning of EVAR on six occasions (21.4%), two related to the feasibility of obtaining a bespoke manufactured endovascular graft and four to address technical questions related to the conduct of the endovascular repair. One patient (3.6%) was discussed at a third MDT because their medical condition had changed. In three patients (10.7%), planned re-discussion took place after a consultation to seek the patient's preference in light of the risks and benefits of repair.

## DISCUSSION

A quarter of the patients were discussed in more than one MDT and the treatment plan made by the MDT was not implemented in 14% of cases, mirroring that found in



**Figure 2.** Patient flow through the vascular multidisciplinary team (MDT). Each stage shows the number of patients that left the process and the number proceeding to further MDT discussion.

cancer studies. At first sight this suggests an inefficient process which fails to reach the most appropriate conclusion in a substantial number of cases. However, this interpretation requires further scrutiny.

The MDT model is drawn from the management of cancer patients. There are significant differences between the patient pathway for cancers and that for AAA, particularly regarding untreated prognosis and disease progression. For most cancers untreated prognosis is known, and disease progression is clinically apparent. For AAA, the contemporaneous prognosis (for AAA >5.5 cm) is unknown and the pathology usually remains symptomatically occult until causing sudden deterioration or death. These considerations bring a different nuance to vascular MDT discussions. It cannot be assumed a cancer MDT model can be transplanted wholesale to serve this population. An iterative process with repeat discussion may add value in some cases and does not necessarily imply inefficiency. The MDT structure at the present authors' institution adheres to many of the recommendations made in the recent 2019 European Society for Vascular Surgery (ESVS) guidelines for the management of AAA. The MDT ensures appropriate pre-operative work up and brings together the specialists required to perform open or endovascular repair.<sup>10</sup>

In the present study over half of the instances of non-compliance were a result of patient choice. These findings highlight the importance of patient choice when formulating a clinical decision in the MDT and the need to support patients when there are no available interventions.<sup>11,12</sup> This is recognised elsewhere in the literature where up to a third of cases of non-implementation of MDT decisions were a result of patient choice.<sup>13</sup> The exclusion of the patient perspective from MDTs has been challenged.<sup>14</sup> Methods of bringing the patient's view to the MDT warrant further study. The present authors' MDT now offers a hierarchy of management options which can be discussed with the patient in clinic after the MDT to consider their wishes.

As well as supporting patient choice, the hierarchy of management options that the present authors' MDT now

produces addresses heterogeneity in the way the MDT decision recommendations were previously recorded. Attempts to code the narratives of the MDT to support detailed qualitative analysis floundered on this complexity. For further clarity, in addition to a hierarchy of management options, the present authors now require the MDT minutes to extend to recommended type of anaesthesia and post-operative care.

A common cause for repeat discussion was the lack of key investigations or specialist opinions. This challenge has been recognised by other investigators.<sup>9</sup> It is now required that patients have completed a core set of investigations and specialist reviews before discussion at the MDT, unless there is a specific reason for variance (e.g., in the extremely old and frail patient or the patient receiving palliative care for another illness).

It is noted that the number and diversity of specialists present at meetings varied substantially. The Vascular Society of Great Britain and Ireland recognises the importance of collaboration between MDTs to safely provide care to vascular patients.<sup>6</sup> It was beyond the scope of this project to investigate how the MDT constitution affected decision making. However, existing literature suggests that effective teamwork and communication results in improved clinician and patient satisfaction.<sup>13,15–17</sup>

In conclusion, the significant number of MDT re-discussions because of missing information indicates that MDT preparation and core dataset completeness was sub-optimal, but multiple MDT discussions may be necessary in this population. In addition to optimising information flow into the MDT, referrals back to the MDT suggests the quality and structure of information being produced by the MDT is an area for targeted improvement.

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**CONFLICT OF INTEREST**

None.

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