A
cute occlusion of the unprotected left main coronary artery (LMCA) is fatal in most cases. The life of the
cardiac patient can be saved by the rapid reperfusion of the
occluded LMCA by means of catheter intervention. However,
percutaneous coronary interventions (PCI) of LMCA are
discouraged by most guidelines. We describe 35 patients who
underwent emergency PCI of the unprotected LMCA.

**METHODS**

Emergency PCI of the unprotected LMCA was performed in
35 cases, representing 0.2% of the 17 683 patients who
underwent PCI at our centre between January 1990 and July
2001. Twenty six of the study patients (74.3%) were being
treated in the setting of acute myocardial infarction (AMI).
In the nine other patients (25.7%) the procedure was
performed as an emergency treatment for dissection that
occurred during coronary angiography. Patient characteristics
and angiographic data are shown in table 1.

The magnitude of STT elevation in lead AVR is also shown
in table 1. Twenty four patients (68.6%) had ST segment
elevation in lead AVR. Patients with an LMCA occlusion due
to complicated coronary angiography did not have a pre-
treatment ECG.

**RESULTS**

Twenty patients (57.1%) had a total occlusion of the LMCA. A
stent was used in 25 patients (71.4%); in one case a cutting
balloon was used and in one further case a rotablator was
applied. In 20 patients (57.1%) an intra-aortic balloon pump
was used. Cardiopulmonary resuscitation was needed in
seven patients (20%). Six patients (17.1%) were transferred
to the operating room for emergency coronary bypass surgery
immediately after orthograde flow in the LMCA was
obtained.

Median follow up was 722 days (interquartile range 0–
1847 days). One year follow up reveals a cumulative mortality
of 41%. The 15 patients who died did so under the following
circumstances. Seven patients (58.3%) died within 10
minutes of arrival in the catheterisation laboratory because
of haemodynamics that could not be corrected, in four of
these patients attempts to open the occluded LMCA had not
been successful, and three other patients died in cardiogenic
shock despite recanalisation. Two patients survived the PCI
procedure but died within 24 hours from cardiac failure. The
remaining three patients died because of aspiration pneu-
monia on day 3, a repeated arrest on day 8, and one patient
had a cerebrovascular accident as a complication of surgery
for groin bleeding. None of the 20/35 (59%) early survivors
died during the long term follow up. Additional revascular-
isations occurred in two of these 20 patients (10%), one
patient underwent coronary artery bypass grafting (CABG)
after 31 months, the other CABG and mitral valve surgery
after 59 months. The Kaplan-Meier survival curve is shown in
fig 1.

**DISCUSSION**

Generally, PCI is a safe and effective treatment for most
significant coronary stenoses. An exception is PCI of the
LMCA, which is not practised routinely, as balloon induced
dissection of the LMCA may result in an immediately life
threatening condition. In contrast, CABG is a safe alternative.
However, emergency CABG is logistically not always feasible;
even when the operating theatre and the surgical team are
available, the preparations for cardiac surgery may last longer
than the haemodynamic circumstances of the patient allows.
In contrast, catheter interventions do not require significant
preparations. Once the patient has arrived in the catheterisa-
tion laboratory, procedures may be carried out within
minutes. Emergency catheter interventions may result in an

**Table 1** Characteristics and angiographic data of 35
patients undergoing emergency PCI of the LMCA

<table>
<thead>
<tr>
<th>Total PCI (n = 17683)</th>
<th>Number of patients (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total PCI of the unprotected LMCA</td>
<td></td>
</tr>
<tr>
<td>Urgent PCI of the unprotected LMCA</td>
<td>26 (0.15%)</td>
</tr>
<tr>
<td>Complicated CAG</td>
<td>9 (0.05%)</td>
</tr>
<tr>
<td>Mean (SD) age (years)</td>
<td>67.1 (12.3)</td>
</tr>
<tr>
<td>Female</td>
<td>10 (29%)</td>
</tr>
<tr>
<td>History of CAD</td>
<td>30 (85.7%)</td>
</tr>
<tr>
<td>ST elevation in lead AVR</td>
<td></td>
</tr>
<tr>
<td>+0.5 mV</td>
<td>8 (22.9%)</td>
</tr>
<tr>
<td>+1.0 mV</td>
<td>7 (20.0%)</td>
</tr>
<tr>
<td>1.5 MV</td>
<td>1 (2.9%)</td>
</tr>
<tr>
<td>+2.0 mV</td>
<td>8 (22.9%)</td>
</tr>
<tr>
<td>Acute ECG not available</td>
<td>9 (25.7%)</td>
</tr>
<tr>
<td>No ST elevation</td>
<td>2 (5.7%)</td>
</tr>
<tr>
<td>Mean (SD) duration of ischaemia</td>
<td>104 (126) mins</td>
</tr>
<tr>
<td>Dominance of RCA</td>
<td></td>
</tr>
<tr>
<td>Yes/no</td>
<td>25/10</td>
</tr>
<tr>
<td>RCA occluded</td>
<td>6 (17.1%)</td>
</tr>
<tr>
<td>Occlusion of LMCA</td>
<td>20 (57.1%)</td>
</tr>
<tr>
<td>Calcification</td>
<td>17 (48.6%)</td>
</tr>
</tbody>
</table>

**Abbreviations:** AMI, acute myocardial infarction; CABG, coronary artery bypass grafting; LMCA, left main coronary artery; PCI, percutaneous coronary intervention.
Immediate restoration of haemodynamics, thus potentially saving lives.

Since PCI has been accepted as a standard treatment for AMI, experience with emergency PCI for the unprotected LMCA is growing. Most publications on this matter concern small subgroups from larger cohorts of patients undergoing PCI. De Luca (from the Zylstra group) so far describes the largest group; 24 patients underwent PCI for LMCA obstruction in the setting of AMI. Fourteen of these patients (58%) died either in the catheterisation laboratory or during the initial hospitalisation.

In our study the time delay between onset of symptoms and time of restoration of coronary blood flow appears to be the only strong predictor of mortality in a univariate analysis. Each quarter of delay results in a 30% increase of the risk of death.

Our study concerns a group of 35 patients with LMCA stenosis or occlusion, presenting at our high volume intervention centre during a 10 year time period. It has never been a policy at our centre to perform PCI of the LMCA routinely, but the immediately life threatening condition of acute closure of the LMCA forced us to carry out this life saving procedure. We strongly believe that scarcely any of these 35 patients would have survived without the catheter intervention. Applicable literature on the prognosis of untreated acute LMCA obstruction is lacking but in all studies on PCI under this condition, treatment failure results in low survival rates.

Fifteen patients died either during the procedure or within the first week thereafter. Survivors had an excellent prognosis with not one single patient dying during the 10 year follow up period. This remarkable finding is consistent with the only larger study published so far. Not surprisingly, a significant proportion (10%) of the survivors underwent additional revascularisations at a later stage, either by PCI or CABG.

In conclusion, the lives of 59% of the study population were saved by the procedure.

**Authors’ affiliations**

B R G Brueren, Department of Cardiology, Catharina Ziekenhuis, Eindhoven, The Netherlands
J M P G Ernst, M J Sutton, J M ten Berg, B J W M Rensing, E G Mast, E T Bal, A J Six, H W M Plkker, Department of Cardiology, St Antonius Hospital, Nieuwegein, The Netherlands

Correspondence to: B R G Brueren, Department of Cardiology, Catharina Ziekenhuis, Michielangeloalaan 2, Postbus 1350, 5602 ZA, The Netherlands; guus.brueren@cze.nl

Accepted 2 December 2003

**REFERENCES**


**ELECTRONIC PAGES**

Heart Online case reports: www.heartjnl.com


Late gadolinium enhanced cardiovascular magnetic resonance in Becker muscular dystrophy

A Varghese, D J Pennell

Becker muscular dystrophy is a rare cause of dilated cardiomyopathy. A case of Becker muscular dystrophy is reviewed in which cardiovascular magnetic resonance showed previously unreported findings of extensive mid-myocardial late gadolinium enhancement. Similar detection of late gadolinium enhancement in conjunction with other uses of cardiovascular magnetic resonance may contribute significantly to the diagnosis and management of patients with this unusual and important diagnosis.

(Heart 2004;90:9/e59) www.heartjnl.com/cgi/content/full/90/9/e59

---

**Figure 1** Kaplan-Meier survival curve: cardiac death.