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Stenosis of large lower limb arteries in a teenager after COVID-19 infection

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ABSTRACT

The aim of the present study is to report a COVID-19 infection sequel in large lower limb arteries in adolescent. An 18-year-old female adolescent those two weeks after COVID- 19 she had severe pain in her right leg that limited her walking and was admitted to hospital. Upon admission, a clinical history and physical examination were performed and the absence of pulses in the femoral was detected. An angiotomography was requested, which revealed thrombosis in a portion of the external iliac artery, femoral, popliteal and tibial. She underwent an embolectomy that progressed well and is discharged from the hospital with anticoagulation using sodium warfarin. In outpatient follow-up, she underwent a control examination with arterial duplex of the right lower limb, eight months after the event, with a finding of stenosis greater than 50% of the diameter, suggesting an inflammatory process in the iliac femoral artery and a significant reduction in the diameter of the artery posterior tibial artery. The clinical evolution of post COVID-19 patients who had arterial thrombotic events should be monitored for possible sequelae that may occur.

Keywords: Stenosis arteries, lower limb, teenager, COVID-19, sequels

1. INTRODUCTION

Studies have shown that infection with severe acute respiratory syndrome Coronavirus 2 (SARS-CoV-2) is also responsible for a severe inflammatory response that can lead to macrovascular and microvascular thrombosis, however, it is not known how long inflammation and thrombotic disorders can last after recovery from COVID-19 symptoms (Borelli et al., 2021). Prehospital therapy with low-dose aspirin may reduce the risk of admission to an intensive care unit or the need of mechanical ventilation in patients hospitalized with COVID-19. Low doses of aspirin in the primary prevention of arterial thromboembolism in patients aged 40-70 years who are at high risk for atherosclerotic cardiovascular disease are suggested (Sayed Ahmed et al., 2021).

The ideal management strategy for acute limb ischemia in patients with COVID-19 without mechanical ventilation is uncertain. One of the cases series

proposes endovascular revascularization (Aasen & Blecha, 2021). Despite the widespread use of thromboprophylaxis, patients hospitalized with COVID-19 are at increased risk of arterial events and subsequent loss of limbs or even death (Topcu et al., 2021; Pereira de Godoy et al., 2021; da Silva et al., 2021). Arterial thrombosis in children is rare and with multiple sites it is even rarer. The chronic sequela of arterial thrombosis of large arteries in children has not been reported yet. The aim of the present study is to report a COVID-19 infection sequel in large lower limb arteries in adolescent.

2. CASE REPORT

An 18-year-old female adolescent with a history of COVID-19 infection for eight months and was treated at home without the need for hospitalization. Two weeks after COVID-19 she had severe pain in her right leg that limited her walking and was admitted to hospital. Upon admission, a clinical history and physical examination were performed and the absence of pulses in the femoral was detected. An angiotomography was requested, which revealed thrombosis in a portion of the external iliac artery, femoral, popliteal and tibial. She underwent an embolectomy that progressed well and is discharged from the hospital with anticoagulation using sodium warfarin.

In outpatient follow-up, she underwent a control examination with arterial duplex of the right lower limb, eight months after the event, with a finding of stenosis greater than 50% of the diameter, suggesting an inflammatory process in the iliac femoral artery and a significant reduction in the diameter of the artery posterior tibial artery, as shown in Figures 1 to 3.

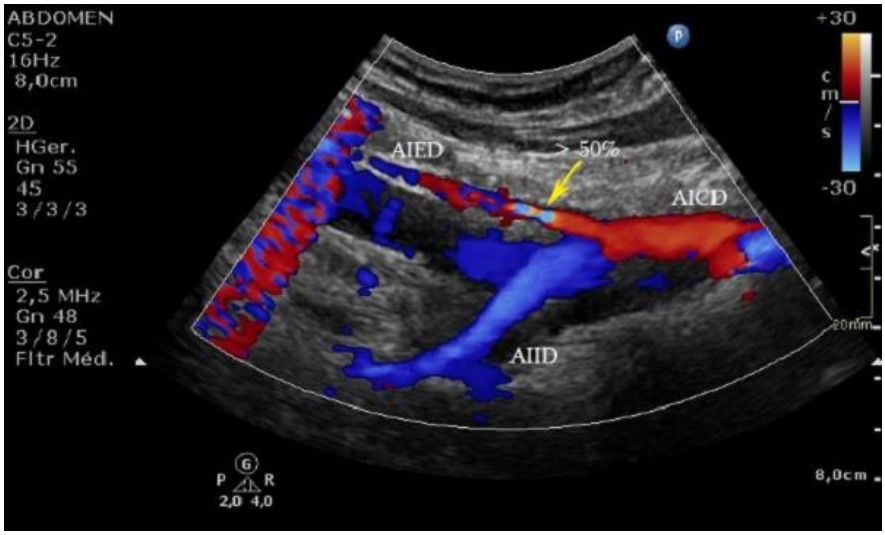

Figure 1 Stenosis greater than 50% of the diameter, suggesting an inflammatory process in the iliac artery

Figure 2 Stenosis greater than 50% of the diameter, suggesting an inflammatory process in the femoral artery

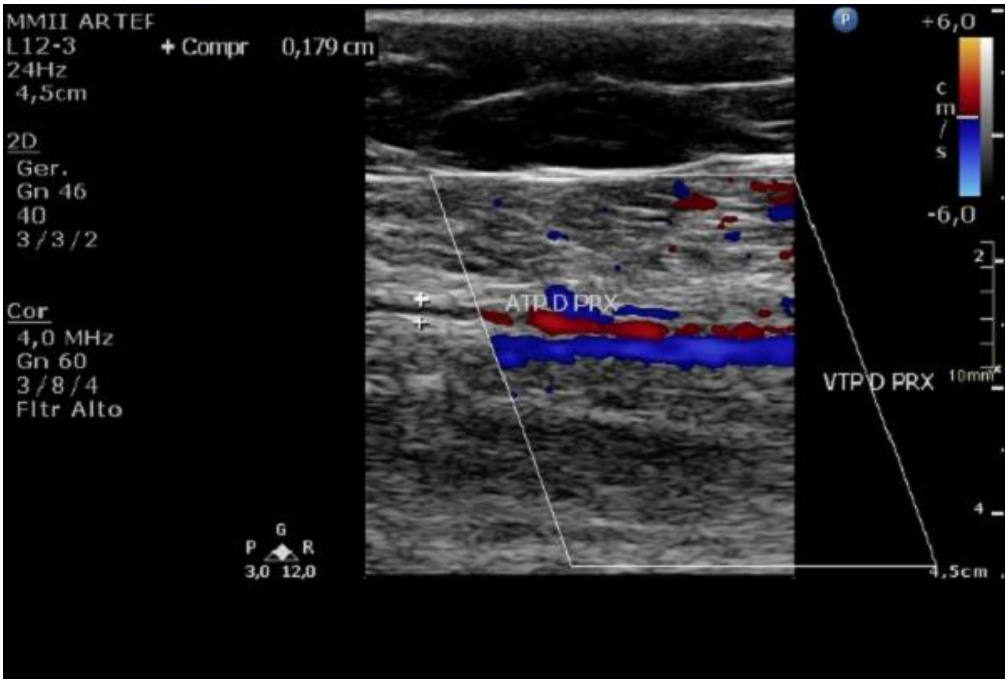

Figure 3 Stenosis greater than 50% of the diameter, suggesting an inflammatory process in the posterior tibial artery

Figure 4 shows the normal posterior tibial artery of the left leg. After the duplex, we chose to introduce aspirin and maintain an outpatient follow-up with our Vascular Surgery team. This study received approval from the institutional review board of the São Jose do Rio Preto School of Medicine # 4.300.416. The familiar responsibility for the patient signed written consent form.

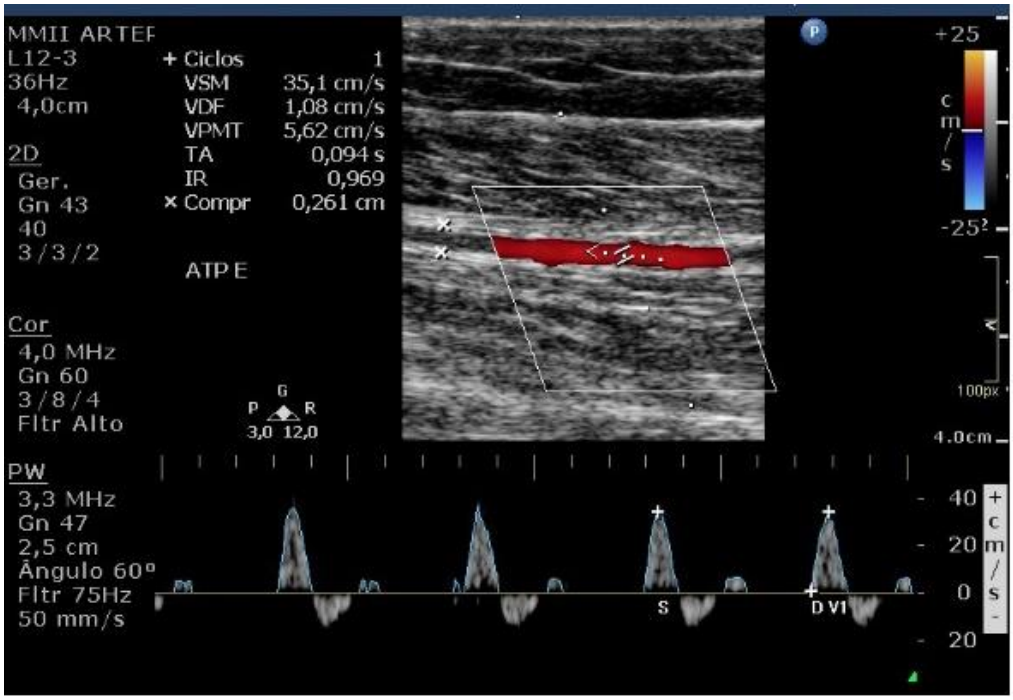

Figure 4 posterior tibial arteries in the contralateral limb within the normal range

3. DISCUSSION

The present study reports chronic arterial sequelae of lower limb arterial thrombosis in adolescent after COVID-19 infection. She had a mild clinical presentation, no need for hospital admission, but two weeks days later presented with arterial thrombosis in right limb. Urgent arterial embolectomy was successfully performed, although this treatment is not the best option in thrombotic

events. Endovascular or surgical treatment with bypass would have been better options. The evolution was satisfactory with recovery of the limb circulation. Echodoppler evaluation eight months after the thrombotic event showed significant stenosis, above 50% of the lesions in the iliac, femoral and posterior tibial arteries, suggesting an inflammatory process involving the entire vessel wall. This suggests that the main thrombotic cause was an important inflammatory component, in relation to the aspect of hypercoagulability. Normally the recovery of the endothelium is faster days and in this case the thrombosis was case late. The evolution of the inflammatory process of the muscular wall of the vessels can extend to the endothelium, have a new thrombosis, and maintain the, endothelial inflammatory condition.

The vascular smooth muscle has both the Angiotensin-converting enzyme 2 (ACE2) and the protease TMPRSS2 (transmembrane protease serine 2) that facilitate local viral entry and proliferation, where there is evidence of microvascular inflammation together with microvascular thrombi (Boisramé-Helmes et al., 2013). Therefore, it can cause a chronic inflammatory process in vessel walls and extending to the vessel endothelium or causing an obstructive event by fibrosis in that vessel. However congenital and acquired thrombophilias like deficiencies of proteins C and S, antithrombin III, factor V of Leiden and anticardiolipin antibodies should be considered like hipotesis in thrombosis cases (de Godoy & Braile, 2003; de Godoy et al., 2006).

The present case is about an adolescent where the vessel walls of the vessels were normal, without a major previous injury. The conduct in these patients is another factor to be considered because there is no consensus study on how long we should keep these patients anticoagulated. The best option is anticoagulation with heparin and derivatives and platelet antiaggregants such as aspirin.

4. CONCLUSION

The clinical evolution of post COVID-19 patients who had arterial thrombotic events should be monitored for possible sequelae that may occur. Immunothrombosis is a sequelae and a new challenge for vascular surgeons regarding the prevention and treatment of post-COVID-19 arterial thrombotic conditions.

Author's contribution

Design and conduct of the study: Godoy JMP, Russeff GJS, Santos HA, Godoy ACP
Collection data: Godoy JMP, Russeff GJS, Santos HA, Godoy ACP
Management: Russeff GJS, Santos HA, Godoy ACP
Analysis and interpretation of the data: Godoy JMP
Preparation: Russeff GJS, Santos HA, Godoy ACP
Review: Godoy JMP, Russeff GJS, Santos HA, Godoy ACP
Approval of the manuscript: Godoy JMP, Russeff GJS, Santos HA, Godoy ACP
Decision to submit the manuscript for publication: Godoy JMP, Russeff GJS, Santos HA, Godoy ACP
All authors agree the manuscript.

Conflict interest

The authors declared no have conflict interest for the study.

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Data and materials availability

All data associated with this study are present in the paper.

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