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RETROSPECTIVE ANALYSIS OF PATIENTS WITH OBLITERATING ATHEROSCLEROSIS OF THE LOWER EXTREMITY ARTERIES IN THE ABAI REGION OF THE REPUBLIC OF KAZAKHSTAN

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Abstract

Background and Objectives. Obliterating atherosclerosis of the lower extremity arteries (OALEA) is a severe vascular condition that leads to impaired blood supply to the limbs, reduced quality of life, and a high risk of amputations. This study presents a retrospective analysis of patients diagnosed with OALEA in the Abai region of the Republic of Kazakhstan. **The objective of the study** is to assess the demographic and clinical characteristics of patients with obliterating atherosclerosis of the lower extremities, as well as to identify the disease course features and treatment approaches.

Materials and Methods. For the retrospective analysis, data from the medical records of patients were obtained from the archive of the University Hospital of Non-profit joint-stock company «Semey Medical University» for the period from 2019 to 2023. The study included patients diagnosed with obliterating atherosclerosis of the lower extremity arteries, confirmed through clinical, laboratory, and instrumental examinations. Inclusion criteria for the study were patients aged 18 years and older. A total of 170 patients diagnosed with obliterating atherosclerosis of the lower extremity arteries were included in the study.

Results. The study included 170 patients with obliterating atherosclerosis of the lower extremity arteries, the majority of whom were male (67.6%) with a mean age of 69.55 ± 9.87 years. Most patients (78.2%) were urban residents, and 64.1% were retired and unemployed. Comorbidities were present in 98.8% of cases. Surgical treatment was performed in 96.5% of patients, including above-knee amputations in 44.1% of cases. Conservative therapy was administered to 25.7% of patients. A total of 76.5% of patients were admitted to the intensive care unit, complications were recorded in 3.5% of cases, and the mortality rate was 4.1%.

Conclusions. The study results reflect the significant clinical severity of patients with obliterating atherosclerosis of the lower extremity arteries in the Abai region, characterized by a high rate of amputations and limited access to reconstructive interventions. The identified patterns highlight the need to implement an integrated care system focused on early diagnosis, interdisciplinary collaboration, and the expansion of vascular surgery services at the regional level.

Keywords: *obliterating atherosclerosis of the lower extremity arteries, retrospective analysis, public health, medicine.*

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Резюме

РЕТРОСПЕКТИВНЫЙ АНАЛИЗ ПАЦИЕНТОВ С ОБЛИТЕРИРУЮЩИМ АТЕРОСКЛЕРОЗОМ АРТЕРИЙ НИЖНИХ КОНЕЧНОСТЕЙ В АБАЙСКОЙ ОБЛАСТИ РЕСПУБЛИКИ КАЗАХСТАН

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Введение и цель. Облитерирующий атеросклероз артерий нижних конечностей (ОААНК) представляет собой серьёзную сосудистую патологию, приводящую к нарушению кровоснабжения конечностей, снижению качества жизни и высокому риску ампутаций. Настоящее исследование представляет собой ретроспективный анализ пациентов с диагнозом ОААНК в Абайской области Республики Казахстан. **Целью данного исследования** является оценка демографических, клинических характеристик пациентов с облитерирующим атеросклерозом нижних конечностей, а также выявление особенности течения и подходы к лечению заболевания.

Материалы и методы. Для проведения ретроспективного анализа были использованы данные из медицинских карт пациентов, полученные из архива университетской клиники Некоммерческое акционерное общество «Медицинский университет Семей» за период с 2019 по 2023 год. В исследование были включены пациенты с диагнозом облитерирующий атеросклероз артерий нижних конечностей, подтверждённым на основании клинических, лабораторных и инструментальных методов обследования. Критерием включения в исследование являлось достижение пациентами возраста 18 лет и старше. Всего в исследование было включено 170 пациентов с установленным диагнозом облитерирующего атеросклероза артерий нижних конечностей.

Результаты. В исследование включено 170 пациентов с облитерирующим атеросклерозом артерий нижних конечностей, преимущественно мужчины (67,6%), средний возраст составил 69,55 ± 9,87 лет. Большинство пациентов (78,2%) городские жители, 64,1% - неработающие пенсионеры. У 98,8% отмечены сопутствующие заболевания. Оперативное лечение проведено 96,5% пациентам, из них 44,1% ампутации выше колена. Консервативную терапию получали 25,7% больных. В АОРИТ находились 76,5% пациентов, осложнения зафиксированы у 3,5%, летальность составила 4,1%.

Выводы. Результаты исследования отражают выраженную клиническую тяжесть контингента пациентов с облитерирующим атеросклерозом артерий нижних конечностей в Абайской области, сопровождающуюся высокой частотой ампутаций и ограниченным доступом к реконструктивным вмешательствам. Выявленные особенности указывают на необходимость внедрения интегрированной системы оказания помощи, ориентированной на раннюю диагностику, междисциплинарное взаимодействие и расширение возможностей сосудистой хирургии на региональном уровне.

Ключевые слова: *облитерирующий атеросклероз артерий нижних конечностей, ретроспективный анализ, общественное здравоохранение, медицина.*

Для цитирования:

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Түйіндеме

ҚАЗАҚСТАН РЕСПУБЛИКАСЫ АБАЙ ОБЛЫСЫНДА ТӨМЕНГІ АЯҚ-АТЕРОСКЛЕРОЗЫ ОБЛИТЕРАЦИЯЛЫҚ АТЕРОСКЛЕРОЗЫ БАР НАУҚАСТАРҒА РЕТРОСПЕКТИВАЛЫҚ ТАЛДАУ

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Кіріспе және мақсаты. Төменгі аяғындағы артериялардың облитерациялық атеросклерозы (ТААОА) - аяқ-қолдардың қанмен қамтамасыз етілуінің бұзылуына, өмір сапасының төмендеуіне және ампутацияның жоғары қаупіне әкелетін ауыр тамырлы патология. Бұл зерттеу Қазақстан Республикасының Абай облысында ТААОА диагнозы қойылған науқастарға ретроспективті талдау болып табылады. **Бұл зерттеудің мақсаты** төменгі аяғындағы облитерациялық атеросклерозбен ауыратын науқастардың демографиялық және клиникалық сипаттамаларын бағалау, сонымен қатар аурудың ағымының ерекшеліктерін және емдеу тәсілдерін анықтау болып табылады

Материалдар мен тәсілдер. Ретроспективті талдауды жүргізу үшін 2019-2023 жылдар аралығындағы «Семей Медицина Университеті» КеАҚ Университеттік клиникасының мұрағатынан алынған пациенттердің медициналық құжаттарының деректері пайдаланылды. Зерттеуге клиникалық, зертханалық және аспаптық зерттеу әдістерінің негізінде расталған төменгі аяғындағы артериялардың облитерациялық атеросклерозы диагнозы бар науқастар қамтылды. Зерттеуге қосу критерийі пациенттердің 18 жастан жоғары болуы болды. Зерттеуге төменгі аяқ-қол артерияларының облитерациялық атеросклерозы анықталған диагнозы бар барлығы 170 пациент қатысты.

Нәтежиелер. Зерттеуге төменгі аяқ-қол артерияларының облитерациялық атеросклерозымен ауыратын 170 науқас қатысты, негізінен ер адамдар (67,6%), орташа жасы 69,55 ± 9,87 жасты құрады. Науқастардың басым бөлігі (78,2%) қала тұрғындары, 64,1%-ы жұмыс істемейтін зейнеткерлер. 98,8 пайызында қатар жүретін аурулар болған. Науқастардың 96,5%-ында хирургиялық ем жүргізілді, оның 44,1%-ы тізеден жоғары ампутация болды. Консервативті емді науқастардың 25,7%-ы қабылдаған. Науқастардың 76,5%-ы жансақтау бөлімінде болса, 3,5%-да асқынулар тіркеліп, өлім 4,1%-ды құрады.

Қорытындылар. Зерттеу нәтижелері Абай облысында төменгі аяқ-қол артерияларының облитерациялық атеросклерозы бар науқастар контингентінің айқын клиникалық ауырлығын көрсетеді, ампутациялардың жоғары жиілігімен және реконструкциялық араласуларға қол жетімділіктің шектелуімен бірге жүреді. Анықталған ерекшеліктер аймақтық деңгейде ерте диагностикаға, пәнаралық өзара әрекеттесуге және тамыр хирургиясының мүмкіндіктерін кеңейтуге бағытталған кешенді медициналық көмек жүйесін енгізу қажеттілігін көрсетеді.

Түйінді сөздер: *төменгі аяқ-қол артерияларының облитерациялаушы атеросклерозы, ретроспективті талдау, қоғамдық денсаулық сақтау, медицина.*

Дәйексөз үшін:

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Introduction

Cardiovascular diseases (CVDs) are the leading cause of disability and mortality worldwide [7,11,21,23], with atherosclerosis being the primary pathological process underlying the majority of these conditions.

Atherosclerosis is a systemic and chronic pathological alteration of the arterial wall layers that begins early in life and remains latent and asymptomatic for an extended period before progressing to its advanced stages [13,16]. It is a multifocal pathological process that has been extensively studied over recent decades. Atherosclerosis typically develops silently over time and only becomes clinically apparent at a late stage, often presenting with severe or even fatal events such as acute myocardial infarction or ischemic stroke.

Peripheral artery disease (PAD) represents a frequent manifestation of systemic atherosclerosis, particularly affecting the lower extremities. Obliterating atherosclerosis of the lower extremities (OALE) is a chronic and progressive condition characterized by the narrowing or occlusion of peripheral arteries, leading to tissue ischemia and, in advanced cases, limb loss [3,8,15]. The prevalence of PAD increases significantly with age, affecting over 20% of individuals older than 70 years, many of whom remain undiagnosed due to the asymptomatic or nonspecific nature of early-stage disease.

According to the guidelines of the European Society of Cardiology and the Global Vascular Guidelines consensus, effective management of patients with OALE requires a multidisciplinary approach involving vascular surgeons, interventional radiologists, general physicians, rehabilitation specialists, and other healthcare professionals. The treatment strategy prioritizes early detection, correction of modifiable risk factors, pharmacological therapy (including antiplatelet agents, statins, and antihypertensive drugs), as well as the use of minimally invasive reconstructive interventions.

However, in resource-constrained settings, including certain regions of the Republic of Kazakhstan, there remains a high incidence of amputations and delays in accessing specialized vascular care. National studies have highlighted a persistently low rate of reconstructive vascular surgery, particularly in rural and underserved areas [19]. These challenges emphasize the urgent need for a more structured and system-wide approach to the care of patients with OALE, including the development of regional screening programs, effective referral pathways, and expanded access to vascular technologies and interventions [15,24].

Recent international experience shows that implementation of early PAD detection programs and centralized referral systems can significantly reduce the burden of late-stage ischemia and improve limb salvage rates. Evidence from Eastern European countries undergoing healthcare reform indicates that integration of vascular diagnostic networks at the regional level leads to earlier intervention and reduced amputation frequency.

In the context of Kazakhstan, particularly in remote areas such as the Abai Region, geographic barriers, limited access to trained vascular specialists, and underfunding of diagnostic infrastructure compound the challenges faced by clinicians. A systematic analysis of regional case data can help guide local health policy, resource allocation, and capacity building in vascular medicine.

The present study aims to conduct a retrospective analysis of the patient profile with OALE in the Abai region of the Republic of Kazakhstan, assessing factors influencing treatment outcomes and the extent of surgical interventions performed, followed by a comparison with international data.

Materials and Methods

For the retrospective analysis, data from the medical records of patients were obtained from the archive of the University Hospital of Non-profit joint-stock company «Semey Medical University» for the period from 2019 to 2023. The study included patients diagnosed with obliterating atherosclerosis of the lower extremity arteries, confirmed through clinical, laboratory, and instrumental examinations.

Inclusion criteria for the study were patients aged 18 years and older.

A total of 170 patients diagnosed with obliterating atherosclerosis of the lower extremity arteries were included in the study. Demographic characteristics and clinical data related to the disease and treatment were obtained from patients and their medical records.

Exclusion criteria: acute arterial thromboembolism; varicose vein disease without signs of arterial involvement; terminal-stage oncological diseases; incomplete or fragmented medical records.

The administration of the clinic where the study was conducted was informed about the study's progress and raised no objections to the publication of its results in an open-access format.

The study was conducted in accordance with the principles of the Declaration of Helsinki and was approved by the Ethics Committee of Semey Medical University (Protocol No. 2, dated December 12, 2023). Written informed consent was obtained from all participants prior to their inclusion in the study.

Statistical Analysis

Means and standard deviations (SD) were used to describe quantitative variables, while absolute (N) and relative (%) frequencies were used for qualitative variables. Pearson's chi-square (χ^2) test or Fisher's exact test, where applicable, was employed for proportion comparisons. Significance levels were two-tailed, with statistical significance set at $p < 0.05$. Statistical analyses were performed using SPSS version 24.0.

Results

A total of 170 patients with a confirmed diagnosis of obliterating atherosclerosis of the lower extremity arteries were included in the study. The majority were male (67.6%, N = 115), and 54.1% (N = 92) were of Russian ethnicity. Regarding place of residence, 78.2% (N = 133) were urban residents.

In total, 64.1% (N = 109) of the respondents were retired and unemployed. The mean age of the patients

was 69.55 ± 9.87 years. The gender and age distribution of patients suggests a predominance of older males, which aligns with the global epidemiology of OALE. Numerous studies have shown that males over 65 are particularly susceptible to peripheral arterial disease, especially in settings with high rates of smoking, diabetes, and hypertension.

Most patients (32.9%, N = 56) were admitted through emergency medical services or transferred from other inpatient facilities. In 57.6% (N = 98) of cases, the pre-hospital period exceeded 10 days, indicating delayed diagnosis and/or delayed presentation to healthcare facilities. The extended pre-hospital period observed in 57.6% of patients (over 10 days) indicates delayed access to specialized care and may be associated with underrecognition of symptoms by both patients and general practitioners. This delay likely contributes to the high proportion of emergency admissions and the severity of clinical presentation. Upon hospital admission, the condition of 71.2% of patients was assessed as being of moderate severity.

Almost all patients (98.8%) had comorbid conditions, including hypertension, diabetes mellitus, ischemic heart disease (IHD), chronic obstructive pulmonary disease (COPD), and others (Table 1). The high rate of comorbidities (98.8%) among patients with OALE reflects the systemic nature of atherosclerosis. This finding supports the need for a multidisciplinary approach to care, incorporating cardiology, endocrinology, and nephrology specialists.

Table 1.

Medical and Social Characteristics of the Patients.

Total number of patients	Indicators	N (%)
Gender	Men	115 (67,6)
	Women	55 (32,4)
Age (years, M ±m)	69,55 ± 9,87 лет	
Place of residence	Urban	133 (78,2)
	Rural	37 (21,8)
Ethnicity	Kazakh	74 (43,5)
	Russian	92 (54,1)
	Other	4 (2,4)
Social status	Worker	16 (9,4)
	Retired	109 (64,1)
	Disabled	31 (18,2)
	Unemployed	14 (8,3)
Admission channels	Emergency Medical Services (EMS)	56 (32,9)
	Family Medicine Clinic (General Practitioner)	39 (22,9)
	Vascular Surgeon	34 (20)
	Doctors of other specialties	41 (24,1)
	Transfer from another hospital	56 (32,9)
Pre-hospital stage duration	Up to 1 day	13 (7,6)
	1-3 days	27 (15,9)
	4-7 days	22 (13,0)
	7-10 days	10 (5,9)
	More than 10 days	98 (57,6)
General condition of patients upon admission	Satisfactory	39 (22,9)
	Moderate	121 (71,2)
	Severe	10 (5,9)
Comorbidities	Yes	168 (98,8)
	No	2 (1,2)

A total of 96.5% (N = 164) of patients underwent surgical intervention. The most commonly performed procedures were above-knee amputations, accounting for 44.1% (N = 75) of all surgical cases. Reconstructive surgeries included femoral-popliteal bypass grafting (15.9%), repair using synthetic implants (8.8%), aortoiliac-femoral bypass (1.8%), and autovenous graft transplantation (0.6%). Most operations were performed under emergency conditions.

The fact that only 8.8% of patients underwent reconstructive procedures using synthetic implants and even fewer (1.8%) received complex bypass surgeries points to a limited availability of advanced surgical interventions in the region. This limitation may stem from resource constraints or a shortage of specialized vascular surgeons.

Conservative therapy was administered to 25.7% (N = 42) of patients. The most frequently used medications included analgesics (93.5%, N = 159), microcirculation enhancers (94.1%, N = 160), antibiotic therapy (85.9%, N = 146), infusion therapy (83.5%, N = 142), antispasmodics (74.7%, N = 127), antiplatelet agents (61.8%, N = 105), and angioprotectors (51.2%, N = 87). In most cases, treatment involved a combination of several pharmacological groups simultaneously. The pharmacological treatment profile indicates a high reliance on symptomatic therapy (analgesics, antispasmodics, microcirculation enhancers), with a relatively modest use of guideline-recommended agents such as antiplatelet therapy. This highlights potential gaps in adherence to international PAD management protocols.

These treatments were often used in combination, suggesting an approach aimed primarily at stabilizing acute symptoms rather than addressing the underlying pathophysiological processes of peripheral artery disease (PAD). The relatively lower rate of evidence-based therapies, such as antiplatelet agents (61.8%) and anticoagulants (41.8%), is of particular concern. Current European Society of Cardiology (ESC) guidelines recommend routine use of antiplatelet therapy and statins in all patients with symptomatic PAD, as these medications significantly reduce the risk of cardiovascular events and progression of ischemia. The underutilization of these agents may reflect either prescribing gaps or limitations in drug availability within the studied region. Additionally, only 7.6% of patients received physical therapy (FZT), which is an essential component of conservative management in chronic limb-threatening ischemia (CLTI). Supervised exercise programs are known to improve pain-free walking distance and enhance quality of life. The minimal implementation of such rehabilitation strategies again highlights a gap between international best practices and the current standard of care in the Abai region. These findings underscore the need for systemic educational initiatives targeting healthcare providers at the primary and hospital levels. Improved awareness of evidence-based PAD management could enhance pharmacologic adherence and reduce the rate of disease progression and amputations. Furthermore, the reliance on antibiotics (85.9%) may suggest frequent presentation of patients with advanced limb infections, which are often associated with delayed diagnosis. This observation further reinforces the urgency of early detection and the establishment of outpatient vascular clinics for timely intervention and monitoring. In summary, while symptomatic treatments are widely administered, the gap in guideline-based pharmacotherapy necessitates urgent interventions in the form of clinical audits, continuing medical education (CME) programs, and better integration of vascular medicine protocols into hospital formularies and electronic medical records.

A total of 76.5% of patients were admitted to the Intensive Care Unit (ICU), with the majority (54.1%, N = 92) staying for less than 24 hours. Postoperative complications were recorded in 3.5% (N = 7) of cases and included thromboembolism, bleeding, multiple organ failure, and wound-related complications. The average hospital stay did not exceed 20 days in 92.4% (N = 157) of patients.

In terms of treatment outcomes, 92.4% (N = 92) of patients recovered, while 4.1% (N = 7) experienced a fatal outcome. Mortality was more frequently observed among older patients with severe comorbidities and those who underwent major amputations at advanced stages of ischemia (Table 2 and Figure 1, 2, 3, 4).

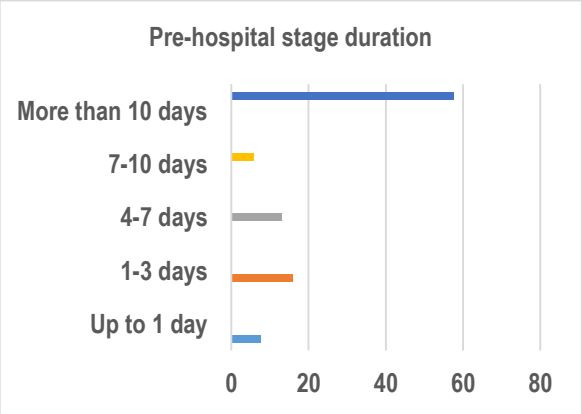

Figure 1. Pre-hospital stage duration.

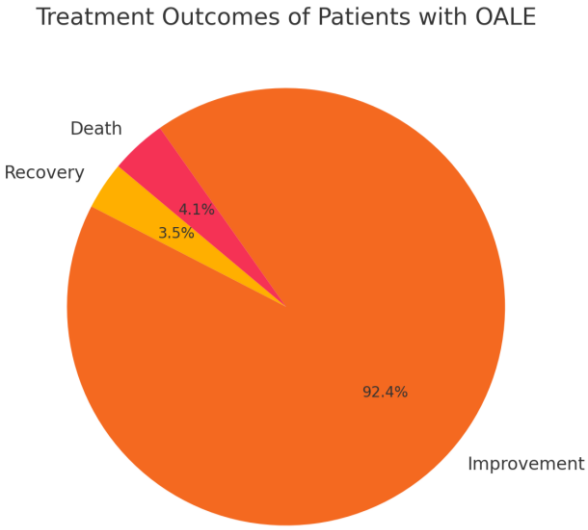

Figure 2. Distribution of Conservative Therapy among Patients with OALE.

Table 2.

Inpatient Care Indicators for Patients.

Indicators		N (%)
Type of treatment	Conservative	6 (3,5)
	Surgical	164 (96,5)
Methods of surgical treatment	Vessel tissue graft restoration	1 (0,6)
	Vascular restoration with synthetic implant	15 (8,8)
	Femoral-popliteal bypass	27 (15,9)
	Above-knee amputation	75 (44,1)
	Below-knee amputation	2 (1,2)
	Aorto-iliac-femoral anastomosis	3 (1,8)
	Foot amputation	5 (2,9)
	Conservative treatment	42 (25,7)
Scope of conservative therapy	Anticoagulant therapy	71 (41,8)
	Antiplatelet therapy	105 (61,8)
	Analgesics	159 (93,5)
	Antispasmodics	127 (74,7)
	Microcirculation correctors	160 (94,1)
	Angioprotectors	87 (51,2)
	Antibiotic therapy	146 (85,9)
	Infusion therapy	142 (83,5)
	FZT (Physical Therapy)	13 (7,6)
Duration of the Intensive Care Unit (ICU)	Not admitted	40 (23,5)
	Up to 1 day	92 (54,1)
	1-3 days	22 (12,9)
	4 -5 days	8 (5,9)
	6-7 days	4 (2,4)
	More than 7 days	4 (2,4)
Complications	Bleeding	1 (0,6)
	Wound complications	1 (0,6)
	Thromboembolic complications	4 (1,7)
	Multiple organ failure	1 (0,6)
	No complications	164 (96,5)
Duration of inpatient treatment	Up to 10 days	69 (40,6)
	Up to 20 days	88 (51,8)
	Up to 30 days	12 (7,0)
	More than 30 days	1 (0,6)
Treatment outcomes	Recovery	6 (3,5)
	Improvement	157 (92,4)
	Death	7 (4,1)

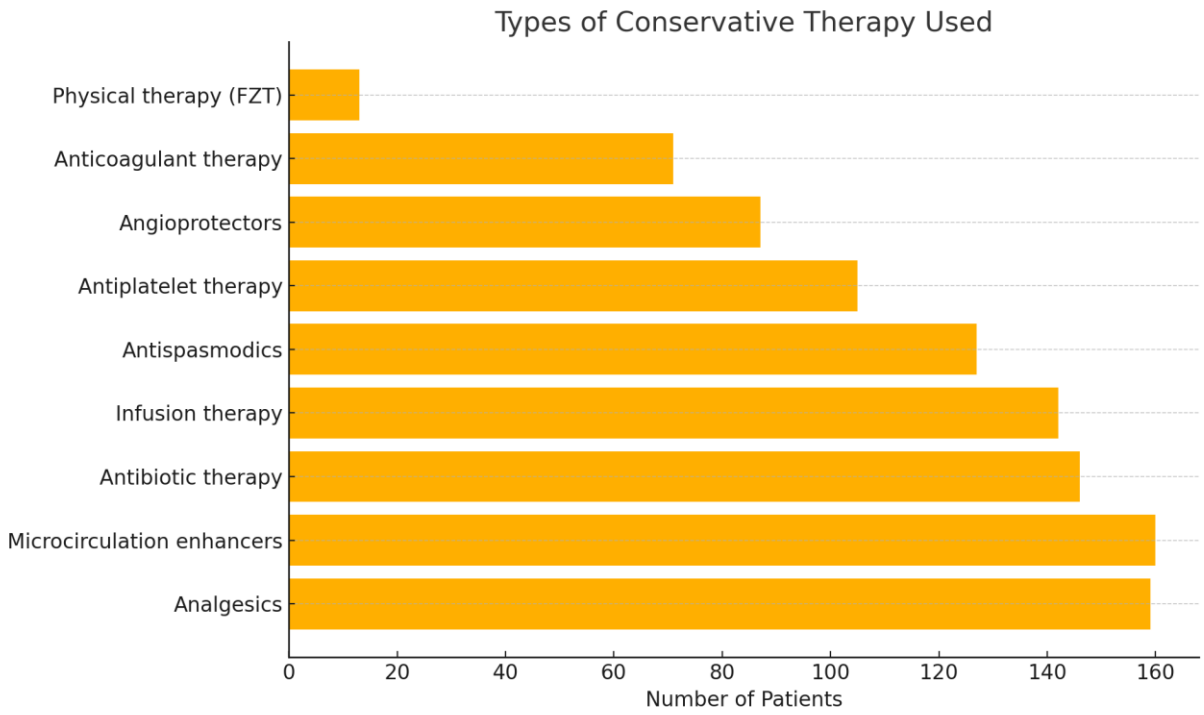

Figure 3. Treatment Outcomes among Patients with OALE.

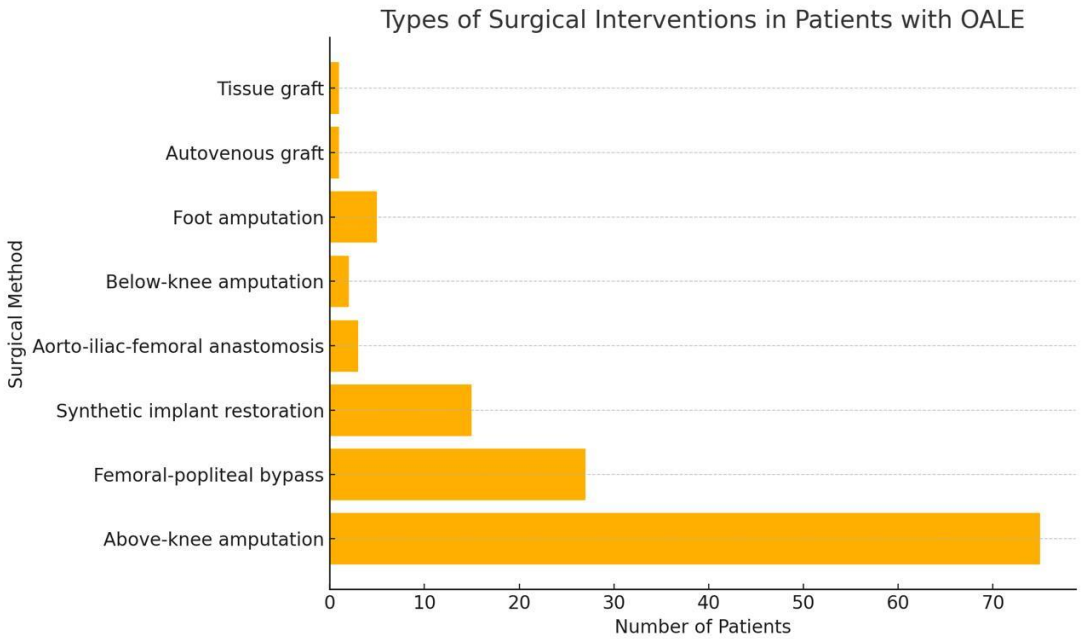

Figure 4. Types of Surgical Interventions in Patients with OALE

Discussion

The clinical profile and treatment patterns observed in this study provide a valuable opportunity to benchmark regional vascular care practices against international standards.

Several system-level issues were identified - ranging from delayed admissions to the limited use of reconstructive procedures - that mirror structural challenges documented in similar healthcare settings [19–26].

In this context, our findings merit broader discussion, particularly with regard to early detection strategies, surgical capacity, and health-system integration.

The high proportion of emergency admissions (32.9%) and inter-hospital transfers (32.9%) may reflect both the delayed recognition of critical limb ischemia at the primary care level and the lack of streamlined referral systems. This is in line with data from similar resource-limited regions in Eastern Europe, where weak pre-hospital triage contributes to worsened clinical outcomes [10].

In our study, only 1.8% of patients underwent aortoiliac-femoral bypass and 0.6% received autovenous grafts, which may indicate a limited capacity for complex reconstructive surgery in the region. International studies suggest that access to such procedures is closely tied to institutional experience and specialized vascular teams [18].

Postoperative complications were recorded in just 3.5% of cases, which may reflect either effective perioperative protocols or, conversely, underreporting due to incomplete documentation — an issue previously noted in retrospective audits of vascular care [19].

The short ICU stay (less than 24 hours for 54.1% of patients) and relatively low complication rates are atypical compared to global benchmarks. Further qualitative research may be required to evaluate clinical decision-making, documentation accuracy, and the adequacy of intensive monitoring practices [5].

A 4.1% mortality rate, though seemingly modest, warrants close attention, especially since deaths were clustered among older patients with comorbidities and major amputations. This aligns with global data on the prognostic value of frailty and ischemia stage in limb salvage surgery [19,26].

Furthermore, our data show that 76.5% of patients required ICU admission. This suggests a high burden of acute decompensation in OALE, which may be mitigated by earlier detection and outpatient optimization of comorbid conditions [16].

From a health systems perspective, the disproportionate reliance on emergency care and the high rate of limb loss highlight the need for capacity building in outpatient vascular diagnostics, community-level education, and continuous professional development for primary care providers [14].

Building on these considerations, the core findings of our study are discussed below in greater detail, with specific attention to clinical severity, surgical outcomes, and comparison with international literature and best practices.

The findings of this study reveal a high clinical severity among patients with obliterating atherosclerosis of the lower extremity arteries (OALE) in the Abai Region. The significant level of disability, high prevalence of comorbid conditions, and delayed presentation (more than 10 days from symptom onset in 57.6% of cases) emphasize the need to revise patient referral pathways and improve access to specialized vascular care.

When compared to the TASC II guidelines and associated studies [4,17], which prioritize early detection and minimally invasive interventions in European countries, the results of our study indicate a substantially higher amputation rate (44.1%). This figure notably exceeds the rates observed in EU countries, where major amputations typically range between 5–10%.

Further comparison with recent international literature supports the relevance of our findings. For example, the study by *Conte S.M. et al.* [8] highlights the need for standardized care in cases of chronic limb-threatening ischemia and advocates for integrated multidisciplinary management, including vascular surgery, interventional procedures, and rehabilitation strategies [8,9]. Our analysis suggests that such multidisciplinary and integrated approaches remain underdeveloped at the regional level.

The work by *Katsanos K. et al.* emphasizes the effectiveness of early endovascular intervention in patients with critical limb ischemia and highlights the importance of reducing amputation rates [7,15]. In our study sample, the rate of major amputations (44.1%) remains critically high, reflecting both delayed healthcare-seeking behavior and limited access to minimally invasive treatment options.

The study by *Criqui M.H., Aboyans V.* [9] underscores the significant role of risk factors such as diabetes mellitus and arterial hypertension—findings that are consistent with our data, where diabetes was observed in 38.8% of patients and hypertension in 72.9%. In Western European countries, proactive risk factor control strategies have contributed to reduced disease progression and lower rates of critical limb ischemia.

According to the review by *Bonaca M.P. et al.,* patients with peripheral arterial disease (PAD) are at increased risk of cardiovascular events, and aggressive risk factor modification is essential, including the use of antiplatelet agents and statins [6]. In our cohort, only 61.8% of patients received antiplatelet therapy, indicating a shortfall in pharmacological prevention.

The findings of *Akhmetova A.Zh. et al.* confirm the insufficient availability of vascular surgery in regional healthcare institutions in Kazakhstan and highlight the importance of expanding preventive and angiology services [2]. Our results support this conclusion, as only 8.8% of patients in our sample received reconstructive vascular procedures.

In addition, the analysis conducted by the World Federation of Angiology emphasizes the need for early detection of lower extremity artery disease in rural and vulnerable populations through screening programs and telemedicine technologies [18]. This is particularly relevant in the context of the Abai Region, where patients from rural areas presented with more advanced stages of the disease.

Conclusions

The results of this study highlight the severe clinical burden among patients with obliterating atherosclerosis of the lower extremity arteries in the Abai Region, characterized by a high rate of major amputations and limited access to reconstructive interventions. These findings underscore the urgent need for a comprehensive approach that includes preventive measures, early diagnosis, improved inter-level coordination of care, and the expansion of vascular technologies within the region.

Conflict of Interest. *The authors declare that they have no conflict of interest.*

Contribution of authors. *All authors were equally involved in the writing of this article.*

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