



## LETTER TO THE EDITOR

### Reply to letter “Beta-blockers in acute coronary syndrome patients: The concept of ‘gradient of benefit’”

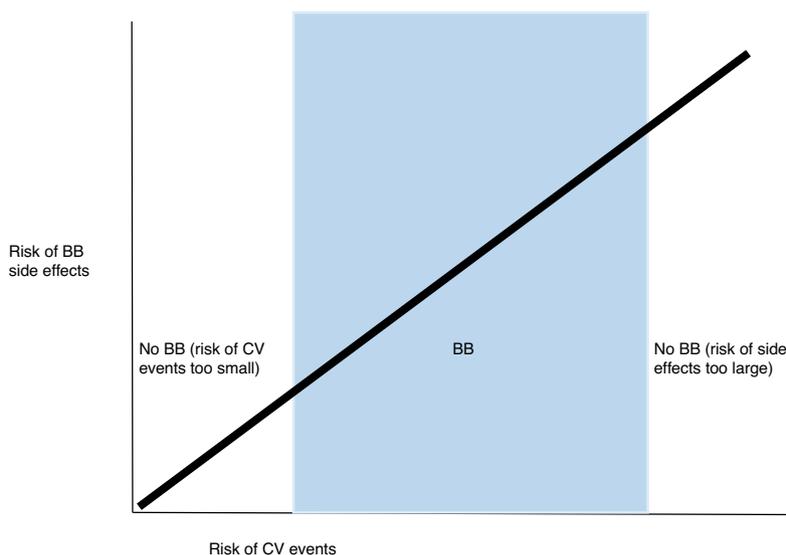


#### Resposta à Carta «Beta-bloquantes no doente pós-SCA: o conceito de gradiente de benefício»

We would like to thank Fernando Montenegro Sá and João Morais for their interest in our paper.<sup>1</sup> Beta-blockers are indicated after ST-segment elevation myocardial infarction (STEMI) in patients with left ventricular ejection fraction (LVEF)  $\leq 40\%$  (class I recommendation, level of evidence A) but in those with LVEF  $>40\%$  the benefit is not clear (class IIa, level B).<sup>2</sup> We agree that in patients in the 40-50% range beta-blockers appear more likely to help than to harm, due to their moderate probability of future events. The gradient of benefit means that beta-blockers should probably not

be used in very low risk STEMI,<sup>3,4</sup> in which the risk of cardiovascular events is extremely small in the near future. In addition, beta-blockers should be avoided in high-risk patients in whom side effects will probably occur, as in those with hypotension, acute heart failure,<sup>5</sup> or shock<sup>6</sup> (Figure 1).

Further studies are needed to better identify STEMI patients who might benefit from beta-blockers, taking into consideration not only LVEF, but also other factors associated with prognosis that might improve with this treatment. For instance, endothelial dysfunction is common in STEMI<sup>7</sup> and beta-blockers improve microvascular function.<sup>8</sup> This is also the case with atrial fibrillation.<sup>9,10</sup> Most studies of beta-blockers in STEMI were performed in an era when the rate of primary angioplasty was low and heart failure and mechanical complications were frequently seen.<sup>11</sup> The current scenario is different and extrapolation of previous data could lead to overuse of these drugs. In the Description of Acute Myocardial Infarction: Management, New Therapies and Evolution (DIAMANTE) registry, 86% of our



**Figure 1** The gradient of benefit of beta-blockers (BB) according to the risk of future cardiovascular (CV) events and the risk of drug side effects in patients with ST-segment elevation myocardial infarction.

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patients received beta-blockers.<sup>1</sup> Finally, regarding dosage, Mars et al.<sup>12</sup> have recently shown that target dose is not associated with cardiovascular outcomes, and Goldberger et al.<sup>13</sup> even suggest that patients treated with 12.5-25% of the target dose may have enhanced survival compared with other doses.

## Conflicts of interest

The authors have no conflicts of interest to declare.

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