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Acute lower limb ischemia in the context of the COVID-19 pandemic

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At the end of 2019, a novel coronavirus was identified in the People's Republic of China, which spread throughout the world [1]. Many studies showed that coronavirus disease 2019 (COVID-19) infection leads to hypercoagulability, and, accordingly, increases the risk of blood clots in various vascular systems [2].

One of the conditions associated with acute thrombotic (embolic) occlusion of the main arteries is acute lower limb ischemia (ALLI). By long-term study of this problem (since the 60s of the last century), the medical community learned to effectively restore blood flow in such patients. In addition, methods of conservative, surgical and endovascular treatment have been developed depending on the severity of clinical manifestations and the timing of acute arterial occlusion [3].

At the time of preparing paper, the PubMed search engine has published >125000 different studies on the treatment, prevention of COVID-19 and its impact on the course of acute and chronic diseases. By the same period, only 88 articles were found in the database, in which the influence of infection on ALLI course is considered. Most of them are case reports.

The Turkish analysis of COVID-19 treatment described that the incidence of ALLI in inpatients treated with low molecular weight heparins was 0,9%. The period between onset of the disease and development of this complication was 13 days [4]. The study from the US demonstrated that, with an overall decrease in emergency surgical pathology, the number of urgent vascular interventions increased [5].

In addition, there are reports on the patients completely atypical for this pathology. Thus, in Italy, two cases of spontaneous arterial lower limb thrombosis were recorded in young patients without comorbidities [6]. The US authors demonstrated a case report of ALLI in a patient with severe COVID-19 pneumonia against the background of prophylactic treatment with low molecular weight heparins (enoxaparin) [7].

Despite the small number of studies on this issue, the urgency of the problem is high. Conventional treatment methods of vascular surgeons are clearly insufficient in view of virus-induced hypercoagulability. The authors note a tenfold increase in the number of patients with ALLI in the hospital ($p<0,001$), and a mortality increase up to 40% [8] after surgery. The same study demonstrated a clear favorable effect of intravenous heparin infusion in the postoperative period on reducing the mortality rate ($p=0,042$).

In another study, a higher incidence of severe grade 2A and 2B ALLI in patients was noted, as well as an increase in the rate of technical thrombectomy failures and amputation up to 30% [9].

There is an opinion that in the current world situation, given hypercoagulation, the high risks of postoperative complications when using artificial ventilation in patients, endovascular interventions should be performed, which will restore blood circulation in the limb under local anesthesia and potentially reduce the surgical risk [10].

The probable advantage of this approach is the effectiveness of action of fibrinolytic drugs, which are used to dissolve blood clots in the main arteries, on microcirculation, which will potentially reduce the retrombosis rate. However, in modern Russian conditions, the vascular surgery departments have little experience in performing such interventions, while catheter-directed thrombolysis is still performed only in large research institutions [11, 12].

The most common method of open revascularization in Russia is thrombectomy. However, it is associated with high mortality and requires study of postoperative anticoagulant/antiplatelet therapy. From the information available to date, the optimal drug (taking into account the performed surgery) is heparin [13]. The majority of studies on the anticoagulation use assess the risks of venous rather than arterial thrombosis. The study "*Surgical thrombectomy versus conservative treatment in cases of acute limb ischemia with COVID-19 pneumonia*" by Fahad A. M., et al. showed that arterial thrombosis can occur in patients without comorbidities treated with anticoagulant therapy. In this regard, the question "what drugs to use after limb revascularization after hospital discharge?" should b e studied separately; unfortunately, there is no answer at the moment. We have to focus on the treatment regimens for venous thrombosis, which is not entirely correct.

The aspirin therapy after peripheral artery interventions is standard; in recent years, rivaroxaban at a dose of 2,5 mg 2 times a day has been increasingly supplemented to therapy. [14]. The anticoagulation dose in the presented regimen is insufficient in patients with COVID-19. In this regard, the guidelines of anticoagulation forum should be considered [15]. For rivaroxaban, the dose is 10 mg a day.

ALLI is an urgent vascular disorder that in most cases requires surgical treatment. During COVID-19 pandemic, the total number of cases has increased and the outcomes of surgical treatment have worsened. In Russian conditions, the most common method of surgical treatment is open surgery, which requires more aggressive anticoagulant therapy in the postoperative period.

Relationships and Activities: none.

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