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Research

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An Overlook at the Patients with Acute Lower Limb Ischemia Undergone Femoral Embolectomy

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ABSTRACT

Objectives: Acute lower extremity ischemia is a rapidly progressive condition that could stem from embolism or thrombus, leading to sudden interruption of blood flow which might cause loss of limb or even mortality. In this study, the registries of the patients having acute lower limb ischemia who has previously undergone femoral embolectomy in our center were assessed, retrospectively. Additionally, relevant literature on this topic were reviewed.
Materials and Methods: The data were obtained from the hospital records of 18 patients with acute lower limb arterial thrombosis ischemia who have undergone femoral artery thromboembolectomy between January 2011 and January 2017.
Results: The age range of 61.1% of the patients is between 65 and 84. 1-month, 6-month, and 1-year mortality rates of the patients are 16.67%, 27.78% and 50%, respectively. A significant portion of the patients having acute lower limb ischemia has a concomitant systemic atherosclerotic disorder in the pre-operative period. High mortality and morbidity rates occur as a result of coexisting medical comorbidities of patients with acute lower limb ischemia (ALLI).
Conclusion: It is crucial to take various risk factors, such as hypertension, diabetes, atrial fibrillation under control and start an immediate treatment for the prevention of multiorgan failure in the case of acute lower limb ischemia.

KEY WORDS: Embolism; Acute limb ischemia; Peripheral arterial occlusion.

INTRODUCTION

Acute lower limb ischemia (ALLI) is a condition that develops rapidly, and leads to sudden decrease in limb perfusion, thus threatening the viability of the relevant limb. This hypoperfusion causes disruption in cardiopulmonary and renal functions by triggering systemic acid-base and electrolyte imbalance.[1] Moreover, enabling reperfusion for the treatment of ALLI might cause mortality by perpetuating electrolyte imbalance and could cause leg edema leading to compartment syndrome which increases morbidity.[2] While the risk of amputation is between 10-30% in patients with ALLI, the mortality rate in the first year is 15-20%.[1]

Pain, pallor, paleness, pulselessness, paresthesia, and paralysis are the main clinical manifestations of acute arterial ischemia.[3] An ischemic event threatening an extremity is named "hyperacute" if it happens earlier than 24 hours, "acute" if it is 1-14 days, "subacute" between 15 days and 3 months, and "chronic ischemia" if it lasts more than 3 months.[4]

The reasons for ALLI are comprised of the acute thrombosis of a native limb artery or bypass graft, cardiac embolus, dissection, and trauma.[3] The study 70-80% of the whole embolisms are located in the extremities, being seen five-fold more frequent in the lower limbs. Peripheral emboli are located most frequently in the site of femoral bifurcation by 35-40%, and secondly in the popliteal artery by 14%.[5] In other respects, thrombosis often develops rapidly from an irregular or ulcerated plaque of an atherosclerotic vessel, thus leading to ischemia.

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The most common site of thrombosis is seen in the entrance of femoral artery in the Hunter's canal and popliteal fossa.[5]

To manage ALLI, percutaneous endovascular methods, such as catheter-assisted thrombolysis, manual aspiration thrombectomy, and mechanical thrombectomy are being used besides surgical methods.[6]

The objective of this study is to assess the registries of the patients with acute lower limb ischemia undergone femoral embolectomy in our center, and to review the relevant literature discuss the characteristics of the disease.

MATERIALS AND METHODS

The approval was obtained to perform of this study by the Ethics Committee of Kafkas University, Kars, Turkey. The data were obtained from the hospital records of 18 patients having acute lower limb arterial ischemia who have undergone conventional thromboembolectomy between January 2011 and January 2017 in our center. The age (<65, 65-84, >85) as the senility criterion, gender, mortality rates (1-month, 6-month, and 1-year), concomitant diseases, and post-operative complications of the patients were evaluated.

RESULTS

In our study, 55.6% (n=10) of the patients were female and 44.4% (n=8) were male. The age of 61.1% (n=11) of the patients were between 65-84. Eleven patients visited our clinic after 12 hours starting symptoms. There was no loss of motor function and sensation in the patients. 1-month, 6-month, and 1-year mortality rates of the patients were 16.67% (n=3), 27.78% (n=5) and 50% (n=9), respectively. One patient had concomitant acute pulmonary thromboembolism, while one had concomitant chronic pulmonary thromboembolism. The co-morbid diseases of the patients were peripheral arterial disease in ten, hypertension in five, diabetes mellitus in two, chronic kidney disease in six, chronic obstructive pulmonary disease in four, coronary artery disease in five, previous cerebrovascular disease in four, heart failure in four, and chronic atrial fibrillation in two. Post-operatively, one patient had cerebrovascular accident, and one patient developed infection. Three of the patients underwent re-embolectomy, while three underwent graft implantation, one fasciotomy, and one phalanx amputation. Reperfusion injury developed in three patients and gastrointestinal bleeding in two patients, post-operatively. The demographic and clinical characteristics of the patients, pre-operatively and rates of mortality are shown in Table 1.

DISCUSSION

Acute arterial occlusions are of the important circumstances of the vascular surgery which result from the blockage of the blood flow pathway by thrombus, air, tumor or fat. These include in 10-16% of vascular surgeries and 7-37.5% of all vascular diseases.[7]

Table 1: The Demographic and Pre-operative Clinical Characteristics of the Patients, and Post-operative Outcomes.

	n (%)
Age:	
<65	3 (16.67%)
65-84	11 (61.10%)
>85	4 (22.22%)
Gender:	
Female	10 (55.60%)
Male	8 (44.40%)
Peripheral artery disease	10 (55.60%)
Hypertension	5 (27.78%)
Diabetes mellitus	2 (11.11%)
Chronic obstructive pulmonary disease	4 (22.22%)
Chronic renal failure	6 (33.33%)
Cerebrovascular disease	4 (22.22%)
Coronary artery disease	5 (27.78%)
Heart failure	4 (22.22%)
Chronic atrial fibrillation	2 (11.11%)
Amputation	1 (5.56%)
Ischemia reperfusion injury	3 (16.67%)
Mortality:	
1 month	3 (16.67%)
6 month	5 (27.78%)
12 month	9 (50.00%)

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Acute arterial occlusion affects both sexes in a similar degree. It occurs frequently in patients with advanced ages and who have a comorbid disease. In our study, 55.6% of the patients were female and 44.4% were male. 61.1% of the patients were between 65-84 years old. Similarly, in a study conducted by Depboylu et al. 53.44% of the patients were female and 46.55% were male.[7] In their study, mean age of all patients was 71.39±14.88.[7]

In general, ALLI occurs as acute embolism or thrombosis on the ground of severe atherosclerotic stenosis. As the patient ages, the formation of atherosclerosis is accelerated, and acute thrombosis in the background of chronic peripheral arterial disease causes this condition, which is more predominant than embolisation.[8] Although, embolism stemming from thrombus in the heart caused by atrial fibrillation were at the forefront in the past, in the present time the usage of warfarin decreases frequency of the formation of acute peripheral occlusion due to atrial fibrillation.[9] In the study reported by Urbak et al, 63% of patients had previously known peripheral arterial disease.[10] Likewise, in our study, peripheral arterial disease was previously determined in 10 of 18 patients.

While improvements in open surgical techniques have diminished the rate of limb loss associated with ALLI, the mortality rate remains unacceptably high.[11] In addition, amputation rates increase for patients who are too late for the treatment. However, if there is no paralysis and anesthesia good results could be obtained by using anticoagulation and delayed elective revascularization.[12] In the study of Depboylu et al 8.62% of the patients did not have adequate circulation in the extremity despite the optimal medical treatment after embolectomy and amputation was performed, and 8.62% of the patients died at early stages.[7] Urbak et al have reported that the mortality rate is 3% in one month, but it reaches 22% in seven years.[10] In our study, while the one-month mortality rate of the patients was 16.67%, the one-year mortality rate was 50%, and only one patient underwent phalanx amputation. High mortality rate might stem from other systemic disease occurring at large frequency, such as pulmonary thromboembolism, hypertension, and heart failure those accompany to peripheral artery occlusion. Moreover, limited number of patients in our study, and delayed reception of the patients into our clinic might be the contributing factors of high mortality rates. In our study, we found that the lower rates of amputation might depend on no loss of sense and motor functions, and the ability of continuation of tissue viability through the collateral development relating chronic aterosclerosis.

Post-operative mortality is significantly higher in ALLI patients. This situation can be explained by two reasons. Firstly, a patient suffering from lower extremity ischemia always has widespread systemic atherosclerosis in addition to the arteries of the lower extremities.[13,14] In addition to peripheral artery disease, multisystem involvement, such as hypertension, chronic obstructive pulmonary disease, chronic renal failure, coronary artery disease, and cerebrovascular disease could be accompanied with aging in these patients. In the study by Koraen et al, hypertension, diabetes mellitus, ischemic, heart disease, cerebrovascular disease and atrial fibrillation were detected at high rates and it has been suggested that these comorbid diseases have a significant effect on surveillance.[15] Consistently, such comorbid diseases have also been found at higher rates in our patients.

Secondly, myoglobin, which is usually released from leg muscles due to hypoperfusion in the pre-operative period, causes renal damage and leads to hyperkalemia and metabolic acidosis in very elderly people and especially in patients having a comorbid disease, primarily coronary artery disease. Myoglobinuria, on the other hand, reaches its peak in the first 48 hours. Therefore, the pre-operative period is important for mortality and morbidity.[16] Apart from this, when reperfusion is achieved in the post-operative period, the compartment syndrome displaying increased extremity swelling could occur, and free oxygen radicals and potassium released from damaged tissue could affect, especially the heart. The possibility of loss of extremity and the severity of reperfusion injury is also related to the duration of ischemic damage.[16] In the Dağ et al study, 90.1% of all amputations were in patients who underwent embolectomy 6 hours after the onset of symptoms.[17] In a study conducted by Taviloglu et al, the mortality rate could be up to 37.7% following interventions after 12 hours.[18] In addition, hemorrhagic complications could develop due to antithrombotic therapy used during the pre-operative and post-operative periods.[19] All patients were treated with anticoagulation in the post-operative period and gastrointestinal haemorrhage developed in two patients.

CONCLUSION

High mortality and morbidity rates occurs as a result of coexisting medical comorbidities and vulnerable medical state of patients with ALLI. It is important to take various risk factors, such as hypertension, diabetes, atrial fibrillation under control. Furthermore, it is crucial to start immediate treatment for the prevention of multiorgan failure.

CONFLICTS OF INTEREST

The authors declare that there are no conflict of interest.

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