

## β-blocker : friend or enemy

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B-adrenergic receptor antagonists (β-blockers) are commonly used for perioperative care. Although widely prescribed, considerable debate still exists about the protective effect of β-blockers. There are different explanations regarding the conflicting evidence for perioperative β-blocker use. Particularly the type of β-blocker, the initiation time of β-blocker therapy prior to surgery, dose adjustments for heart rate control and the patients' underlying cardiac risk are important factors which may influence the effectiveness of therapy.

The acute effects of β-blockade include the reduction of myocardial oxygen demand by a decrease in heart rate, systolic pressure and ventricular contractility. It is unclear whether the effect on coronary plaque stabilization, in contrast to heart rate control, can be achieved instantly after β-blocker therapy initiation. The suggested effect of β-blockers on coronary plaque stabilisation may be related to anti-inflammatory properties and possibly only be observed after prolonged use.

The different β-blockers have various plasma half-lives and peak ratios. In the perioperative period, long acting β-blockers are associated with

higher cardioprotective benefit than short acting β-blockers. In patients with CAD/unstable plaques, β-blockers with short half-lives will increase the risk of cardiovascular events on sudden withdrawal. In the acute absence of β<sub>2</sub>-blockade the up-regulated β<sub>1</sub>-receptors plus high catecholamine levels would be a dangerous mix. Thus long-acting β-blockers like bisoprolol, will be safer than agents with short half-lives.

In addition to the initiation time before surgery and type of β-blockers, dose adjustment for heart rate control is important. Higher doses of β-blockers and tight heart rate control are associated with reduced perioperative myocardial ischemia, troponin T release and improved long-term outcome. Accordingly, the new ACC/AHA guidelines on perioperative care strongly recommend a heart rate of 60-65 beats per minute. Tight heart rate control will increase the likelihood that a patient will receive benefit from β-blockade.

Another important issue is the identification of surgical patients who may benefit from β-blocker therapy. Currently, the evidence of beneficial effect of β-blockers is strongest in high risk patients.