## Komentarz

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Myocardial preconditioning is a well known phenomenon of heart muscle protection against ischaemic injury in experimental models of ischaemia and reperfusion. The principal effect of this protection is a huge reduction of infarct area (in some models 70% reduction of the infarct area) in the preconditioned heart. This is the most powerful endogenous mechanism of protection known in nature. Mechanisms of myocardial protection by preconditioning have been studied for more than thirty years and a lot of new data are accumulating simultaneously with the progress in molecular biology almost every year. Research areas are mainly focusing on two aspects of myocardial preconditioning: **trigger mechanisms which may induce protection** and **mechanisms of this protection**. The clinical relevance of this approach is obvious. It has been shown in the meantime that preconditioning is not only valid for myocardium, but has been observed in other tissues as well. Surprisingly, not only ischaemic insult but other stress factors may induce preconditioning and protection. Beside that there are many types of myocardial protection such as: early (lasting a few hours), late (a few days), remote (trigger not in the heart but for example in the limb) and postconditioning (protection during the reperfusion phase after ischaemia). For many years numerous clinical data, mainly in cardiology and cardiac surgery, have shown the presence of the mechanism in a clinical setting. For more than ten years myocardial "preconditioning" has been a field of interest in cardiac anaesthesia.

**Volatile anaesthetic as a trigger of myocardial protection has been recognized and this protection is called "anaesthetic preconditioning" [1]**. Modern inhalation agents used for general anaesthesia mimic the protective effects observed in experimental protocols of ischaemic preconditioning. This protective effect was observed in numerous patients undergoing cardiac surgery. The improvement in the outcome of coronary surgery patients receiving sevoflurane was published a few years ago [2]. Protective measures against ischaemic events can be taken before ischaemia (as presented in the paper of Goździk W et al. in this issue of Kardiochirurgia i Torakochirurgia Polska), during ischaemia or after ischaemic insult. The authors of the cited paper did not find a profound cardioprotective effect with sevoflurane or ischaemic preconditioning in the limited number of cases studied, but the increased production of reactive oxygen species (ROS) in coronary sinus blood after anaesthetic as well as after ischaemic preconditioning protocols has been documented. Of note is the presence of ROS activity in coronary sinus blood in the control group of patients after 10 min of cardiopulmonary bypass. This indicates the universal mechanism of ROS production in the human body.

### References

1. De Hert SG. Cardioprotection in anesthesia. Minerva Anesthesiologica 2008; 74: 259-270.
2. Garcia C, Julier K, Bestmann L, Zollinger A, von Segesser LK, Pasch T, Spahn DR, Zaugg M. Preconditioning with sevoflurane decreases PECAM-1 expression and improves one-year cardiovascular outcome in coronary artery bypass graft surgery. British Journal of Anaesthesia 2005; 94: 159-165.