

The complexity of perioperative management of acute limb ischemia in elderly with multiple comorbidities and underlying diseases: A case report



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ABSTRACT

Background: Aging process commonly associated with multiple comorbidities such as metabolic disorders, vascular, visual, gait, balance and psycho-social problems. Atherosclerosis is one of comorbidities that could occur as a pre-existing condition in elderly with peripheral artery disease (PAD). Elderly patients associated with complex and multi-factorial medical conditions need to be addressed in a comprehensive approach. Here we report the complexity of perioperative management of an elderly with acute limb ischemia in elderly with multiple comorbidities and underlying diseases.

Case Presentation: An elderly woman, 77-year-old, was referred to emergency room due to decreased level of consciousness. There were complaints of loss appetite, inactivity, bedridden, pain, paresthesia and muscle weakness in the right lower limb. There was history of chronic hypertension and dyspepsia. Since there was a sign of right lower limb acute limb ischemia, the patient was discussed with the multi-discipline team, planned for primary amputation, and received systemic anticoagulant treatment. Due to multiple comorbidities and underlying diseases, the patient died prior to amputation surgery.

Conclusion: Surgery is not contraindication to elderly; however, from this case it shed light the needs of multi-discipline approach to decide the best treatment options for patient's needs. Utilizing a Comprehensive Geriatric Assessment (CGA) could be an alternative to non-invasive, simple, and effective approach available in any healthcare setting.

Keywords: elderly, acute limb ischemia, primary amputation, comprehensive geriatric assessment, case report.

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INTRODUCTION

World Health Organization (WHO) predicts the aging population in the world will doubled in the end of 2050 to 22% and this will increase aging-associated health problems.^{1,2} The aging population will Multiple Ageing processes commonly associated with atherosclerosis, increased vascular rigidity and decreased vascular compliance of arteries which could developed progressively to peripheral artery disease (PAD), in which one-half are symptomatic in geriatric population.^{3,4}

One of the PAD spectrums, acute limb ischemia (ALI) is malignant vascular disease with high morbidity and mortality rate.⁵ ALI management commonly combination of pharmacological and surgical or minimally invasive procedure approaches based on individual clinical conditions and Rutherford classification.⁶ In surgical elderly patients, frailty

recognized as one of risk factors of adverse post-operative outcomes, also associated with morbidity and mortality.⁶

Recent epidemiological studies found a higher prevalence of PAD in women compared to men with 12-20% above age of 60.^{5,7} In the US, incidence of ALI in general population relatively rare about 1 to 2 cases per 10.000 persons per year and higher incidence rates up to 1.7% in population with pre-existing PAD like in elderly population.^{4,6} We reported a case of an elderly with ALI and multiple underlying diseases with a complex management approach using a Comprehensive Geriatric Assessment (CGA) as a toolkit to address each problem to provide the patient's required treatments and management.

CASE PRESENTATION

A 77-years-old woman was referred to the

Emergency Room of Dr. Soetomo Teaching Hospital, Surabaya with prior admission diagnosis septic encephalopathy. The patient presented with the main complaint of decreased level of consciousness in the last 12 hours prior to admission. Decrease in consciousness occurred gradually, no history of head trauma or injury, no vomiting, no partial extremity weakness nor lingual palsy. There was no problem in swallowing meals or liquid. The patient complained that the lower right limb sometimes felt pain, numbness, and tingling sensation and was difficult to move since a week prior to admission, followed by loss of appetite and weight loss 3 kilograms in one month. Cough, lightheadedness, and seizure were denied. There was no problem in urinating. There was decreasing physical activity in a month. A history of hypertension known for one year was on therapy with amlodipine 5 mg once daily. There was history of dyspepsia

treated unregularly with omeprazole 20 mg twice daily pre-meal. There is no history of diabetes mellitus, coronary artery disease, cerebrovascular accident (CVA), or hospital admission and major surgery. The patient was a widow with four children, physically active and independent, with adequate nutritious daily intake and preserved cognitive function as patient last education degree was elementary school, prior to present illness.

From physical examination, the patient had a weak condition with Glasgow Coma Scale (GCS) E3V3M5. Blood pressure was 120/80 mmHg, respiratory rate was 20 times per minute, heart rate 104 irregular beats per minute and axillary temperature 36.8°C. No miosis pupils and isochor pupils were found from head and neck examination. We found displaced ictus cordis during chest examination, no murmurs, with vesicular sound of pulmonary auscultation. Epigastric tenderness was not found.

There was slightly edema, pallor, and cold sole in palpation on the right lower extremity from extremities examination. Left ankle-brachial index (ABI) was 1.05. Right ABI cannot be evaluated due to difficulty finding pulse in artery dorsalis pedis and tibialis posterior, with no response to pain stimulation or touch sensation, biased to decrease level of consciousness. Motoric bilateral upper and lower relatively adequate symmetrical spontaneous movement but due to decreased level of consciousness we were unable to conclude for normal motoric function.

Laboratory results showed hemoglobin level 11.8 g/dL, hematocrit 38.3%, leucocyte 16,740/mm³, granulocyte 89.9%,

platelet 427,000 mm³, serum glutamic oxaloacetic transferase 236 IU/L, serum glutamic pyruvate transferase 100 IU/L, blood urea nitrogen 26 mg/dL, serum creatinine 1.08 mg/dL, serum sodium 134 mmol/L, serum potassium 2.9 mmol/L, serum chloride 94 mmol/L, and random blood glucose 147 mg/dL. Urine analysis showed leucocyte 2+, protein 2+ and blood 3+. Hepatitis B surface antigen was non-reactive. Chest X-ray showed aortosclerosis with cardiothoracic ratio 60% and electrocardiography showed abnormality with atrial fibrillation moderate with ventricular response average 80-100 beats per minute (Figure 1). The patient was consulted to Cardiology Department in Emergency Room and was assessed as atrial fibrillation, premature ventricular contraction and cardiomegaly and needs further evaluation using trans-thoracic echocardiography (TTE). The patient has treated with clopidogrel 75 mg once daily and bisoprolol 2.5 mg once daily.

Based on medical history, physical examination and laboratory findings, patient was assessed delirium suspected acute confusional state suspected precipitated by infection, suspect ALI of lower limb dextra, suspected urinary tract infection (UTI), atrial fibrillation moderate with ventricular response, hypokalemia, unspecified transaminitis, and controlled hypertension. Diagnostic plans were urine microbial culture, lipid profiles, serum electrolytes, duplex ultrasound (DUS) and TTE. As early management, the patient was provided with 200 cc per sonde diet therapy each 4 hours, infusion of Wida KN2 (potassium contain infusion) 500 ml

every 24 hours, Triofusin 500 ml every 24 hours (containing fructose 60 g, glucose 33 g, xylitol 30 g), ceftriaxone 1,000 mg every 12 hour (IV), omeprazole 40 mg every 12 hours (IV), metoclopramide 10 mg every 8 hours (IV), amiodarone 600 mg for 6 hours loading (IV), fondaparinux injection 2.5 mg 24 hours (subcutan), irbesartan 150 mg every 24 hours (enterally), amiodarone 100 mg every 8 hourly (enterally), aspilet 100 mg every 24 hours, and atorvastatin 20 mg every 24 hours. Monitor plans were vital signs, complaints.

On sixth day of admission, patient delirious. The potassium level was normal post-correction, lipid profiles within normal range and *Escherichia coli* ESBL 4.0x10⁵ colony forming unit (CFU)/ml from urine microbial culture. The right lower limb progressed to Rutherford class III. Vital signs were relatively stable. Patient was planned to primary amputation by a vascular surgeon. Antibiotic has switched to meropenem 500 mg every 8 hours (IV). The geriatric assessment to measure performance in activities of daily living (ADL) using Barthel Scale (BI) suggested total dependency, instrumental activities of daily living (IADL) inactive, Mini Nutritional Assessment (MNA) score was 8 suggesting at risk of malnutrition. Mini Mental State Examination (MMSE) and Geriatric Depression Scale (GDS) were not evaluated due to decreased level of consciousness. Wells score, risk of developing deep vein thrombosis (DVT), was high risk; while Norton scale suggested high risk of decubitus ulcer and acute urinary incontinence.

On tenth day of admission, patient delirious to somnolence. The patient could not sleep at the night. Vital signs were unstable. Blood urea nitrogen 96 mg/dL, creatinine 12.14 mg/dL and results of the Duplex vascular scanning confirmed specific lesion in superficial femoral artery with no flow in distal arteries (Figure 2). Crystalloid loading 250 cc for 2 hours was added in to therapy and the anticoagulant switched to unfractionated heparin due to acute kidney injury. On fifteenth day of admission, patient suddenly cardiac arrest. Cardiopulmonary resuscitation was performed and the patient was declared died due to suspected a cardiovascular event.

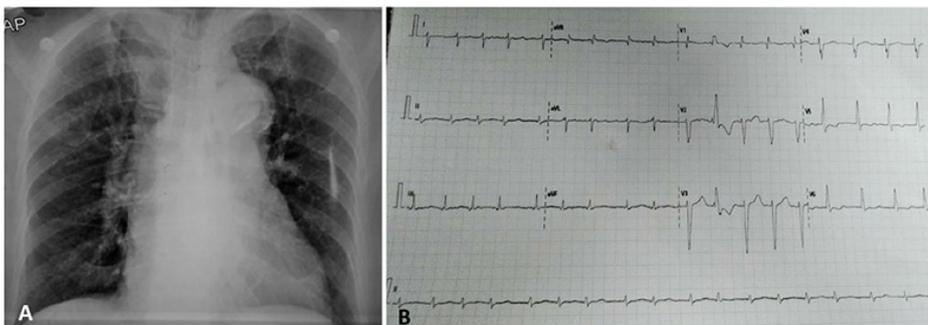


Figure 1. The chest x-ray (A) and electrocardiogram (B) of the patient during admission

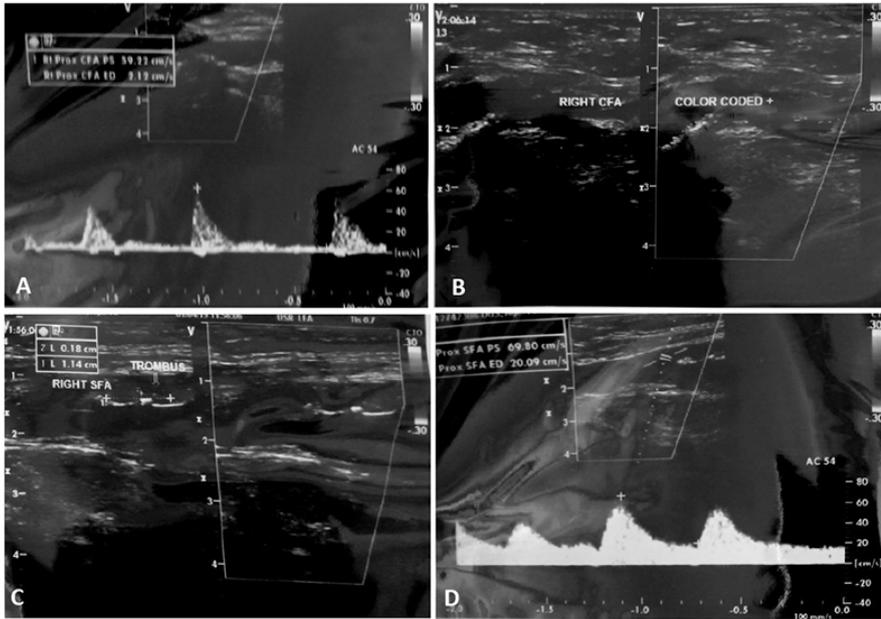


Figure 2. Duplex vascular scanning of common femoral artery (A and B) and superficial femoral artery of patient's right lower extremity.

DISCUSSION

ALI clinical presentation is characterized with “six P’s” consisting of 1) pain; 2) pulselessness; 3) pallor; 4) poikilothermic; 5) paresthesia; and 6) paralysis. Rutherford classification classifies ALI into 4 broad categories: clinical symptoms of sensory problem, muscle weakness, and Doppler examination. Category I for viable limb that is not urgently threatened, category IIa marginally threatened and salvageable limb if adequately treated, category IIb immediately threatened limbs that require urgent revascularization if salvage limb becomes the goal III is irreversibly damaged limbs resulting in major tissue loss and permanent nerve damage.⁴ Elderly patients are predominant to lower limb amputation (LLA) due to vascular disease with high prevalence of co-morbid pathology.⁴ In this our patient, the right lower limb progressed to Rutherford class III with is irreversibly damaged limbs resulting in major tissue loss and permanent nerve damage.

Surgery becomes a challenge in the elderly because it should reduce medical optimization time available in the preoperative setting.⁷ Patient goals, expectations of their overall health and surgical outcome could be assessed using comprehensive geriatric assessment at

any healthcare setting including the risk and benefit of the surgery procedure. The patient's comorbidities, cognition, presence of depression, functional status, fall risk, nutrition, frailty, and use of potentially inappropriate medications should be evaluated. This is because these factors could predict the possible postoperative complications.⁸

Many methods have been developed to assess some crucial aspects of elderly patients in preoperative settings. For example, the confusion assessment method (CAM) could help to identify the risk of delirium in the perioperative time of the elderly patient.⁸ Barthel Index can be used to assess patient functional status using score activities of daily living.⁸ The frailty, a state of reduced physiological reserve from pathological or iatrogenic stressors, in elderly patients can be assessed using a semi-quantitative assessment of frailty developed by the Canadian Study of Health and Aging clinical frailty scale (CFS).¹⁰ Interventions preoperatively are needed when the patient is identified frail to reduce risk of surgery including vitamin D supplementation, protein supplementation, and exercise programs.^{8,11} Preoperative malnutrition in elderly has been shown to predict delirium, wound dehiscence, infection, anastomotic leaks, increased length of

hospital stay and mortality.⁸ Preoperative nutrition assessment, MNA, has been developed with great sensitivity and specificity. In our case report the patient had high Barthel Scale suggesting total dependency. In addition, the MNA score was 8 indicating that the patient was at risk of malnutrition. Wells score, risk of developing deep vein thrombosis (DVT), was high risk; while Norton scale suggested high risk of decubitus ulcer and acute urinary incontinence.

Prognosis in the elderly associated with frailty, disability, impaired mobility, cognitive dysfunction, poor nutrition, polypharmacy, fall risk, mood disorders, and social isolation.^{4,7,8,12} These factors may play more dominant role as prognostic sign than traditional prognostic scores. A study of 13,885 PAD patients with ALI found that these patients had almost 1.5 time greater risk of major adverse cardiac event and more than three times greater risk of all-cause mortality.^{4,7,8,12} The 30-day amputation free survival varied based on ischemia severity (ranging from 100% for the viable limb to only 4.8% for irreversible ischemia).¹³ Patients mortality rates of 30 days as high as 17% who requires lower limb amputation.^{4,7,8,12} There are several prognostic models such as Walter Index may help physicians with estimating patients' life expectancy and prognosis in elderly. In this case, the patient died on fifteenth day of admission due to cardiac arrest.

CONCLUSIONS

PAD incidence in elderly predicted to increased followed by acute spectrum like ALI, which may need urgent revascularization or even surgery. The comprehensive geriatric assessment provides suitable approach to treat elderly patient that could help meet the patients' benefits. We reported a lower ALI indicated for primary amputation surgery with malnutrition, frail, delirium, total dependent functional capacity and comorbidities such arrhythmia, infection and metabolic disorders. Optimizing clinical conditions based on findings in comprehensive geriatric preoperative assessment in a timely manner becomes a challenge to solve in a multi-disciplinary approach.

PATIENT CONSENT

The patient provided the written informed consent to be reported as case report in an academic journal.

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DISCLOSURE OF CONFLICTS OF INTEREST

The authors declare that the study was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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AUTHOR CONTRIBUTION

The authors contributed significantly to this case report.

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