Comparison of results of percutaneous coronary interventions in patients with ST-segment elevation myocardial infarction during routine working hours or off-hours

Grzegorz Słonka, Mariusz Gąsior, Andrzej Lekston, Marek Gierlotka, Michał Hawranek, Mateusz Tajstra, Lech Poloński

3rd Chair and Department of Cardiology, Silesian Medical University, Silesian Centre for Heart Diseases, Zabrze, Poland

Abstract

Background: Data on the efficacy of coronary angioplasty in patients with ST-segment elevation myocardial infarction (STEMI) treated during off-shift hours are limited, but some publications suggest a worse outcome in this group of patients.

Aim: To compare the results of percutaneous coronary interventions (PCI) in STEMI patients admitted to hospital during the daytime and off-shift hours and to identify factors which influence prognosis.

Methods: From January 1998 to October 2003, 1992 patients with STEMI were hospitalised and 1778 of them were treated with immediate PCI, including 482 admitted in the daytime (weekdays 8 a.m. – 3 p.m.; group I) and 1296 during off-shift hours (weekdays 3 p.m. – 8 a.m., weekends and holidays; group II). The clinical characteristics of both groups were similar, except for less frequent hypercholesterolaemia in the daytime group (52.1 vs. 59.7%; p=0.0041).

Results: There was no significant difference between the groups regarding time from admission to angiography (30 vs. 25 minutes), rates of reocclusion (5.2 vs. 4.9%), stroke (1.4 vs. 1.6%), haemorrhagic complications (8.1 vs. 6.9%), in-hospital mortality (6.8 vs. 6.2%) and long-term (24 months) mortality (13.7 vs. 13.6%) (p >0.05 for all parameters). The rate of stent implantation was significantly higher in the daytime group (71.2 vs. 66.2%; p=0.047).

Conclusions: The proper organisation of duties of the division of cardiology and the cardiac catheterisation laboratory, with focus on providing onsite staffing of the cardiac catheterisation laboratory around the clock, enables similar results of PCI in patients with ST-segment elevation myocardial infarction treated during off-shift hours as compared with patients treated during the daytime.

Key words: myocardial infarction, angioplasty, off-shift hours

Kardiol Pol 2007; 65: 1171–1177

Introduction

Acute coronary syndromes (ACS) still remain one of most frequent causes of hospital admissions and deaths, despite undeniable progress in the methods of ACS diagnosis and treatment which has been made over the last few decades. In Poland, the incidence of acute coronary syndromes is roughly estimated to be 140 000 per year, with ST segment elevation myocardial infarction (STEMI) accounting for 35% of ACS [1].

Percutaneous coronary intervention (PCI) is currently regarded as the most effective method of treatment of patients with STEMI. This method, however, has certain limitations. The major problem is the necessity of providing a network of cath labs equipped with costly diagnostic equipment and organising there 24-hour duties of highly qualified physician, nursing and technical staff. Ensuring efficient work of cardiology wards and cath labs during off-hours besides routine working hours may turn out to be a particularly difficult issue. It may be associated with inferior prognosis of patients with STEMI treated with PCI during off-hours, among other things due to longer door-to-balloon time. Data from literature indicate that the door-to-balloon time is significantly prolonged in patients treated outside regular hours [2, 3].

Address for correspondence:

Grzegorz Słonka MD, III Katedra i Oddział Kliniczny Kardiologii, Śląskie Centrum Chorób Serca, ul. Szpitalna 2, 41-800 Zabrze, tel. +48 32 373 36 19, e-mail: gslonka@poczta.onet.pl

Received: 13 April 2007. **Accepted:** 23 May 2007.

Some reports imply worse prognosis in this group of patients as well [3]. This issue is of great importance for clinical practice as approximately two thirds of all STEMI patients are admitted during off-hours.

The aim of this study was to carry out a comparative analysis of treatment outcomes in STEMI patients who underwent PCI during business and off-shift hours, based on the experience gathered by a large invasive cardiology centre in Poland. Moreover, factors influencing long-term prognosis depending on treatment were identified.

Methods

Study group

The study enrolled consecutive patients with STEMI admitted to our Department from February 1998 to October 2003. The core analysis was limited to the group treated with immediate PCI.

The following patients were selected for invasive treatment (urgent coronary angiography with intended angioplasty):

- with persistent chest pain ≥30 min,
- with electrocardiographic signs of evolving acute MI, i.e. ST segment elevation by ≥0.1 mV in at least 2 limb leads or ≥0.2 mV in at least 2 precordial leads, or a new left bundle branch block,
- with the time from pain onset below 12 hours (6 hours between 1998 and 1999), in the event of cardiogenic shock – 18-24 hours,
- from whom written consent to the proposed treatment was obtained.

The following patients were qualified for conservative treatment:

- with clinical (relief of coronary pain) and electrocardiographic (resolution of ST segment by ≥50% of initial value) signs of reperfusion,
- with the time from pain onset above 12 hours without haemodynamic instability,
- with contraindications for invasive treatment,
- refusing to consent to coronary angiography.

Depending on the time of admission, patients were divided into two groups: group I – patients admitted during routine working hours, i.e. working days between 8.00 a.m. and 3.00 p.m. (routine hours); and group II – patients admitted outside normal working hours, i.e. on working days between 3.00 p.m. and 8.00 a.m., on weekends and on public holidays (off-hours).

Initial pharmacotherapy

All patients qualified for invasive treatment were given acetylsalicylic acid 300-500 mg (unless previously treated) and unfractionated heparin 5-10 kU and morphine 2.5-5 mg intravenously, and other drugs as indicated.

PCI procedure

Following initial medical treatment, patients were referred to the cath lab for coronary angiography. After coronary angiography, an attempt to perform PCI was made except for the following situations:

- inability to identify infarct-related artery,
- normal blood flow (i.e. TIMI 3 according to TIMI score [4]) in the infarct-related artery without significant stenosis (over 50%).

Standard guide wires, balloon catheters and coronary stents were used for these procedures. In all patients who underwent stent deployment, ticlopidine 250 mg BID was started after the procedure and continued for 8 weeks. Besides, if clopidogrel was started in site all patients received a loading dose of 300 mg immediately prior to stent implantation. In patients with MI complicated with cardiogenic shock, intra-aortic balloon pumping was used depending on the patient's clinical condition. Vascular sheaths were removed after normalisation of blood coagulation parameters, i.e. kaolin-cephalin clotting time.

Off-hours cath lab team

There are 3 doctors on duty at our Department: a supervising doctor (cardiologist), a ward doctor and an interventional cardiologist. On-duty staff in the cath lab also include a nurse and a radiologist technician. The nursing staff at an intensive cardiological care unit work on shifts and their number is similar on both routine and off-hours. All the above-mentioned people remain on-site during the entire duty duration.

Statistical analysis

Continuous variables of normal distribution are presented as mean ± standard deviation. The significance of differences between means for continuous parameters of normal distribution was tested with Student's t-test. Continuous parameters of other than normal distribution were presented as medians and interquartile intervals, and statistical significance was examined using Mann-Whitney U-test. Quantitative variables were compared using χ^2 test (Yates modification was used for small groups). Factors influencing 2-year mortality were assessed using Cox proportional hazards multifactor regression model and the results are presented as relative risk (RR) and 95% confidence interval (95% CI). Results were found statistically significant if $p < 0.05$ (two-sided). Statistical analyses were performed using Statistica PL software v. 6.1 (StatSoft Inc.).

Results

From January 1998 to October 2003, 1992 patients with STEMI were treated at our Department. Based on clinical evaluation in the admission room 51 patients were referred for conservative treatment, whereas 1941 patients were

Table I. Clinical characteristics of study groups

Variable	Group I (n=482), routine hours	Group II (n=1296), off-hours	p
Age [years]	58.2±10.9	57.6±10.9	0.34
Males	356 (73.9%)	953 (73.5%)	0.89
Pain duration [hours]	4.8±3.7	4.9±3.9	0.55
Previous thrombolysis	133 (27.6%)	415 (32.0%)	0.072
Anterior wall myocardial infarction	198 (41.1%)	526 (40.6%)	0.85
Risk factors			
Hypertension	265 (55.2%)	660 (51.2%)	0.13
Diabetes mellitus	95 (19.8%)	257 (19.9%)	0.95
Hypercholesterolaemia	250 (52.1%)	771 (59.7%)	0.0041
Smoking	303 (63.3%)	831 (64.5%)	0.62
Past myocardial infarction	102 (21.2%)	243 (18.8%)	0.25
Cardiogenic shock on admission	52 (10.8%)	123 (9.5%)	0.42

qualified for invasive procedures. Following coronary angiography, 163 patients were qualified for further conservative treatment and urgent PCI was carried out in 1778 subjects, who comprised the analysed population. The study population was divided into two groups: group I – 482 patients (admitted during routine hours), and group II – 1296 patients (admitted during off-hours).

Clinical characteristics of the studied groups are shown in Table I. There were no significant differences between the groups with respect to age, sex, duration of chest pain, cardiogenic shock rates, anterior wall infarctions and prior thrombolytic therapy. Also, percentages of patients with hypertension, diabetes, smoking, and with history of previous infarction were similar in both groups. The only statistically significant difference was hypercholesterolaemia, being more frequent in the off-hours group (59.7 vs. 52.1%; p=0.0041).

There were no significant differences between the study groups regarding most of the analysed angiographic variables, including distribution of infarct-related arteries, percentage of patients with multi-vessel disease, and baseline blood flow in the infarct-related artery. Effectiveness of PCI expressed as percentage of patients with final TIMI 3 flow in the targeted artery was high and similar in both groups (89.6% in group I and 90.7% in group II). However, stent implantation was significantly more frequent in patients treated during routine hours than in off-hours (71.2 vs. 66.2%; p=0.047). Detailed results of angiographic analysis are presented in Table II.

In-hospital course was similar in both groups. Door-to--angiography time, re-occlusion rate, incidence of serious treatment-related complications (stroke, gastrointestinal bleeding and puncture site haematomas whether or not requiring red blood cell transfusion) and maximum creatine kinase activity were similar in both study groups. There were 33 in-hospital deaths (6.8%) of patients treated during routine hours and 81 (6.2%) in patients treated during off-

Table II. Angiographic parameters in the study roups

Variable	Group I (n=482) routine hours	Group II (n=1296) off-hours	p
Infarct-related artery			
Left main	3 (0.6%)	13 (1.0%)	0.62
Left anterior descendens	212 (44.0%)	531 (41.0%)	
Rright coronary artery	200 (41.5%)	565 (43.6%)	
Circumflex	67 (13.9%)	187 (14.4%)	
Baseline TIMI flow			
0	295 (61.3%)	768 (59.4%)	0.64
1	37 (7.7%)	119 (9.2%)	
2	74 (15.4%)	216 (16.7%)	
3	75 (15.6%)	190 (14.7%)	
Final TIMI flow			
0	17 (3.5%)	50 (3.9%)	0.23
1	2 (0.4%)	13 (1.0%)	
2	31 (6.4%)	58 (4.5%)	
3	432 (89.6%)	1175 (90.7%)	
Implantation of stent	343 (71.2%)	858 (66.2%)	0.047
Multi-vessel coronary artery disease	267 (55.4%)	681 (52.6%)	0.30

-hours (p=0.65). Detailed characteristics of in-hospital course are summarised in Table III.

During a 24-month follow-up 66 (13.7%) patients from group I and 176 (13.6%) patients from group II (p=0.95) died; long-term mortality rate was similar in both groups (Figure 1).

The independent factors affecting the risk of death during long-term follow-up were cardiogenic shock on admission, re-occlusion of targeted artery, multi-vessel coronary artery disease, anterior wall infarction, diabetes, hypertension, age, left ventricular ejection fraction, implantation of stent, baseline flow in the

Table III. In-hospital characteristics of the study groups

Parameter	Group I (n=482), routine hours	Group II (n=1296), off-hours	p
Max creatine kinase [U/L]	2483±2273	2548±2208	0.34
Left ventricular ejection fraction	44.2±8.6	44.8±8.3	0.22
Re-occlusion of infarct-related artery	25 (5.2%)	64 (4.9%)	0.83
Complications			
Stroke	7 (1.4%)	21 (1.6%)	0.80
Gastrointestinal bleeding	6 (1.2%)	19 (1.5%)	0.72
Haematoma requiring packed red cell transfusion	10 (2.1%)	23 (1.8%)	0.68
Haematoma not requiring packed red cell transfusion	23 (4.8%)	47 (3.6%)	0.27
Elective PCI of another artery	55 (11.4%)	146 (11.3%)	0.93
CABG during hospitalisation	17 (3.5%)	68 (5.2%)	0.13
Intra-aortic balloon pump use	24 (5.0%)	48 (3.7%)	0.23
GP IIb/IIIa inhibitors use	23 (4.8%)	46 (3.6%)	0.24
Time from admission to angiography (median, range) [minutes]	30 (20-55)	25 (20-45)	0.11
In-hospital mortality	33 (6.8%)	81 (6.2%)	0.65

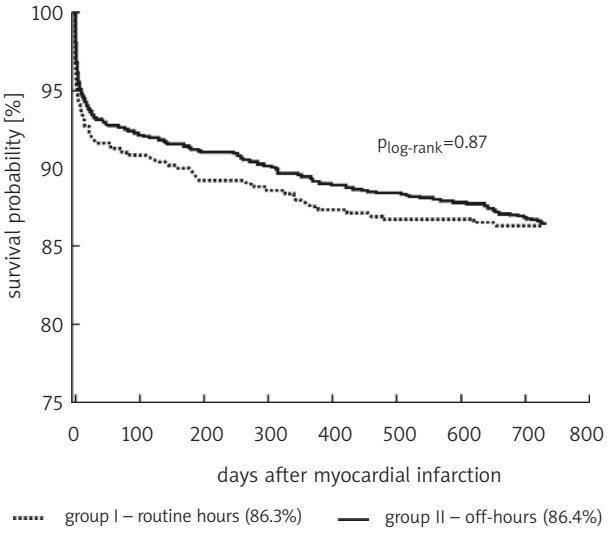

Figure 1. Kaplan-Meier 2-year survival curves in analysed groups

infarct-related artery, and final flow in the infarct-related artery.

Treatment setting (during regular or off-hours) did not affect long-term mortality. The complete list of multifactor analysis is presented in Figure 2 and Table IV.

Discussion

Data from literature regarding the results of PCI in patients with STEMI depending on treatment setting (regular hours vs. off-hours) are limited. However, there are some theoretical rationales possibly indicating worse results in patients admitted during off-hours. This involves some aspects of hospital workflow organisation during off-hours such as:

1. Interventional cardiologist and cath lab staff availability on call outside of hospital – particularly in smaller sites where the number of emergency admissions is small.
2. Lower number of physicians and other medical personnel is present during off-hours. This results in the possibility to perform only one PCI at a time, so the patient needs to wait until the previous procedure ends if more than one admission occurs at the same time. Additionally, in cases of cardiogenic shock and sudden cardiac arrest, the number of personnel performing resuscitation procedures is lower, which may affect their effectiveness.
3. No possibility to consult more experienced team members about more challenging cases if the interventional cardiologist on duty has less experience.

The above factors may worsen patients' prognosis, e.g. by extending the door-to-balloon time.

For accurate performance of comparative analyses, similarity of baseline clinical characteristics of groups is essential. This was the case in our study regarding the most important factors except hypercholesterolaemia, which was more often present in the group treated during off-hours.

In other reports on a correlation between primary PCI in patients with STEMI and treatment setting (routine hours vs. off-hours) clinical characteristics were also comparable. Garot et al. showed no statistically significant differences between patients treated during routine hours and off-hours [5], whereas Zahn et al. observed only prolonged duration of infarction pain in patients admitted within normal working hours versus patients admitted at night (180 vs. 120 min; p=0.005) [6]. Slightly larger differences were described by Magid et al. Patients treated with PCI during off-hours in comparison to those treated during routine working hours were younger, more often smokers, and more frequently had positive family history

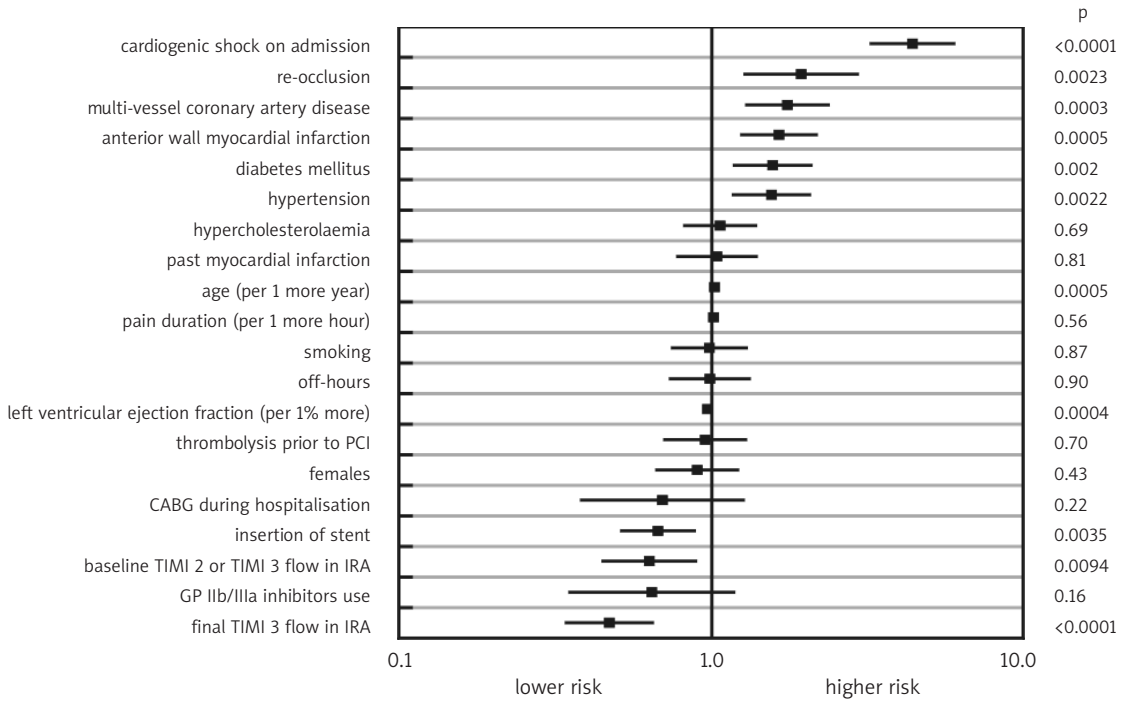

Figure 2. Multivariable analysis of the risk of death during 24-month follow-up. The relative risk and 95% confidence intervals are presented

of coronary artery disease, heart failure of various severity as well as shorter pain duration. What is worth mentioning is the data on patients treated with fibrinolysis in the same report. In addition to the above-mentioned differences, this cohort of patients treated during off--hours was also characterised by significantly more common presence of diabetes, hypercholesterolaemia, past MI and past percutaneous and surgical revascularisations. This may suggest that patients with higher risk were less frequently qualified for PCI on duties than normal working hours; however, the data from this report are insufficient to draw definite conclusions [3].

In-hospital mortality in our study was 6.8% in group I and 6.2% in group II. Similarly to Garot et al. [5] and Zahn et al. [6] there was no significant relationship with the type of admission (routine or on-duty). Different are conclusions from a study by Magid et al. The analysis of the entire population (patients treated with PCI or thrombolysis) showed a significant increase of in-hospital mortality during off-hours (OR 1.07; 95% CI 1.01-1.14; p=0.02). This trend resulted mainly from longer door-to--reperfusion time (door-to-balloon time for PCI patients and door-to-drug time in patients treated with fibrinolytics), as including this time in multifactor analysis the observed increase of in-hospital mortality rate during off-hours decreased and lost statistical significance. Significant prolongation of door-to-reperfusion time during off-hours compared to normal working hours was observed in patients treated with PCI as well as thrombolysis; however, it was markedly higher in the former (difference of 21.3 minutes), and only slightly in the

Table IV. Multifactor analysis of effects of individual parameters on 24-month mortality

Parameter	RR (95% CI)	p
Cardiogenic shock on admission	4.38 (3.22-5.95)	<0.0001
Re-occlusion of infarct-related artery	1.92 (1.26-2.93)	0.0023
Multi-vessel coronary artery disease	1.75 (1.29-2.35)	0.0003
Anterior wall myocardial infarction	1.63 (1.24-2.15)	0.0005
Diabetes mellitus	1.56 (1.18-2.07)	0.002
Hypertension	1.54 (1.17-2.04)	0.0022
Hypercholesterolaemia	1.05 (0.81-1.37)	0.69
Past myocardial infarction	1.04 (0.77-1.39)	0.81
Age (per 1 more year)	1.02 (1.01-1.04)	0.0005
Pain duration (per 1 more hour)	1.01 (0.98-1.03)	0.56
Smoking	0.98 (0.74-1.29)	0.87
Off-hours	**0.98 (0.73-1.31)**	**0.90**
Left ventricular ejection fraction (per 1% more)	0.97 (0.96-0.99)	0.0004
Thrombolysis prior to PCI	0.94 (0.70-1.27)	0.70
Females	0.89 (0.66-1.20)	0.43
CABG during hospitalisation	0.69 (0.38-1.25)	0.22
Implantation of stent	0.67 (0.51-0.88)	0.0035
Baseline TIMI 2 or TIMI 3 flow in IRA	0.64 (0.45-0.89)	0.0094
GP IIb/IIIa inhibitors use	0.64 (0.35-1.18)	0.16
Final TIMI 3 flow in IRA	0.47 (0.34-0.65)	<0.0001

Abbreviations: PCI – percutaneous coronary intervention, CABG – coronary artery bypass grafting, IRA – infarct-related coronary artery

latter (difference of 1.0 minute). Magid et al. indicated longer time necessary to prepare the cath lab for the procedure as a main cause of invasive treatment delay during off-hours, which resulted mainly from the common practice in the USA where the interventional cardiologist on duty and often the remaining cath lab staff are available on call outside the hospital [3].

Numerous studies have shown that delayed interventional treatment in patients with STEMI was associated with significant worsening of short- and long--term prognosis. Cannon et al. reported that prolongation of door-to-balloon time over 120 minutes was associated with significantly higher in-hospital mortality, which increased also in subsequent time intervals [7]. Analysis of NRMI-3 and NRMI-4 registers (29 222 subjects) performed by McNamara et al. revealed a statistically significant increase of in-hospital mortality related to prolongation of time from admission to first balloon inflation (3.0, 4.2, 5.7, 7.4% for time intervals of ≤90 min, 91-120 min, 121-150 min and >150 min, respectively; p <0.01 for trend); the increase was observed regardless of pain duration prior to admission and presence of risk factors influencing the patient's baseline prognosis [8]. Pinto et al. concluded that longer delay of invasive treatment of STEMI patients (expressed for individual hospitals as the difference between median door--to-balloon time and median door-to-thrombolysis time) led to increased in-hospital mortality by about 10% for each 30-minute delay, and in case of further prolongation of delay up to 114 minutes the risk of death in patients treated with invasive methods became equal to those receiving thrombolytic agents [9]. In the GUSTO-IIb study, 30-day mortality increased along with prolongation of time from patient enrolment to first balloon inflation, being for ≤60 min 1.0%, for 61-75 min 3.7%, for 76-90 min 4.0%, and for ≥90 min 6.4% (p=0.001) [10]. Finally, De Luca et al. documented that each 30-minute delay in initiation of treatment resulted in a significant increase of one-year mortality [11].

No relationship was however found between door-to--balloon time and 30-day mortality in the report of Brodie et al. based on Stent-PAMI trial results [12].

Taking into account all these observations, it should be highlighted that in our study there were no significant differences regarding time from admission to angiography between the groups admitted during regular working hours and off-hours. It should be noted at this point that prolongation of door-to-balloon time during off-hours was found, except for Magid et al. [3], also in the report of Zahn et al., where median time from admission to angiography at night (94 min) was slightly, but significantly, longer than during routine working hours (85 min) [6]. The short time to treatment in our site during off-hours undoubtedly translated into favourable outcomes of STEMI patients treated in this setting.

Comparable results of treatment as during in-hospital surveillance were maintained during 24-month follow-up. There were no significant differences in mortality between groups through this period. Unfortunately, no data from other sources are available to analyse the likely correlation between long-term mortality and treatment setting.

Conclusions

Results of PCI in patients with STEMI performed during off-hours in hospital with on-site cath lab staff are similar to those observed during normal working hours. Multifactor analysis confirmed no influence of treatment setting (regular hours or off-hours) on long-term prognosis.

References

1. Poloński L, Gąsior M, Gierlotka M, et al. Epidemiologia, leczenie i rokowanie w ostrych zespołach wieńcowych na Śląsku. Wyniki etapu pilotażowego ogólnopolskiego rejestru ostrych zespołów wieńcowych – PL-ACS. *Kardiol Pol* 2005; 62 (Supl. 1): 22-8.
2. Angeja BG, Gibson CM, Chin R, et al. Participants in the National Registry of Myocardial Infarction 2-3. Predictors of door-to-balloon delay in primary angioplasty. *Am J Cardiol* 2002; 89: 1156-61.
3. Magid DJ, Wang Y, Herrin J, et al. Relationship between time of day, day of week, timeliness of reperfusion, and in-hospital mortality for patients with acute ST-segment elevation myocardial infarction. *JAMA* 2005; 294: 803-12.
4. The Thrombolysis in Myocardial Infarction (TIMI) trial. Phase I findings. TIMI Study Group. *N Engl J Med* 1985; 312: 932-6.
5. Garot P, Juliard JM, Benamer H, et al. Are the results of primary percutaneous transluminal coronary angioplasty for acute myocardial infarction different during the "off" hours? *Am J Cardiol* 1997; 79: 1527-29.
6. Zahn R, Schiele R, Seidl K, et al. Daytime and nighttime differences in patterns of performance of primary angioplasty in the treatment of patients with acute myocardial infarction. Maximal Individual Therapy in Acute Myocardial Infarction (MITRA) Study Group. *Am Heart J* 1999; 138: 1111-7.
7. Cannon CP, Gibson CM, Lambrew CT, et al. Relationship of symptom-onset-to-balloon time and door-to-balloon time with mortality in patients undergoing angioplasty for acute myocardial infarction. *JAMA* 2000; 283: 2941-7.
8. McNamara RL, Wang Y, Herrin J, et al. NRMI Investigators. Effect of door-to-balloon time on mortality in patients with ST-segment elevation myocardial infarction. *J Am Coll Cardiol* 2006; 47: 2180-6.
9. Pinto DS, Kirtane AJ, Nallamothu BK, et al. Hospital delays in reperfusion for ST-elevation myocardial infarction: implications when selecting a reperfusion strategy. *Circulation* 2006; 114: 2019-25.
10. Berger PB, Ellis SG, Holmes DR Jr, et al. Relationship between delay in performing direct coronary angioplasty and early clinical outcome in patients with acute myocardial infarction: results from the global use of strategies to open occluded arteries in Acute Coronary Syndromes (GUSTO-IIb) trial. *Circulation* 1999; 100: 14-20.
11. De Luca G, Suryapranata H, Ottervanger JP, et al. Time delay to treatment and mortality in primary angioplasty for acute myocardial infarction: every minute of delay counts. *Circulation* 2004; 109: 1223-5.
12. Brodie BR, Stone GW, Morice MC, et al. Importance of time to reperfusion on outcomes with primary coronary angioplasty for acute myocardial infarction (results from the Stent Primary Angioplasty in Myocardial Infarction Trial). *Am J Cardiol* 2001; 88: 1085-90.

Porównanie wyników leczenia chorych z ostrym zawałem mięśnia sercowego z uniesieniem odcinka ST poddanych zabiegowi angioplastyki wieńcowej w trybie normalnym lub dyżurowym

Grzegorz Słonka, Mariusz Gąsior, Andrzej Lekston, Marek Gierlotka, Michał Hawranek, Mateusz Tajstra, Lech Poloński

III Katedra i Oddział Kliniczny Kardiologii, Śląskie Centrum Chorób Serca, Zabrze

Streszczenie

Wstęp: Dane dotyczące rezultatów leczenia przezskórną interwencją wieńcową (PCI) chorych z zawałem serca z uniesieniem odcinka ST (STEMI) w trybie dyżurowym są ograniczone. Niektóre publikacje sugerują jednakże gorsze wyniki w tej grupie chorych, wynikające głównie z dłuższego czasu oczekiwania na leczenie (czas od przyjęcia do szpitala do pierwszej inflacji balonu) poza normalnymi godzinami pracy. Problem ten ma duże znaczenie w praktyce klinicznej, gdyż ok. 2/3 wszystkich chorych ze STEMI jest przyjmowanych do szpitali w czasie trwania dyżurów.

Cel: Porównanie wyników leczenia za pomocą PCI chorych ze STEMI przyjętych do szpitala w trakcie normalnych godzin pracy i w czasie dyżurów oraz identyfikacja czynników wpływających na rokowanie w obserwacji odległej.

Metodyka: W okresie od stycznia 1998 do października 2003 r. w naszym ośrodku leczono 1992 chorych ze STEMI. W izbie przyjęć na podstawie oceny stanu klinicznego do leczenia zachowawczego zakwalifikowano 51 chorych, natomiast do diagnostyki inwazyjnej skierowano 1941 chorych. Po wykonaniu koronarografii u 163 chorych podjęto decyzję o dalszym leczeniu zachowawczym, natomiast zabieg PCI w trybie natychmiastowym wykonano u 1778 chorych, którzy stanowili analizowaną grupę. W badanej grupie znajdowało się 482 chorych przyjętych do ośrodka w trybie normalnym (dni robocze 8:00–15:00 – grupa I) oraz 1296 chorych przyjętych do ośrodka w trybie dyżurowym (dni robocze 15:00–8:00, dni wolne od pracy – grupa II). Charakterystyka kliniczna obu grup była podobna. Grupy nie różniły się istotnie pod względem wieku i płci chorych, czasu trwania bólu zawałowego, częstości występowania wstrząsu kardiogennego, zawału serca ściany przedniej i poprzedzającego leczenia trombolitycznego. Także odsetek chorych z nadciśnieniem tętniczym, cukrzycą, palących tytoń oraz po przebytym zawale serca był zbliżony w obu grupach. Jedyną statystycznie istotną różnicą między grupami był mniejszy odsetek chorych z hipercholesterolemią wśród przyjętych w normalnych godzinach pracy (52,1 *vs* 59,7%; p=0,0041).

Wyniki: Skuteczność zabiegu angioplastyki wieńcowej wyrażona odsetkiem chorych, u których uzyskano końcowy przepływ TIMI 3 w tętnicy dozawałowej, była wysoka i podobna w obu grupach (89,6% w grupie I i 90,7% w grupie II). Nie obserwowano istotnych różnic pomiędzy grupami pod względem czasu od przyjęcia do PCI (30 *vs* 25 min), częstości reokluzji (5,2 *vs* 4,9%), udarów mózgu (1,4 *vs* 1,6%), powikłań krwotocznych (8,1 *vs* 6,9%), śmiertelności wewnątrzszpitalnej (6,8 *vs* 6,2%) i w obserwacji 24-miesięcznej (13,7 *vs* 13,6%); p >0,05 dla wszystkich parametrów. W grupie chorych przyjętych w normalnych godzinach pracy istotnie częściej implantowano stenty wieńcowe (71,2 *vs* 66,2%; p=0,047). Niezależnymi czynnikami wpływającymi na ryzyko zgonu w obserwacji odległej były: wstrząs kardiogenny przy przyjęciu, reokluzja tętnicy dozawałowej, wielonaczyniowa choroba wieńcowa, zawał serca ściany przedniej, cukrzyca, nadciśnienie tętnicze, wiek, frakcja wyrzutowa lewej komory, implantacja stentu, wyjściowy przepływ w tętnicy dozawałowej oraz końcowy przepływ w tętnicy dozawałowej. Tryb wykonania zabiegu nie miał wpływu na uzyskiwane wyniki.

Wnioski: Wyniki leczenia za pomocą PCI chorych ze STEMI w czasie dyżurów w ośrodku ze stacjonarnym dyżurem zawałowym nie różnią się od uzyskiwanych w normalnych godzinach pracy. Przeprowadzona analiza wieloczynnikowa potwierdza brak wpływu trybu leczenia na rokowanie w obserwacji odległej.

Słowa kluczowe: zawał mięśnia sercowego, angioplastyka

Kardiol Pol 2007; 65: 1171–1177

Adres do korespondencji:

lek. med. Grzegorz Słonka, III Katedra i Oddział Kliniczny Kardiologii, Śląskie Centrum Chorób Serca, ul. Szpitalna 2, 41-800 Zabrze, tel. +48 32 373 36 19, e-mail: gslonka@poczta.onet.pl

Praca wpłynęła: 13.04.2007. **Zaakceptowana do druku:** 23.05.2007.