

New Data Acquisition using Variable Graphic Display of the Coronary Vessel Anatomy for Rapid and Easy Creation of Angiography Reports

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Abstract

In this newly developed software, the anatomical variation of the threedimensional coronary vessel system can be recreated. A few mouse clicks are sufficient to reproduce an anatomically correct model of the patients own coronary artery system with respect to vessel size and number.

The localization, the severity and type of stenosis can be entered, as well as grafts and stents. Through the use of anatomically accurate visual representations of coronary anatomy, the transfer of complex coronary angiography information between operators, cardiologists, and surgeons is enhanced and expedited.

1. Introduction

The basis for existing computer software programs for documenting the results of coronary angiography are tables and fixed diagrams of coronary anatomy. The disadvantage of these is that the three dimensional coronary system of an individual patient is not well represented. The individual differences in the size of the myocardial regions supplied by the left anterior descending, the circumflex and the right coronary artery cannot be seen. For this reason, a new computer supported graphic display has been developed, where the size of the coronary arteries as well as their number and relationship to the myocardial region perfused can be variably created. Emphasis has been placed on ease of data entry and user-friendliness. The extra effort required to create the coronary diagram is rewarded by the time saved in the generation of the final report. Vessel size, and the determination of the dominant vessel type are already included in the coronary diagram.

In the case of interventions or repeat of angiography procedures (more than 30% of patients), the vessel diagram simplifies the report of new findings as the diagram can be easily modified and updated. Even complex findings with multiple stenoses or grafts can be easily captured and rapidly updated.

2. Creation of the coronary diagram

A few mouse clicks are sufficient to reproduce an anatomically correct model of the patients own coronary artery system with respect to vessel size and number. Through the opening of the vessel ring, the respective vessel size of the left anterior descending (reaches around the cardiac apex or not) and posterior descending are determined. The rightdominance or leftdominance of the coronary circulation is determined by interruption of the vessel ring between the circumflex and the right coronary artery. A mouse click (diagonal, posterolateral branch), will shorten or lengthen each vessel.

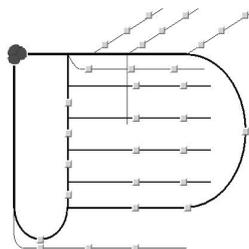


Figure 1. Basis diagram of the coronary artery system.

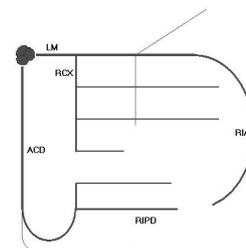


Figure 2. Diagram of the coronary artery system, patient: Mustermann, G.

3. Findings

3.1. Stenoses

Previously, only stenoses for specific vessel segments could be entered. Bifurcation stenoses were only possible for the left main and the Crux cordis of the right coronary artery. For catheter interventions, stenoses located near the large branches (diagonal, postero lateral) are very important. With this software program, a window opens to display involvement of bifurcation or segments of branches.

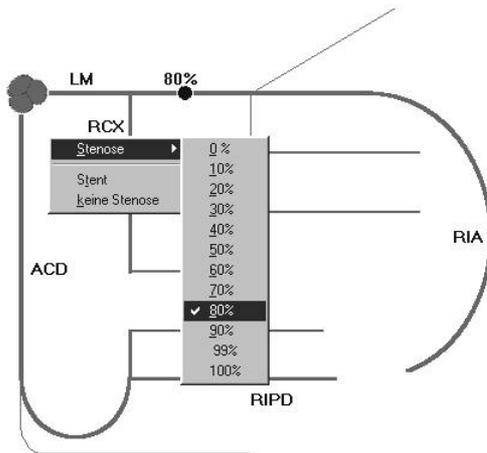


Figure 3. Window to display involvement of bifurcation or branches.

3.2. Ventricle

Clicking on the individual regions of the diagram of the ventricle in RAO and LAO position will open an additional window for documenting regional wall motion abnormalities. Hypokinesia, akinesia and aneurysms of the ventricle can be displayed.

3.3. Grafts

The course of grafts can be entered by clicking on the graft anastomosis site in the vessel diagram in direction of flow. Venous and arterial grafts are differentiated. Stenoses and graft closure at the site of the graft ostium, the graft segment or anastomosis site can be displayed in on the diagram.

4. Report

After data entry, a clear graphic representation of the patients' individual coronary anatomy is documented. The complete graphic coronary and ventriculography findings with vessel configuration, stenoses, stents, grafts and ventricular diagram with regional wall abnormalities are entered into data files, stored and printed as a graphic representation.

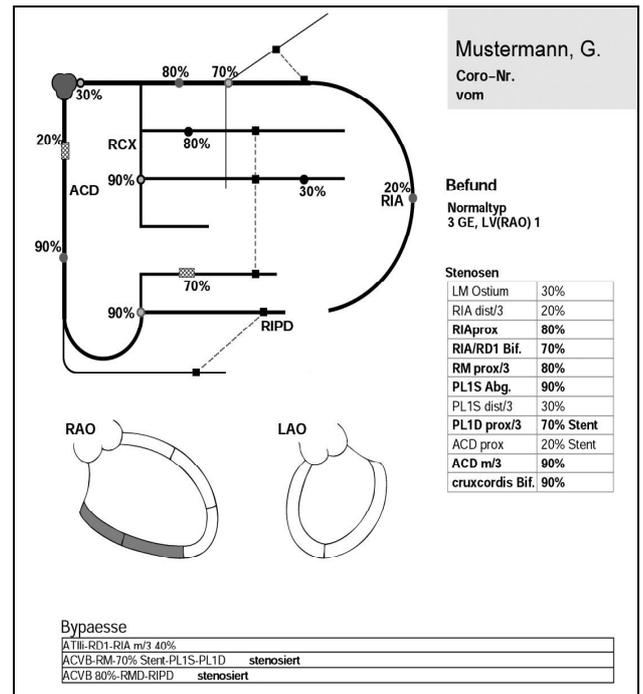


Figure 4. Angiography report

5. Summary

This software was developed to permit quick, easy and flexible assessment by graphic representation of the three-dimensional coronary vessel system for coronary angiographic reporting.

- The programmed module can be integrated at defined interfaces in the computer programs for the angiography laboratory or function as an independent program on a personal computer.
- The new graphic reporting system with variable coronary vessel diagrams has contributed to improved report quality in our own routine clinical practice.
- Through the use of anatomically accurate visual representations of coronary anatomy, the transfer of complex coronary angiography information between interventionalists, cardiologists, and surgeons is enhanced and expedited.

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