

Open Topics

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Quantification of Apoptotic Cell Death of Using the Internal Thoracic Artery in Coronary Artery Bypass Grafting (CABG)

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Internal thoracic artery is the preferred conduit for coronary artery bypass grafting (CABG). We investigated whether thoracic epidural anesthesia (TEA) as an adjunct to general anesthesia (GA) plays a role on of apoptosis (programmed cell death) of ITA.

Ethics committee approval was received for this study. Thirty patients scheduled for elective CABG were randomized to receive either GA (n=15) or GA+TEA (n=15). In the preoperative period, the patency of the left ITA was confirmed by coronary angiography in all patients. A short segment of ITA was excised from patients who underwent coronary artery bypass grafting surgery with the GA+TEA group and GA group. Tissue samples were fixed in 0.9% NaCl followed by 4% buffered formaldehyde fixative, then prepared for cryomicrotome. Tunel procedure was used for about 10 µm thickness cryosections obtaining from ITA. Each section sample was fractionated optically into approximately 100 frames with the used of image analysis software and the apoptotic index was calculated as apoptotic cells/total cells.

The apoptotic index in tissue samples of GA+TEA group was significantly lower than the GA group (0.110±0.020 vs. 0.529±0.014, respectively; p<0.001).

We were analysed comparatively of the incidence in endothelial cells and smooth muscle cells of survival/apoptosis [1] and we have obtained statistically significant differences of both groups [2]. The result of this study indicated that GA group induced apoptosis in the ITA compared to GA+TEA group. Therefore, TEA as an adjunct to GA might be considered as an alternative approach for increasing ITA flow in CABG [3].

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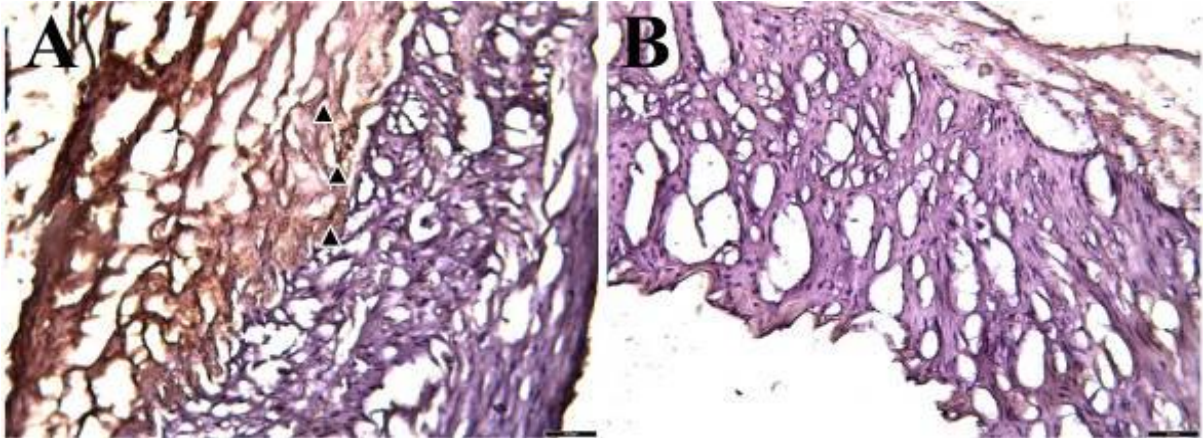


Figure 1. TUNEL staining features of the Internal Thoracic Artery (ITA) in different groups: A (General Anesthesia), and B (General Anesthesia + Thoracic Epidural Anesthesia). Apoptotic cells are demonstrated with arrow head in the ITA. Scale Bar: 50 μ m.

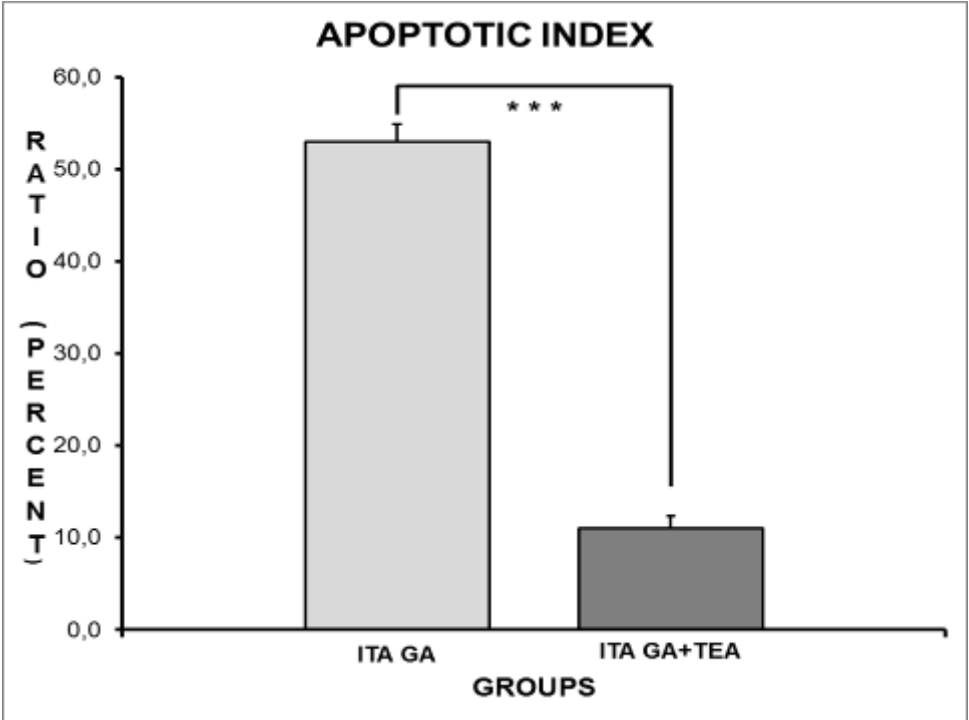


Figure 2. The apoptotic index of Internal Thoracic Artery (ITA) shows TUNEL (+) cells ratio. Graphs compare to GA and GA+TEA groups. There was significant decrease in apoptotic index of ITA in GA+TEA groups (** $p < 0,001$).