

Local hospital networks for STEMI treatment for a population of half a million inhabitants increase the use of invasive treatment of acute coronary syndromes to the European recommended level. The Małopolska Registry of Acute Coronary Syndromes 2005-2006

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Abstract

Background: According to the European Society of Cardiology (ESC) consensus, over 75% of patients with ST-elevation myocardial infarction (STEMI) should receive reperfusion therapy. An early invasive strategy is also advocated for high-risk non-ST elevation acute coronary syndromes (NSTEMI ACS). Until 2005, a single high-volume percutaneous coronary intervention (PCI) centre provided 24-hour service for the population of 3.2 million inhabitants in the Krakow Hospital Network Region. In August 2005 and December 2005 two additional round-the-clock duty PCI centres were launched in remote municipal hospitals (Tarnow and Nowy Sącz).

Methods: 29 non-PCI centres participated in the Registry of ACS in February-March 2005 (Period 1) and in December 2005-January 2006 (Period 2), so while Period 2 was conducted, three PCI centres provided 24-hour service for the Małopolska Region.

Results: A total of 1404 patients with ACS were enrolled – 695 during Period 1 and 709 in Period 2. In comparison to Period 1, a non-significant trend towards more frequent mechanical reperfusion of STEMI patients with chest pain onset <12 hours was observed in Period 2 (54 vs. 60%; $p=NS$). A steep and significant rise was observed particularly among STEMI patients treated in non-PCI centres outside of the Krakow City Network (51 vs. 78%; $p=0.001$). In the newly established Tarnow and Nowy Sącz (eastern Małopolska) PCI networks the reperfusion rates for STEMI patients with chest pain <12 hours were 78% and 88%, respectively, in comparison to 55% in western Małopolska ($p=0.001$). The transfer rate for invasive treatment of NSTEMI ACS has increased from 13.8% in Period 1 to 19% in Period 2 ($p=0.031$) in the entire region. The in-hospital mortality for patients receiving conservative treatment in community hospitals has decreased among NSTEMI ACS patients (6.8 vs. 3.9%; $p=0.045$) and remained unchanged in STEMI (21.3 vs. 19%; $p=NS$).

Conclusions: Opening of new PCI centres, based on population magnitude and structure, improves local adherence to the guideline-recommended invasive approach in high-risk ACS patients. The Małopolska Programme model showed that one high-volume 24-hour duty PCI centre with a network of cooperating non-PCI centres for a population of 0.5 million might be sufficient to provide invasive treatment according to the ESC guidelines for eligible patients.

Key words: acute coronary syndrome, registry, percutaneous coronary intervention, hospital networks, guidelines

Kardiologia Polska 2008; 66: 489-497

Introduction

One of the top priorities of Polish and worldwide healthcare systems is the optimal treatment of acute coronary syndromes (ACS). In the light of current research it is known that invasive treatment of patients with myocardial infarction (MI) [1-3] and high-risk patients with

non-ST segment elevation ACS (NSTEMI ACS) [4-6] may considerably reduce mortality and improve prognosis in comparison with conservative treatment alone. The European Society of Cardiology (ESC) advocates that over 75% of patients with ST-segment elevation MI should have reperfusion strategy implemented [7]. What seems to be

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Received: 05 July 2007. **Accepted:** 27 February 2008.

of great importance is proper organisation of patient's management, communication and information exchange between healthcare units by creating so-called 'hospital networks for ACS treatment'. Such arrangements allow shortening of time delay, the introduction of consistent procedures and facilitation of the decision-making/therapeutic process [8-13].

The guidelines and therapeutic standards developed by cardiovascular societies, with regard to the merits they contain, should be vital for the decision-making process in management of ACS [7, 14, 15]. Nevertheless, following them in everyday clinical practice is insufficient [16-21], and the guidelines are usually based on randomised clinical trials and are suited for such patient populations, which do not often reflect real life cases of ACS [19]. As a result, local, national and international registries of patients are being kept, which seems to be grounded bearing in mind the available results, and thanks to advanced statistical methods, the data gained are highly objective. [12, 20-31]. Additionally, registries are an effective and reliable method of assessment of treatment quality and demographic as well as epidemiologic characteristics of patients in specific populations and regions; also based on their findings more detailed randomised trials may be carried out. Continuing prospective registries of MI patients remains justified [32, 33]. Registries such as GRACE and Euro Heart Survey ACS allowed verification of adherence to the ACS management guidelines and emphasised existing differences with respect to the use of therapeutic strategies between countries, regions and hospitals [9, 12, 17, 20, 23-26].

The aim of this study was to assess management of ACS in regional hospitals without cath lab availability in Małopolska province in 2005 and 2006. It covers the period both before and after the opening of two new cath labs (with 24-hour duties in hospitals in Tarnów and Nowy Sącz) as part of the hospital network for MI treatment for a population of 0.5 million inhabitants each. The changes of accessibility to invasive therapy as well as adherence of therapeutic strategy to current ESC standards were evaluated.

Methods

Duration and rules of organisation of ACS registries

Since 2002 in Małopolska province (3.2 million inhabitants) a periodic registry has been carried out of patients with ACS admitted to regional and district hospitals in the province, which do not have their own cath lab available 24 hours a day. Three editions of the registry have been conducted so far. The first one was based on paper questionnaires and covered 2002-2003, whereas another two were performed in 2005-2006 and are the subject of this publication [12, 21, 31]. The presented outcome was derived from Period 1 analysis

(second edition) for the period of February-March 2005, when there was only one cath lab available for the treatment of patients with MI in the province, situated in Kraków, and Period 2 analysis (third edition of the Małopolska registry) done in December 2005 and January 2006 after the opening of two new cath labs with MI treatment duties on a 24h basis in Tarnów and Nowy Sącz (eastern Małopolska).

Organisation of medical care of ACS patients in Periods 1 and 2

In Period 1 patients diagnosed with ACS from 28 district and regional hospitals in Małopolska province and in Kraków city were referred to the Kraków centre (two cath labs). In Period 2, three hospital networks emerged in the province: the first one referred patients to the cath lab in Tarnów (Bochnia, Brzesko, Dąbrowa Tarnowska, Tuchów), a population of approximately 500,000 inhabitants; the second one to the cath lab in Nowy Sącz (Rabka, Limanowa, Gorlice, Krynica), a population of approximately 500,000 inhabitants; and the third one to the cath lab at the Kraków centre (Olkusz, Chrzanów, Oświęcim, Miechów, Myślenice, Nowy Targ, Proszowice, Sucha Beskidzka, Szczyrzyc, Zakopane, and 7 local hospitals in Kraków), a population of about 2.2 million people. The selection criterion of individual district and regional hospitals to one of the three networks depended on the distance to the cath lab, but mainly on door-to-balloon time. It was assumed that the time from MI diagnosis to the onset of invasive therapy, as recommended in the guidelines, should not exceed 90 minutes.

Data collection

Registry of Period 1 and Period 2 was carried out using an electronic data collection system designed specifically for this purpose, available at www.cardio.pl, which improved and accelerated data collection and analysis, as well as made it possible on-line analysis of the number of patients enrolled in the individual sites. The study involved patients with initial diagnosis of ACS hospitalised at the above-mentioned sites on cardiology wards, internal medicine wards with cardiology profile and internal medicine wards.

Clinical and demographic data, in-hospital follow-up and treatment administered were collected for all patients, both referred for invasive treatment and treated in regional hospitals receiving conservative therapy. In-hospital mortality data come from patients treated conservatively in regional hospitals.

Biomarkers of myocardial damage

Elevated serum troponin T (>0.1 ng/ml) or troponin I levels (above the reference range of local laboratory) and MB fraction of creatine kinase, CK-MB (>6% of total

creatine kinase activity – CK), were deemed reliable markers of myocardial necrosis.

Statistical analysis

Data are given as percentages or as mean \pm standard deviation (SD). Statistical analysis of continuous variables was performed using Student's t-test and U Mann-Whitney test, while qualitative variables were analysed with χ^2 test, and Fisher's exact test when needed. The differences were considered statistically significant when the p value was less than 0.05.

Results

Altogether, Małopolska ACS Registry involved 1404 patients diagnosed with ACS: 695 patients in Period 1 and 709 patients in Period 2. There were no differences between patients in the two periods in terms of clinical characteristics on admission and medical history (Table).

ST-elevation myocardial infarction

Patients with STEMI made up 26% and 22% of subjects in Periods 1 and 2, respectively. In comparison with Period 1, the number of STEMI patients from the whole Małopolska province who were referred to a cath lab for invasive therapy increased insignificantly by 3% in Period 2, from 41 to 44% (NS). Taking into consideration patients within the first 12 hours of the onset of chest pain, these numbers were 54 vs. 60%, respectively (NS). In-hospital mortality of STEMI patients receiving medical treatment in regional hospitals in Periods 1 and 2 were 20 vs. 19.3%, respectively (NS). After the opening of the cath labs in Tarnów (in August 2005) and in Nowy Sącz (in December 2005) the percentage of patients who underwent mechanical reperfusion within 12 hours from the onset of pain was 78% in Tarnów and 88% in Nowy Sącz. At the same time in hospital networks collaborating with the Kraków centre the percentage of patients referred for interventional treatment was 55% (Figure 1). The use of thrombolytics in eastern Małopolska was very low, barely a few percent, whereas in western Małopolska it remained at 10% (Figure 1).

Table. Demographic characteristics and medical history of patients with ACS in Period 1 and Period 2 (N=1404)

	Period 1 49% (n=695)	Period 2 51% (n=709)	p
Age [years]	65.5 \pm 12	66.5 \pm 11	NS
BMI [kg/m ²]	26.7 \pm 4.0	27.0 \pm 4.1	NS
Females [%]	36	38	NS
Past myocardial infarction [%]	27	30	NS
Diabetes mellitus [%]	22	23	NS
Renal failure [%]	5	5.5	NS
Hypertension [%]	72	77	NS
Past PCI or CABG [%]	6	7	NS
History of stroke [%]	8	6	NS
Hyperlipidaemia [%]	41	45	NS
Smoking [%]	25	30	0.05
Killip 3+4 class on admission [%]	13	15	NS

Abbreviations: BMI – body mass index, PCI – percutaneous coronary intervention, CABG – coronary artery bypass grafting surgery

There were 35% of patients with very early STEMI presentation, up to 3 hours, and 37% of patients with late presentation (above 12 hours), (Figure 2). Presence of STEMI up to 6 hours from the onset of symptoms was associated with a significant percentage of patients referred for invasive coronary angiography, 68% and 64% for patients with pain duration from 0 to 3 hours and 3-6 hours, respectively, in Period 2. There was a significant increase in the number of patients with pain duration between 3 and 6 hours treated with invasive procedures in Period 2 (Figure 3). Use of in-hospital thrombolysis below 12 hours from the onset of pain decreased non-significantly from 15 to 7% (NS) in the whole province (Figure 3), but still a significant percentage of patients with up to 3 hours of pain received thrombolysis in both Periods 1 and 2 (19 and 12%).

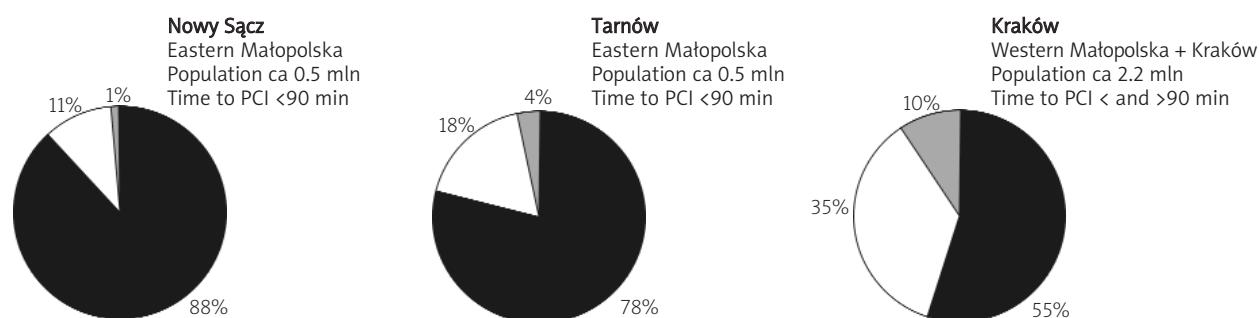


Figure 1. The percentage of patients with STEMI <12 hours from the onset of pain referred for invasive treatment (black) and receiving thrombolytic treatment (grey) in the hospital network in Nowy Sącz, Tarnów and Kraków in Period 2

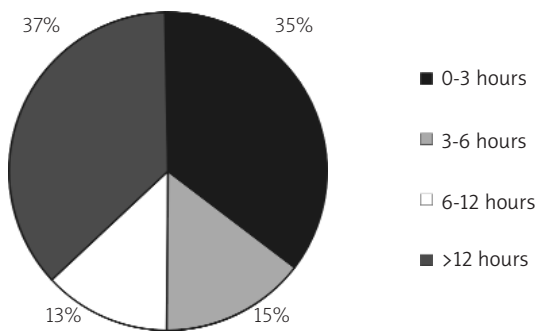


Figure 2. Pain-to-diagnosis time for STEMI patients in Periods 1 and 2 together

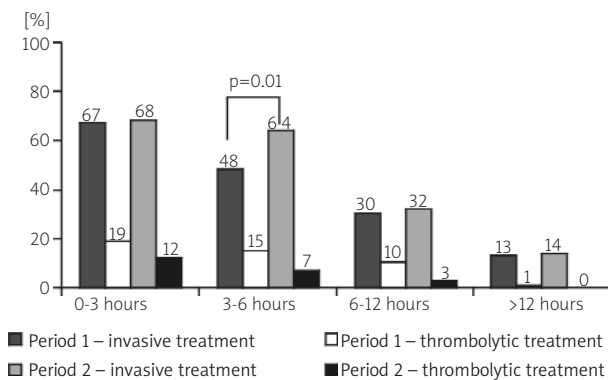


Figure 3. The percentage of patients with STEMI receiving invasive and thrombolytic treatment in particular time intervals from the onset of pain to the initiation of therapy (0-3, 3-6, 6-12 and over 12 hours) in Period 1 vs. Period 2

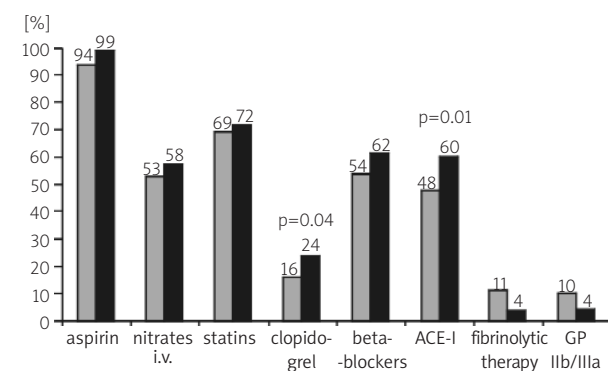


Figure 4. Pharmacotherapy in STEMI patients in Period 1 (grey bars) vs. Period 2 (black bars)

ACE-I – angiotensin-converting enzyme inhibitors

There was a trend to more frequent use of aspirin, beta-blockers, nitrates, and statins in Period 2, although only the increases in the use of angiotensin-converting enzyme inhibitors and clopidogrel were statistically significant. Figure 4 shows the comparison of pharmacotherapy in patients with STEMI in two consecutive registry editions.

Patients with NSTEMI-ACS and unstable angina (UA)

Patients with NSTEMI-ACS comprised 74 and 78% of patients in Period 1 and Period 2, respectively. The percentage of patients undergoing invasive angiography increased significantly in this group, from 14 to 19% in Period 2 ($p=0.03$). The highest number of patients with NSTEMI-ACS, as many as 55%, underwent invasive diagnostics in 2006 in regional hospital networks cooperating with the cath lab in Nowy Sącz, followed by the ones in Kraków and Tarnów (Figure 5). Figure 6 shows the NSTEMI-ACS group divided into subgroups with positive (NSTEMI) and negative (UA) myocardial necrosis markers, the percentage of patients undergoing invasive treatment and in-hospital mortality in patients treated conservatively in regional hospitals in Periods 1 and 2.

Discussion

The Małopolska Registry of Acute Coronary Syndromes indicated the need for gathering and analysing data on ACS patients. Registries allow one to monitor management of patients and its possible modifications for a given area. Registries remain a desirable investigational method despite obvious limitations as compared to randomised clinical trials [10, 19, 32, 33]. In particular, high quality, large prospective registries could make a valuable contribution to the knowledge coming from randomised clinical trials and draw attention to data not available in controlled clinical studies [32, 33]. What is typical for the Małopolska registry is the use of short periods of intensive data collection from a number of sites, enabling better assessment of current trends in the therapeutic approach and inclusion of a high number of patients, which allows the use of many different statistical tools. Moreover, such a registry is not a long-term job for doctors collecting data. Nowadays there seems to be a worldwide trend to organise smaller registries with shorter periods of data collection than large long-term registries conducted in many countries; as a matter of fact there is quicker access to these data through analyses and publications [19, 32].

Our analysis documented that following the opening of two new hospital networks in eastern Małopolska that are in collaboration with invasive cardiology units in Tarnów and Nowy Sącz, having populations of about 500,000 each, optimum mechanical reperfusion rates in MI patients was achieved. It turns out that one invasive cardiology unit with experienced operators working on a round-the-clock basis is able to assure even higher than the 75% MI reperfusion therapy rate recommended in Europe [7]. This increase was observed in the whole province, where a considerable tendency towards more frequent reperfusion therapy in MI than in the previous registries [12, 31] was seen. Nevertheless, it was the dynamic development of two new hospital networks serving invasive cardiology units in

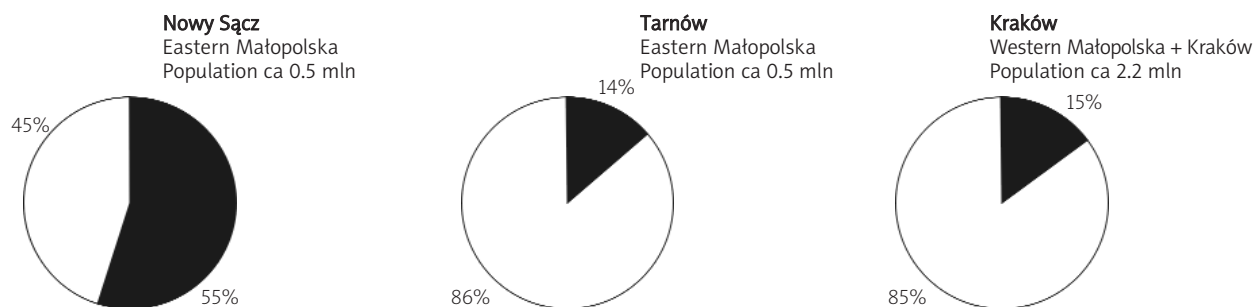


Figure 5. The percentage of patients with NSTEMI-ACS referred for invasive treatment (black) in hospital network in Nowy Sącz, Tarnów and Kraków in Period 2

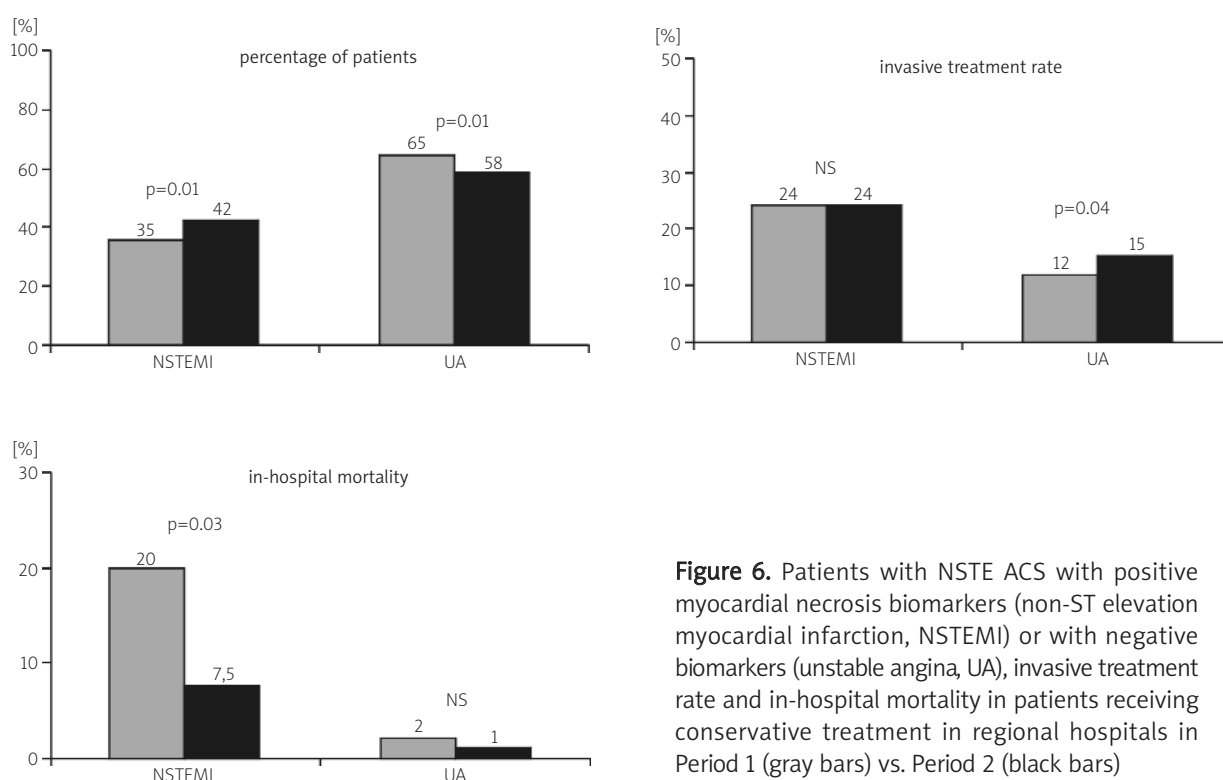


Figure 6. Patients with NSTEMI ACS with positive myocardial necrosis biomarkers (non-ST elevation myocardial infarction, NSTEMI) or with negative biomarkers (unstable angina, UA), invasive treatment rate and in-hospital mortality in patients receiving conservative treatment in regional hospitals in Period 1 (gray bars) vs. Period 2 (black bars)

Tarnów and Nowy Sącz that contributed most to the increase (eastern Małopolska). At the same time in hospital networks cooperating with the Kraków centre such a growth was not observed. This was probably associated with the fixed system of transferring patients with STEMI that was implemented many years ago by the hospitals as well as with migration of some patients with STEMI to new sites in Tarnów and Nowy Sącz.

Since the end of 2005 most Małopolska inhabitants have been provided with access to primary percutaneous coronary intervention (pPCI) within 90 minutes from STEMI diagnosis. The use of facilitated coronary intervention, which was a frequent method of treating patients outside Kraków in 2001-2005, is now very rarely

used [31, 34, 35]. This can be well seen when analysing decreasing use of GPIIb/IIIa inhibitors in regional hospitals, from 10% to 4%, and it is certainly related to the termination of the facilitated PCI programme with the use of combined fibrinolytic therapy, which was replaced by pPCI in new hospital networks. Nevertheless, according to the ESC guidelines the treatment with abciximab in patients with STEMI should be initiated as soon as possible, the rationale of which seems to be confirmed in available studies [36-38]. Data presented during the 2007 ESC meeting in Wien (FINESSE study, EUROTRANSFER registry) did not provide the final answer to the question of the effectiveness of pPCI 'facilitated' with abciximab, and this problem remains highly controversial [39, 40].

At the same time in Period 2, with the opening of new invasive treatment sites, the number of patients transferred for PCI at 3-6 hours from the onset of pain increased significantly with a simultaneous drop of thrombolysis rate, as suggested by current guidelines. However, it remains controversial which treatment to choose in patients with chest pain lasting less than 3 hours [14]. Use of fibrinolytics in these patients decreased, though is still the highest among all groups of patients with different pain duration times (about 12%). With full access to primary PCIs, fibrinolysis seems to be reserved only for exceptional cases where independent factors delay mechanical reperfusion.

The registry also indicated that over 1/3 of patients presented with chest pain lasting over 12 hours. For this large group of patients the optimal treatment strategy has not been clarified so far, although some studies suggest high efficiency of reperfusion treatment [41]. In our registry only 14% of patients in this group were treated with primary PCI, a percentage definitively too low.

Over the almost one-year break between reporting of Period 1 and Period 2 the use of ACE inhibitors and clopidogrel in patients with STEMI increased significantly and 99% of patients received aspirin in Period 2.

Noteworthy is the relatively high percentage of patients in the Małopolska population who are in Killip class 3 or 4 on admission. This is probably associated with the truly high incidence of this phenomenon in general, not the selected population of patients with ACS. Patients treated in clinical, specialist hospitals or participating in clinical trials often represent a highly selected lower risk group.

The registry reflects a very interesting situation in the management of NSTEMI ACS patients. The promotion of invasive treatment and referring patients with NSTEMI ACS for invasive diagnostics as well as the system of educational training contributed to a significant increase in the percentage of patients with NSTEMI ACS transferred to invasive cardiology sites. Nevertheless, in patients with particularly high risk – with NSTEMI (MI according to the new definition) – it is still insufficient, being 24%. Recent data demonstrated that in NSTEMI patients prognosis is similar to STEMI patients, and so more frequent use of an early invasive strategy is likely to be required in these patients [42]. Newly opened hospital networks for invasive therapy in the surroundings of Nowy Sącz confirm that the frequency of invasive therapy use in a short time increased up to 55%. In Małopolska province in-hospital mortality in NSTEMI patients dropped from 20 to 7.5% in regional hospitals in Period 2; it is still very high though. Only hospital networks located close to the cath lab in Nowy Sącz reached an optimal percentage of patients with NSTEMI-ACS being diagnosed using invasive methods; thus, every second patient had coronary angiography performed within 72 hours. It should be stressed that while the percentage of NSTEMI patients referred for coronary angiography did not

change, in-hospital mortality in patients receiving conservative treatment was reduced almost three-fold. This was associated with the change of profile of patients referred for invasive treatment in Period 2. In December 2005 and January 2006 the patients were significantly older, more frequently had diabetes and a history of MI and were at higher risk according to TIMI risk score than in the previous edition of the registry (data not shown).

The Małopolska Registry in addition to the Zachodniopomorskie registry and the national Polish registry of ACS is another attempt to describe the efficacy of the functioning model of management in a given region and how it impacts patient prognosis [29, 30]. In Poland on average 60% of patients with STEMI have access to reperfusion therapy and thus the outcomes presented in two small hospital networks in Tarnów and Nowy Sącz seem to be promising. Intensive and continuous training of hospitals making up the network and their close cooperation with the core site by means of training, scientific sessions, clinical internships and internet communication is crucial.

Creating hospital networks for MI treatment (STEMI networks) for a population of half a million appears to ensure optimal access to invasive treatment. A higher number of cath labs designated for a population of half a million would lead to a decrease of primary PCIs in each site and subsequently less operators' experience. In 2001-2003 the Małopolska Programme of Interventional Treatment of Myocardial Infarction with facilitated percutaneous coronary angioplasty provided invasive treatment with good effects for the entire province [8, 34, 35]. However, its basic limitations were contraindications to thrombolysis in some patients and the fact that some patients qualified for PCI did not receive invasive treatment. That is why it is so important that diagnosis-to-balloon time in STEMI patients does not exceed 90 minutes, which is ensured by half-million hospital networks cooperating with one invasive cardiology site.

Advantages and limitations of the registry

The advantage of the Małopolska ACS Registry is that it is representative for patients from Małopolska province treated for ACS in regional hospitals not having their own cath lab. The registry provided additional information about patients we know hardly anything about as they do not take part in randomised trials or present with contraindications to invasive treatment. Moreover, the e-form for data collection was protected against entering erroneous data and facilitated the process of entering information to ensure the highest data quality. Reliability of the database was analysed by a mathematician-statistician and a computer scientist.

A significant drawback of the registry could seem to be in particular a lack of long-term follow-up of patients treated invasively and no registry validation. However,

the authors did not intend to evaluate the effectiveness of any form of therapy but to explore the quantitative and qualitative structure of patients with ACS in Małopolska province after relevant changes made in 2005 regarding ACS treatment in the province. One of the limitations might also be the short time span of separate editions – two months. Following the first edition in 2002-2003 lasting nearly one year, the authors of the registry came to the conclusion that several-month reporting of ACS allows for gathering an equally representative group of patients and decreases the amount of time doctors in regional hospitals devote to data processing, which is compatible with current trends of conducting registries in Europe (short periods of reporting for a great number of individuals). In addition, it should be noted that reporting in Period 2 started almost immediately after opening the cath lab in Nowy Sącz, which might have been associated with a greater effectiveness of implementing logistic changes; therefore, it seems to be of great importance to carry out further editions to confirm that the observed changes are permanent.

Conclusions

The location of new cath labs based on size and structure of the target population in Małopolska helped to improve access to invasive treatment compatible with current ACS treatment guidelines. Organisation of a hospital network with one highly specialist cath lab available on a 24-hour basis in an area with a population of approximately 500,000 seems to be sufficient to reach European invasive treatment standards. Such hospital networks reached >75% mechanical reperfusion in STEMI. Nevertheless, even more vigorous actions should be taken as far as organisation and education are concerned so as to increase the number of patients with diagnosis of NSTEMI referred within the first 72 hours for invasive therapy, especially in those at high risk of death.

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Sieć szpitali współpracujących z ośrodkiem kardiologii inwazyjnej dla leczenia zawału serca w populacji liczącej 0,5 miliona osób zwiększa częstość inwazyjnego leczenia ostrych zespołów wieńcowych do poziomu zalecanego w Europie. Małopolski Rejestr Ostrego Zespołu Wieńcowego

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Streszczenie

Wstęp: Według Europejskiego Towarzystwa Kardiologicznego zalecana częstość reperfuzji w zawałe serca z uniesieniem odcinka ST (STEMI) powinna wynosić >75%. Także chorzy z ostrymi zespołami wieńcowymi bez uniesienia odcinka ST (NSTEMI) wysokiego ryzyka powinni być kierowani do leczenia inwazyjnego. Do roku 2005 Instytut Kardiologii w Krakowie pełnił 24-godzinny dyżur zawałowy dla 3,2-milionowej populacji województwa małopolskiego. W sierpniu i grudniu 2005 r. zostały uruchomione dwie sieci szpitali dla leczenia ostrych zespołów wieńcowych (ACS) z 24-godzinnym dyżurem – w Tarnowie i w Nowym Sączu.

Cel: Ocena, jak zmiana sieci szpitali leczących MI wpływa na częstość leczenia inwazyjnego ACS i możliwości spełnienia wymogów europejskich.

Metodyka: Dwadzieścia dziewięć szpitali rejonowych bez pracowni kardiologii inwazyjnej wzięło udział w kolejnej edycji Małopolskiego Rejestru Ostrego Zespołu Wieńcowego w okresie od lutego do marca 2005 (okres 1.) oraz od grudnia 2005 do stycznia 2006 r. (okres 2.). W okresie 2. trzy ośrodki kardiologii inwazyjnej zapewniały 24-godzinny dyżur zawałowy dla całego terenu województwa.

Wyniki: Do badania włączono 1404 chorych z ACS, z czego 695 w okresie 1. i 709 w okresie 2. W porównaniu z okresem 1., w okresie 2. w całym województwie zauważono trend do zwiększenia liczby chorych ze STEMI leczonych inwazyjnie, z czasem bólu <12 godz. (54 vs 60%; NS). Istotny wzrost zaobserwowano w szpitalach rejonowych poza siecią szpitali miasta Krakowa (51 vs 78%; p=0,001). W pracowniach hemodynamiki w Tarnowie i w Nowym Sączu (wschodnia Małopolska) odpowiednio 78 i 88% chorych ze STEMI ze szpitali współpracujących w ramach „zawałowej” sieci z tymi pracowniami, <12 godz. od początku bólu, było leczonych metodami inwazyjnymi w porównaniu z 55% w Małopolsce zachodniej (p=0,001). Zwiększył się odsetek chorych z NSTEMI leczonych inwazyjnie w okresie 1. w porównaniu z okresem 2. – z 13,8 do 19% (p=0,031). Śmiertelność wewnątrzszpitalna wśród chorych pozostających w szpitalach rejonowych zmniejszyła się odpowiednio dla okresu 1. i okresu 2. z 6,8 do 3,9% (p=0,045) wśród chorych z NSTEMI ACS i pozostała niezmienną (21,3 vs 19%; NS) wśród chorych ze STEMI. Częstość stosowania wewnątrzszpitalnej fibrynolizy zmalała istotnie z 15 do 7% (p=0,15) w całym województwie.

Wnioski: Rozmieszczenie nowych pracowni kardiologii inwazyjnej, oparte na wielkości i strukturze populacji docelowej, pozwoliło promować postępowanie zgodne z wytycznymi w leczeniu ACS. Organizacja sieci szpitali w województwie małopolskim sprawiła, że jeden wysokospecjalistyczny ośrodek kardiologii inwazyjnej dyżurujący w trybie 24-godzinnym na obszarze zamieszkałym przez 500-tysięczną populację wystarcza, by zapewnić standardy zgodne z wytycznymi Europejskiego Towarzystwa Kardiologicznego. Sieci szpitali w Tarnowie i w Nowym Sączu osiągnęły zalecany odsetek mechanicznej reperfuzji w STEMI. Należy jednak podjąć jeszcze więcej wysiłków organizacyjnych i edukacyjnych, aby zwiększyć częstość leczenia inwazyjnego w NSTEMI ACS wysokiego ryzyka.

Słowa kluczowe: ostry zespół wieńcowy, rejestr, przezskórna interwencja wieńcowa, sieć szpitali, wytyczne

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Praca wpłynęła: 05.07.2007. Zaakceptowana do druku: 27.02.2008.