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Editorial

Pressures for New Ways

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In this issue of *Revista Brasileira de Cardiologia Invasiva* (RBCI), Novaes et al.[1] describe a new method for obtaining pressure curves in patients with congenital and structural heart disease. What is its relevance in the current context of invasive cardiology? It is unquestionably enormous, and the authors deserve the applause of our community.

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Perhaps precisely because we are experiencing a unique and revolutionary era in interventional cardiology in various areas of our specialty (coronaries, valves, peripheral, congenital, and structural vascular diseases), in which we have the ability to treat a variety of diseases safely and effectively, sometimes the effort to obtain basic hemodynamic data is neglected and relegated to a second level. It is relatively common for residents in hemodynamics training not to be acquainted with the different pressure curves in cardiac chambers, and with calculations of cardiac output, systemic and pulmonary flow, and valve area. We cannot forget that the correct collection and interpretation of some of these parameters precede and often guide an appropriate intervention, whether percutaneous or surgical. Thus, restoring the importance of obtaining accurate hemodynamic data is part of the role of a good interventional professional.

Patients with congenital heart diseases have a number of features that typically complicate or even prevent us from obtaining appropriate pressure curves. Size and weight of patient, tortuosity of vessels, differences in regional flows (in pulmonary or systemic arteries), and impossibility of using catheters with a larger profile are some of these limiting factors. We know that "necessity is the mother of invention"; thus, the authors of the article in question were put under pressure to find new ways – and succeeded. The use of the pressure-wire, as described by Novaes et al.,[1] in this issue, suffices to overcome some of these limitations. Thanks to its low profile, the system can be advanced even by 4 F diagnostic catheters, and is able to successfully negotiate any tortuosity. Such characteristics are advantageous for obtaining pressure curves at different lung segments in patients with pulmonary atresia and ductus arteriosus-dependent pulmonary flow or from aortopulmonary collaterals, as demonstrated by the same group in another publication.[2] This information is important for surgical planning, since lung areas with severe hypertension may coexist with other areas of normal pressure. The application, in cases of stenosis of pulmonary arteries, especially those that are critical or sub-atretic, is also useful for determining the severity of the injury. In such cases, if a catheter can be advanced through the lesion, the flow is drastically reduced. However, there is no gradient without local flow, and often the curve exhibits damping. The pressure-wire system helps minimize this limitation, allowing for a better assessment of the immediate results of possible interventions, such as angioplasty. The possibility of advancing the pressure-wire through Balock-Taussig anastomoses also allows the gauging of pressures within the lung territory, without requiring the advancement of the catheter through the anastomosis itself, which minimizes the possibility of dissections on site, reduction of the flow to the lung, and the occurrence of desaturation during the examination. As the authors comment in their article, another possibility for using these miniaturized systems is the determination of local flows; in addition to obtaining the pressures, they would allow for the estimation of local vascular resistance. It is likely that this application will become a reality in the near future.

Other applications of the method described here can be foreseen. Nowadays, the hybrid procedure as initial palliation for hypoplastic left heart syndrome, despite an initial learning curve with disappointing

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results in our midst,[3] has become a well-established method, with initial survival of 70 to 80% in some centers, such as Hospital do Coração of Associação Sanatório Sírio. At the follow-up, approximately 25% of patients may develop stenoses through the mesh of the stent implanted into the ductus arteriosus, with compromised retrograde flow through the arch and subsequent myocardial ischemia, especially in patients with aortic atresia. The advancement of the pressure-wire through the mesh of the stent may help to better assess the severity of the injury and to guide the therapeutic indication. Moreover, the system can be advanced through the pulmonary artery banding, allowing the evaluation of distal pulmonary pressures, which are so important for the indication of Glenn-Norwood surgery.

Fetal interventions, particularly aortic and pulmonary valvuloplasties, have been used safely and effectively in an increasing number of patients, especially in our midst.[4] The use of the pressure-wire system was described in a case of fetal aortic valvuloplasty,[5] with an accurate documentation of the effectiveness of the intervention. However, the everyday use of this technology in this context probably presents some difficulties, such as a space and time limitation for handling the system.

The major limitations for a large-scale use of pressure-wiring in the hemodynamic evaluation of congenital heart diseases are perhaps the costs of catheters and of the system. However, as observed with other technologies introduced in the past, expanded use results in decreased costs. Hopefully, in the near future, we shall witness the increasing use of this method for obtaining pressures by new approaches.

CONFLICTS OF INTEREST

The author declares no conflicts of interest.

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