EuroIntervention 2017;13:e1013-e1017 published online e-edition October 2017

PCR Peripheral @ GISE: a unique educational link between peripheral endovascular solutions and interventional cardiologists

Antonino Nicosia[1], MD; Carlo Cernetti[2], MD; Alberto Cremonesi[3], MD; Omer Goktekin[4], MD; Antoine Sauguet[5], MD; William Wijns[6], MD, PhD; Giuseppe Musumeci[7], MD

1. M.P. Arezzo Hospital, Ragusa, Italy; 2. San Giacomo Hospital, Castelfranco Veneto, Veneto, Italy; 3. Maria-Cecilia Hospital, GVM Care & Research, Cotignola, Italy; 4. Bezmialem University Hospitals, Istanbul, Turkey; 5. Clinique Pasteur, Toulouse, France; 6. The Lambe Institute for Translational Medicine and Curam, National University of Ireland Galway, Galway, Ireland; 7. Ospedale Santa Croce e Carle, Cuneo, Italy

GISE and PCR Peripheral Course are joining forces during the upcoming annual meeting of GISE, in Milan, 11-12 October 2017. This editorial explains why interventional cardiologists should engage in peripheral vascular intervention, especially at sites active in valvular intervention, or in environments where patients suffering from peripheral arterial diseases are not yet offered endovascular treatment. Many patients suffering from one manifestation of atherosclerosis are likely to have concomitant disease in other vascular districts, i.e., coronary and/or peripheral and/or cerebral. Interventional cardiologists are well suited to perform peripheral interventional procedures because of their background and familiarity with both endovascular techniques and adjunctive pharmacotherapy. A translational approach to endovascular interventions between disciplines has the potential to address the systemic nature of atherosclerotic cardiovascular diseases and to offer patients a holistic problem-solving approach.

Despite multiple clinical manifestations, coronary and peripheral arterial diseases share the same pathogenesis and risk factors, and atherothrombosis is predicted to be the principal cause of death worldwide by the year 2020[1,2]

Arterial vessels of the heart, brain and peripheral circulation present a similar structure and are susceptible to the same risk factors. Not surprisingly, atherosclerosis usually initiates and develops at multiple sites simultaneously. Patients with one manifestation of atherosclerosis are more likely to have concomitant disease in other vascular districts. Understanding the epidemiology and pathogenesis that predispose to the coexistence of different manifestations of the same disease, as well as the implications of multidistrict involvement, is essential to enable holistic patient management strategies.

Patients with coronary artery disease (CAD) and concomitant peripheral arterial disease (PAD) are usually older and present a higher prevalence of diabetes and hypertension than those without PAD. The greater atherosclerotic burden appears to be related to the associated inflammatory status and endothelial dysfunction, beyond the classic risk factors[3]. Most patients with PAD also have concomitant CAD and cerebrovascular disease; in such patients, the additional burden of morbidity and mortality is related to acute myocardial infarction (AMI), ischaemic stroke and cardiovascular death[4-6]. The formation of arterial thrombi, induced by ruptured atherosclerotic plaque, occupies a central role in the context of acute ischaemic events[7,8]. Therefore, the optimal management of such a complex multidistrict atherothrombotic disease requires not only interventional treatment using the most appropriate endovascular techniques but also an aggressive secondary prevention approach to risk factors and adequate antiplatelet/anticoagulant pharmacotherapy[9].

**Corresponding author: Division of Cardiology, MP Arezzo Hospital, Via Claudio Traina, 4, 97100 Ragusa, Italy. E-mail: Antonino.Nicosia@asp.rg.it*

DOI: 10.4244/EIJV13I9A154

Endovascular techniques have gained a leading role in the treatment of both PAD and CAD, with significant impact on mortality, especially in acute settings

The treatment of cardiovascular disease is today one of the most rapidly evolving fields of medicine, and percutaneous therapies continue to make significant advances through the constant development and evaluation of new techniques and devices. Endovascular interventions for chronic atherosclerotic disease have been shown to reduce angina and limb pain, to improve quality of life, and to prolong walking distance for patients with claudication[10,11]. In experienced hands, carotid stenting with adequate neuroprotection devices has reduced the rate of cerebrovascular events, especially in patients with symptoms or severe carotid lesions[12,13].

More recently, timely endovascular treatment has become a first-line therapy for acute atherothrombotic events, i.e., unstable angina and AMI, acute ischaemic stroke, and critical limb ischaemia. The application of emergent reperfusion therapies has led to a significant lowering of mortality and morbidity as well as to a reduction in amputation rates.

Interventional cardiologists have learned that optimal treatment of AMI is based on the implementation of effective emergency medical services (EMS) and networks between hospitals with various levels of proficiency, in order to minimise treatment delays and improve the clinical outcomes[14]. Similarly, as strong scientific evidence in favour of thrombus retrieval devices in the treatment of acute ischaemic stroke accumulates, the expertise of interventional cardiologists should be applied to build up similar EMS, adapted for this particular setting, in close cooperation with neurologists and neuroradiologists[15-18].

The technical expertise gained in treating CAD has also played a major role in the development of endovascular solutions for the treatment of peripheral and below-the-knee arterial diseases, which show anatomical similarities to the coronary vasculature. Novel devices such as dedicated guidewires, drug-eluting stents and drug-coated balloons have improved patency rates for these lesions. Endovascular treatment of acute limb ischaemia and diabetic foot have become the therapy of choice in such patients, while associated CAD is one of the major determinants of mortality and ulcer healing[19].

Lastly, it must be emphasised that cardiovascular interventional techniques require specialised skills and adequate training to be successfully applied to different lesions in different settings. The risk/benefit ratio narrows down when increasingly complex, multilevel interventions, tailored to the individual clinical profile, are required. This is particularly important because treatment strategies in patients with multidistrict disease are not only related to symptoms or anatomical complexity but also to frequent and severe comorbidities, especially diabetes and chronic kidney disease. Thus, mastering the technical skills to perform the interventional procedure itself is only one of the necessary prerequisites to approach patients with multidistrict atherosclerosis adequately. Patient opportunities to benefit from a holistic therapeutic approach of multiple forms of the same disease process rely on the active engagement of several disciplines, among which is interventional cardiology.

Antiplatelet/anticoagulant pharmacotherapy is an essential part of the management of cardiovascular diseases both in the acute setting and after elective revascularisation procedures

Due to the systemic nature of the atherosclerothrombotic process, all patients with CAD, PAD and cerebrovascular disease should be considered candidates for secondary prevention strategies that include aggressive risk factor modification and antiplatelet therapy[9]. Clopidogrel has been shown to be an effective drug for secondary prevention of atherosclerothrombotic events (including stroke and AMI), in patients with recent AMI, ischaemic stroke or PAD, and is currently used after endovascular procedures (such as carotid or lower limb interventions)[20]. As cardiologists, we have learned that a more aggressive and effective platelet inhibition with new $P2Y_{12}$ inhibitors reduces the incidence of MACE in patients with acute coronary syndromes[21,22]. Although not proven in specific randomised trials, concepts and therapeutic schemes validated for CAD have been applied to the peripheral setting[23-25]. A new PAD subgroup analysis of the PEGASUS trial has shown that the addition of a second antiplatelet agent, the $P2Y_{12}$ inhibitor ticagrelor, not only reduced major adverse cardiovascular events, but also reduced "limb-specific" events by 35%, without excess of TIMI major bleeding[26,27]. Similar to the issues with percutaneous coronary intervention in patients with concomitant atrial fibrillation, physicians are required to weigh carefully the bleeding and ischaemic risks in order to decide on the possibility of using antiplatelet therapy on top of oral anticoagulant therapy, especially after an endovascular procedure[9].

Another open question relates to the value of thrombolytic therapy. Since rapid restoration of blood flow is critical, thrombolysis still plays a major role in the treatment of either acute limb ischaemia[28-30] or acute stroke, be it with local or systemic infusion[15-17].

All endovascular procedures can be burdened by the risk of haemorrhagic complications and, therefore, adequate management of access sites is key to a successful and safe intervention. This holds true especially in the era of valvular cardiac interventions that require large bore access to the iliofemoral vessels

Bleeding and other vascular complications after endovascular treatment are associated with morbidity or even death, and increase the total procedural costs by use of resources and prolongation of the patient's hospital stay. Prevention of vascular complications is therefore essential to optimise outcomes. In this regard, the choice of access site is crucial; a radial approach for coronary intervention, especially in the acute setting, has significantly reduced

haemorrhagic complications and is recommended as a first choice for these procedures[31,32]. The radial approach is currently adopted for iliac as well as for femoral interventions; when allowed by the anatomy of the aortic arch, it can also minimise embolic as well as vascular access complications during selected carotid interventions. When a femoral access is chosen, the use of percutaneous closure devices can be helpful to reduce vascular complications, time to haemostasis and time to ambulation. The choice between different closure techniques depends on patient size, availability of specific devices and the expertise of the interventionalist. Valvular and other structural interventions, and specifically TAVI, have recently raised the need for interventional cardiologists to master peripheral interventional skills. Operators should be able to prevent, diagnose and treat potential access-site complications related to the use of large-size arterial sheaths[33-35]. Therefore, TAVI operators should be familiar with the following principles:

- To be able to select appropriate patients for transfemoral TAVI based on angiography as well as CT angiography.
- To master the basis of peripheral intervention. Dedicated team members should consider undergoing a formal training in peripheral intervention.
- To be familiar with manoeuvres that limit damage in case of complications (e.g., contralateral access, proximal balloon inflation).
- To have access to and be familiar with a minimal set of equipment to handle peripheral complications (e.g., wires, balloons, stents, covered stents).
- To have standard operating procedures in place with the vascular surgeon should vascular complications be difficult to solve by percutaneous means.

Summary and key messages

The next frontier in interventional medicine requires a translational approach, where cross-fertilisation is taking place between interventional specialists who used to practise exclusively in one vascular domain. Learning from each other and applying specific techniques across vascular frontiers represents the only way to address the systemic nature of atherosclerotic cardiovascular disease and to offer patients a holistic problem-solving approach. Cardiologists are well suited to perform peripheral interventional procedures because of their background and familiarity with both endovascular techniques and adjunctive pharmacotherapy. Getting involved with peripheral endovascular interventions can represent, for the interventional cardiologist, the first step in shaping a pan-vascular departmental approach. Our catheterisation laboratories may become the places to overcome interdisciplinary boundaries and to build effective horizontal integration, allowing professional handling of a complete spectrum of cardiovascular diseases.

Full integration of interventional care for all patients suffering from CAD, PAD and cerebrovascular disease within a standard interventional cardiology unit, although desirable, may not be easily achievable in all environments. Access to peripheral interventions depends on proper training, and it is our ambition to offer such a dedicated training programme, crafted by and for cardiologists, as a prerequisite to getting started, within the context of PCR Peripheral @ GISE and other PCR courses. Depending on the specific needs, a two-year curriculum will be proposed, starting with basic concepts and progressing forward in order to acquire advanced skills.

By continuous improvement of our knowledge and skills, with the appropriate use of technological innovations and, on many occasions, through collaboration with other specialists, the "translational interventional cardiologist" can integrate into the "Vascular Team" as a reliable and most useful member of the caring group, in the best interests of the many patients suffering from multidistrict atherosclerosis.

Conflict of interest statement

W. Wijns is Chairman of PCR and G. Musumeci is President of GISE. The other authors have no conflicts of interest to declare.

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