

Avoiding Major Amputation: The Crucial Role Of The Vascular Specialist

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When Professor Alberto Oliaro asked me to organize a monography for Italian Journal of Vascular and Endovascular Surgery “on an issue of contemporary interest and debate”, my thoughts and feelings have been thoroughly directed to all patients afflicted by end-stage malperfusion to the lower extremities.

These are the most symptomatic patients in the vascular scenario, so limited in their daily activity, suffering from incoercible pain, discomfort, and restless nights. Still, their poor condition seems to be faced by most vascular specialists with a sense of resigned disenchantment, likely because of the complex treatment these patients should undergo, and their poor prognosis. Furthermore, there seems to be a diffuse, but wrong opinion that limb loss is not correlated with death. Therefore, critical limb ischemia (CLI) still looks like a *second class disease*, as well as limb salvage (LS), at least compared to other vascular operations and procedures, surely more exciting in the short term. The title of this monography recalls fundamental aspects when dealing with a patient afflicted by CLI: imperative therapeutic target, severity of the disease, union of efforts, practicality of the whole treatment. The aim is to avoid a major amputation, focusing on the six concepts the vascular specialists should deal with when facing a CLI patient.

I had the privilege to work with the Authors, all experienced vascular specialists with significative attitude in CLI and limb salvage.

Pr. Federici approaches the first intensive treatments the CLI patient should receive. Adjusting the metabolic dysregulation, and targeting antibiotic therapy, are essential to arrest the progression of the foot infection in diabetics. Cardiac output and heart rate, as well as coronaries and carotids patency, should be quickly assessed and eventually optimized before planning LS. In fact, this therapeutic program could be long and demanding for the patient (endovascular procedure, distal bypass surgery, minor amputation, several dressings of the foot), thus posing at risk the life of these delicate patients. A special attention will be given to those under dialysis, who represent for sure the most challenging and fragile patients, at high risk of sudden death.

Dr. Settembrini makes the point on the diagnosis and levels of arterial obstruction, exploring the vascular tree from the aorta to the feet. Arterial flow must be optimal since the very upper. Therefore, a correct examination of all the vascular districts is crucial to start planning the correct therapy. Clinical examination finds in duplex scan its natural complimentary act. Detecting the patent distal leg vessel is crucial to attempt endovascular or surgical revascularization of the ischemic foot. Specific machine settings and patient's postural optimize insonorization of the distal landing zone. Second level examinations (CT- and MRI-angiography) give a static evaluation of the flow, and require injection of contrast medium that can be unsafe for patients affected by renal insufficiency.

Pr. Alimi (a), Dr. Accrocca (b) and Dr. Sangiorgi (c) explore the endovascular options, which represent the first desirable attempt of revascularization of the ischemic lower limb.

(a) Modern endovascular techniques allow to restore the flow not only in the iliac axis but even in the obstructed aorta, so avoiding major abdominal surgery in these patients often severely cardiac and pulmonary ill.

(b) The femoro-popliteal patency must be obtained and guaranteed in the long-term, since it is the natural out-flow of the aorto-iliac district as well as the necessary in-flow for popliteal-distal

bypasses. The deep femoral artery must be preserved, and is today object of an initial paradigm shift from the traditional open surgical approach to innovative endovascular attempts. This district is also of greatest interest for its possibility of allowing hybrid procedures (partially open, partially endovascular) in the operating theatre.

(c) Percutaneous transluminal angioplasty of the leg arteries (BK-PTA) is potentially decisive to restore the flow to the ischemic foot, but it is technically challenging and demanding a wide variety of penetrating guides and low-profile catheters and balloons. Furthermore, in case on failure, BK-PTA can jeopardize the landing zone of a distal bypass, that is the vitality of the foot. This is why extreme BK-PTA, such as plantar loop technique or subintimal recanalization, must be justified by rigorous indications before being attempted.

Pr. Cho deals with open surgical revascularization of the ischemic lower limb, focusing on the distal or very distal target artery which could receive the most adequate conduit available, and on the different technical options. Distal bypasses are technically demanding, but represent the only way to save the lower limb when the endovascular attempt of recanalization is prohibitive, fails or is not sufficient to heal extensive tissue loss in the foot.

Dr. Vigliotti faces up with the final and decisive goal of limb salvage, that is sparing the heel, no matter of the loss of the toes. Hence, avoiding a major amputation, the patient can still walk by means of an adequate shoe. To gain this endpoint, the surgical stump in the foot must heal.

Appropriate surgical technique is necessary when sacrificing the forefoot, and advanced dressings with meticulous follow-up is mandatory.

Finally, Pr. Elkouri, who has accepted the most challenging issue to deal with: when LS fails? And above all: when LS should not be undertaken, since useless or at high risk for the life of our patient? Indeed, this is the most difficult decision making when facing CLI patients.

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