

Editorial Comment

Macrocirculation and Microcirculation in Critical Limb Ischemia: Correlated but Complementary

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Kawarada and colleagues publish an interesting article in this issue of CCI. They aspire to a lofty task—establish the relationships among angiographic macroscopic flow and microvascular flow in critically ischemic lower extremities. They performed noninvasive evaluation of the macrocirculation by ankle-brachial index (ABI) and ankle pressure and assessed the microcirculation by skin perfusion pressure. These measures were made in both supine and dependent positions, for dorsal and plantar locations. Results showed that microcirculation and macrocirculation correlated well in the supine position only. Gravitational effects provided marked improvement in the microcirculation for the dependent position. They found important differences by disease states.

Although the results are not surprising, they provide a window into physiology of the microcirculation that establishes the tenets of basic physiology as useful in comparing macrocirculatory and microcirculatory measurements. This study appears to be one of the first, if not the first, to correlate macroscopic and microcirculations in the lower limb, especially in the critically ischemic situation. Moreover, the article was able to show variability in the microcirculatory distributions. This is very important, because it strongly

suggests what is suspected and logical; that all microcirculatory regions are not affected equally in diabetes and renal failure. The disease distributions are reasonably specific. Crural artery disease proved most consistently affected, as did the superficial femoral artery, and both were “mainstays” of critical limb ischemia. Plantar artery disease was present in 73% of cases, whereas dorsalis pedis disease was found in 55%, again proving a distribution of affect. And angiographic disease could not detect these differences, making the importance of microvascular assessment key. Reasons for the differences are unknown, but the answer to this question is likely part of an important understanding of the microcirculation.

Understanding the microcirculation in health and disease should be a major priority. After all, this complex, microscopic organ is the major reasons that cells can respire, that organs can specialize, and that the total organism survives. Nothing could be more crucial toward sustaining living homeostasis. Long-term prognosis of an affected limb must relate to tissue perfusion, and this article suggests that this can be assessed comparatively easily.

Future work, understanding microcirculation in an absolute context, and in the context of large vessel disease will likely yield novel technologies for both enhanced diagnosis and treatment. The article by Kawarada is an early stop on this road.

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