In the context in which coronary artery disease represents the largest segment of pathology in the group of cardio-vascular diseases, the surgical myocardial revascularization continues to be an actual problem, being an extremely efficient treatment in which the arterial grafts are preferred due to their very good results in time.
The purpose of this PhD thesis is to present the methods of treatment of the coronary artery pathology and the results obtained by using current surgical techniques – “total arterial” myocardial revascularization surgery, in which besides the left internal thoracic artery (considered the "golden standard") we used the radial artery as associated graft.

The thesis is structured in two parts, a general one and the personal contributions. The general part contains three chapters which are presenting the current state of knowledge regarding the anatomy and the microscopy of the radial artery, the role of radial artery graft in coronary surgery and its surgical harvesting methods.

The first chapter presents the anatomical details of the trajectory and the topographic relationships of the radial artery in the anterior cubital region, the anterior region of the forearm and of the wrist, in conjunction with elements of radial artery histology and the receptors of the vascular wall.

Chapter two details the features of the arterial grafts used in the surgical treatment of the ischemic cardiopathy: the left and right internal thoracic artery, the right gastroepiploic artery, the inferior epigastric artery, the ulnar artery and the radial artery - in terms of their characteristics, the possibilities of harvest, variants of implantation and the results on medium and long term.

The third chapter presents the radial artery harvesting in terms of variants of approach, methods of work regarding to the necessary devices for harvest and the surgical techniques that can be used for each variant with comparision in between them by examination of the radial artery graft wall after its removal with “transmision” electron-microscopy, “scanning” electron-
microscopy and immuno-histochemistry, thereby recording the post-harvest injuries at the level of the endothelial cells, intima, basement membrane and media.

The personal contributions part includes three studies: the first one presents the morphological and functional assessment methods of the radial artery, the second study investigates in a comparative manner the results of harvesting the radial artery by the “skeletonized” and “pedicled” surgical techniques using the “open” approach and “sharp dissection”; the final study describes the results obtained by using the harvested radial artery for coronary artery bypass grafting in our experience.

The conclusions statement is that beside the modified “Allen” test and the echoDoppler examination combined with pulse-oximetry investigation (wich are providing enough information for a safe harvest of the radial artery), the angio-CT examination with three-dimensions reconstruction indeed offers complementary details regarding the anatomy of the radial artery and the structure of its wall but it is too expensive in order to be used routinely. The radial artery harvested as “pedicle” has a proper length but a bigger and uniform diameter compared with the “skeletonized” technique in wich the graft is longer, both of them without complications at the harvest site. The radial artery graft can be used with good results for the treatment of the coronary artery disease, being able to reach all the coronary systems as “free graft” or “composite graft” and with very good clinical and angiographical results on short and medium term.