Diagnostic Capabilities of 64 Slice CT Coronography Compared to Classic in Coronary Disease Detection

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1. INTRODUCTION

Cardiovascular disease, among which the most common is coronary disease of the heart are the main cause of death at middle aged persons in the majority of European countries. Percent of cardiovascular disease in overall mortality among our population is even more than 50%. Up to 55 years of live myocardial infarction is by 5-6 times more common among men, and up to age of 75 years that difference decreases to 2.5 times. Goal: The goal of this study is to determine the diagnostic value of 64 slices computerized tomography in detection of coronary disease compared to classic, invasive coronaryography. Material and methods: Study included 50 patients, of both genders, at average age of 60 years. Patients underwent CT coronography as well as classic coronaryography. Results: Our research prove that the sensitivity of MSCT coronaryography 92% with positive predictive value of 86%. Mayor difference was in the analysis of CX artery in the evaluation of significant and non-significant stenosis in application of these two methods. During the analysis of LAD and RCA artery there was no statistically significant difference in findings of these two methods. Conclusion: CT coronaryography is non-invasive, comfortable and reliable method in coronary disease diagnostics. Thanks to its high sensitivity and PPV it enables reliable exclusion of coronary disease and takes significant place in a cardiovascular diseases diagnostic algorithm. Key words: coronaryography, CT coronaryography, coronary diseases.

2. GOAL

The goal of this study is to determine the diagnostic value of 64 slices computerized tomography in detection of coronary disease compared to classic, invasive coronaryography.

3. MATERIAL AND METHODS

50 patients with suspected coronary disease underwent examination on a CT machine. The examination was performed on a 64 slices Siemens, dual source machine (0.6mm collimation, 330 msec/rotation). The patient was placed in a supine position with raised hands. Ba large diameter needle 18-20 gouge was applied nonionic, iodine contrast agent in concentration of 1 ml/kg of patient’s body mass. Scanning field was from the tracheal branch to the base of the heart. Determination of the optimal imaging time was done by bolus method. At the work station after the scanning was performed data processing and reconstruction
Invasive coonography was performed on a Siemens machine by Seldinger method with application of nonionic, iodine contrast agent with automatic syringe, Acist.

3.1. STATISTICAL ANALYSIS

Data analysis was performed by ANOVA test, and for the comparison of data was used Student’s paired samples t test. The level of significance was p=0.05.

4. RESULTS

The study included 50 patients, of which 41 male, and 9 female. Analysis of the sample age structure was determined that the mean age is 60.64±9.66 years. ANOVA indicated that there is no statistically significant difference in relation to gender, F=0.532; p=0.469.

Paired samples Student’s t test determined that there is no statistically significant difference in coronography finding of LAD by applying MSCT and invasive coronography, t=-0.784; DF=49; p=0.438.

Paired sample Student’s t test showed statistically significant difference in CX finding by application of these two methods. Paired sample t test, determined that there is no statistically significant difference in obtained results, so the values of these two diagnostic methods did not differ, t=2.852; DF=49; p=0.006.

Analysis of RCA state by MSCT and invasive coronography, by paired sample t test, determined that there is no statistically significant difference in results, so the values of these two diagnostic methods did not differ, t=0.109; DF=49; p=0.228.

From the total number of patients included in this study, by MSCT coronography application in 46 cases was detected pathological finding, and by application of invasive coronography in 41 cases. Sensitivity of MSCT coronography is 92% and positive predictive value was 86%.

5. DISCUSSION

Cardiovascular diseases in the world today are the leading cause of morbidity and mortality. In order to prevent this, or decrease, it is necessary to in due time detect and adequately treat these disorders by non-invasive diagnostic procedures.

MSCT coronography represents method of choice in diagnosis of atherosclerotic changes in coronary arteries by non-invasive approach. The goal of this study was to test the diagnostic accuracy of MSCT coronography compared to standard coronary angiography (Figure 5-11).

Our study showed that the sensitivity of MSCT is 92%, with the positive predictive value of 86%. Major differences occurred in the analysis of the CX artery in the evaluation of significant and non-significant stenosis by application of these two methods.

Data from the available literature indicate that there is no difference in diagnostic accuracy in coronary disease between classic and CT coronography. It is also listed that the CT coronary is superior in the diagnostics of myocardial bypass compared to classic coronary angiography.

Table 1. Gender and age structure of the sample

<table>
<thead>
<tr>
<th>Gender</th>
<th>N</th>
<th>Mean ± SD</th>
<th>SEM</th>
<th>95% Confidence Interval for Mean</th>
<th>Lower Bound</th>
<th>Upper Bound</th>
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<tr>
<td>Male</td>
<td>41</td>
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<td>62.77 ± 10.44</td>
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<td>60.64 ± 9.66</td>
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<td>57.89</td>
<td>63.38</td>
</tr>
</tbody>
</table>

Figure 1. Analysis of LAD (left anterior descending artery) by MSCT and invasive coronography

Figure 2. Analysis of CX by MSCT and invasive coronography

Figure 3. Analysis of RCA by MSCT and invasive coronography

Figure 4. Confirmation of pathological findings by MSCT coronography

Figure 5. Occlusion of LAD.

Figure 6. Occlusion of RCA.

Figure 7. Subocclusion of RCA
diagnostic accuracy in detection of coronary disease between classic and CT coronography. It is also listed that the CT coronography is superior in the diagnostics of myocardial bypass compared to classic coronography (4). Authors from Iran (Sajjadieh et al.) noted high sensitivity (96%) as well as PPV (90.5%) of CTA in the detection of coronary disease (5).

German authors (Gorennoi et al.) found sensitivity of 96%, specificity of 86%, of CT coronography in comparison to the classic one (6).

Authors from USA (Otaki et al.) mentioned excellent diagnostic informations in detection and exclusion of coronary disease by CT coronography in comparison to the standard (7).

According to British authors the main role of CT coronography is in exclusion of significant coronary disease. They also listed that the sensitivity is the lowest for CX artery 85%; PPV 81%, while for the LAD sensitivity is 96%, PPV 92% (8).

6. CONCLUSIONS

CT coronography is non-invasive, comfortable and reliable method in coronary disease diagnostics. Thanks to its high sensitivity and PPV it enables reliable exclusion of coronary disease and takes significant place in a cardiovascular diseases diagnostic algorithm.

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