



A Best Practice
Clinical Care Pathway for
Major Amputation Surgery

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Introduction

The perioperative mortality rate after major lower limb amputation in the UK is unacceptably high in modern medical practice. A rate of 17% was reported to the VSGBI AGM in 2009. With the aim of improving outcomes for vascular patients, the VSGBI Council invited a stakeholder group to discuss a possible quality improvement framework (QIF) for major amputation surgery in Feb 2010. A draft version was circulated to the VSGBI membership for comment. After amendments in line with the membership responses, the Amputation framework (QIF) was endorsed and adopted by the Council in September 2010.

In 2014, an NCEPOD report into the outcomes of lower limb amputation between October 2012 and March 2013 showed mortality was still high, with 30-day postoperative mortality at around 12.4%. The report reiterated many of the VSGBI QIF principles of good practice, and made a number of good practice recommendations.

The VSGBI has now revised the 2010 Amputation QIF to take into account these recommendations and changes in vascular service provision across the UK since 2010. The National Vascular Registry will provide information as to how well these recommendations are being incorporated in practice through the publication of its annual reports.

Aim of the best practice pathway

To reduce and maintain the 90-day mortality of major lower limb amputation to 10% or less nationally. Major lower limb amputation is defined as any amputation above the ankle. Forefoot and toe amputations are defined as minor amputations.

Main recommendations of the 2014 NCEPOD report on lower limb amputation

- Develop a best practice pathway for major amputation that:
 - Has protocols for patient transfer
 - Involves a Multi-Disciplinary team pre- and post-operatively
 - Recognises end of life presenting as limb ischaemia
 - Encourages putting operations on elective lists
- Consultant vascular surgeon review within 12 hours
- Early and sustained input from diabetes medicine, pain control and anaesthesia
- Timely surgery on elective lists by surgeons with a regular practice in amputation
- Rehabilitation and discharge planning to start before surgery

Main recommendations of the VSGBI 2010 Amputation QIF

- Develop an amputation service in keeping with the best practice pathway
- Major amputations in vascular patients only to be undertaken in arterial centres
- Submission of major amputation procedure data to the NVR

The Best Practice Clinical Care Pathway

The goal of major lower limb amputation (MLLA) is to provide the patient with a pain-free limb and optimal prosthetic potential. Patients at the end of life should be considered for palliative care including appropriate discussion with the patient and family, rather than futile surgery. If life cannot be saved then consider quality of death.

All patients undergoing MLLA should be considered for revascularisation and the discussion with the reason for the final choice of amputation clearly documented in the clinical record.

The goal should be to undertake below knee amputation wherever appropriate. Vascular units should aim to have a below knee to above knee ratio above one, with continuous audit of outcomes and revision rates.

All units should have a written pathway for MLLA. An important aspect of this is the provision of patient advice leaflets.

The Amputation pathway for vascular patients should be implemented at an accredited arterial centre by a multi-disciplinary team. The multidisciplinary team would be expected to have input from:

- Vascular Surgeons, Vascular Anaesthetists, Vascular Specialist Nurses, Interventional Radiology
- Diabetes Medicine
- Tissue Viability Nurses, Acute Pain specialists
- Specialist Amputation Rehabilitation physiotherapy team, Occupational Therapists, Prosthetics Department, Rehabilitation Medicine and Complex Discharge Co-ordinator
- Critical care, other medical specialties as required.

The quality of care delivered in all three phases of the patient pathway is important for achieving successful outcomes. Most patients with limb ischemia will also have significant co-morbidities and are often nutritionally deficient with high risk of acquired complications. General physiotherapy is important as well as specialist amputee rehabilitation physiotherapy pre and post-operatively. A well-prepared patient carries a higher chance of a successful operation and return to independent mobility without hospital acquired complications.

Preoperative phase

All patients being considered for MLLA should:

- Be assessed by a multidisciplinary vascular specialist team for suitability for surgery (see Appendix 1)
- Undergo diagnostic arterial imaging to determine revascularisation options except where the amputation is for non-vascular indications (infection, trauma) or where the limb is clearly beyond salvage and poses a risk to the patient's life
- Have revascularisation options discussed at a vascular imaging MDT meeting (vascular surgeons plus interventional radiology) and the MDT decision documented in the patient's notes
- Have care decisions made in conjunction with patient and family
- Written information and counselling should be offered to patients and family

All vascular patients undergoing MLLA should:

- Be admitted in a timely fashion to a recognised arterial centre with agreed protocols and timeframes for transfer from spoke sites and non-vascular units
- Be under a named Consultant in Vascular Surgery
- Have all decisions, reviews and interventions recorded in the clinical record
- Have a member of the Diabetes team involved within 12 hours where appropriate, with regular blood glucose monitoring
- Have the Pain team involved within 12 hours, wherever possible
- Be screened for MRSA
- Have antibiotics commenced as clinically indicated according to local microbiology protocols
- Have physiological optimisation with fluids as clinically indicated
- Have nutritional assessment and receive dietician advice
- Have pressure area assessments and precautions
- Have a falls risk assessment and receive any necessary precautions
- Have a VTE assessment and prophylaxis according to local protocols
- Undergo a formal assessment of the potential for rehabilitation to guide the appropriate level of amputation

- Be allocated a named Discharge Co-ordinator to begin social and rehabilitation needs on discharge planning, pre-operatively
- Be reviewed by a Consultant Vascular Anaesthetist for optimisation and post-operative level of care
- Be seen and optimised by other medical specialities as required including:
 - Cardiology
 - Respiratory
 - Renal
 - Critical Care

- There should be direct access to a local amputee rehabilitation team including early mobilisation and physiotherapy
- Formal referral to a specialist amputee rehabilitation team (prosthetics)
- Patients should be educated in safe mobilisation, stump care and cardiovascular health
- Discharge planning home, or to an appropriate facility should be completed
- If discharged to home, specialist domiciliary rehabilitation physio should be available
- If repatriated to a spoke site rehabilitation unit, a rehabilitation prescription for amputee mobilisation should be developed by the specialist team and accompany the patient
- Outpatient review and rehabilitation follow up should be continued by the rehabilitation team, with rapid access to Vascular team as needed

Perioperative phase

- Procedures should be undertaken on a planned operating list during normal working hours. If performed on CEPOD or urgent lists, they should still be performed in normal working hours
- Urgent procedures should be performed within 48 hours of the decision to operate
- No patient should have their operation deferred more than once, unless there are new medical contraindications
- A Consultant Vascular Surgeon should operate, or be present in theatre to supervise a senior trainee (ST4 or above)
- A consultant anaesthetist or experienced post FRCA trainee should be present
- There should be rapid access to blood products
- An appropriate level critical care bed should be available according to preoperative assessment, with emergency access to Level 3 care
- Patients should have routine antibiotic and DVT prophylaxis according to local policy

Monitoring performance and clinical audit

- All vascular amputations should be recorded on the National Vascular Registry
- Information produced by the NVR should be reviewed to determine where local improvements can be made

This will be a challenging framework to introduce and vascular networks that cannot meet the requirements should engage actively with service managers and commissioners to implement the changes required to develop safe and effective services that meet the local needs of their patients with vascular diseases.

Postoperative

- Critical care and medical speciality cover should be available 24/7
- Patient should be reviewed on Day 1 by the Acute Pain team, and according to need thereafter
- Diabetes Medicine should review appropriate patients at least twice weekly and according to need
- There should be regular physician input available with medication review
- Wound and pressure area care should be managed according to local protocols

Appendices

1. Constituents of the Multi-Disciplinary team

Core	Input available from
Vascular Surgeon (Lead)	Acute Medicine
Vascular Specialist Nurse	Micro-biology
Amputation Physio	Physiotherapy
Diabetologist/Diabetes specialist nurse	Nutrition team
Rehabilitation Physician, Prosthetics	
Anaesthetist with Vascular Interest	
Acute pain (nurse or Consultant)	
Interventional Radiologist	
Discharge Co-ordinator	

2. Timescales

Admission for CLI	< 48 hours from decision to admit	StAMP
Consultant vascular surgeon review	< 12 hours from urgent admission < 24 hours from elective admission	NHS England NCEPOD
Diabetic review	< 12 hours from admission	NCEPOD
Pain team review	< 12 hours from admission	NCEPOD
Investigation for revascularisation	< 48 hours from admission	StAMP
Procedure	< 48 hours from decision to amputate	NCEPOD

StAMP APPG: Stop AMPutation NHS England NW

3. Metrics for local evaluation of performance

Metric	Target
Admission to recognised arterial centre	100%
Multidisciplinary team with MLLA experience	100%
VTE prophylaxis protocol	100%
Pain management team/protocol	100%
Wound/pressure area care protocol	100%
Diabetic team review	80%
Consultant Vascular Anaesthetist review	90%
Planned daytime procedure	75%
Consultant or senior trainee present	100%
Post-FRCA anaesthetist present	100%
Antibiotic prophylaxis	100%
Specialist rehabilitation referral	75%
BKA:AKA ratio	>1
NVR submission	95%

NVR: National Vascular Registry, OA: VSGBI Organisational Audit