

# Introduction

NCEPOD operates under the umbrella of the National Patient Safety Agency (NPSA) as an independent confidential enquiry, whose main aim is to improve the quality and safety of patient care. Evidence is drawn from all sections of hospital activity in England, Wales, Northern Ireland, Guernsey, the Isle of Man and the Defence Sector, both NHS and private. We are very grateful to all those who take part as advisors, local reporters and as recipients of individual case reporting forms. I would also like to express my sincere thanks to our clinical co-ordinators and all the permanent staff of NCEPOD for the enormous amount of work and enthusiasm which they have put into the production of this report and without which we could not hope to perform such detailed analysis of, and comment upon, clinically-related hospital activity.

Once again we have produced a summary report to accompany distribution of the detailed data both on CD ROM and also on the NCEPOD website, both of which allow major advances in the presentation of our data. Unlike traditional NCEPOD studies and in keeping with our new title of National Confidential Enquiry into Patient Outcome and Death, this is a cohort study looking at a specific area of clinical activity, namely, the management of abdominal aortic aneurysm (AAA). This was a fully representative sample of all patients admitted to hospital with an AAA during the study period, not just of those who died after operation, and thus provided us with good denominator data.

There were 844 patients included in the study, 752 of which involved open operations, 53 of which involved endovascular repairs and 79 of which were patients who did not undergo operation but received palliative care. It had been hoped to carry out case-mix adjustment for the different groups, but this was not possible because the risk data for those patients admitted as emergencies were missing more often than for those admitted for elective treatment. The overall mortality for open elective operation was 6.2% and for emergency operations it was six times higher at 36%.

Abdominal aortic aneurysm is a life threatening condition and once a decision has been made to operate, this should be carried out as expeditiously as possible. In patients scheduled for elective major vascular surgery, numerous factors contribute to delays, not least of which is the availability of high dependency and intensive care facilities. Operations are frequently cancelled due to lack of an available critical care bed and the patients in this study were no exception; one in six elective cases having their operation postponed. Not infrequently, the lack of a critical care bed only becomes apparent at the last minute and because AAA repairs are major procedures which occupy several hours operating, large amounts of theatre, surgical and anaesthetic time are wasted with the inevitable knock-on effect on waiting lists. For patients presenting as an emergency, where surgical repair of a ruptured aneurysm is considered life saving, critical care bed availability may be a secondary consideration, but in busy units on major vascular take, for what may be a large catchment area, patients not infrequently spend several hours in the immediate postoperative period waiting for a bed to become free. During this critical time when cardiovascular stability, respiratory function, fluid management, analgesia and temperature control require constant monitoring by experienced staff, such situations are far from ideal. Of those patients undergoing elective surgical or endovascular repair, 56% went to ICU after treatment and 34% went to HDU. The remaining 9% of elective patients were nursed in a dedicated theatre recovery area for an extended period after surgery, though whether this was normal practice in those hospitals, by offering 24 hour recovery facilities or as a result of a shortage of critical care beds is uncertain.

Many of these patients have significant comorbidities, which inevitably require preoperative

assessment and treatment, but nevertheless, of those scheduled for elective admission 21% spent more than 12 weeks on the waiting list and 18 patients admitted as an emergency had been on the waiting list for elective repair. Since morbidity increases with increasing aneurysm size and still further with intraluminal leaking or rupture, there is often a fine line to be drawn between optimising a patient's clinical condition in terms of cardiorespiratory system and delaying surgery beyond a certain time.

Vascular surgery is a sub-specialty in which close co-operation and team work between surgeon and anaesthetist is essential to ensure optimal management and patient outcome and this was certainly confirmed by this study. There was excellent consultant involvement in both elective and emergency cases (97% for both anaesthetists and surgeons in elective cases), which is undoubtedly a key factor in the high quality of care delivered to these patients.

Inevitably, a number of hospitals and clinicians were performing very small numbers of AAA repairs, particularly as emergencies, with only 57% of hospitals having an on-call rota for vascular surgery and only 3% reporting an on-call rota for vascular anaesthesia. While the published evidence shows that the outcome of elective AAA repair is better when hospitals and surgeons are performing large numbers of cases and therefore, ideally, this is not the operation for the occasional practitioner, the situation, particularly for emergency cases, is far from satisfactory in many parts of England, Wales and Northern Ireland. This is often simply related to isolated hospitals, where the risks of transferring an acutely ill patient (and usually the only method of transport is by road) with a leaking or ruptured aneurysm are considered greater than operative treatment by a general surgeon in the isolated hospital. The situation is changing nationally, in that, while many of the more senior general surgeons based in district general hospitals certainly have had vascular surgical training and therefore possess the necessary skills and experience, younger surgeons are frequently highly specialised in more limited surgical areas. Few of us would wish to be the isolated surgeon confronted by a major vascular problem which in his and the anaesthetist's view, is unfit for transfer.

Encouragingly, the patients in this study who were transferred did not do worse than patients directly admitted to the operating hospital. However, they are a selected group considered fit for transfer and who survived that transfer. It is difficult to be sure for an individual patient that transfer produces better results than staying put, since considerable additional risk and morbidity can result from delay and transfer, before the benefits of treatment in a specialised unit are realised. Every case is different and factors to be considered include comorbidity, the transfer distance and time and the mode of transport. Equally the benefit of the unit in which surgery will be undertaken is as much about supporting facilities such as critical care provision, haemodialysis etc., as about surgery. Although a surgeon may be geographically isolated, many of the other available facilities may be as good as or better than those available at a tertiary centre, particularly if postoperative critical care facilities in the receiving hospital are severely stretched or unavailable. Many small hospitals still undertake significant numbers of similar cases involving substantial blood loss and rapid transfusion in seriously ill patients. Some tertiary units now run a dedicated on-call outreach service; this team may prefer to travel to the isolated hospital rather than subject a critically ill and cardiovascularly unstable patient to a prolonged transfer in far from optimal conditions. Solutions for improving the service for patients with AAA may therefore differ between geographical areas.

In the case of elective AAA treatment, the well-recognised problem of low case numbers is more relevant and referral or transfer is normally in the patient's best interests. There is little to support surgeons continuing to treat single figure numbers of elective cases on a regular annual basis.

Although the diagnosis and monitoring of abdominal aortic aneurysm by CT scan is widely available and routinely used for elective cases, the availability of specialised imaging services

outside normal working hours in many units was considered poor. Whilst in four out of five hospitals that had a CT scanner it was possible to have a CT scan out of hours, only half of all hospitals could organise out of hours angiography or interventional radiography and in only one third was MRI scanning available out of hours. Painful and leaking AAAs are often difficult to confirm in the face of alternative differential diagnoses and this study emphasises that Trusts should ensure the availability of diagnostic radiology services including CT scanners outside normal working hours, for all seriously ill patients. Failure to do so will allow the acute aneurysm to progress to frank leakage or rupture before the diagnosis is apparent, when the outcome for the patient may be considerably worse as a result.

Although a total of 79 patients received palliative care, the question of when not to operate is a very difficult one and a greater proportion of emergency patients were operated on rather than received palliative care in large vascular units, compared to intermediate sized or remote units. This may of course reflect the greater experience and skill of specialist vascular surgeons in large units, but advanced aortic vascular disease is a malignant condition in all but name, rendering the patient terminally ill and this should always be borne in mind. In emergency cases in particular, and in patients with significant cardiorespiratory comorbidity, the decision not to operate, linked to properly considered and administered palliative care, should be considered positively and in full consultation with the patient or his or her advocate.

Although only a small number (53) of patients in this study underwent endovascular repair (EVAR), their good outcome is in accordance with published trials. Of these, only one was ruptured and treated as an emergency, the vast majority were unruptured and asymptomatic. Since successful endovascular stenting requires that the patient is cardiovascularly stable, this method of treatment is limited at present, but increased diagnosis and endovascular treatment of asymptomatic aneurysms will undoubtedly reduce the number which eventually leak or rupture. The results of the recent UK EVAR trials show that in low risk patients (those fit for open repair), endovascular repair is significantly more efficacious in preventing aneurysm-related death than operative repair for four years after operation and therefore should be offered to all patients in this category. In contrast, no survival benefit was demonstrated for EVAR over best medical therapy in patients unfit for EVAR. While this does not mean that no unfit patient should ever be offered EVAR, it does mean that every effort should be made to render unfit patients as fit as possible.

There are many recommendations arising from this report, a number of which are as much about organisation of existing facilities as about transferring or centralising services. Major elective surgery should not be considered or take place unless all essential elements of perioperative care are available. Trusts should take action to improve access to Level 2 beds for patients undergoing elective aortic aneurysm repair so as to reduce the number of operations cancelled and inappropriate use of either recovery area beds or Level 3 beds. In addition, in those units where vascular surgery patients routinely receive postoperative mechanical ventilation, anaesthetic departments and critical care units should review together whether those patients could be managed in a Level 2 high dependency unit.

Clinicians, commissioners and Trusts are encouraged to review whether elective aortic aneurysm surgery should be concentrated in fewer hospitals and to take measures to ensure that surgeons, who do not routinely perform elective vascular surgery, only operate on emergency aortic aneurysms in exceptional circumstances. Equally, isolated surgeons should not be put in the impossible position of receiving a critically ill patient through the A&E department with no support from an outreach or transfer service and no alternative but to operate. Anaesthetic departments are urged to review the allocation of vascular lists so as to reduce the number of anaesthetists caring for very small volumes of aortic surgery cases.

The perioperative diagnosis and management of AAA and in particular symptomatic and

emergency cases, is a major consumer of surgical, anaesthetic, radiological and critical care resources. Inevitably these cases compete with other patients for such facilities and significant advances in the treatment of AAA will have a major impact in this area. While it is vital to ensure optimal care for such severely ill patients, it is also important to try to produce good evidence based data to inform the decision-making process in key areas such as the transfer of a critically ill patient with a ruptured aneurysm to a tertiary centre and also to ensure that the decision of whether to opt for surgical, endovascular or palliative care is taken in the best interest of the patient.

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