

Commissioner's Guide for the NCEPOD Report 'Risking Life and Limb'

1. INTRODUCTION

DEFINITION

Acute limb ischaemia (ALI) is a sudden drop in limb perfusion, it is a vascular emergency that is highly treatable if diagnosed and treated promptly but can cause permanent disability, amputation, or death if not treated promptly. The true scale of the problem is largely unknown due to the inconsistent coding of ALI.

IMPACT

Delays in seeking or accessing medical advice can have serious consequences for patients with ALI. It is vital that healthcare professionals triaging patients are aware of the symptoms and signs of ALI and the need for prompt treatment, ideally in a vascular specialist centre.

CHALLENGES

- Inconsistent coding obscures the true scale of ALI.
- Delays in triage and transfer to vascular hub from primary and secondary care can increase risk of poor outcome.
- Comorbidities (hypertension, atrial fibrillation, diabetes, peripheral vascular disease) and lifestyle factors (smoking) heighten vulnerability. Treating these comorbidities, giving lifestyle advice and warning high-risk patients of the symptoms of ALI can help reduce the risk of ALI and ensure that people seek medical attention early.

CLINICAL FRAMEWORK

- Assessing patients for the '6Ps' (pain, pallor, paraesthesia, paralysis, poikilothermia and pulselessness) is essential for prompt diagnosis, although not all must be present to diagnose ALI. This report found inconsistent recording of the '6Ps', with peripheral pulses being recorded in primary care in only a third of patients.
- Vascular services are provided via a hub and spoke model, with patients presenting to spoke hospitals being transferred to vascular hubs for specialist treatment. This can add delay, making it even more important that these patients are identified quickly and prompt transfer is arranged. It is vital that supportive treatment, including anticoagulation, intravenous fluids and oxygen are started as soon as possible, and that patient records and imaging can be transferred easily.
- The Rutherford classification (I, IIa, IIb, III) is used to categorise the severity of ALI. IIb is the most critical—limb viability being threatened unless revascularisation occurs within 6 hours. This requires patients to recognise the potential severity of their symptoms and seek medical attention, and healthcare professionals to make the diagnosis and treat the condition rapidly, with prompt admission or transfer to a vascular centre.

COMMISSIONING IMPERATIVE

- National guidance, reporting standards, comprehensive data collection and a quality improvement framework for the treatment for ALI are recommended to improve outcomes.

2. PATIENT POPULATION

Inclusion criteria

Adults over the age of 18 years who were admitted to a vascular hub hospital as an emergency, between 1st January 2023 and 31st March 2023 for treatment of ALI.

3. CLINICAL AND ORGANISATIONAL ISSUES

3.1 Delays occurred throughout the patient pathway often due to a lack of recognition of the symptoms of acute limb ischaemia by both healthcare professionals and patients with the condition.

- Delays to presentation were common, with 144/283 (50.9%) patients presenting more than 24 hours after the onset of their symptoms.
- There were missed opportunities to recognise ALI prior to admission, most commonly due to a lack of patient awareness (82/115; 71.3%) and/or recognition in primary care (24/115; 20.8%).
- Detailed local written guidance to assist in the recognition and initial management of ALI was available in 36/111 (32.4%) primary care organisations. It was noteworthy that in 41/111 (36.9%) this was unknown.

3.2 Patients most likely to benefit from an intervention (Rutherford category IIb) were not always directed to a vascular hub, delaying their treatment beyond the accepted target of six hours

- A Rutherford category was not recorded for any patients in primary care.
- The Rutherford category was included in only 8/56 spoke hospital guidelines which may explain why it was so infrequently used.
- All the patients in this study were admitted to a vascular hub. In 16/50 vascular hubs, at least one spoke hospital within the network was more than an hour away by blue light ambulance in working hours.
- The median time from arrival at the spoke hospital to arrival at the vascular hub was 8.16 hours, exceeding the recommended target for treatment of immediately threatened limbs (Rutherford IIb) from relevant sensory-motor symptom onset.
- In 15 patients there was a deterioration in their limb with 8/15 deteriorating to a Rutherford category IIb, an immediately threatened limb that required urgent revascularisation for salvage, and 3/15 to an unsalvageable limb requiring amputation.
- Of the 52 patients classified as having Rutherford category IIb ALI, only 5/52 (9.6%) achieved the six-hour target, with a median time of 3.1 days.

3.3 Vascular networks were underused and non-vascular specialists reported not being confident to treat patients in the spoke hospitals and had no formal transfer option to the vascular hub

- In total, 7/78 spoke hospitals described a network where they referred to two or more vascular hubs. A more complicated picture emerged with the number of spoke hospitals from which the vascular hub received referrals. This ranged from 0-22, with a mean of 3.54 and mode of two. 36 spoke hospitals referred to more than one vascular hub.

- The Rutherford category for the patients attending the spoke hospital indicated that 30/106 (28.3%) required revascularisation within six hours of their development of sensory-motor symptoms, while 8/106 (7.5%) probably required a primary amputation. At least 38/106 (35.8%) patients were in a hospital where the treatment they required could not be provided, suggesting that many vascular networks are not grasping the organisational opportunities to improve the care of ALI.
- There were 34/91 spoke hospitals in which medical records could be shared electronically and 56/91 in which images could be shared immediately. All other systems that were described, such as email and paper copies, risk delays or other harm.
- Measuring performance is crucial for quality improvement. Only 22/47 vascular hubs stated that they recorded data on surgical procedures, while 19/42 collected data on interventional radiological revascularisation procedures for ALI. When asked about shared learning across the ALI network, the use of prospectively collected data was uncommon with most learning occurring in morbidity and mortality meetings or in response to reported adverse events.

3.4 There is no national guideline covering the care pathways between primary care, spoke hospitals and vascular hubs for patients with acute limb ischaemia

- A well-organised vascular network should be able to reduce the issues that have been identified with presentations to spoke hospitals. Written guidance specific to the management of suspected ALI was available in only 56/91 spoke hospitals, and where it existed key components were often missing.
- Detailed local written guidance to assist in the recognition and initial management of ALI was available in 36/111 (32.4%) primary care organisations.
- Using a local ALI care pathway in the vascular hub appeared to have a positive impact on care: 3/46 (6.5%) patients experienced a delay in senior review on an ALI pathway compared to 18/165 (10.9%) not on a pathway.
- Only 18/58 vascular hubs returning an organisational questionnaire stated that they had a policy or standard operating procedure for repatriating patients to their referring hospital.
- No risk management was documented for 44/291 (15.1%) patients and where documentation existed, it was considered inadequate in 20/291 (6.9%) cases, including 15 patients who should have had smoking/vaping cessation advice. Smoking cessation advice was offered to 58/92 (63.0%) current smokers.
- Delays were identified as a key area of concern in improving ALI care. Considering the data relating to delays in the pathway, 123/249 (49.4%) individual patients who had a procedure experienced a delay at some stage between their initial presentation and first procedure. Excluding the patient-related delays in presenting, there were 115/249 (46.2%) individual patients delayed at some point in the pathway.

3.5 There is no clinical ICD10 code for acute limb ischaemia and no registry to record data locally, therefore the true number of patients with ALI is unknown, leading to an absence of data to promote improvement in patient outcomes.

- The incidence of ALI is unknown as there is no ICD-10 code for ALI. For the NCEPOD study, a local study contact (vascular surgeon or vascular radiologist) had to screen patient notes to identify those with acute limb ischaemia from those with chronic limb-threatening ischaemia.

- It is widely believed that acute limb ischaemia (ALI) predominantly occurs in older people. However, in this study, 70/290 (24.1%) patients were 60 years or younger and 92/290 (31.7%) were of working age (65 or younger), highlighting that age should not be a factor to exclude ALI in any adult with an acutely painful limb and the need for a national registry for ALI to better understand the population and their needs.
- There were 260/268 (81.7%) patients in the study sample who were White. It is not believed that this dataset has under recorded the incidence of ALI in Black and ethnic minority patients but longer-term population data would confirm this. Ethnicity is not currently recorded in registries such as the National Vascular Registry nor in hospital episode statistics recorded in secondary care but is available from primary care datasets.
- This admission was the first episode of ALI for 241/293 (82.3%) patients, but 25/293 (8.5%) had experienced an episode of ALI in the previous ten years. There were 60/293 (20.5%) patients who had undergone previous surgical or endovascular revascularisation procedures for ALI or peripheral artery disease (PAD) and 11/293 (3.75%) patients who had undergone a previous amputation. Monitoring ALI procedures and outcomes at a national level would provide a benchmark for assessing readmissions/recurrence of ALI.
- Excluding the patient-related delays in presenting, there were 115/249 (46.2%) individual patients delayed at some point in the pathway. National data collection for ALI would aid benchmarking and monitoring of the delays occurring throughout the entire ALI pathway. This could focus resources as well as educational opportunities.
- The vascular hubs identified delays in patient presentation, initial assessment, recognition of and imaging for ALI as areas requiring improvement, along with transfer delays between vascular hubs and spoke hospitals. Additional challenges included a limited number of vascular surgical beds, the lack of a hybrid theatre, and too few interventional radiologists, limiting the treatment options. Embedding this into a registry would ensure that these factors can be considered beyond this report alone

4. KEY FEATURES OF A SERVICE

4.1 Awareness and early recognition of ALI symptoms/ signs

- **Public awareness:**
 - National awareness campaign for ALI (e.g., “Six Hours to Save a Limb”).
 - Patient information leaflets/infographics /information for high-risk groups (Diabetes, PAD, smokers).
 - Online resources for ALI (GP/ hospital websites, NHS 111).
- **Professional awareness:**
 - Training for primary care, community care, ED staff, and ambulance services.
 - Red flags in electronic systems to distinguish ALI from other conditions eg. DVT, stroke.
 - Standardised templates for assessment for primary care, NHS111, 999 call handlers, spoke hospitals and vascular hub hospital emergency departments.
- **Clinical assessment:**
 - Assessment using 6 Ps to aid diagnosis.
 - Use of Rutherford classification to communicate urgency.
 - Emphasis on recognising new sensory or motor impairment beyond the toes (Rutherford IIb) as critical.

4.2 Risk stratification and referral

- **Direct referral:**
 - Patients with Rutherford IIb symptoms (with sensory/motor impairment beyond toes) should be transferred directly to vascular hubs.
- **Protocols/standard operating procedures:**
 - Use of the 6Ps/ Rutherford classification to identify high-risk group and refer directly to vascular hub – NHS111, 999 call handlers, primary care, spoke hospital ED and vascular hub ED
 - Ambulance bypass protocols to expedite transfer to a vascular hub.
 - Theatre booking systems and on-call rota/ staffing levels of vascular surgeons/ interventional radiologists to allow emergency access to surgery/endovascular procedures for high-risk patients.
- **Audit and learning:**
 - Record time from symptom onset to procedure.
 - Review outcomes (fasciotomies, amputations, deaths).

4.3 Organisation of vascular networks

- **Hub and spoke model:**
 - Endure vascular networks are organised with clear referral pathways and points of contact
 - Inclusion of primary care in vascular networks
- **Network standards:**
 - Introduce collaborative pathways across similar to national trauma networks.
 - Standardised national guideline for ALI should be implemented across the pathway
 - Repatriation guidelines to balance resources and patient proximity to home.
 - Shared electronic case records and imaging across providers – primary care, spoke hospital ED and vascular hub hospitals.
- **Multidisciplinary collaboration:**
 - Emergency medicine, general practice, pharmacy, vascular surgery, interventional radiology, specialist and general nursing, anaesthesia/ critical care and acute pain teams.
 - Senior review and treatment planning.
 - Integration of palliative care when appropriate.
- **Clinical governance:**
 - Performance indicators and compliance audits.
 - Regular morbidity and mortality meetings.
 - Shared learning/audit across the vascular network

4.4 National guideline and standardised pathways

A national guideline should cover:

- **Initial assessment and treatment:**
 - Standard operating procedures for NHS111, primary care, ambulance, and ED.
 - An immediate anticoagulation protocol.
 - the use of Rutherford classification across care settings.
 - Prompt senior review by vascular surgery/ interventional radiology
- **Transfer and vascular hub care:**
 - Shared records and imaging.

- Senior vascular surgical decision-making.
- Expedited referral and ambulance transfer to vascular hub
- Prioritisation processes for revascularisation.
- Frequent reassessment of limb condition post-operatively.
- Pain management and anticoagulation post-operatively
- **Discharge planning:**
 - Clear pathways for follow-up, risk reduction (smoking cessation, diabetes referrals etc.), rehabilitation (including psychological support, particularly for those who had undergone an amputation), and repatriation.

4.5 Quality monitoring:

- National Vascular Registry reporting.
 - Record Age, ethnicity, procedure, previous ALI, vascular surgery for ALI patients
 - Procedure and outcome reporting
 - Flag at-risk patients
- Inclusion in NCIP dashboards and GIRFT metrics.
- **Research participation:**
 - Facilitate patient involvement in ALI research studies.

5. COMMISSIONING STANDARDS AND OUTCOMES

- **Clinical outcomes:**
 - Reduced time to diagnosis and treatment.
 - Improved limb salvage rates.
 - Reduced amputation and mortality rates.
- **Operational outcomes:**
 - Introduce ambulance bypass protocols.
 - Effective hub-spoke coordination.
 - Audit of time-to-treatment and outcome metrics for patients with Rutherford IIb classification.
- **Patient outcomes:**
 - Increased awareness of ALI symptoms.
 - Improved patient satisfaction and engagement.
 - Reduced health inequalities in access to vascular care.

6. SUPPORTING NATIONAL GUIDANCE AND REPORTS

- [EUROPEAN SOCIETY FOR VASCULAR SURGERY \(ESVS\) 2020 CLINICAL PRACTICE GUIDELINES ON THE MANAGEMENT OF ACUTE LIMB ISCHAEMIA](#)
- [NHSE: PERIPHERAL ARTERIAL DISEASE, AN OVERVIEW](#)
- [NHSE: COMPLICATIONS OF TYPE 2 DIABETES](#)
- [PATIENT INFO: PERIPHERAL ARTERIAL DISEASE](#)
- [ROYAL COLLEGE OF EMERGENCY MEDICINE: ACUTE LIMB ISCHAEMIA](#)
- [LEGS MATTER: ACT NOW TO SAVE LIMBS AND LIVES](#)
- [NICE CLINICAL KNOWLEDGE SUMMARY: ACUTE LIMB ISCHAEMIA](#)
- [VASCULAR SOCIETY: PROVISION OF SERVICES FOR PEOPLE WITH VASCULAR DISEASE 2024](#)
- [PROVISION OF INTERVENTIONAL RADIOLOGY SERVICE \(PIOR\) 3RD EDITION](#)