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NON-ST-SEGMENT ELEVATION ACUTE CORONARY SYNDROMES - PERCUTANEOUS CORONARY INTERVENTIONS IN THE FIRST, SECOND AND THIRD DAY SINCE THE ONSET OF SYMPTOMS

This paper describes the in-hospital outcome of urgent percutaneous coronary interventions (PCI) with delayed PCI in patients suffering from non-ST-segment elevation acute coronary syndromes (NSTE-ACS). The time when the PCI should be performed is still under debate. Results from 620 patients hospitalized in Silesian Centre of Heart Diseases in Zabrze in years 2002-2005 were included in this study for analysis. Patients were divided into two groups: group I – patients with urgent PCI and group II – patients with delayed PCI. The frequency of Thrombolysis In Myocardial Infarction grade 3 flow (TIMI 3) before PCI was significantly higher achieved in the second group (36.67% vs. 50.78%, p=0.05). Patients from group II had significantly more often TIMI 3 flow after PCI (82.72% vs. 92.55%, p=0.00036). The angiographic success evaluated as TIMI 3 flow after PCI occurred significantly more frequent in patients with delayed PCI than in patients with urgent PCI.

1. BACKGROUND

Cardiovascular diseases are presently the leading causes of death in industrialized countries and expected to become so in emerging countries by 2020 [6]. Among these coronary artery disease (CAD) is the most prevalent manifestation and is associated with high mortality and morbidity. The working diagnosis of non-ST-segment elevation acute coronary syndromes (NSTE-ACS), based on the measurement of troponins, includes non-ST-segment elevation myocardial infarction (NSTEMI) and unstable angina(UA).

It has been shown that the annual incidence of hospital admissions for NSTE-ACS is in the range of 3 per 1000 inhibitants.

Revascularization for NSTE-ACS is performed to relieve angina and ongoing myocardial ischemia and to prevent progression to myocardial infarction or death. The indications for myocardial revascularization and the preferred approach: PCI or Coronary Artery Bypass Graft (CABG) depend on the extent and severity of the lesions as identified by coronary angiography, the patient's condition, and co-morbidity [3].

Despite modern reperfusion techniques NSTE-ACS is still combined with poor prognosis (in-hospital mortality of 5%). However, outcome after PCI in NSTE-ACS has been improved with the use of intracoronary stenting and contemporary antithrombotic and antiplatelet therapy.

The Intracoronary Stenting with Antithrombotic Regimen Cooling-Off Trial(ISAR-COOL) compared early invasive strategy and urgent invasive strategy. According to this trial the lower number of nonfatal myocardial infarctions occurred in the delayed group (5.9% vs. 10.1%) [7].At any rate the time when the PCI should be performed is still under debate.

The reason for the study was to investigate the in-hospital outcomes in patients with urgent PCI and in patients with delayed PCI. This study sought to determine whether urgent PCI improves survival in the management of non-ST-segment elevation acute coronary syndromes.

2. INVESTIGATION PURPOSE

The aim of our study was to compare the in-hospital outcome of urgent PCI with delayed PCI in patients suffering from NSTE-ACS.

3. MATERIALS AND METHODS

The investigation included data from 620 patients with NSTE-ACS hospitalized in Silesian Center for Heart Diseases in Zabrze in years 2002-2005. We divided our study group into two subgroups: group I – 333 patients with PCI performed in the first day since the onset of symptoms and group II – 287 patients with PCI in the second and third day since the onset of symptoms.

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4. RESULTS

The compared groups didn't differ in terms of clinical characteristics.

Table 1. Clinical characteristics

	Group I	Group II	P
Mean age (years)	63.00	62.64	0.67
Male sex	63.84%	62.91%	0.97
Hypertension	75.39%	77.21%	0.6
Diabetes mellitus	28.13%	30.63%	0.5
Hyper-cholesterolemy	65.89%	65.83%	0.98
Current smoker	28.25%	25.28%	0.42
+ family history	45.45%	49.59%	0.33
Prior myocardial infarction	39.43%	41.42%	0.63
Peripheral vessels disease	9.79%	9.78%	0.99
Multi vessel coronary artery disease	30.79%	24.90%	0.12
Transient ischemic attacks	9.09%	6.19%	0.48

However, there was a significant difference in leucocytes level (G/l) (8.13 vs. 7.70, p=0.03).

Table 2. Laboratory data

	Group I	Group II	p
Leucocytes (G/l)	8.13	7.71	0.03
Cholesterol (mmol/l)	6.38	7.87	0.45

There weren't significant differences in the percentage of infarct related arteries in both study groups as well as in the percentage of patients undergoing PCI of one coronary artery and PCI of two and more coronary arteries.

The frequency of TIMI 3 flow before PCI was significantly higher achieved in the second group(36.67% vs. 50.78%, p=0.05). Patients from group II had significantly more often TIMI 3 flow after PCI (82.72% in the I group vs. 92.55% in the II group, p=0.00036).

Table 3. Angiographic characteristics

Infarct related artery	Group I (%)	Group II (%)	p
Bypass	1.35	5.24	0.16
LM	1.89	1.63	0.73
LAD	40.47	33.71	0.59
D	1.44	3.93	0.30
OM	7.58	6.21	0.87
Cx	16.11	19.89	0.63
RCA	24.06	22.91	0.99
PCI of one coronary artery	56.29	57.74	0.63
PCI of two and more coronary arteries	43.36	42.26	0.52
TIMI 3 before PCI	36.67	50.78	0.05
TIMI 3 after PCI	82.27	92.55	0.00036

Mean difference in the Left Ventricular Ejection Fraction (LVEF) in the compared groups wasn't statistically significant (46.63% vs. 47.75%, p=0.33) but significant difference was achieved in the mean time of hospitalization (6.17 days vs. 7.72 days, p=0.001).

Finally, the percentage of patients with heart failure(4.76% vs. 7.52%, p=0.16) and the percentage of in-hospital deaths (1.58% vs. 1.52%, p=0.95) was similar in both groups.

5. DISCUSSION

An invasive management strategy should be considered for all patients with NSTE-ACS because it has a comparable benefit in men and high- risk women for reducing the composite end point of death, myocardial infarction, or rehospitalization with NSTE-ACS [2, 8].

Patients presenting with NSTE-ACS have to be first stratified for their risk of acute thrombotic complications. A clear benefit from early PCI (<48 h) has been reported only in the high-risk groups. Routine stenting is recommended on the basis of the predictability of the result and its immediate safety [4].

According to the CRUSADE Quality Improvement Initiative, urgent PCI appears to be reserved for patients without significant co-morbidities and those cared for by cardiologists and is associated with a lower risk of in-hospital mortality [1].

Long-term follow-up of the Invasive Versus Conservative Treatment in Unstable Coronary Syndromes (ICTUS) trial suggests that urgent PCI might not be better than delayed PCI in patients with NSTE-ACS and an elevated cardiac troponin, and implementation of either strategy might be acceptable in these patients [5].

The decision about the timing of catheterization must continuously be evaluated and modified according to clinical evolution and occurrence of new clinical findings [3].

According to the Polish Registry of Acute Coronary Syndromes, 39% of patients with NSTEMI were hospitalized in the hospitals with PCI facilities. Median duration of hospitalization was 8 days. In the NSTE-ACS group, invasive strategy was applied in about 30% of patients which gave a low rate of PCI in unstable angina (29%) and NSTEMI (32%). Patients with NSTEMI had to wait 3 hours after admission to have PCI. The NSTEMI patients had mortality of 6.6%, rate of recurrent myocardial infarction of 5.6%, incidence of stroke of 0.6%. The composite outcome (death, recurrent myocardial infarction or stroke) in this group is 11.9% [9].

Data of the Polish Registry of Acute Coronary Syndromes show several discrepancies between guidelines' recommended treatment and their utilization in everyday practice. Particularly, the under-utilization of invasive treatment in patients with NSTEMI and application of invasive procedures to patients with a lower risk profile is alarming. Efforts should be made to shift the invasive burden to NSTEMI patients and to shorten the delay from symptom onset to intervention [9].

6. CONCLUSION

The angiographic success evaluated as TIMI 3 flow after PCI is significantly more often achieved in patients undergoing delayed PCI than in patients treated with urgent PCI.

BIBLIOGRAPHY

[1] BHATT D., Utilization of early invasive management strategies for high risk patients with non-ST-segment elevation acute coronary syndromes: results from CRUSADE Quality Improvement Initiative., Vol. 292, No. 17, pp. 2096-2104, The journal of the American Medical Association, 2004

[2] CHOUDRY N., SINGH J., BAROLET A., TOMLINSON G., DETSKY A., How should patients with unstable angina and non-ST-segment elevation myocardial infarction be managed? A meta-analysis of randomized trials., Vol. 118, No. 5, pp. 465-474, Am. J. Med., 2005

[3] EUROPEAN SOCIETY OF CARDIOLOGY, Guidelines for the diagnosis and treatment of non-ST-segment elevation acute coronary syndromes, Vol. 28, pp. 1598-1660, European Heart Journal, 2007

[4] EUROPEAN SOCIETY OF CARDIOLOGY, Guidelines for Percutaneous Coronary Interventions, Vol. 26, pp. 804-847, European Heart Journal, 2005

[5] HIRSCH A., Long-term outcome after an early invasive versus selective invasive treatment strategy in patients with non-ST-elevation acute coronary syndrome and elevated cardiac troponin T (the ICTUS trial):a follow-up study., Vol. 9564, No. 369, pp. 827-835, Lancet, 2007

[6] MURRAY C., LOPEZ A., Alternative projections of mortality and disability by cause 1990-2020., Vol.9064, No. 349, pp. 1498-1504, Global Burden of Disease Study, Lancet, 1997.

[7] NEUMANN F., KASTRATI A., POGATSA-MURRAY G., MEHILI J., BOLLWIEN H., BESTEHOM H., SCHMITT C., SEYFARTH M., DIRSCHINGER J., SCHOMIG A., Evaluation of prolonged anti-thrombotic pre-treatment before intervention in patients with unstable coronary syndromes: a randomized controlled trial., Vol. 290, pp. 1593-1599, The journal of the American Medical Association, 2003

[8] O'DONOGHUE M., BODEN WE., BRAUNWALD E., Early invasive vs conservative treatment strategies in women and men with unstable angina and non-ST-segment elevation myocardial infarction: a meta-analysis. Vol. 300, No.1, pp. 71-80, The journal of the American Medical Association, 2008

[9] POLOŃSKI L., Polish Registry of Acute Coronary Syndromes (PL-ACS). Characteristics, treatments and outcomes of patients with acute coronary syndromes in Poland., Vol. 65, No. 8, pp. 861-872, Kardiologia Polska, 2007