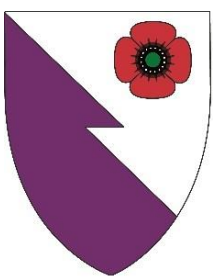
The Royal College of Emergency Medicine

Best Practice Guideline

Management and Transfer of Patients with a Diagnosis of Ruptured Abdominal Aortic Aneurysm to a Specialist Vascular Centre



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Summary of recommendations

1. A clinical diagnosis of ruptured abdominal aortic aneurysm (rAAA) should be considered:
    - In patients over the age of 50 years presenting with abdominal/back pain AND hypotension;
    - In patients with a known AAA and symptoms of either abdominal/back pain OR hypotension/collapse;
    - In patients where an alternative diagnosis is considered more likely on clinical grounds, rAAA still must be excluded, with radiological confirmation made prior to referral.

    Level 3, strong recommendation

2. All decisions concerning treatment and transfer should, where possible, be made in conjunction with the patient and/or their family.

3. Avoid hypertension in patients with a clinical diagnosis of rAAA to maintain an alert patient and systolic blood pressure 90-120mmHg is acceptable.

4. If a specialist vascular service cannot be provided on-site, the patient will require transfer to a centre with appropriate facilities and expertise. Transfer agreements with the local ambulance service should be in place.
    Level 4, strong recommendation

5. Rapid and co-ordinated transfer can reduce delays in the patient journey and improve outcome.
    Level 3, strong recommendation
    To expedite transfer, the most senior doctor available should lead and be actively involved in the care of any patient with suspected rAAA. Outgoing referrals should go to a senior vascular trainee or consultant.

Items 6–18, below, are all Level 5, strong recommendation

6. All patients with a clinical or radiological diagnosis of rAAA should be assessed as to their current clinical state AND premorbid level of function to determine suitability for transfer.

7. Patients aged ≤85 years with no/mild/moderate systemic disease should be referred to the receiving hospital's on-call vascular service without delay.

8. Patients age >85 years or with severe systemic disease will benefit from a consultant*****–consultant discussion prior to transfer to a vascular unit.

9. Impaired mental capacity is not a contraindication to assessment and transfer.

10. Patients who have been previously turned down for elective surgery should still be discussed via a consultant*****–consultant referral.

11. Contraindications to transfer are restricted to those with:
    - Cardiac arrest in the current admission;
    - Patients requiring intubation due to acute deterioration;
    - Patients requiring inotropic support (vasoactive drugs), except in certain rare situations.

Such patients are unlikely to survive transfer and surgery and should only be transferred after consultant*****–consultant discussion.

12. There are no ESSENTIAL investigations required prior to transfer. However, a blood gas and an Emergency Department (ED) ultrasound are considered useful, if these incur no delay.

13. Investigations, including FBC, U&E, amylase, X-match, CT scans, MUST not delay transfer to a centre that can provide definitive care. If an alternative diagnosis is more likely, or the investigation can be performed without causing delay, it is reasonable to perform these investigations before transfer.

14. Patients should be treated, if necessary, with both analgesia (according to the Royal College of Emergency Medicine (RCEM) guidelines) and if required, fluids before and during transfer.

15. A time-critical transfer in a 999 ambulance, preferably with a paramedic crew is required, although this is not essential.

16. The facility to transfer CT images electronically must be in place to ensure all images are transferred to the receiving hospital. If electronic transfer is not possible, a copy of the DICOM files (CD or DVD or USB memory stick) must accompany the patient.

17. Patients should not usually travel with blood products, unless transfusion already commenced.

18. Patients who remain haemodynamically stable should be transferred to either an ED resuscitation area or local equivalent. Patients who are unstable may need rapid transfer to theatres.

19. Transfer to a specialist vascular centre should occur within 30 minutes of diagnosis.

***** If consultants are off-site, out of hours, the most senior person involved in patient care should initiate the discussion/referral

Scope

This guideline aims to ensure patients with a clinical diagnosis of rAAA equity of access to a specialist vascular centre for expert assessment and intervention. If not already present, emergency physicians and vascular surgeons should work collaboratively to develop region-wide protocols to facilitate access to this standard of care. Simultaneously, this guideline should assist the emergency physician in the assessment, resuscitation and timely preparation for transfer of the patient with a clinical diagnosis of rAAA, if this diagnosis is made in a hospital without suitable vascular facilities.

This guideline should optimise and standardise the management of patients arriving in vascular centres, ensuring patients who would benefit from surgery are transferred without delay and those not suitable for surgery, and likely to die, are palliated appropriately.

Reason for development

There are no existing UK guidelines on the emergency management of rAAA, although these are available for other critical conditions and life-threatening conditions, e.g. head injury, asthma etc. There is evidence of wide variation in current practice in the emergency management of patients with rAAA (see below).

There is an accelerating trend for vascular and endovascular surgery to be practised in fewer, but larger, vascular centres, which is likely to increase the need for the transfer of patients from presenting centres to centres where definitive treatment can be offered.[1–3] The views of a cohort of vascular specialists (including radiologists) and emergency physicians have been obtained, using the Delphi consensus method.[4]

There has been widespread variation in practice, including the selection of patients for referral, diagnosis, referral pathways and the conditions under which the transfer is made[4], which may incur unnecessary time delays between presentation and repair.

Introduction

rAAA is a life-threatening emergency. Without rapid surgical or endovascular intervention, there is an almost 100% mortality within 3 days.[5] With appropriate intervention, mortality can be as low as 20%. Surgical intervention is most effective if delivered rapidly, reducing the duration of hypotension that leads to multi-organ failure in the post-operative period in ICU. Although hypotension may be fluid responsive, aggressive pre-operative fluid therapy may accelerate bleeding and permissive preoperative hypotension is recommended. There is some evidence, from retrospective single centre cohort studies, that an untimely or delayed transfer may worsen patient outcome.[6–8] Any unnecessary delay can prolong the period of hypotension, worsening eventual outcome. Therefore, delivery of the patient to a specialist who can provide definitive care is time critical. National 30-day mortality rates for repair of rAAA have been >40% for many years,[9] but with the increasing use of endovascular repair and high-volume centres, mortality is now declining[10] and mortality results of <20% have been reported by a few specialist centres outside of the UK. [11]

Management

Emergency management of rAAA in a hospital without a specialist vascular centre has five steps:

1. Diagnosis

Symptoms/signs of rAAA include abdominal/back pain, collapse with pallor, hypotension (which initially may be postural only), tachycardia, sweating, agitation (usually secondary to pain or hypotension), pulsatile abdominal mass, pain radiating to the legs and evidence of lower limb ischaemia.[12] In elderly patients, flank pain should prompt consideration of rAAA and patients may be misdiagnosed with renal colic.

Clinical Diagnosis

A clinical diagnosis of rAAA can be made:

- In patients over the age of 50 years presenting with acute onset of abdominal/back pain AND hypotension
- In patients with known AAA symptoms of either abdominal/back pain OR hypotension/collapse

Patients with other combinations of signs/symptoms may need further investigation to confirm/exclude the diagnosis of rAAA.

Radiological Diagnosis

Ultrasound can confirm the presence and size of an aortic aneurysm.[13] It cannot exclude rupture. However, ultrasound confirmation of an aortic aneurysm in a patient with abdominal/back pain or hypotension supports the clinical diagnosis of rAAA, and a well-visualised, normal aorta in a haemodynamically stable patient excludes rAAA. Ultrasound has the advantage of portability, it does not require contrast and the complications thereof and its increasing availability in the ED as a result of an increasing number of trained emergency physicians skilled in its use. The disadvantages of ultrasound include the fact it is operator-dependent. Adequate visualisation of the aorta may be impaired by body habitus or bowel gas and a rupture cannot be confirmed. A further disadvantage is that a normal-sized aorta viewed on ultrasound in the presence of severe hypotension does not exclude the diagnosis of rAAA or other abdominal pelvic aneurysm, in which case a contrast-enhanced diagnostic CT scan must be performed without delay.

The CT scan can confirm the diagnosis of rAAA and is recommended in stable patients pre-operatively to confirm diagnosis and assist operative planning.[10,14] If image acquisition is to specific protocol, CT provides rapid high-resolution images which can be reconstructed quickly in any plane, allowing for rapid endovascular planning or the identification of adverse features for both endovascular and open repair. It might also provide alternative/co-morbid diagnoses. There are some associated disadvantages: the requirement for image transfer, interpretation by a radiologist, contrast requirement in patients who might have impaired renal function and the potential need for repeat scans if the diagnostic scan is of insufficient quality to plan endovascular repair or unreadable in the receiving hospital. The CT scan may be best performed at the vascular centre if the clinical diagnosis is secure without the CT scan.

It is essential that electronic data transfer arrangements are in place between referring hospitals within a region. For imaging this requires all regional hospitals in England to transfer images via the image exchange portal (IEP) but in the other 3 UK countries more sophisticated bespoke systems already exist and must be used. Facilities for cross-border image transfer must be in place. In the absence of a reliable electronic transfer system, images should be transferred by downloading DICOM files to CD, DVD or another appropriate type of portable storage device, e.g. USB memory stick.

2. Assess Suitability for Transfer

Physiological and pre-morbid condition is more important than age in assessing suitability for transfer of a patient to a specialist vascular centre. Blood pressure and conscious level are the most important physiological parameters.[10,11]

The extent of pre-existing systemic disease should be assessed as none, mild, moderate or severe.

Identify whether the patient has lost consciousness in the current episode.[15]

Identify whether there is evidence (from notes or relatives) that the patient has given an advance directive.

Patients with cardiac arrest in the current episode have poor outcomes and are not usually candidates for transfer.[16] Patients who require intubation or vasoactive drugs ('inotropes') due to acute deterioration are unlikely to survive transfer. In certain rare circumstances, it may be appropriate to consider transfer, e.g. haemodynamically stable patients and 'incidental' findings on CT.

3. Referral to a Vascular Specialist

Speed of referral and transfer is critical once the likely diagnosis has been made and confirmed by an experienced emergency medicine doctor. For alert patients of 85 years or less, with no, mild or moderate systemic disease this request can be made by an experienced emergency medicine doctor to a senior vascular trainee in the closest specialist vascular centre. Under most circumstances, the patient does not need to be assessed by a local general surgeon prior to the request for transfer, although if no experienced emergency medicine doctor is available, the patient may need to be assessed by a local general surgeon. For candidates over 85 years, or with severe systemic disease, who are intubated or have fluctuating consciousness, the possibility of referral (or decision not to transfer) must be made after discussion between the most senior emergency doctor available and the on-call vascular surgeon at the closest vascular centre.

It is the role of the receiving vascular team to liaise with theatres, anaesthetists, ICU and the ED as required.

4. Monitoring and Treatment in the ED

The patient's vital signs must be monitored continuously.

Investigations

If the patient is known to have an abdominal aortic aneurysm, the clinical diagnosis does not have to be supported by investigations.

Investigations should not delay the transfer of patients with a strong clinical suspicion of aneurysm rupture but the following investigations should be considered:

- Abdominal ultrasound or CT scan
- ECG
- Full blood count, serum electrolytes and creatinine, serum amylase, troponin, blood gas

Treatments

There are no essential treatments required, prior to or during transfer, that are known to affect outcome. A timely decision regarding transfer, as discussed above, and then prompt transfer, if required, are the key therapeutic interventions. Management in the ED should focus on alleviating pain and maintaining adequate perfusion, whilst preparing the

patient for transfer (and theatre). Occasionally, critical care interventions may be required.

Pain can be managed according to standard RCEM guidance[17] with appropriate dose titration.

Large bore intravenous access should be obtained. Avoid hypertension and use fluid resuscitation (crystalloids) to maintain a mentally alert patient with a systolic BP 90-120mmHg. The previously recommended lower range of systolic BP of 70mmHg may be too low, particularly in the elderly.[20] Blood products may be required but cross-matching must not delay transfer. Rarely, inotropic support may be required if the patient is not fluid responsive.

Those patients who are unconscious and who ordinarily require intubation are unlikely to survive transfer.

Patients should be kept nil by mouth. Insertion of a urinary catheter and/or central venous line should only occur if they do not delay transfer. All further preparations for theatre can be undertaken at the receiving centre.

5. Transfer to a Specialist Vascular Centre

Whenever possible, the decision to transfer a patient should be discussed with the patient and/or their family. Patients should be transferred swiftly by an emergency ambulance. A paramedic crew is preferred but not essential. Except in very rare circumstances, there will be no need for a trained transfer doctor to accompany the patient. Local protocols regarding the ability to continue blood transfusions with a paramedic only crew may dictate that the transfusion is stopped prior to and during transfer.

Any cross-sectional imaging performed locally may aid the receiving vascular unit to expedite aneurysm repair. However, the organisation of image transfer, either electronically or as downloaded DICOM files, should not be allowed to delay the transfer of the patient. Similarly, patients should not under normal circumstances travel with cross-matched blood or other blood products,[19] unless transfusion commenced prior to transfer.

After agreement to accept the patient, the vascular senior registrar/consultant should put in place all necessary arrangements to assess and manage the patient expeditiously upon arrival.

Patients should be transferred to an area which offers critical care facilities (monitored bed, oxygen, direct nursing care, doctor availability). The exact location will depend on local arrangements but is likely to include ED resuscitation area or critical care (ICU/high dependency). The patient should ideally be met on arrival by the most senior surgical decision maker on-site for further assessment and determination of treatment strategy, which is usually CT imaging followed by selection of endovascular repair if feasible or otherwise open repair[10] but occasionally straight to open repair or palliation.

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Review

Usually within three years or sooner if important information becomes available.

Conflicts of Interest

None.

Disclaimers

RCEM recognises that patients, their situations, EDs and staff all vary. This guideline cannot cover all possible scenarios. The ultimate responsibility for the interpretation and application of this guideline, the use of current information and a patient's overall care and wellbeing resides with the treating clinician.

Research Recommendations

None.

Audit Standards

Transfer to specialist care should occur within 30 minutes of diagnosis.

Key Words for Search

rAAA, ruptured abdominal aortic aneurysm

Appendix 1

Methodology

Where possible, appropriate evidence has been sought and appraised using standard appraisal methods. High quality evidence is not always available to inform recommendations. Best Practice Guidelines rely heavily on the consensus of senior emergency physicians and invited experts.

Evidence Levels

1. Evidence from at least one systematic review of multiple well-designed randomised control trials
2. Evidence from at least one published properly designed randomised control trials of appropriate size and setting
3. Evidence from well-designed trials without randomisation, single group pre/post, cohort, time series or matched case control studies
4. Evidence from well-designed non-experimental studies from more than one centre or research group
5. Opinions, respected authority, clinical evidence, descriptive studies or consensus reports.

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