One-day coronary angioplasty. Patients' characteristics and results of 30-day follow-up. Data from a single-center registry

Authors: Andrzej Ciszewski

Article type: Short communication

Received: December 31, 2019.

Accepted: February 14, 2020.

Published online: February 19, 2020.

ISSN: 0022-9032

e-ISSN: 1897-4279
One-day coronary angioplasty. Patients' characteristics and results of 30-day follow-up.

Data from a single-center registry

Andrzej Ciszewski

Department of Cardiology and Invasive Angiology, National Institute of Cardiology, Warsaw, Poland

Short title: One-day coronary angioplasty

Corresponding author:

Andrzej Ciszewski, M.D., Ph.D.

Department of Cardiology and Invasive Angiology

National Institute of Cardiology

ul. Alpejska 42, 04-628 Warszawa, Poland

Phone: (+48 22) 34 34 013

e-mail: aciszewski@ikard.pl

Conflict of interest: none declared
Introduction

Single-Day Coronary Angioplasty (S-D PCI) is a rapidly developing procedure significantly reducing hospital costs. The safety of ambulatory PCI in selected patients (pts) has been confirmed in several randomized studies with different entrance criteria and methodology [1-3]. In practice, the patients’ selection criteria for S-D PCI are not yet clearly established, vary significantly among performing centers and may influence the patients’ safety [1-5].

The aim of the study is to evaluate the results and safety of an S-D PCI performed according to our original criteria of patients’ qualification and management protocol.

Methods

The prospective registry included consecutive pts subjected to a PCI in a Single-Day Coronary Invasive Unit. The pts who were admitted and discharged on the same day constituted the study group (S-D PCI group). The remaining pts who were qualified for an overnight or longer stay after PCI because of various causes comprised the control group. As all pts were originally referred as candidates to S-D PCI, there were no: Left Main, CTO, and bypass PCI procedures among them. All PCI procedures were performed on the day of admission via the radial approach.

The selection of pts to S-D PCI group was performed in three steps. Step One was to identify “Pre-hospital Exclusion Criteria”. We excluded “a priori” pts with: clinical instability, planned PCI of left main, coronary bypass and chronic total occlusion, LVEF <30%, NYHA class ≥3, planned femoral access, GFR<50 ml/min, domicile far from hospital (transport >60 min), and patient’s refusal to be discharged early for psychological or social reasons.
Step Two “Immediate evaluation of angioplasty technique and outcome” included data associated with the PCI procedure. At this stage, the resignation from S-D PCI and decision of an overnight in-hospital stay was taken if one of the following occurred: shift to femoral approach, ischemic complications – MACE, target vessel or side branch occlusion, dissection not covered by stent or the performing physician’s decision associated with unexpected high complexity of the procedure.

After the PCI a patient spent time in an armchair in a sitting or reclining position. Each patient received 1000 ml fluid infusion and his vital functions were evaluated by a heart monitor and experienced personnel.

Step Three – final “Discharge Decision” was taken 4-6 hours after uncomplicated angioplasty. The discharge criteria were: stable clinical signs, no ecg ischemic changes, no hematoma after the removal of radial compression. Each early discharge decision was accepted by the patient and the physician performing the PCI.

A follow-up telephone interview was carried out at day 30 by an experienced medical secretary.

The study was approved by the Local Ethics Committee [Decision Nr. 1785] and each patient gave a written informed consent to participate in the study.

Statistical analysis

Quantitative variables are expressed as mean and standard deviation (SD) and range, and compared by unpaired t-test. Qualitative variables are reported as counts and percentages, and compared using Chi2 independent test or Fisher’s exact test, where appropriate. Univariable and multivariable stepwise binary logistic regression analyses were used to determine independent predictors of overnight in-hospital stay. All tests were two-sided with
the significance level of p<0.05. Statistical analyses were performed with statistical package SAS.

Results and Discussion

Patients and Procedure

During the study period between January 2018 and October 2019 there were 821 diagnostic and 180 therapeutic procedures performed in a Single Day Coronary Invasive Unit. The clinical and angiographic characteristics of 92 S-D PCI pts (Study Group) and 76 overnight stay PCI pts are shown in Table 1. The reasons for qualification to overnight stay (Control Group) were as follows: non-medical reasons (far inhabitancy, lack of caregiver, patient’s preference) – 26 pts, GFR <50ml/min – 4 pts, shift to femoral approach – 3pts, cardiac ischemic complications – 6 pts, performing physician’s decision due to unexpected high complexity of PCI- 39 pts.

In a multivariable binary logistic regression analysis, 2 independent predictors of overnight stay were identified – complex PCI and LVEF. Pts with complex PCI procedures had a significantly lower chance for same-day discharge: 0.24; 95%CI:0.12-0.46, p< 0.001 and pts with better LVEF had a higher chance for S-D PCI: 1.27; 95%CI:1.02-1.58, p=0.03. Each 5% of better LVEF increases the chance of same day discharge by 27%.

Follow-up

A 30-day follow-up data were obtained from all 92 S-D PCI pts. Clinical symptoms improved in 84 (91.3%) pts. Eighty-nine (96.7%) pts found a discharge on the same day after the PCI to be safe and more convenient. Non-cardiac complications were found in 3 pts (3.3%). Two pts (2.2%) were referred to ambulatory consultations because of small hematoma in the access site. One patient (1.1%) needed neurological hospitalization due to symptoms that occurred
also before PCI and a later diagnosis confirmed their neurological origin. All-cause readmission was observed in 2pts (2.2%); 1p. for non-cardiac and 1p. for cardiac reasons.

Cardiac events during follow-up

In the S-D PCI pts we did not observe death, STEMI, urgent revascularization. One patient (1.1%) had an n-STEMI. He was admitted to hospital on the second day following S-D PCI due to chest pain and increased troponin levels. In coronary angiography, an occlusion of a small side branch was found and the patient was discharged on the third day, after the normalization of troponin level and without any need for repeated PCI. One patient (1.1%) required a non planned ambulatory consultation because of chest discomfort and high blood pressure. He had no ecg ischemic changes and troponin was not elevated.

Discussion

A multiple analysis of post-angioplasty complications has shown that early complications if they occur, reveal themselves during the first 6 hours after the procedure. A period between 6 and 24 hours is almost free of unexpected events and is called a “honeymoon” after PCI [6]. Owing to this information and generalization of radial approach, the number of Single-Day PCI procedures and that of performing centers is growing constantly. However a key problem – In which patients S-D PCI can be performed safely – remains unclear. Recent European Guidelines on Myocardial Revascularization totally ignore this question [4]. Cordoba-Soriano et al. in 533 pts from multicentre Spanish registry of ambulatory PCI reported 3 (0.56%) major adverse events and 8 (1.5%) readmissions in 30-day follow-up [3]. The data of 169,623 pts. from the British Cardiovascular Intervention Society registry clearly show that the number of S-D PCI is increasing constantly and is not associated with a higher complications rate [7]. The 30-day mortality in S-D PCI in the British registry is below 0.5%. Simillary, Amin et al. analysing a database from 493 US hospitals (672,470 PCI’s) found that S-D PCI
procedures were not associated with a higher risk of death, bleeding, MI or acute kidney injury at days 30, 90 and 365 [8].

According to the best of my knowledge this is a first paper reporting S-D PCI in Poland. The only previous report included pts. from an American center [9]. In our protocol, unlike in many other centers, we included not only lower-risk patients, but also those in moderate risk (no age limit, multivessel disease, complex PCI procedures), [Table 1]. The low 30-day events rate in our results and a favorable patients’ opinion is an important contribution to a discussion in this field, as we observe an increasing heterogeneity in the discharge practice [3,7,8,10].

Conclusions

The first conclusion from this study is that single-day coronary angioplasty is feasible in the Polish medical system and reimbursed like a procedure with overnight stay. The second is that the proposed protocol of patient qualification criteria and management for S-D PCI is safe and the 30-day events rate remains low.

Limitations

It is a preliminary report and an important limitation is a small study group, especially in the context of low events rate. A comparison of S-D PCI p. with the overnight Stay Group is controversial as pts. qualified to longer observation should represent a higher risk group [7]. According to many authors, the 30-day mortality and MACE rates in S-D PCI should not exceed 1%, and readmission 5%, as it is reported in the risk models and large multicenter registries [5,7,8,10].
References


Table 1. 1-Day PCI patients and procedural characteristics. A comparison with overnight stay group.

<table>
<thead>
<tr>
<th>Patients characteristics</th>
<th>1-D PCI</th>
<th>Overnight stay</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n=92</td>
<td>n=78</td>
<td></td>
</tr>
<tr>
<td>Age, mean (SD), range, y</td>
<td>65.9 (9.3)</td>
<td>67.1 (10.7)</td>
<td>0.43</td>
</tr>
<tr>
<td></td>
<td>(46-88)</td>
<td>(35-87)</td>
<td></td>
</tr>
<tr>
<td>Male Sex, n (%)</td>
<td>67 (72.8%)</td>
<td>56 (71.8%)</td>
<td>0.88</td>
</tr>
<tr>
<td>LVEF, mean (SD), range, %</td>
<td>57.2 (6.6)</td>
<td>54.5(8.5)</td>
<td>0.02</td>
</tr>
<tr>
<td></td>
<td>(35-70)</td>
<td>(28-70)</td>
<td></td>
</tr>
<tr>
<td>GFR, mean (SD), ml/min</td>
<td>65.2 (11.8)</td>
<td>67.1 (14.4)</td>
<td>0.34</td>
</tr>
<tr>
<td>Diabetes, n (%)</td>
<td>27 (29.4%)</td>
<td>25 (32.1%)</td>
<td>0.70</td>
</tr>
<tr>
<td>Previous MI, n (%)</td>
<td>26 (28.3%)</td>
<td>32 (41.0%)</td>
<td>0.08</td>
</tr>
<tr>
<td>Multivessel disease, n (%)</td>
<td>50 (54.4%)</td>
<td>57 (73.1%)</td>
<td>0.01</td>
</tr>
<tr>
<td>Procedure characteristics</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>“Ad hoc” PCI, n (%)</td>
<td>63 (68.5%)</td>
<td>43 (55.1%)</td>
<td>0.07</td>
</tr>
<tr>
<td>Use of iFR/FFR/IVUS, n (%)</td>
<td>15 (16.3%)</td>
<td>11 (14.3%)</td>
<td>0.69</td>
</tr>
<tr>
<td>Complex PCI, n (%)</td>
<td>36 (39.1%)</td>
<td>57 (73.1%)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td></td>
<td>[bifurcations, multivessel PCI, 3-vessel disease]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of stents, mean (SD)</td>
<td>1.3 (0.6)</td>
<td>1.5 (0.8)</td>
<td>0.08</td>
</tr>
<tr>
<td>Total stent length, mean (SD), mm</td>
<td>20.9 (9.7)</td>
<td>26.9 (17.0)</td>
<td>0.005</td>
</tr>
</tbody>
</table>

Abbreviations: GFR, glomerular filtration rate; iFR/FFR/IVUS, intravascular diagnostic tests; LVEF, left ventricular ejection fraction; MI, myocardial infarction; n-STEMI, non ST elevation myocardial infarction; STEMI, ST elevation myocardial infarction.