National Vascular Registry Report 2017: Summary for Anaesthetists

The NVR is commissioned by the Healthcare Quality Improvement Partnership (HQIP) as part of the National Clinical Audit and Patient Outcomes Programme and is designed to support quality improvement within NHS hospitals performing vascular surgery by providing information on their performance.
The report provides data on the major vascular interventions:

1) Repair of aortic aneurysms:
    a. elective infra-renal
    b. ruptured infra-renal
    c. complex aneurysms
2) Carotid endarterectomy
3) Lower limb revascularisation (bypass and endovascular)
4) Major lower limb amputation

Areas of excellence in this year's report were:

- Very low mortality (2.9% for open repair and 0.4% for endovascular repair) in 4,153 elective aortic aneurysm repairs (AAA)
- Good progress on data collection on outcomes for complex aneurysm repair and ruptured AAA – to support the ongoing re-organisation of services
- Good results in 4,330 carotid surgery interventions

Areas for improvement were:

- Variable waiting times for elective AAA repair and carotid surgery
- Delays in performing lower limb endovascular procedures (mainly peripheral angioplasty)

Aortic aneurysm

1) Elective infra-renal AAA
The provision of services for the repair of elective infra-renal AAA has been the subject of a Quality Improvement Programme supported by the VSGBI. Acknowledging the importance of case volume in driving better clinical outcomes, many regional vascular services have been reconfigured in a hub-and-spoke system.
The NVR received detailed information on 4,153 elective AAA repairs in 2016 (5% decrease in activity since 2015).
The proportion of cases performed by open repair (OR) and endovascular repair (EVAR) is similar to the previous 2 years (30% OR, 70% EVAR).
In particular:

- overall in-hospital mortality rates: OR 3.1%; EVAR 0.6% (Jan 2014-Dec 2016).
- Postoperative complications: OR 20.5%; EVAR 6.3%. Patients having OR were more susceptible to respiratory complications, and the rate of return to theatre was also higher. They had a comparatively high in-hospital mortality rate.
- Postoperative admission to critical care: OR 98%, median length of stay of 2 days; EVAR 40%, median length of stay 1 day.
- Overall postoperative stay: OR 8 days; EVAR 3 days

Most centres continue to achieve good performances for the majority of patients.

Specifically:

- 78.3% were discussed at MDT meetings
- 84.9% had pre-operative CT/MR angiography
- 96.6% of patients underwent a formal anaesthetic review (91.9% by a consultant vascular anaesthetist)
- 83.9% had documented formal fitness assessment tests

Areas of potential improvement highlighted by the report were:

- Significant variations in the timelines from diagnosis to surgery, ranging from < 30 days to > 100 days. The majority of patients waited 70 days. The National Screening Programme has set a timeline of 8 weeks from diagnosis to repair and vascular units should strive to meet this target.
- A number of centres are still providing elective AAA services with low case volumes (13 vascular centres had a case volume of <30 patients). Further reconfiguration of services is desirable to ensure patients receive treatment in vascular centres with the best facilities and clinical pathways.

2) Complex Aneurysm Repair

There were 2,055 complex AAA repairs:

- 217 OR
- 1,838 EVAR

The endovascular procedures included:

- 984 fenestrated repairs (FEVAR)
- 177 branched repairs (BEVAR)
- 332 thoracic procedures (TEVAR)

Outcomes remain favourable for EVAR compared to OR (in-hospital mortality of 3.5% and 18.4%, respectively). Direct comparison of these figures is difficult and the open procedures may represent a more complex anatomical AAA to repair. Further work is required to clarify which patients benefit most from an endovascular approach or an open repair.

Complex aortic surgery remains a relatively high risk, high cost service. Centres should only be commissioned to perform such procedures if they have submitted complete and accurate data to the NVR to ensure the provision of safe and effective services. 57 of the 76 centres performing complex AAA repairs in 2014-2016 submitted fewer than 10 cases per year.

3) Ruptured AAA

Despite the national screening programme, the number of aneurysm ruptures remains high, with 2,913 cases over the 3-year period.

The choice of endovascular repair remains static (approximately 30% compared to 70% for elective repair) for ruptured AAA despite clinical trial evidence of benefit from EVAR.

Over 80% of patients who had an OR required level 3 critical care after the procedure (median length of stay of 4 days). There were also a greater proportion of patients who returned to theatre within their hospital admission, and who suffered from respiratory problems.

Patients undergoing EVAR for ruptured AAA had a lower reported in-hospital postoperative mortality compared to OR (23.2% and 41.2%, respectively). Direct comparison of these figures is difficult and the open procedures may represent the more complex cases.

All NHS trusts demonstrated postoperative mortality rates within the expected range, given the number of procedures performed.
The report recommends that vascular units performing emergency AAA repair should ensure they are able to provide endovascular services 24/7 days a week, with appropriate skill mix, hybrid operating facilities and endovascular consumables.

Carotid endarterectomy

There were a total of 4,330 carotid interventions. The number of procedures recorded in the NVR has decreased significantly (a 15% drop in two years). This seems to reflect a fall in activity rather than a reduction in case-ascertainment.
The median time from symptom to surgery is unchanged in 2016 (median: 13 days). However, there remains significant variation between NHS trusts, with the median delay ranging from 5 days to over 70 days.
In detail:

- GA only was chosen for 54.9% of the procedures
- 24.8% were performed under local anaesthetic only
- 54.4% of procedures involved the use of a shunt.
- 42.9% of patients were admitted to critical care wards. The length of stay in critical care was typically short.
- The median overall length of stay in hospital was 3 days.

Surgical outcomes continue to be good and estimated rates of significant complication are low (see full report for more details).
Areas of improvement highlighted by the report are:

- Time from symptom to surgery. The benefit of surgery is much lower for most patients once 14 days have elapsed from the presenting symptoms.
- Case volume. There is a documented volume outcome relationship between case volume and clinical outcomes for CEA. VSGBI recommends that centres perform a minimum volume of 40 cases/year. In 2016, over 30 centres did not meet this standard.

Lower Limb Interventions for Peripheral Artery Disease

1) Lower limb bypass
NHS hospitals submitted 17,200 open surgical/bypass procedures to the NVR:

- 73.5% were performed under general anaesthetic
- 13.4% were performed under regional anaesthetic
- 9.9% were performed under general+ regional anaesthetic
- In- hospital postoperative mortality rate was 1.2% for elective patients and 5.8% for emergency patients
- The length of stay was 5 days for elective cases and 16 days for emergency patients
- Complications were relatively uncommon: 90% of elective patients and 79% of emergency patients did not require further unplanned intervention.

The outcomes for lower limb bypass are in line with recent literature, however the observed 10% unplanned readmission rate suggests this is an area for improvement.

2) Endovascular lower limb procedures

- Most endovascular procedures were performed under local anaesthetic (88.5%)
- General anaesthetic (8.9%) and regional anaesthetic (2.7%) were also used.
- Many angioplasties were performed as day cases. Among the patients who did stay in hospital overnight, the length of stay was generally short.
- Only a small proportion of patients were admitted to critical care.

Overall, there were good clinical outcomes with an in-hospital mortality rate of 1.6% and a complication rate of 5.7%.

3) Major lower limb amputation

Over the three-year data collection period, 8,866 major lower limb amputations were entered into the NVR (with a yearly increase in estimated case ascertainment from 48% to 53%).

- 52.9 % below-knee amputations (BKA), 47.1% above-knee amputations (AKA)
- 69.7 % were undertaken under general anaesthetic; 29.8% under regional anaesthetic; 0.5% under local anaesthetic
- Most patients were emergency admissions but > 80% underwent surgery during daytime hours– one of the key quality indicators in the VSGBI quality improvement pathway
- In-hospital mortality: BKA 5.8 %; AKA 12.2%
- 87 % of BKA and 76% of AKA returned to the ward following surgery
- 13% of BKA and 24% of AKA went to intensive care for an average of 2-8 days
- Median length of hospital stay associated with major amputations: 23 days.

All the NHS trusts had a risk adjusted rate of in-hospital death that fell within the expected range.

Some of the key recommendations for improving perioperative amputation care in NHS hospitals concern the timing of the procedure. In particular, it is recommended that:

- major amputations should be undertaken on a planned operating list during normal working hours;
- a consultant surgeon should operate or at least be present in the theatre to supervise a senior trainee undertaking the amputation; and
- the patient should have routine antibiotic and DVT prophylaxis according to local policy.

Characteristics of perioperative care for BKA and AKA patients, suggest that, by and large, these recommendations are not met.

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