INHIBITION OF ARTERIAL CALCIFICATION BY LOCAL CATHETER-BASED ADMINISTRATION OF BISPHOSPHONATES ON ARTERIAL WALL IN AN EXPERIMENTAL ANIMAL MODEL

Oral Contributions
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Background: Calcification of coronary and peripheral vessels is independently associated with increased cardiovascular mortality. Currently, common molecular mechanisms between active bone formation and vascular calcification have been demonstrated, indicating new therapeutic approaches. Bisphosphonates are pharmaceutical compounds, which inhibit calcification and bone resorption. In the current study, we aimed to evaluate the safety and effectiveness of the local catheter-based delivery of the bisphosphonate zolendronic acid on the arterial wall in an experimental atherosclerotic animal model.

Methods: We used 16 New Zealand rabbits. The animals were placed on vitamin D enriched atherogenic diet for three weeks. Subsequently, all animals underwent angiography of abdominal aorta and common iliac arteries. A mixture containing 25 mg/l zolendronic acid was delivered on the vascular wall of the target iliac artery, using a dedicated balloon catheter. A placebo mixture was administered on the contralateral iliac artery of each animal, which was used as control. At 28 days all animals underwent euthanasia, both iliac arteries were collected and sectioned transversely in multiple sections. Computer-assisted histomorphometry (Image Pro Plus; Media Cybernetics) was performed for the calcium content quantification of each section from the target and the control iliac artery. Calcium content was expressed as %percentage coverage of the vascular media area.

Results: In all animals the delivery of zolendronic acid and placebo mixtures in both the target and control arteries was successful and uncomplicated. A total of 144 artery segments were microscopically examined from each treatment group. The mean percentage of the calcium content of the media was higher in the control artery segments in comparison to the target artery segments (2.66±0.73 versus 1.08±0.62 %, p<0.01).

Conclusion: Inhibition of vascular calcification by local catheter-based delivery of bisphosphonate zolendronic acid is safe and effective. These finding and its potential clinical implication remain to be confirmed in human studies.