Coronary angioplasty and stenting in out-patient: indication and results

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Conflict of interest

• none
Same day discharge

- 1994 - 1st published experience from Amsterdam (Br Heart J)
- 2008 - 1st important data from USA (Am Heart J)
- 2011 - 1st data about older patients in (JAMA)
- 2013 - 1st meta-analysis (JACC CI)
- 2013 - 1st European consensus (Eurointervention)
- 2015 - Last edition of Topol Textbook of Interventional Cardiology
- 2018 - 2nd US consensus (CCI), Czech position paper (CorVasa)
Same-day PCI: Most Adverse Events Occur Within 6 Hours

N=450 TR-PCI 2004-2007

<table>
<thead>
<tr>
<th>Complications, n (%)</th>
<th>0-6 h</th>
<th>6-24 h</th>
<th>&gt;24 h</th>
</tr>
</thead>
<tbody>
<tr>
<td>Access site bleeding (minor)</td>
<td>11 (2.4%)</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>Access site bleeding (major)</td>
<td>None</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>Postprocedure infarction</td>
<td>8 (1.8%)</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>Repeat revascularization</td>
<td>4 (0.9%)</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>Ventricular tachycardia</td>
<td>1 (0.2%)</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>CABG</td>
<td>None</td>
<td>None</td>
<td>1 (0.2%)</td>
</tr>
<tr>
<td>Death</td>
<td>None</td>
<td>None</td>
<td>1 (0.2%)</td>
</tr>
<tr>
<td>Atrial fibrillation</td>
<td>None</td>
<td>None</td>
<td>1 (0.2%)</td>
</tr>
<tr>
<td>Stroke</td>
<td>None</td>
<td>None</td>
<td>1 (0.2%)</td>
</tr>
</tbody>
</table>

Jabara R, et al. [8]  
*Am Heart J 2008*
Consensus document on the radial approach in percutaneous cardiovascular interventions: position paper by the European Association of Percutaneous Cardiovascular Interventions and Working Groups on Acute Cardiac Care** and Thrombosis of the European Society of Cardiology

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International experts: Gerald Barbeau15, MD; Shigeru Saito16, MD; Sanjit Jolly17, MD; Yves Louvard18, MD; Tejas Patel19, MD; Sunil V Rao20, MD; Nicolaus Reifart21, MD; Philippe Gabriel Steg22, MD; Orazio Valsecchi23, MD; Yuenjin Yang24, MD

Stable patients with an optimal PCI result, optimal pharmacological treatment according to ESC guidelines and no cardiac or vascular complications during the procedure or up to 4-6 hours afterwards can be considered for outpatient treatment if performed at high-volume centres by experienced interventionists. Close follow-up and immediate readmission should be possible for delayed complications.
DAY-CASE ANGIOGRAPHY AND ANGIOPLASTY

The immediate ambulation of the patient, safety of the entry site and, for PCI patients, reliable immediate outcome of an optimal coronary stent procedure, theoretically allow patients to be discharged from the hospital after a few hours of uneventful observation. Day-case angiography is already routine practice after femoral access, especially when closure devices are used. Of course, early discharge should not prevent the attending physician from discussing the results with the patient. A radial approach facilitates the process and avoids prolonged hospital stays. Because of the potential risk of bleeding after anticoagulation, day-case angioplasty is less frequently practised with the femoral approach, and is often limited to unstable patients.

transferred back to admitting hospitals. The first outpatient transradial coronary stent implantation was reported in 1994\textsuperscript{72}. Day-case angiography/PCI has several advantages\textsuperscript{73}: patient preference, ease of ward management, shortened waiting lists, and enhanced cost-savings. Overnight stay sometimes is prudent or required in selected groups meeting the following characteristics:

- Preprocedural: unstable angina pectoris, acute myocardial infarction, shock, heart failure, renal failure, severe comorbidities, poor social circumstances limiting family support after discharge.
- Procedural: transient vessel closure, arrhythmias or resuscitation during procedure, prolonged chest pain, persistent ECG changes, suboptimal PCI result, major or symptomatic side branch occlusion, entry site complication(s).
- Post-procedural: any cardiac or vascular complication within the 4-6 hour observation period.
STATE-OF-THE-ART PAPER

Same-Day Discharge Compared With Overnight Hospitalization After Uncomplicated Percutaneous Coronary Intervention

A Systematic Review and Meta-Analysis

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Quebec City, Quebec, Canada; Durham, North Carolina; Hershey and Scranton, Pennsylvania; Pilsen, Czech Republic; Chicago, Illinois; and Syracuse, New York

Objectives This study sought to evaluate outcomes of same-day discharge (SDD) following percutaneous coronary intervention (PCI) versus overnight hospitalization (ON).

Background Although there are data on the safety and feasibility of SDD after PCI, ON continues to be prevalent.

Methods The Cochrane search strategy was used to search the PubMed database, EMBASE, and the Cochrane Library for relevant literature. Thirteen studies (5 randomized and 8 observational) of SDD after uncomplicated PCI versus ON met inclusion criteria. Data were pooled using a random effects model, and reported as odds ratios (OR) with their 95% confidence intervals (CI). The primary outcomes were incidence of total complications, major adverse cardiovascular events (MACE), and rehospitalization within 30 days after PCI.

Results A total of 13 studies, involving 111,830 patients were pooled. There was significant variation in the definition of outcomes across studies. For total complications, the strategy of SDD compared with ON after PCI had an estimated OR of 1.20 (95% CI: 0.82 to 1.74) in randomized and 0.67 (95% CI: 0.27 to 1.66) in observational studies. Similar results were found for MACE (randomized, OR: 0.99, 95% CI: 0.45 to 2.18; observational, OR: 0.59, 95% CI: 0.06 to 5.57) and rehospitalizations (randomized, OR: 1.10, 95% CI: 0.70 to 1.74; observational, OR: 0.62, 95% CI: 0.10 to 3.98) at 30 days post PCI.

Conclusions There is considerable heterogeneity across published studies comparing SDD with ON. This, coupled with the low event rate and wide corresponding CIs, suggest that an adequately powered multicenter randomized trial comparing SDD with ON would require a very large sample size (>17,000). Until such a trial is completed, SDD after uncomplicated PCI seems a reasonable approach in selected patients. (J Am Coll Cardiol Intv 2013;6:99–112) © 2013 by the American College of Cardiology Foundation
Dedicated Lounges are better than beds ...
150 m²

50 m²

50 m²
Our radial lounge for 800 patients

(= 60% of our elective and 30% of all pts)

Four chairs

Nurse’s and kitchen corner

TV, internet

Table for lunch and RBT
Our radial lounge in

Topol 7th Edition 2015
Easy radial patency control

- Reverse Barbeau Test
Radial artery patency control by RBT in our Lounge
What we do and require?

Before admission:
• Instructions - one page for the patient
• History - one page from his physician incl. echo and lab. results
• Admission - first two pts at 7 a.m., 3rd and 4th at 8 a.m. (CAG and PCI 9 a.m.-noon)

In the Lounge:
• Routine postprocedural care - minimal compression pressure á 20 min, compression time, hematoma measurement in cm, final RBT, 1 hour ulnar compression in case of RAO
• Lunch at noon
• Fluid intake control - 1500 ml before discharge
• Patient satisfaction control by questionnaire
• Signatures before discharge about complete informations

After discharge:
• Discharge and overnight stay only with family member or close person
• In case of overnight complications - immediate phone contact to ICU
• We do not contact patient next day personally
Instructions: before admission

a) for physicians

- Kandidát vhodný pro ambulantní výkon zatím bez:
  a) warfarinu
  b) kreatinu na 150 mmol/l
- První dva pacienti se dostaví na stacionář v 7.00
- Další dva pacienti se dostaví na stacionář v 8.00
- Pacient si pokud možno vezme s sebou 1.5L PET lahev s tekutinou
- Pacient musí mít zajištěný odvoz k večeru či večer domů, kde nežijí sám
- Ráno v 6.00 pacient lehne posnídat (nejlépe 1 rohlík s másmů + hodně napít), pak již nepřijmává tekutiny ani potravu. Před tím do rána pít zcela bez omezení.
- Pacient si vezme ranní léky, kromě tbl. na diabetes (perorální antidiabetika)
- Ostatní léky, které pacient užívá přes den, si vezme s sebou.
- Pacient přijde v domácím pohodlném oblečení, nebo si je vezme s sebou. Ne
  pyžamo.
- Pacient si může vztít s sebou něco na čtení.
- Při anamnése CABG nutno dodat popis bypassů (počet a kam našity)

Důležité:

- Zjistit, zda jsou alespoň na jednom zápěstí hrmatné obě tepny (radiální a
  ulnární)
- Dodat vypněnou žádanku s výsledky, včetně náběru krve

Pokyny pro pacienta níže, lze oddělit a předat pacientovi spolu s vypsaným termínom
výšetření.

---

Datum plánovaného vyšetření: ..................... Hodina nástupu: 7.00 nebo 8.00
(nedodací se škrtníte)

b) for patients

Co s sebou a jak se dostaví k vyšetření?

- Pokud možno si s sebou vernete 1.5L PET lahev s tekutinou
- V každém případě musíte mít zajištěný odvoz k večeru či večer domů, kde nežijíte sama!!!
- Ráno v 6.00 lehne posnídat (nejlépe 1 rohlík s másmů + hodně napít), pak již nejezte ani nepijte. Před tím do rána pít zcela bez omezení.
- Vernete si ranní léky, kromě tbl. na diabetes (perorální antidiabetika)
- Ostatní léky, které užíváte přes den, si vernete s sebou.
- K nástupu přijdete v domácím pohodlném oblečení, ne pyžamo.
- Vernete si s sebou něčo na čtení.

Kardiostacionář najdete, pokud půjde vchodem “B” a výtažem vyjedete do 3. patra, kde jsou kardiologické ambulance, chodbou kolem ambulanci projdete až na její konec, a zde se nachází dveře kardiostacionáře.

Důležitá telefonní čísla:

Kardiostacionář: 377 103 352, Sál č. I.: 377 103 496, Sál č. II.: 377 103 491
Nurse’s document in Lounge

in red:

1. date
2. type of procedure
3. start of compression (time)
4. 0 ml in TR Band (time)
5. total compression time (minutes)
Nurse in our Lounge

1. arranges admission, documents and basic examination of the patient

2. arranges transfer to and from the cathlab

3. arranges optimal postprocedural radial artery care including patent hemostasis and short total compression time, measures hematomas, HR, BP...

4. arranges lunch and fluid intake (1,5 liter during the stay in the Lounge)

5. arranges discharge including personal contact with family member, finalizes documents
## Lounge in University Hospital Pilsen 2009-2018

<table>
<thead>
<tr>
<th>Year</th>
<th>Number of Patients</th>
<th>PCI</th>
<th>Pacemaker Exchange</th>
</tr>
</thead>
<tbody>
<tr>
<td>2009</td>
<td>301</td>
<td>72</td>
<td>0</td>
</tr>
<tr>
<td>2010</td>
<td>706</td>
<td>179</td>
<td>36</td>
</tr>
<tr>
<td>2011</td>
<td>708</td>
<td>155</td>
<td>76</td>
</tr>
<tr>
<td>2012</td>
<td>748</td>
<td>161</td>
<td>89</td>
</tr>
<tr>
<td>2013</td>
<td>821</td>
<td>177</td>
<td>105</td>
</tr>
<tr>
<td>2014</td>
<td>853</td>
<td>162</td>
<td>108</td>
</tr>
<tr>
<td>2015</td>
<td>825</td>
<td>184</td>
<td>94</td>
</tr>
<tr>
<td>2016</td>
<td>817</td>
<td>179</td>
<td>100</td>
</tr>
<tr>
<td>2017</td>
<td>773</td>
<td>165</td>
<td>76</td>
</tr>
<tr>
<td>2018</td>
<td>741</td>
<td>170</td>
<td>60</td>
</tr>
</tbody>
</table>

**Total:**  
- > 7000 pts  
- > 1500 PCI  
- > 700 pacemaker exchanges
Trials in our Lounge

- Comparison of two doses of UFH and ulnar compression for soon RAO treatment (Am J Cardiol 2011) - RAO ..... 2.9%...0.8%

- PROPHET II (JACC Cardiovasc Interv 2017) - RAO ..... 2.7%

- RAP and BEAT (Eurointervention 2017) - RAO ..... 2.6%

- RAO detected by RBT and duplex ultrasound - RAO .... 0.4% (will be published in 2019)
SDD position paper 2018
of the Czech Interventional Cardiology Association

Cor et Vasa 2018;60: 236-239
VI TRANSRADIAL WORKSHOP TREC-2019
Length of stay following percutaneous coronary intervention: An expert consensus document update from the society for cardiovascular angiography and interventions

Abstract
Since the publication of the 2009 SCAI Expert Consensus Document on Length of Stay Following percutaneous coronary intervention (PCI), advances in vascular access techniques, stent technology, and antiplatelet pharmacology have facilitated changes in discharge patterns following PCI. Additional clinical studies have demonstrated the safety of early and same day discharge in selected patients with uncomplicated PCI, while reimbursement policies have discouraged unnecessary hospitalization. This consensus update: (1) clarifies clinical and reimbursement definitions of discharge strategies, (2) reviews the technological advances and literature supporting reduced hospitalization duration and risk assessment, and (3) describes changes to the consensus recommendations on length of stay following PCI (Supporting Information Table S1). These recommendations are intended to support reasonable clinical decision making regarding postprocedure length of stay for a broad spectrum of patients undergoing PCI, rather than prescribing a specific period of observation for individual patients.

Seto et al. Catheter Cardiovasc Interv 2018
**TABLE 4 Consensus recommendations for discharge following PCI**

<table>
<thead>
<tr>
<th>Patient</th>
<th>Expedited and same-day discharge requirements and milestones</th>
<th>Factors unfavorable for same-day discharge</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clinically stable</td>
<td></td>
<td>Chronic kidney disease requiring prolonged hydration</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Decompensated CHF or fluid overload</td>
</tr>
<tr>
<td></td>
<td>Baseline comorbidities (e.g., diabetes, CHF, COPD, PAD, ESRD) stable</td>
<td>Decompensated COPD</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Continuing angina</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Contrast reaction with ongoing symptoms</td>
</tr>
<tr>
<td>Procedure</td>
<td>Successful procedure, including:</td>
<td>Angiographic complication (slow/no reflow, side branch closure, dissection, perforation)</td>
</tr>
<tr>
<td></td>
<td>• Single or multivessel PCI, proximal LAD, or bifurcation PCI</td>
<td>Inability to deliver stent/balloon angioplasty only</td>
</tr>
<tr>
<td></td>
<td>• Uncomplicated CTO attempt</td>
<td>Last remaining coronary artery PCI</td>
</tr>
<tr>
<td></td>
<td>• Regardless of number, length of stents used</td>
<td>Adequate hemostasis</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Bleeding complication</td>
</tr>
<tr>
<td></td>
<td>Effective dual-antiplatelet therapy administered</td>
<td>Vascular complication</td>
</tr>
<tr>
<td></td>
<td>• Pretreatment not required</td>
<td>Large contrast volume</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Need for GP IIb/IIa infusion</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Periprocedural MI</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Left ventricular support device used</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Large-bore (≥ 9 French) or brachial access</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Atherectomy</td>
</tr>
<tr>
<td>Program</td>
<td>Meets PCI program operational requirements for postprocedure care</td>
<td>Inadequate home support</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Adequate caregiver support</td>
</tr>
<tr>
<td></td>
<td></td>
<td>No transportation home</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Patient and caregiver education</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Discomfort of patient, caregiver, or physician with same-day discharge</td>
</tr>
<tr>
<td></td>
<td>• Provision of P2Y12 inhibitor and medication instruction</td>
<td>Inadequate access to emergency medical care following PCI</td>
</tr>
<tr>
<td></td>
<td>• Contact information and follow-up appointment</td>
<td></td>
</tr>
</tbody>
</table>
**Figure 1** Flowchart of patient status following elective PCI

**Conclusions**

Advances in practices and technologies have made discharge following PCI demonstrably safe when milestones of clinical stability, procedural success, and process measures have been achieved. Ultimately, the duration of observation following PCI for an individual patient must be a professional medical decision based on individual procedural and patient factors. The schema proposed here is intended to support the reasonable judgment of physicians to allow expedited discharge following PCI, and should not be interpreted as prescribing a specific period of observation for individual patients.

Seto et al. *Catheter Cardiovasc Interv* 2018
Conclusion

Outpatient coronary angiography and PCI in 2019 - conditions:

- Transradial approach in experienced radial center
- Dedicated infrastructure - Lounge
- Careful patients selection
- Optimal information before and after PCI
- Dedicated and trained nursing and medical staff

Then SDD is recommended for all cathlabs for majority of selective stable patients.