

Diabetes Mellitus, Insulin Use, and Infective Endocarditis

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The prevalence of diabetes mellitus (DM) is very high in Brazil and worldwide. It is estimated that there are now more than 12 million diabetics in Brazil, not counting those who already have the disease but have not yet been diagnosed. Since the introduction of insulin, the treatment of DM has been constantly changing, according to treatment guidelines proposed by diabetes societies, from the diagnosis to more advanced stages of the disease. More stable insulins, as well as incretin-based therapy for subcutaneous use, have been proposed in the treatment of type 2 DM patients. These therapies have not only contributed to the better treatment of the most prevalent type of diabetes, but also introduced the use of a parenteral medication other than insulin.

Infective endocarditis (IE) is a relatively rare, serious cardiovascular disease with a hospital mortality rate of 17-25%, despite all therapeutic advances.¹ In an observational study by Bezerra et al.,² published in this issue of the IJCS, the association between the use of insulin and IE is discussed. In this retrospective study involving 211 patients, 17 with DM (nine insulin users), there was a higher proportion of *S. aureus* infection in diabetics using insulin. However, mortality rate was not higher among diabetics when compared to non-diabetics. There is a lack of studies on IE in DM and regarding the use of insulin and IE, data are even more scarce. So, the study by Bezerra et al.,² assumes an importance in this area of knowledge, since we are talking about a highly prevalent disease (DM) and a serious comorbidity (IE) with a still high risk of mortality.

Keywords

Diabetes Mellitus/physiopathology; Infectious Endocarditis; Insulin; Staphylococcus Aureus; Mortality/Morbidity.

Today there are more pure and more stable insulin preparations, which allied to modern applicators, produce virtually no reaction. Also, the risk of infection (and complications including the formation of abscess and hematogenous spread of the infection) is lower. However, the higher prevalence of *S. aureus* infection found in diabetics calls attention to a possible entry point via cutaneous route. In a recent observational study by Lin et al.,¹ who assessed the risk of in-hospital mortality between diabetics and non-diabetics with IE, *S. aureus* was also the most frequent pathogen in endocarditis in diabetics, but only 15% of these patients used insulin.

Another important and controversial aspect is the association of in-hospital mortality with DM and IE. In the studies by Bezerra et al.,² and Olmos et al.,³ no difference was observed in mortality between diabetics and non-diabetics, although an independent association of DM and septic shock was reported.³ On the other hand, in the study by Lin et al.,¹ DM was independently associated with mortality and was a factor of poor prognosis in IE. In another study, Duval et al.,⁴ showed that the in-hospital mortality was higher in diabetic patients, especially in those using insulin.

The study by Bezerra et al.,² also showed a greater impairment of tricuspid valve in diabetic patients using insulin (compared with non-users), which resembles the pattern found in IE in injecting drug users. This is not corroborated by results of previous studies on DM, as in the study by Duval et al.,⁴ who evaluated subgroups of patients with DM by the use or not of insulin. Larger studies evaluating diabetic patients of several centers should be done to enhance our understanding about IE in DM. Several questions remain to be solved, for example, which heart valve is most commonly affected in diabetic patients. Greater involvement of the tricuspid valve would allow us to infer that the site of insulin application could be the source of bacterial skin infection.

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Given the increase of the diabetic population, mainly type 2 diabetic patients, and advances in the knowledge of pathophysiological mechanisms and therapeutic options, which has led to an increase in the life expectancy of these patients, improving the knowing of the development of IE in DM is justified. It is important to elucidate the possible increased risk of

patients on insulin or other subcutaneous medication to have IE compared with non-diabetics or diabetic patients on oral medications. Also, the reports showing that *S. aureus* is the main pathogen responsible for IE, in addition to the increasing number of diabetic patients, call for the need to develop prophylactic measures against this pathogen.

References

1. Lin CJ, Chua S, Chung SY, Hang CL, Tsai TH. Diabetes mellitus: an independent risk factor of in-hospital mortality in patients with infective endocarditis in a new era of clinical practice. *Int J Environ Res Public Health*. 2019;16(12):2248-58.
2. Bezerra RL, Carvalho TF, Batista RS, Silva YM, Campos BF, Castro JHM, et al. Association between insulin use and infective endocarditis: an observational study. *Int J Cardiovasc Sci*. 2020;33(1):14-21.
3. Olmos C, Vilacosta I, Pozo E, Fernández C, Sarriá C, López J, et al. Prognostic implications of diabetes in patients with left-sided endocarditis: findings from a large cohort study. *Medicine (Baltimore)*. 2014;93(2):114-9.
4. Duval X, Alla F, Doco-Lecompte T, Lemoing V, Delahaye F, Mainardi JL, et al. Diabetes mellitus and infective endocarditis: the insulin factor in patient morbidity and mortality. *Eur Heart J*. 2007;28(1):59-64.

