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Editorial

Complications in Vascular and Endovascular Surgery: To Defeat Your Enemy, You Must Know Your Enemy

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In recent decades, the field of vascular surgery has been revolutionized by the introduction and ever-rising growth of endovascular techniques for almost all arterial and venous diseases, mainly owing to their reduced morbidity and mortality rates as compared with conventional open surgical approaches. Therefore, contemporary indications for invasive treatment of most vascular diseases have progressively widened to include increasingly older and comorbid patients who would not otherwise make ideal surgical candidates [1]. This phenomenon is further amplified by the very nature of modern vascular and endovascular surgery, which encompasses a broad range of pathologies and treatments in almost all body parts, from head to toe. However, even with the newest technological advancements in peri-operative medicine and surgical care, intra-procedural and post-procedural complications remain just around the corner to restrain the potential benefit of the endovascular treatment for the patients and dampen the mood of vascular specialists [2]. In effect, prior research has shown that major complications may indeed detrimentally affect and possibly harm the psychological health of vascular surgeons [3]. As adverse events may occur in the peri-operative period as well as during late follow-up, they may pose a serious threat to patients' lives or organs, abolish the clinical efficacy of treatments, and lower the cost-effectiveness of care by reducing quality of life while augmenting associated costs.

"Primum non nocere" still abides as the first rule to be applied in clinical medicine, and physicians should always implement a comprehensive risk-to-benefit evaluation of their treatment choices but show readiness to address adverse events should they result from therapeutic maneuvers. There is substantial literature that addresses the importance of teamwork coupled with fast and effective recognition and treatment of peri-operative complications to avoid potentially preventable deaths, a scenario known as "failure to rescue". In fact, the occurrence of post-operative complications may have a noxious effect on the short-term but also the mid-term survival of vascular patients, even after seemingly minimally invasive endovascular treatment [4]. Conversely, even in the subgroup of elderly patients, their long-term life expectancy may be equal to their non-vascular counterparts if no peri-operative complications occur. Therefore, excellence in administering any form of (more or less) invasive treatment requires the ability to deal with the unexpected, including post-interventional complications.

For patients, physicians, and stakeholders or caregivers alike to make fully informed shared decisions regarding elective management, three key pieces of information should be available: (1) the immediate risks of the procedure itself; (2) the risk of disease progression if the underlying pathology is not treated; and (3) the life expectancy of the patients after the intervention. Therefore, identifying the risk inherent with modern endovascular treatment in older patients is crucial for three main reasons. First, the incidence and prevalence of most vascular diseases directly correlate with age. Second, the older population is constantly increasing in Western populations, as is the proportion of people with significant comorbidities who will become octogenarians and possibly older. Third, the optimization

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of endovascular techniques and peri-operative care have made this option safe and feasible even for elderly patients 75 years of age, at least in the immediate postoperative period.

Much has been written about the advantages of endovascular treatments for various vascular lesions. Some of these writings have dealt with the limitations of endovascular treatments. Despite the abundance of textbooks devoted to endovascular techniques, there is still a relative paucity of academic resources that specifically address these challenging scenarios. How to address those complications and failures is not commonplace even at major scientific meetings, and many operators are inclined to share them only privately, which is not unusual. Furthermore, clinical trials are not ideally suited to answer these many questions, as the incidence and quality of adverse events will continue to change as new treatment modalities come into play. Notably, there is no current peer-reviewed scientific journal that systematically reviews complications of surgical therapy, including open vascular and endovascular treatments, how to prevent them, and how to manage them. In this regard, the present publication may clearly fill this gap. The editors hope that the studies published in *Complications* will allow surgeons to not only prevent many issues, but also identify others early so they may be resolved effectively.

As noted above, complications and failures after invasive procedures may still represent one of the most challenging scenarios that physicians will face in their practice. How to prevent, recognize, and manage these instances in a prompt and effective manner is an area of never-ending effort for healthcare practitioners. At the same time, the field of vascular surgery and interventions is intrinsically prone to contingent adverse events due to a combination of factors, including the high physiologic risk of many patients and the level of technical demands for advanced reconstructions. Moreover, new endovascular materials and technologies are constantly released on the market, and even the most experienced specialists may face new or otherwise unexpected complications. For the above-mentioned reasons, it is reasonable to say that the "endovascular revolution" has created a new spectrum of complications and failures, and no safety net exists even after minimally invasive endovascular procedures. The future broader implementation of Artificial Intelligence and Machine Learning may be instrumental in helping with the development, evaluation, and adoption of refined risk prediction models that could serve the dual purpose of establishing a more objective baseline risk of individual patients (based on physiology, disease, and procedure) that could help with decision making as well as with the process of informing patients and their caregivers [5].

This new journal, *Complications*, will address the management of a wide range of early complications and late failures resulting from the treatment of different pathologies, thereby providing all physicians with a contemporary and exhaustive reference that will conveniently help their everyday practice. We recognize that considerations may change in the years ahead, but we are confident that a constant influx of high-quality papers may be instrumental in maintaining up-to-date information for the healthcare community worldwide. Lastly, we hope to encourage all healthcare professionals globally to adopt shared metrics for the assessment and reporting of surgical complications. While reporting standards from specialized fields do already exist (such as, for instance, those endorsed by the Society for Vascular Surgery), most systems for reporting surgical complications (such as the Clavien–Dindo score) are outdated and difficult to reproduce across different specialties [6]. The ICARUS system represents a novel, fully encompassing system for the data collection of intraoperative adverse events. The presented core-set variables for reporting intraoperative adverse events are not based solely on our opinion, but rather are synthesized from the globally validated ICARUS criteria for reporting intraoperative adverse events, and their broader implementation is likely to increase our ability to cross-compare findings from different healthcare settings [7,8].

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