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RESEARCH LETTER**Vascular Life During the COVID-19 Pandemic Reminds Us to Prepare for the Unexpected**

Since the first case of coronavirus infection (COVID-19) was detected in China late in 2019, the rapid, worldwide expansion of the disease has demonstrated its epidemic potential.¹ Current knowledge of the disease mostly describes a severe acute respiratory syndrome (SARS-CoV-2) but other clinical manifestations of the disease have also been reported (i.e. myocarditis).²

The first reported case in Spain was on 31 January, and since then the rapid spread of the virus has been demonstrated by the numbers of confirmed diagnoses (>188 000), and deaths (nearly 20 000) which have increased dramatically every day.

The vascular patient is at a higher risk of developing a severe form of the disease due to the nature of its association with several comorbid states and thus, vascular surgery communities from many countries have tried to stratify patients into those requiring urgent care, such as > 70 mm abdominal aortic aneurysm (AAA) or ruptured AAA, critical limb ischaemia (CLI), and symptomatic carotid disease. However, the setting is very dynamic with a clear trend to worsening. Today's circumstances do not fit any previous protocol guidance. An overwhelmed health system, with a lack of personal protection equipment (PPE) and ventilatory support, has led to a global sanitary collapse; with a 90% in hospital occupancy of COVID-19 disease alone, one might correctly guess that the response to remaining diseases, including all cardiovascular ones, is underdiagnosis and undertreatment.

Moreover, patients are quite afraid (understandably) of coming to hospital, resulting in an unprecedented and unpredictable scenario where surgical arterial practice has severely dropped to an historic minimum: reaching, in total, between 15% and 20% of the usual numbers, mostly related to vascular emergencies (mainly CLI). All ambulatory consultations and imaging follow up (duplex and computed tomography scans) have been rescheduled and consultation by telephone is provided for those awaiting any arterial surgical repair.

In addition, for those arriving with any medical or surgical pathology, “war like” decisions are driven by insufficient support to take care of everybody and, therefore, breaking the state of wellbeing that has been largely achieved in most European countries.

Therefore, we want to focus on four points that we have faced so far and might help in improving care of, particularly, vascular patients.

First, although the aim of protocols is to provide the best treatment for specific situations, they are based mostly on patient assessment. Despite the extensive use of telematic consultation with the aim of identifying patients at risk of

clinical worsening (i.e. amputation risk in CLI patients), these “assessment based protocols” are far from working in this unusual scenario. People are simply not coming to hospital as they are extremely afraid; in addition, the first line of disease identification (family medicine) is nearly absent, as family doctors have already been distributed to emergency departments to aid in pulmonary care. Thus, a change in current protocol design considering these novel issues should be created.

Second, nearly 20% of COVID-19 positive people are healthcare workers. This is of extreme importance,³ as the lack of an unaffected workforce could be avoided with adequate and fast COVID testing,⁴ receiving specific disease education and by using PPE (unfortunately not adequate in Spain). Moreover, the health professional (potentially infected and working actively with patients) can maintain the negative circle of contagion for those coming to hospital with other kinds of disease and their co-workers. This may lead to the organisation of specific COVID free surgical teams; however, this surely deserves a more in depth discussion in each centre.

Third, due to the “extreme” situation, we are forced to optimise surgical care. What does this mean? Not necessarily provide the best care. It actually means “... keep in mind there is no mechanical post-operative support nor ICU beds for your patient ...”. One might think that an “endovascular first approach” is the best solution to deal with this issue. Protocols suggest treating ruptured AAA by endovascular aneurysm repair if anatomically feasible in patients with long life expectancy. The same may be considered for CLI. However, one may consider the global scenario where all has changed: we are not working in the usual operating room (it has been converted into an ICU for COVID-19 patients); we are without our usual nursing staff (they have been distributed according to hospital needs); and room availability is pretty scarce (as our > 800 bed hospital now shares only four or five COVID free surgical rooms for all surgical specialities plus one for identified COVID-19 patients).

One case representing such a scenario is described in Fig. 1. It is really hard to decide whether an endovascular or open approach seems best for our patients. Moreover, COVID patients are more prone to post-operative complications, as some of them present with lymphopenia, which reflects their immunodeficiency state.⁵

We hypothesise that an endovascular first approach (counterbalancing the global aforementioned picture) might be considered, as every patient hospitalised for any type of care should be considered potentially infected and therefore, the fewer wounds and grafts, the less chance of infection.

It seems that COVID-19 might present with a procoagulant state (mostly in the inflammatory response and some days after it), as we have observed a higher frequency of

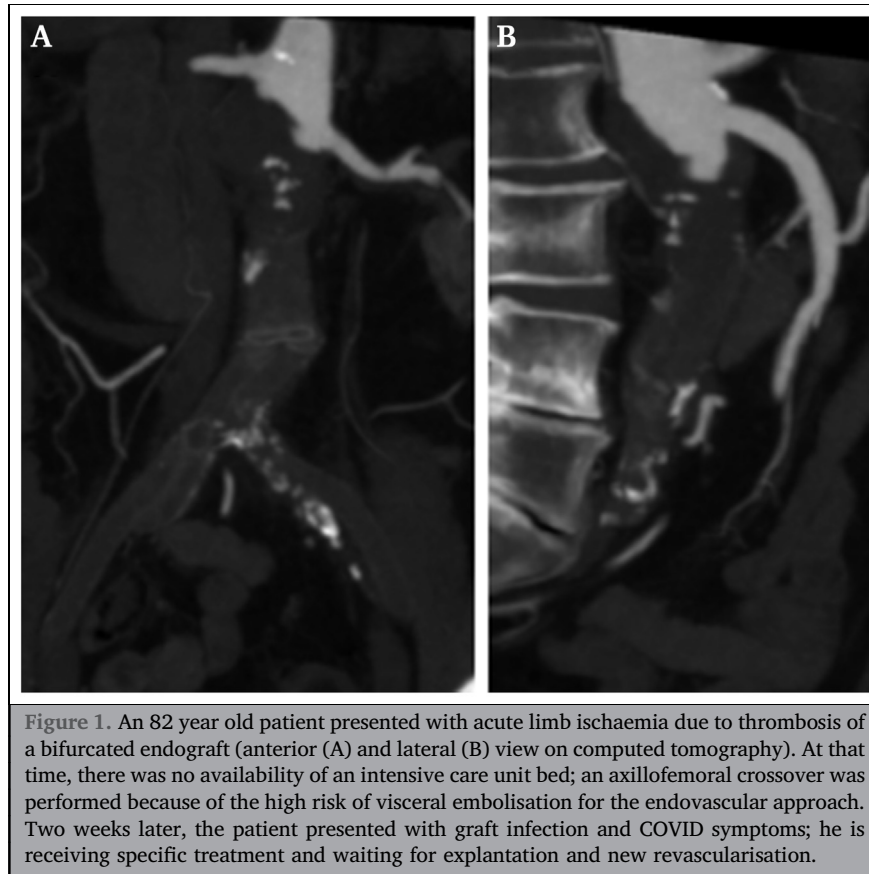


Figure 1. An 82 year old patient presented with acute limb ischaemia due to thrombosis of a bifurcated endograft (anterior (A) and lateral (B) view on computed tomography). At that time, there was no availability of an intensive care unit bed; an axillofemoral crossover was performed because of the high risk of visceral embolisation for the endovascular approach. Two weeks later, the patient presented with graft infection and COVID symptoms; he is receiving specific treatment and waiting for explantation and new revascularisation.

deep vein and arterial thrombosis (very much like antiphospholipid syndrome). Further data are required to reach stronger conclusions and, certainly to provide any recommendation for aggressive anticoagulation therapy.

We encourage the vascular community to spread any new knowledge related to this new disease. We do not have the answer yet for the best organisation or strategy and therefore, it should be adapted for the hospital/centre's resources. There is a lot of uncertainty now, but also in the future when the COVID-19 pandemic is overcome. Our weakened health system will need to deal with a scenario that might again exceed the available resources.

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