

Akutni koronarni sindrom i intervencijska kardiologija u Dubrovniku.

2013. godina stručnog kontinuiteta i teritorijalnog diskontinuiteta

Acute coronary syndrome and interventional cardiology in Dubrovnik

2013 as the year of professional continuity and territorial discontinuity

Josip Lukenda*

Opća bolnica Dubrovnik, Dubrovnik, Hrvatska
Dubrovnik General Hospital, Dubrovnik, Croatia

SAŽETAK: Uz uspjeh Hrvatske mreže primarne perkutane kornarne intervencije ipak su zaostale "sive zone", kao što je Dubrovačko-neretvanska županija, a grad je uz dva granična prijelaza udaljen 210 km od sljedećeg najbližeg centra. Stoga je od 1. siječnja 2013. godine pokrenut redoviti rad invazivnog laboratorija u Općoj bolnici Dubrovnik, 24 h/7 dana.

Od 361 invazivne obrade u 2013. godini 227 (66,8%) učinjeno je kod hitnih bolesnika. Među bolesnicima s akutnim koronarnim sindromom 33,5% imalo je nestabilnu anginu pektoris, 39,2% akutni infarkt miokarda bez elevacije ST-segmenta i 27,2% (N=62) akutni infarkt miokarda s elevacijom ST-segmenta (STEMI). Perkutana koronarna intervencija (PCI) je učinjena kod 167 bolesnika, kod 62% svih bolesnika s AKS. Implantirane su 223 proširnice, 1,33 po postupku, kod 16,2% na dvije ili više žila, uz penetraciju proširnica obloženih lijekovima od 25,6%. Među koronarnim bolesnicima 30% je ostalo na medikamentoznoj terapiji, kod 55% je učinjena PCI, a kod 15% je preporučena kardiokirurški zahvat. Unutarbolnički mortalitet akutnog infarkta miokarda bio je 2,61%, a kod STEMI 4,8%. Bilo je 2,4% tromboza u stentu te 0,8% kirurški liječenih perifernih komplikacija.

Gotovo da samo hitni bolesnici opravdavaju postojanje laboratorija u Općoj bolnici Dubrovnik, uz potrebu daljeg povećanja broja elektivnih PCI, osoblja i aparature.

KLJUČNE RIJEČI: akutni koronarni sindrom, perkutana koronarna intervencija, Dubrovnik.

SUMMARY: Along with the success of the Croatian Network of Primary Percutaneous Coronary Intervention, there are still "grey zones" remaining, such as the Dubrovnik-Neretva County where the City of Dubrovnik is 210 kilometers away with two border crossings from the nearest center. Therefore, from the first of January 2013, the General Hospital Dubrovnik started a regular operation of the invasive laboratory 24 hours/7 days.

Of 361 invasive procedures in 2013, some 227 (66.8%) of them were performed in emergency patients. Among the patients with acute coronary syndrome (ACS), 33.5% had unstable angina pectoris, 39.2% had acute myocardial infarction without ST-segment elevation and 27.2% (N = 62) had acute myocardial infarction with ST-segment elevation (STEMI). Percutaneous coronary intervention (PCI) was performed in 167 patients, in 62% of all patients with ACS. 223 stents were implanted, 1.33 per procedure, in 16.2% of patients on two or more vessels, with the penetration of the drug-eluting stents in 25.6%. Among coronary patients, 30% remained on medical therapy, 55% underwent PCI and 15% of them received a recommendation for cardiac surgery. In-hospital mortality of acute myocardial infarction was 2.61%, and 4.8% for STEMI. 2.4% stent thrombosis and 0.8% of surgically treated peripheral complications were recorded.

It is almost only the emergency patients that justify the existence of the laboratory in Dubrovnik General Hospital, along with a need for further increase in the number of elective PCI, personnel and apparatus.

KEYWORDS: acute coronary syndrome, percutaneous coronary intervention, Dubrovnik.

CITATION: *Cardiol Croat.* 2014;9(3-4):117-126.

Uvod

Krajem osamdesetih godina prošlog stoljeća koncept "otvorene koronarne arterije" u liječenju akutnog infarkta miokarda (AIM) selio se iz farmako-koagulacijskih u laboratorije za invazivnu kardiologiju.^{1,2} Od 1997. godine u izvorištu naše invazivne kardiologije, Kliničkoj bolnici Sestre milosrdnice u Zagrebu, započele su primarne perkutane koronarne intervencije (pPCI) kod akutnog infarkta miokarda s elevacijom ST-segmenta (STEMI).³ Krajem 2000. godine u tom centru započinje i kontinuirana pripravnost invazivnih kardiologa za STEMI (24 sata/7 dana).⁴ Krug oko te bolnice širi se početkom 2001. na krugove oko Kliničkog bolničkog centra Zagreb i Kliničke bolnice Dubrava u Zagrebu⁵ te se postupno pokriva i cijelo područje Zagreba. Struka se paralelno razvija i u Rijeci gdje je prva pPCI učinjena već 1998. godine.

Od 2004. inicijativom članova Hrvatskog kardiološkog društva osniva se Hrvatska mreža pPCI koja od 2005. godine širi krugove teritorija gdje se radi pPCI, od Zagreba i Rijeke na nove invazivne kardiološke laboratorije, koji pokrivaju većinu hrvatskog teritorija, rezultirajući fascinantnim rezultatima.⁶ Mreža je povećala dostupnost i smanjila razlike u liječenju AIM naših građana, kako po teritorijalnoj pripadnosti, tako i po dobi i spolu.⁷ Ipak, ostale su i "sive zone našeg teritorija" gdje Mreža nije obuhvaćala svo pučanstvo i sve bolesnike, što zbog nerazumijevanja lokalnih voditelja bolnica, sve do sredine 2013. (Slavonski Brod), što zbog nedostatka kvalificiranih invazivnih kardiologa, sve do kraja 2012. godine (Dubrovnik).

Invazivni kardiološki laboratorij Opće bolnice Dubrovnik ustanovljen je 2009. godine i sljedećih par godina radio je prigodice, tijekom ljeta i vikendima, kada bi dolazili kolege iz Zagreba. Budući da je transport do Splita u razumnom roku bio gotovo nemoguć (samo putovanje traje 3-4 sata), uključujući 210 km djelomično "planinske ceste" od Ploča do Vrgorca, te dva granična prijelaza, do 1. siječnja 2013. godine reperfuzijska terapija u Dubrovniku uglavnom je značila fibrinolizu. Od tada i u Dubrovniku započinje stalni kontinuirani rad laboratorija i stalna pripravnost za akutni koronarni sindrom (AKS) (24/7), s jednim invazivnim kardiologom u prvoj polovici godine i nakon ispunjavanja uvjeta i sljedećom kolegicom.⁷ Laboratorij je integriran s koronarom jedinicom u Odsjek za akutne srčane bolesti i intervencijsku kardiologiju, a rezultati prve godine rada deskriptivno su predstavljeni u ovom članku.

Rezultati

Tijekom 2013. god. u OB Dubrovnik primljeno je 227 bolesnika s AKS, od čega 151 bolesnik (66,5%) zbog AIM i 76 bolesnika (33,5%) s nestabilnom anginom pectoris (NAP). Među bolesnicima s AIM bilo je 89 bolesnika (39,2% AKS) s akutnim infarktom bez elevacije ST-segmenta (NSTEMI) i 62 bolesnika (27,2% AKS) sa STEMI (**Tablica 1**).

U prvoj godini rada invazivna kardiološka obrada učinjena je kod ukupno 361 bolesnika, od čega dvije trećine kod hitno primljenih bolesnika (241 bolesnik; 66,8%), a trećina kod naručenih bolesnika (120 bolesnika; 33,2%). Prosječna dob bolesnika bila je 65,5 godina (raspon 25-89 god.). Žene su bile prosječno nešto starije (67,4 god.) i bilo ih je manje (33,2%) od muškaraca (**Tablica 2**).

Introduction

In the late eighties of the last century, the concept of an "open coronary artery" in the treatment of acute myocardial infarction (AMI) moved from phamaco-coagulation laboratory to the invasive cardiology laboratory.^{1,2} Since 1997 our principle invasive cardiology institution, University Hospital Sestre milosrdnice in Zagreb initiated primary percutaneous coronary intervention (pPCI) in acute myocardial infarction with ST-segment elevation (STEMI).³ In late 2000 this center also started with continuous preparedness of invasive cardiologists for STEMI (24 hours/7 days).⁴ This concept was also extended in early 2001 to the laboratories in University Hospital Zagreb and University Hospital Dubrava in Zagreb⁵ whereas the entire Zagreb region was gradually covered. The profession is simultaneously evolving in Rijeka, where the first pPCI was performed already in 1998.

Since 2004, upon the initiative of the members of the Croatian Cardiac Society the Croatian pPCI network was established and after that it started extending to some other territories since 2005, from Zagreb and Rijeka to some new invasive cardiology laboratories, covering major part of the Croatian territory, recording fascinating results.⁶ The network resulted in a greater availability and reduced differences in the treatment of AMI for our citizens, both in terms of territorial allegiance and by age and gender.⁷ However there are certain "grey zones of our territory" where the network did not include all of its population and all of its patients, partly because of a lack of understanding by local hospital principals till the mid of 2013 (Slavonski Brod), partly because of a lack of skilled invasive cardiologists till the end of 2012 (Dubrovnik).

The invasive cardiac laboratory of Dubrovnik General Hospital was established in 2009 and in the next few years it worked on certain occasions, in summer and at weekends, when colleagues from Zagreb would come to this hospital. Since the transport to Split within a reasonable time was almost impossible (only the journey takes 3-4 hours), including 210 km partly along the "mountain road" from Ploče to Vrgorac and two border crossings, the reperfusion therapy in Dubrovnik mainly included fibrinolysis prior to the 1st of January 2013. Since that date a continuous operation of the laboratory and constant preparedness for acute coronary syndrome (ACS) (24/7) started with one invasive cardiologist in the first half of the year and another colleague after she fulfilled some conditions.⁷ The laboratory is integrated with the coronary unit into Department for acute cardiac care and interventional cardiology, and the results of the first year of operation are descriptively presented in this article.

Results

During the year 2013, the Dubrovnik General Hospital received 227 patients with ACS, of whom 151 patients (66.5%) with AMI and 76 patients (33.5%) with unstable angina pectoris (UAP). Among the patients with AMI there were 89 patients (39.2% ACS) with acute myocardial infarction without ST-segment elevation (NSTEMI) and 62 patients (27.2% ACS) with STEMI (**Table 1**).

In the first year of operation, the invasive cardiac workup was performed in a total of 361 patients, of whom two-thirds of patients were admitted in an emergency department (241 patients, 66.8%), and one third as ordered patients (120 patients; 33.2%). The average age of patients was 65.5 (range 25-89 years of age). Women were on average slightly older (67.4) and there were fewer of them (33.2%) than men (**Table 2**).

Table 1. Structure of admitted, invasively processed and invasively treated patients in Department of Cardiology, GH Dubrovnik during 2013.

	Admitted Pts	Coronary angiography (CA)		Percutaneous coronary intervention (PCI)		RCS (%CA)
		N (% Pts)	TRA (%CA)	N (%CA)	TRA (%PCI)	
UAP	76	76 (100)	43 (56.6)	32 (42.1)	19 (59.4)	10 (13.2)
NSTEMI	89	78 (87.6)	50 (64.1)	53 (67.9)	33 (62.3)	15 (19.2)
STEMI	62	61 (98.4)	31 (50.8)	55 (90.2)	26 (47.3)	6 (9.6)
SAP	(80)*	87	35 (40.2)	26 (29.9)	15 (57.7)	12 (13.7)
VD/CMP	(30)*	58	33 (56.9)	2 (3.4)	2 (100.0)	26 (44.8)
Total	—	361	192 (53.2)	168 (46.5)	95 (56.5)	69 (19.1)

UAP — unstable angina pectoris; NSTEMI — non-ST segment elevation myocardial infarction; STEMI — ST segment elevation myocardial infarction; SAP — stable angina pectoris; VD/CMP — valvular disease and cardiomyopathy; TRA — transradial approach; RCS — recommended cardiac surgery. * scheduled patients

Table 2. Invasive cardiac procedures and percutaneous coronary interventions (PCI) in GH Dubrovnik during 2013.

	Coronary angiography		PCI		pPCI
	N	Age (mean)	N (%)	Age (mean)	N (% PCI) [TIMI 0/1/2/3]
Total	361	65.5	167 (46.3)*	65.0	55 (32.9) [2/0/2/51]
Male	241 (66.8%)	64.5	121 (72.4%)	64.0	38 (31.4) [0/0/1/37]
Female	120 (33.2%)	67.4	46 (27.6%)	67.7	17 (40.0) [2/0/1/14]

* % of coronary angiographies

Invazivna obrada učinjena je kod 215 hitno primljenih koronarnih bolesnika (94,7%), i to kod svih 76 bolesnika s NAP (100%) i kod većine bolesnika sa AIM (92%) te kod 61 od 62 bolesnika sa STEMI (98,4%). Među 120 bolesnika naručenih radi invazivne obrade kod njih 80 indikacija je bila stabilna angina pektoris, a istu dijagnozu imalo je i 7 hitno primljenih bolesnika, primljenih iz drugog razloga, a obrada je učinjena većinom kao priprava za nekardijalnu kirurgiju. Kod 30 naručenih bolesnika obrada je učinjena zbog valvularnih bolesti i kardiomiopatija. Gotovo jednak broj bolesnika invazivno je obrađen zbog valvularnih bolesti i kardiomiopatija nakon prijema iz hitne službe (28 bolesnika). Transradijalnim pristupom učinjeno je ukupno 192 obrade, 53,2% (**Tablica 1**).

Obradom 361 bolesnika nađeno je 570 značajnih stenoza/okluzija, 1,6 po bolesniku. Nađena je 31 (5,4%) stenoza na deblu lijeve koronarne arterije (LM) te polovica na velikim arterijama, gotovo trećina (27,4%) na lijevoj prednjoj descendentnoj arteriji (LAD) i četvrtina (23,9%) na desnoj koronarnoj arteriji (RCA) (**Tablica 3**). Perkutane koronarne intervencije učinjene su kod 167 bolesnika, s udjelom od 46,3% svih invazivnih obrada i na trećini svih nađenih značajnih stenoza/okluzija (34%). Prosječna dob bolesnika kojima je učinjena PCI bila je 65 godina (raspon 36-87), žene su bile starije, prosječno 67,7 godina, i bilo ih je ukupno manje, 27,6% (**Tablica 2**).

Sa PCI rezultiralo je više od polovice intervencija kod koronarnih bolesnika (54,4%; 165/303), a udio PCI kod bolesnika sa AKS bio je i veći, 62%. Kod 140 bolesnika PCI je uči-

Coronary angiographies were performed in 215 of emergency coronary patients (94.7%), in all 76 patients with UAP (100%), in the majority of patients with AMI (92%) and in 61 of 62 patients with STEMI (98.4%). Among 120 patients ordered for invasive workup, 80 of them had indication for stable angina pectoris, and the same diagnosis was made in 7 emergency patients, received for some other reason, while the workup and preparation was done mostly for non-cardiac surgery. The workup was done in 30 ordered patients for valvular diseases and cardiomyopathy. Almost the same number of patients underwent the invasive workup for valvular disease and cardiomyopathy after being admitted from the emergency department (28 patients). Transradial access was done in a total of 192 procedures, 53.2% (**Table 1**).

The workup of 361 patients found 570 significant stenosis/occlusions, 1.6 per patient. We found 31 (5.4%) stenosis of the left main coronary artery (LM) and a half of them on the large arteries, almost one third of them (27.4%) on the left anterior descending artery (LAD) and one fourth of them (23.9%) on the right coronary artery (RCA) (**Table 3**). Percutaneous coronary interventions were performed in 167 patients, accounting for 46.3% of all invasive procedures and also on one third of all found significant stenosis/occlusions (34%). The average age of patients who underwent PCI was 65 years (range 36-87), women were older, on average 67.7 years, and there were fewer of them, 27.6% (**Table 2**).

PCI has resulted in more than one half of interventions in coronary patients (54.4%, 165/303), and the proportion of PCI in patients with ACS was higher, 62%. 140 patients under-

njena na jednoj, a kod 27 na dvije ili više arterija (16,2%). Implantirane su 223 proširnice, 1,33 po intervenciji, od toga 52 proširnice obložene lijekom (DES), s penetracijom od 25,6%. U 15 bolesnika (9%) učinjena je perkutana transluminalna angioplastika balonom (PTCA), bez implantacije proširnice.

Polovica od 156 značajnih stenoza/okluzija na LAD je liječeno primjenom PCI (48,7%) što je 45,5% svih intervencija, a od 136 lezija na RCA sa PCI liječeno je 41,2%, što je 33,5% svih PCI. Ostatak od 21% PCI učinjeno je na arteriji cirkumfleksiji (ACx) (12,9%) i na manjim žilama, nešto više na marginalnim (OM) granama (10,8%) nego na dijagonalnoj (D) i posterodescendentnoj (PD) grani (ukupno 7,7%) (Tablica 3). Neliječene lezije ostale su kod bolesnika kojima je pre-

went PCI on one, and 27 patients on two or more arteries (16.2%). 223 stents were implanted, 1.33 per intervention, of which 52 of them were drug-eluting stents (DES), with a penetration of 25.6%. 15 patients (9%) underwent percutaneous transluminal coronary angioplasty, without stent implantation.

A half of the 156 significant stenosis /occlusions on the LAD was treated with PCI (48.7%), which is 45.5% of all interventions, and out of 136 lesions on the RCA 41.2 % was treated with PCI, which is 33.5% of all PCIs. The remaining 21% of PCI was performed in circumflex coronary artery (CCA) (12.9%) and on the smaller vessels, somewhat more on marginal (OM) branches (10.8%) than on the diagonal (D) and posterodescending (PD) branch (a total of 7.7%) (Table 3). Untreated lesions remained in patients who were recommen-

Table 3. Coronary angiography results and performed percutaneous coronary interventions.

	Stenosis N (%)	PCI N (%)
Left main (LM)	31 (5.4)	1 (0.5)
Left anterior descending (LAD)	156 (27.4)	76 (39.2)
Diagoal branch (D)	54 (9.5)	6 (3.1)
Circumflex artery (Acx)	80 (14.0)	25 (12.9)
Obtuse marginal artery (OM)	73 (12.8)	21 (10.8)
Right coronary artery (RCA)	136 (23.9)	56 (28.8)
Posterior descending artery (PD)	40 (7.0)	9 (4.6)
Total	570	194 (34.0)*

* % of all stenosis

poručena kardiokirurška revaskularizacija (CABG), nerekanalizirane kronične totalne okluzije, bolesnicima sa stupnjevanom PCI (ugavnom nakon STEMI) te kod dva bolesnika koje smo uputili u tercijarni centar s kardiokirurškom potporom, u Kliničku bolnicu Dubrava (jedna PCI debla LKA i jedna PCI jedine ostatne žile, ukupno 1,2%). Transradijalnim pristupom učinjeno je ukupno 95 PCI (56,5%).

Od 61 invazivno obrađenog bolesnika zbog STEMI kod 55 je učinjena PCI, jedna bolesnica je imala Takotsubo kardiomiopatiju i nije trebala intervenciju, kod 3 je preporučena hitna kardiokirurška revaskularizacija, bez prethodne PCI, a kod 3 bolesnika je učinjena intervencija i preporučena CABG zbog nalaza na ostalim žilama. Kod 2 bolesnice nije postignuta rekanalizacija žile uz TIMI 0 protok (Tablica 2 i 5), a

ded to undergo surgical cardiac revascularization (CABG), non-recanalized chronic total occlusions, patients with staged PCI (mainly after STEMI) and in two patients who were referred to a tertiary center with cardiosurgical support, University Hospital Dubrava (one PCI of the left main and one PCI on the only residual vessel, total 1.2%). Transradial access was performed in a total of 95 PCIs (56.5%).

Out of 61 patients invasively processed for STEMI, 55 of them underwent PCI, one patient had Takotsubo cardiomyopathy and did not need an intervention, 3 of them were recommended to undergo urgent CABG without prior PCI, and 3 patients underwent PCI and were recommended to undergo CABG for their findings in other vessels. In 2 patients no vessel flow was achieved (TIMI 0 flow) (Table 2 and 5) and

Table 4. Foreigners invasively processed and invasively treated in Dubrovnik General Hospital during 2013.

	CA*	PCI
UAP	4	2
NSTEMI	10	4
STEMI	9	9
SAP	2	0
VD; CMP	0	0
Total	25	15

*For abbreviations see Table 1.

dvoje bolesnika je imalo krajnji TIMI 2 protok. Ukupno TIMI 3 protok imalo je 93.4% bolesnika sa STEMI (**Tablica 5**).

two patients had final TIMI 2 flow. 93.4% of patients with STEMI had a total TIMI 3 flow (**Table 5**).

Table 5. In-hospital mortality and other complications of invasively treated patients in Dubrovnik General Hospital during 2013.

Outcome	Age, gender	Primary dg & complication	Therapy
Death	83; F	— STEMI anteroseptalis — Shock	— Equipment out of order — Fibrinolysis — Death 3 rd day
	88, F	— STEMI anteroseptalis, 3 vessel disease — Shock	— Failed PCI of LAD — Fibrinolysis — Death 3 rd day
	76; F	— STEMI anteroseptalis, 3 vessel disease — Asystolia	— Failed PCI of LAD — Death after procedure
	80; F	— NSTEMI and shock — Multiorgan failure	— Conservative th. — Death 3 rd day
Stent thrombosis	45; M	— STEMI anteroseptalis. pPCI on LAD and PCI on Acx. Chronic renal failure — STEMI inferior 4 th day	— Stent thrombosis in Acx — rePCI on Acx (PTCA and another stent)
	55; M	— NAP. PCI on RCA — STEMI inferior 3 rd day	— Stent thrombosis in RCA — rePCI on RCA (PTCA and another stent)
	74; M	— STEMI inferior. PCI on RCA — reSTEMI inferior 1 st day	— Stent thrombosis in RCA — rePCI on RCA (PTCA)
	80; M	— NSTEMI and ventricular fibrillation out of hospital — PCI on RCA (in 24 hours) — STEMI inferior on 2 nd day	— Stent thrombosis in RCA — rePCI in RCA (PTCA)
Vascular complications	69; M	— Femoral artery dissection and occlusion	— Surgery, aortofemoral by pass
	72; F	— Femoral artery pseudoaneurysm	— Surgery, aneurysmectomy
	65; F	— Radial artery pseudoaneurysm	— Surgery, aneurysmectomy

* For abbreviations see Table 1 and Table 3.

Kardiokirurški zahvat, elektivni ili direktni premještaj, preporučan je kod 69 bolesnika (19,1% ukupno obrađenih). Nije bilo urgentnih ili helikopterskih prevoza. Među bolesnicima obrađivanim zbog koronarne bolesti preporuku za CABG dobilo je 43 bolesnika (14,2%), a među bolesnicima obrađenim zbog valvularne bolesti ili kardiomiopatijom kod njih 26 preporučena je valvularna kirurgija, s ili bez CABG (44,8%).

Konačno, od svih koronarnih bolesnika oko 30% je ostalo na medikamentoznoj terapiji, kod oko 55% učinjena je PCI, a kod 15% preporučan je kardiokirurški zahvat.

Grad Dubrovnik veliko je turističko središte, a Dubrovačko-neretvansku županiju godišnje posjeti više od milijun turista. Iako nisu dostupni podaci o demografskoj strukturi gostiju, možemo reći da smo 2013. godine invazivno obradili 25 stranih državljana i da je kod njih 15 učinjena PCI (60%). PCI je učinjena kod dva od četiri bolesnika sa NAP, četiri od

Cardiac surgery, elective or direct transfer was recommended in 69 patients (19.1% of totally worked up). There were no urgent or helicopter transported patients. Among the patients worked up for coronary heart disease, 43 patients (14.2%) received the recommendation for CABG, and among the patients treated for valvular disease or cardiomyopathy there were 26 of them who were recommended to undergo valvular surgery with or without CABG (44.8%).

Finally, of all coronary patients about 30% remained on medical therapy, with approximately 55% who underwent PCI and 15% of them were recommended to undergo cardiac surgery.

The city of Dubrovnik is a major tourist destination and the Dubrovnik-Neretva County is visited by more than one million tourists each year. Although no data on the demographic structure of guests is available yet, we can say that in 2013 some 25 foreign citizens underwent invasive treatment and PCI was performed in 15 of them (60%). PCI was per-

10 bolesnika sa NSTEMI i svih 9 bolesnika sa STEMI (**Tablica 4**).

Naravno, dešavali su se i neželjeni događaji (**Tablica 5**). Nestandardizirani unutarbolnički letalitet bolesnika sa AIM bio je 2,61% (4/153), sve su bile žene, srednje dobi 81,2 godine (raspon 76-88), kod tri od četiri s infarktom prednje stijenke, kod dvije uz neuspješnu PCI na LAD i kod jedne nakon neuspješne terapije fibrinolizom tijekom kvara aparata. Unutarbolnički letalitet bolesnika sa STEMI bio je 4,8%. Nije bilo smrti kod bolesnika s NAP i stabilnom anginom pectoris. Tijekom godine bilo je 2,4% akutnih i subakutnih tromboza u stentu (4/168), sve kod bolesnika s AKS i sve kod muškaraca, u 3 slučaja u RCA i jednom u Acx. Jedan bolesnik imao je klinički vođenu rePCI zbog restenoze, nakon 3 mjeseca. Imali smo 3 periferne komplikacije koje su zahtijevale kirurški tretman (0,8%), dvije kod bolesnika sa AKS i jednu kod naručene bolesnice (**Tablica 5**).

Utrošak glavnih stavki materijala 2013. godine vidi se u **Tablici 6**. Prema potrošnji iz 2013. godine planirali smo potrošnju za 2014. godinu, 900 dijagnostičkih i 280 vodećih katetera. Na kraju, prema nacionalnom tenderu, odobreno nam je 200 dijagnostičkih katetera, bez vodećih katetera (sic!). Planirali smo sljedeće godine implantirati oko 300 metalnih proširnica (BMS) i 45 DES, no odobreno nam je samo 130 BMS.

formed in two of four patients with UAP, four of 10 patients with NSTEMI and all 9 patients with STEMI (**Table 4**).

Of course, there were some adverse events we faced (**Table 5**). Non-standardized in-hospital lethality of patients with AMI was 2.61% (4/153), all of them were women, mean age 81.2 (range 76-88), in three of the four with anterior wall AMI, in two with unsuccessful PCI on the LAD and in one after unsuccessful treatment with fibrinolysis during malfunction of the appliance. In-hospital lethality of patients with STEMI was 4.8%. There were no deaths in patients with UAP and stable angina pectoris. During the year there were 2.4% of acute and subacute stent thrombosis (4/168), all of them in patients with ACS and all of them in men, in three cases on the RCA and one in Acx. One patient had clinically guided rePCI for restenosis after 3 months. There were three peripheral complications that required surgical treatment (0.8%), two in patients with ACS and one in a patient who was ordered (**Table 5**).

The consumption of major supplies in 2013 can be seen in **Table 6**. Based on consumption in 2013, we planned to spend 900 diagnostic and 280 guiding catheters in 2014. Finally, according to the national tender, 200 diagnostic catheters and no guiding catheters (sic!) were approved to us. We planned to implant 300 bare-metal stents (BMS) and 45 drug-eluting stents, however only 130 BMS were approved to us.

Table 6. *Interventional products consumption in Dubrovnik General Hospital during 2013. Planned consumption during 2014, and the finally approved material in the National tender for 2014.*

		Consumption in 2013	Planned for 2014	Approved for 2014
Diagnostic catheters		800	900	200
Guiding catheters		200	280	0
Stents	Total	223	345	130
	BMS	171	300	130
	DES	52	45	0

BMS — bare-metal stent; DES — drug-eluting stent

Rasprava

Jedan od rijetkih uspješno provedenih nacionalnih programa u zadnjem desetljeću, ne samo u zdravstvu, program je Hrvatske mreže primarne PCI.⁶ Inicijativom vodstva Hrvatskog kardiološkog društva koje je pratilo integrirani razvoj mreže pPCI u drugim zemljama, kao u Republici Češkoj, a uz već etablirane hrvatske laboratorije za pPCI, invazivni i neinvazivni kardiolozi, kao i liječnici hitne medicinske pomoći i obiteljske medicine uspješno su, uz pomoć tadašnjeg Ministarstva zdravstva, organizirali Hrvatsku mrežu za primarnu PCI 2005. godine. Na počecima intervencijske kardiologije, prije organiziranja Mreže, hrvatski su građani bili diskriminirani pri liječenju AKS i po spolu, i po dobi i po teritorijalnoj pripadnosti. To se izgubilo nakon uvođenja Mreže i početka unisonog postupanja po smjernicama Europskog kardiološkog društva (ESC).⁷⁻⁹ Međutim, i sedam godina nakon uvođenja Mreže teritorij čitave zemlje još nije bio potpuno pokriven, primjerice na područjima Dubrovačko-neretvanske županije i

Discussion

One of few successfully implemented national programs in the last decade, not only in health care, is the program of the Croatian network of primary PCI.⁶ At the initiative of the Leadership of the Croatian Cardiac Society, which monitored the integrated development of the pPCI network in other countries as in the Czech Republic, invasive and non-invasive cardiologists, emergency physicians and family physicians along with already established Croatian laboratories for pPCI have successfully, with the help of then Ministry of Health organized the Croatian network for primary PCI in 2005. At the beginning of interventional cardiology, before the Network was organized, the Croatian citizens were discriminated against in the treatment of ACS, both by gender and by age and by territorial affiliation. It was lost after the introduction of the Network and start of unison procedures according to the European Society of Cardiology guidelines.⁷⁻⁹ However, seven years after the introduction of the

regije Zapadne Slavonije. Entuzijazmom kolega, a unatoč zadnjim objavljenim shemama u kojima su ta područja označena kao da pružaju tu uslugu samo za radnog vremena,¹⁰ u OB Dubrovnik usluga pPCI tijekom 24 h/7 dana dostupna je od početka 2013., a u OB Slavonski Brod od početka 2014. godine.¹¹ Uvrštavanjem novih centara za pPCI sada ih u Hrvatskoj imamo 11, a jednom centru tendira 391.000 stanovnika. To je odličan rezultat na europskoj razini i sada bolju dostupnost pPCI u Europi imaju samo: Austrija, Belgija, Francuska, Njemačka, Italija i Švicarska.¹² Koliko je to razložno u ovom času ostaje zadaća za izračun i prosudbu od strane naših stručnjaka za ekonomiku zdravstva, koji će trebati procijeniti odnos koristi/troškova za pPCI u Hrvatskoj.⁸ Švedska analiza pokazuje da su u njihovom okruženju konačni rezultati liječenja s pPCI bolji i da je ukupna cijena liječenja manja u odnosu na fibrinolizu.¹³

Dubrovačko-neretvanska županija ima 122.500 stanovnika od kojih se 70% (86.000) uglavnom liječi u OB Dubrovnik. No, kada se pribroje posjeti više od milijun turista godišnje možemo ugrubo govoriti o populaciji od cca 100.000 stanovnika koja tendira našoj bolnici. U 2013. primljeno je oko 230 bolesnika sa AKS, od kojih 27% zbog STEMI, što je udio sličan američkom registru (29%),¹⁴ iako GRACE registar govori o udjelu od 38% bolesnika sa STEMI.¹⁵ Od 2010. godine konačno su nam dostupni podaci Hrvatskog zavoda za zdravstveno osiguranje, pa sada znamo da je u Hrvatskoj te godine hospitalizirano 7.300 bolesnika s AIM (170/100.000) i 2.552 sa NAP (26% AKS), dakle 9.852 bolesnika s AKS (229/100.000). Radi račlanjivanja i praćenja pojedinih skupina bolesnika i uspješnosti terapije jasna je potreba formiranja Hrvatskog nacionalnog registra za AKS i PCI. U 2013. godini u OB Dubrovnik primljena su 62 bolesnika sa STEMI, sa sličnom učestalošću kao u Švedskom registru (66/100.000), dok je stopa NSTEMI od 89 bolesnika ipak bila niža nego u drugim registrima (120-130).¹⁶ Prema Europskom kardiološkom društvu očekuje se europski prosjek od 190 bolesnika sa AIM na 100.000 stanovnika,¹² a naš broj od 151 bolesnika povoljniji je od očekivanog europskog prosjeka, ali i hrvatskog prosjeka, od 170 bolesnika. Međutim, ostaje pitanje koliko se naših bolesnika sa NSTEMI nije niti javilo liječniku, iz razloga slabe informiranosti, a također da li je kod dijela bolesnika s NAP propušteno registrirati porast kardioselektivnih enzima, iz razloga štednje i pravilno ih sistematizirati kao NSTEMI.

Prema smjernicama ESC rijetki su bolesnici sa AKS čiji izbor liječenja ne bi trebala biti PCI, barem u roku od 72 sata. Među bolesnicima sa AKS u OB Dubrovnik invazivno je obrađeno 94%, a konačno je liječeno metodom PCI 62%, dok je CABG preporučeno kod 13,7% bolesnika. Trećina svih obavljenih PCI bile su primarne PCI (33%), što je više od hrvatskog prosjeka 2007. godine (22%), dok se udio u Europi kreće od 9-39%.¹² Među bolesnicima sa STEMI invazivno je obrađeno 98,4% a kod 90,2% učinjena je pPCI, što je dalji korak u približavanju idealnom cilju da svi bolesnici sa STEMI budu liječeni pPCI. U Sjedinjenim Američkim Državama 2005. godine invazivno je obrađeno 43% bolesnika sa NSTEMI i 65% bolesnika sa STEMI.¹⁷ U Hrvatskoj je 2007. godine bilo 3.600 STEMI (82/100.000), prema broju stanovnika više nego u našoj županiji i 1.150 pPCI (22,5/100.000), značajno manje nego sada u našoj županiji.¹² Usporedba navedenih rezultata govori o našoj usmjerenosti prema intervencijskom liječenju hitnih bolesnika i AKS, što je sačinjavalo oko 2/3 ukupno obavljenih intervencija, a manju usmjerenost na stabilnu anginu pektoris i naručene bolesnike. Pošteno rečeno i štrajk liječnika krajem 2013. godine imao je utjecaj na manji broj narudžbi za koronarografiju. Ova či-

Network, the entire territory of the country was not yet fully covered, for example in the regions of Dubrovnik-Neretva County and the region of Western Slavonia. Owing to the colleagues' enthusiasm and despite the latest published schemes in which these areas are designated as those that provide this service only during normal working hours¹⁰, the pPCI service has been available in the General Hospital Dubrovnik 24 hours/7 days since early 2013, and in General Hospital Slavonski Brod since early 2014.¹¹ By including new pPCI centers now we have 11 of them in Croatia, while 391,000 inhabitants gravitate to one center. This is an excellent result at the European level and only the following European countries have a better availability to pPCI: Austria, Belgium, France, Germany, Italy and Switzerland.¹² How reasonable it is at this point remains the task for our experts for Health Economics to evaluate the costs benefit analysis for pPCI in Croatia.⁸ The Swedish analysis shows that in their environment the final results of treatment with pPCI are better and that the total cost of treatment is lower compared to fibrinolysis.¹³

Dubrovnik-Neretva County has 122,500 inhabitants, of whom 70% (86,000) are mainly treated in General Hospital Dubrovnik. However, when the visits by over one million tourists a year are added, we can roughly speak about the population of approximately 100,000 inhabitants that gravitate towards our hospital. In 2013, about 230 patients with ACS were admitted, of whom 27% for STEMI, which is a proportion similar to the one in the American registry (29%),¹⁴ although the GRACE registry suggests the proportion of 38% of patients with STEMI.¹⁵ Since 2010, the figures of the Croatian Institute for Health Insurance have been finally available to us, so now we know that some 7,300 patients with acute myocardial infarction (170/100.000) and 2,552 with unstable angina (26% ACS), that is, 9,852 patients with ACS (229/100.000) were hospitalized in Croatia in that year. It is necessary to establish the Croatian national registry for ACS and PCI for better classification and follow-up of some groups of patients and achieving success in the therapy. In 2013, 62 patients with STEMI were admitted to the General Hospital Dubrovnik, with a similar frequency as in the Swedish registry (66/100.000), while the rate of 89 NSTEMI patients was lower than in other registries (120-130).¹⁶ European Society of Cardiology expects the European average of 190 patients with AMI per 100,000 population,¹² while our figure of 151 patients is better than the expected EU average, but also the Croatian average of 170 patients. However, the question remains how many of our patients with NSTEMI have not even contacted a doctor, for reasons of not being properly informed, and also because an increase in troponin level was not registered in one portion of patients with unstable angina for reasons of cost saving and they were not classified as NSTEMI patients.

According to the ESC guidelines, patients with ACS whose choice of treatment should not be PCI, at least within 72 hours are rare. Among the patients with ACS, 94% of them underwent invasive workup in General Hospital Dubrovnik, and 62% were finally treated by the PCI, whereas CABG was recommended to 13.7% of patients. A third of all performed PCI were primary PCI (33%), which is above the Croatian average in 2007 (22%), while the proportion in Europe ranges from 9-39%.¹² Among the patients with STEMI, 98.4% underwent the invasive workup and 90.2% underwent pPCI, which is a further step towards reaching the ideal goal that all patients with STEMI are treated by pPCI. 43% of patients with NSTEMI and 65% of patients with STEMI underwent invasive treatment in the United States of America in 2005.¹⁷

njenica utjecala je i na neostvarivanje našeg plana od najmanje 200 PCI godišnje, koliko je potrebno da bi se jedan PCI centar svrstao u srednje veliki centar bez kardiokirurške potpore, i po američkim standardima bio sposoban zasebno funkcionirati.⁹

Raspodjela PCI po liječenim žilama slična je drugim registrima bolesnika s AKS, a usmjerenost prema hitnim bolesnicima pokazuje i udio PCI na velikim žilama, najviše na LAD na kojoj je učinjeno 45,5% svih procedura.⁵ Objašnjava to i penetraciju DES od 25,6%, koja je za europsku razinu bila minimalna, no aktualno realna.

Među 58 bolesnika sa STEMI kojima je izbor liječenja bio pPCI konačni TIMI 3 protok postignut je kod 93,4% bolesnika, što je rezultat bolji i od europskog prosjeka od 85%. Iako na maloj skupini bolesnika taj podatak uz intrahospitalni letalitet AIM od 2,61% i 4,8% od STEMI zasigurno ne govori o lošoj, nego više o izvrsnoj kvaliteti rada, a uspoređujući to sa smrtnošću u Europi, za AIM od 5 do 14% i za STEMI od 4,2 do 13,5% te u SAD (2005. godine) 9,7% za STEMI i 9,5% za NSTEMI.^{12,17} U Hrvatskoj je 2007. mortalitet kod STEMI bio 10%,¹² a podaci iz susjedne Splitsko-dalmatinske županije pokazuju da je mortalitet od AIM značajno pao uvođenjem PCI, sa 15% na 10% u 2005. godini, prvoj godini rada njihovog laboratorija.¹⁸ U Splitu se kroz sljedećih 5 godina mortalitet AIM spustio na 4%,¹⁸ dok je mortalitet od STEMI bio 6,3%.¹⁹ Dostupni podatak za Kliničku bolnicu Dubrava iz 2003. pokazuje intrahospitalni letalitet od STEMI 6,2%, a u Kliničkom bolničkom centru Zagreb 2005. godine za STEMI 13,9% a za NSTEMI 9,6%.^{5,20}

Osim TIMI protoka i smrtnosti, učestalost komplikacija također je mjera kvalitete rada. Učestalost akutne i subakutne tromboze u stentu od 2,4% među svim bolesnicima i 3,6% među bolesnicima sa STEMI bila je ipak veća nego u općim registrima, gdje se kreće od 0,5-2%.²¹ Ova komplikacija nije prikazana u analizi iz Splita, a na jednom skupu u Hrvatskoj prikazana je veća učestalost, i do 13,3% kod bolesnika sa STEMI.²² Svi naši bolesnici sa trombozom u stentu bili su na potrebnoj dvojnjoj antiagregacijskoj terapiji, uz klopidogrel, kao i u registrima (prasugrel i tikagrelor bi mogli imati bolje rezultate) te će biti potrebno i dalje pratiti ovu komplikaciju i tražiti joj uzroke, da bi i u tome dosegli europske rezultate. Međutim, potrebnu pomoć u tome morati će nam pružiti uvođenje novih metoda unutaržilnog prikaza (IVUS i/ili OCT), kojima bi se prekontrolirali neki postPCI nalazi, koji angiografski izgledaju odlično, a kasnije rezultiraju trombozom. Srećom, svi bolesnici su riješeni reintervencijom, bez daljih komplikacija. Perifernih komplikacija imali smo 1,2% kod femoralnog pristupa i 0,5% kod radijalnog pristupa, i to jednu ekstremno rijetku pseudoaneurizmu radijalne arterije, uz ukupnu potrebu kirurškog liječenja u 0,8% bolesnika. U globalnim registrima, uz modernu farmakološku terapiju, lokalne komplikacije kod femoralnog pristupa javljaju se u 5,5-7,4% bolesnika, uz potrebu kirurškog liječenja od 1,3%.²³⁻²⁵ U susjednoj županiji, u Splitu, ovih je komplikacija bilo 1,6%.¹⁹

Uz pokrivenost ostatka Hrvatske Mrežom, populaciju od 100.000 stanovnika, ali uz 210 km polovično loše ceste, dva granična prijelaza EU i više od milijun turista godišnje i nepostojanje laboratorija u graničnim regijama susjednih država smatramo da je postojala opravdana potreba uvođenja centra za intervencijsku kardiologiju u Dubrovačko-neretvanskoj županiji, a opseg rada samo s hitnim bolesnicima u 2013. godini gotovo da to i potvrđuje. Dubrovnik koji osigurava značajan prihod od brodova za krstarenje, kao popratnu uslugu mora imati integralno visoko kvalitetnu akutnu

There were 3,600 STEMI (82/100.000) patients in Croatia in 2007, more than in our county and 1,150 pPCI (22.5/100.000), significantly less than now in our county.¹² The comparison of results suggests our focusing on interventional treatment of emergency patients and ACS, which accounted for about 2/3 of all interventions performed, and placing a less emphasis on stable angina pectoris and ordered patients. To be fair, even doctors' strike in 2013 had an impact on a smaller number of orders for coronary angiography. This fact also affected the failure to achieve our plan to perform at least 200 PCI per year, which is needed to classify a single PCI center into the medium-sized center without cardiac support, and which according to American standards it would be able to function independently.⁹

Classification of PCI by treated vessels is similar to the one in other registries of patients with ACS, and focusing on emergency patients shows the proportion of PCI on large vessels, mostly on LAD on which 45.5% of all procedures were performed.⁵ This explained the DES penetration of 25.6%, which for the European level was minimal, but actually realistic.

Among 58 patients with STEMI whose treatment of choice was pPCI, final TIMI 3 flow was achieved in 93.4% of patients, which is a better result than the European average of 85%. Although this data is one on the small group of patients together with intra-hospital lethality of AMI of 2.61% and 4.8% of STEMI certainly does not suggest the poor, but rather outstanding quality of work even when we compare it with mortality in Europe, regarding AMI from 5-14% and regarding STEMI from 4.2 to 13.5% and in the U.S. (in 2005) 9.7% for STEMI and 9.5% for NSTEMI.^{12,17} In 2007, mortality in STEMI patients was 10% in Croatia,¹² and the data from the neighboring Split-Dalmatia County shows that the mortality of AMI significantly dropped by introducing PCI, from 15% to 10% in 2005, the first year of work of their laboratory.¹⁸ Mortality from AMI dropped to 4% in Split over the next five years,¹⁸ while the mortality from STEMI was 6.3%.¹⁹ The available data for the University Hospital Dubrava in 2003 shows intra-hospital lethality of STEMI 6.2%, while in 2005, intra-hospital lethality of STEMI was 13.9% and 9.6% of NSTEMI in University Hospital Zagreb.^{5,20}

In addition to TIMI flow and mortality, the incidence of complications is also a measure of quality of work. The incidence of acute and subacute stent thrombosis of 2.4% among all patients and 3.6% among patients with STEMI was still higher than in the general registries, ranging from 0.5-2%.²¹ This complication is not shown in analysis of Split, and at one meeting in Croatia higher incidence was shown, namely, up to 13.3% in patients with STEMI.²² All our patients with stent thrombosis underwent the required dual antiaggregation therapy with clopidogrel, as in the registries (prasugrel and ticagrelor might have better results) and it will be necessary to continue to monitor this complication and look for its causes in order to reach the European results. However, the necessary assistance in this matter will have to be provided to us by introducing new intravascular imaging methods (IVUS and/or OCT), which will check some postPCI results, which angiographically look great, but will later result in thrombosis. Fortunately, all those patients were managed by reintervention, without further complications. Peripheral complications were present in 1.2% in case of femoral access and 0.5% in case of radial access, and we had one extremely rare radial artery pseudoaneurysm, with a total need for surgical treatment in 0.8% of patients. Global registries report that with modern pharmacotherapy local complications in femoral access occur in 5.5 to 7.4% of patients, with the need for

zdravstvenu skrb, a konačno od svih pPCI kod STEMI na strane državljanke otpada gotovo 15% (9/61). Lijepo je čuti pohvale stranih kardiologa glede naših intervencija, kada se bolesnici s nalazom intervencije na CD vrata u SAD,²⁶ Veliku Britaniju, Francusku i Španjolsku, što je zasigurno povećalo ugled naše zemlje kao sigurne turističke destinacije. No, naša primarna zadaća u Dubrovačko-neretvanskoj županiji i OB Dubrovnik u sljedećoj godini bila je zamišljena kao povećanje udjela hospitalizacija u koronarnoj jedinici, odvajanjem ostalih nekardioloških bolesnika osnivanjem opće internističke intenzivne skrbi, a s intervencijske strane povećanje opsega rada u segmentu naručenih bolesnika (na kraju godine lista čekanja bila je 80 bolesnika), prezentacija usluge pPCI susjednim zemljama, kao i nova oprema, injektor, IVUS i FFR. Kako laboratorij nije funkcionirao u vrijeme početka nacionalnog tendera za materijal u intervencijskoj kardiologiji, prvotno nismo niti prepoznati kao stalni intervencijski centar. Nakon analize 2013. godine planirali smo materijal za narednu godinu, no upozoreni smo da moramo smanjiti predviđene količine, a početkom 2014. dobili smo rješenje u kojem smo zamijetili da je odobrena količina materijala upola manja i od one koju smo reducirali (**Tablica 6**). Nevjerojatno zvuči podatak da je za nas predviđeno katetera za svega 90-100 dijagnostičkih procedura, da nam nisu odobrili niti jedan kateter za intervencije, koje pretpostavljam, ne bi trebali niti raditi no tada ostaje smiješna činjenica čemu bi nam trebalo služiti onih 130 odobrenih proširnica? Kada bi i imali katetere to bi bilo dostatno samo za bolesnike sa STEMI. Da bi se takva situacija štednje zaokružila, ukinut je i Odsjek za akutne srčane bolesti i intervencijsku kardiologiju, koji se pripojio Internom odjelu. Uz nove okolnosti ostaje za vidjeti kakvi će biti dalji rezultati, za 2014. i dalje godine, ne samo u zdravstvu nego i turizmu, jer bi se na webu mogli pojaviti komentari turista i turoperatera o zdravstvenoj nesigurnosti u našim zdravstvenim ustanovama na obali.

Received: 24th Feb 2014; Updated 2nd Mar 2014; Accepted: 5th Mar 2014

*Address for correspondence: Opća bolnica Dubrovnik, Dr. Roka Mišetića 2, HR-20000 Dubrovnik, Croatia.

Phone: +385-20-431-777

E-mail: lukendaj@hotmail.com

Literature

1. Hartzler GO, Rutherford BD, McConahay DR. Percutaneous transluminal coronary angioplasty with and without thrombolytic therapy for treatment of acute myocardial infarction. *Am Heart J.* 1983;106:965-73.
2. Grines CL, Browne KF, Marco J. A comparison of immediate angioplasty with thrombolytic therapy for acute myocardial infarction. *N Engl J Med.* 1993;328:673-9.
3. Mišatović Š, Starčević B, Nikolić-Heitzler V, et al. Percutaneous coronary interventions in treatment of acute myocardial infarction. *Neurol Croat.* 2001;50:151-4.
4. Mišatović Š, Starčević B, Nikolić-Heitzler V, et al. Interventional reperfusion strategy in acute myocardial infarction. *Acta Clin Croat.* 2001;40(Suppl.):102.
5. Raguž M, Starčević B, Todorović N, Vesković M, Vagić JS, Bergovec M. [Percutaneous coronary interventions (PTCA and stent) myocardial infarct with ST segment elevation]. *Acta Med Croatica.* 2004;58:107-9.
6. Nikolić Heitzler V, Babic Z, Milicic D, et al. Results of the Croatian Primary Percutaneous Coronary Intervention Network for patients with ST-segment elevation acute myocardial infarction. *Am J Cardiol.* 2010;105:1261-7.
7. Potocki-Karacic T, Lukenda J. Yentl's syndrome in Croatia: younger male patients from capital were favoured for PCI. *Int J Cardiol.* 2011;146:450-2.

surgical treatment in 1.3% patients.²³⁻²⁵ There were 1.6% of such complications in the neighboring county, in Split.¹⁹

Covering the rest of Croatia by the Network, namely our population of 100,000 inhabitants, but mentioning 210 km half poorly built roads, two EU border crossings and more than a million of tourists a year as well as the lack of laboratories in the border regions of the neighboring countries, we believe that there was a reasonable need to establish the Center for Interventional Cardiology in Dubrovnik-Neretva County, and the scope of work only with emergency patients in 2013 almost confirms it. Dubrovnik which generates considerable revenues from cruise ships must render an integral high quality acute medical care as an accompanying service, and finally there are almost 15% (9/61) foreign nationals of all pPCI for STEMI. It is nice to be paid compliments by foreign cardiologists regarding our interventions, when patients with the CD intervention findings come back to the USA²⁶, United Kingdom, France and Spain, which certainly increased the reputation of our country as a safe tourist destination. However, our primary task in the Dubrovnik-Neretva County and General Hospital Dubrovnik in the next year was conceived as to increase the proportion of hospitalizations in the coronary care unit, separate other non-cardiac patients by establishing a general internal intensive care, and in the segment of interventions we are about to increase the volume of work in the field of ordered patients (by the end of the year, 80 patients were in the waiting list), present the pPCI service to some neighboring countries, new equipment purchase, injector, IVUS and FFR. As the laboratory was not functioning at the time of initiating the national tender for supplies in interventional cardiology, we were not recognized as a permanent interventional center at the beginning. After we made an analysis on 2013, we forecasted the supplies for the next year, but were warned that we had to reduce the quantity of forecasted supplies, and in early 2014, we received the decision in which we noticed that the approved quantity of supplies was half the size of the one we had already reduced (**Table 6**). We faced an incredible fact that we have been approved catheters for only 90-100 diagnostic procedures, that we have not been approved a single catheter for interventions, which I suppose should not be performed by us, but then we wondered what the purpose of 130 approved stents was? If we had catheters, those stents would be sufficient only for patients with STEMI. To round up this situation regarding cost savings, the Department for acute heart diseases and interventional cardiology has been abolished, and now it is annexed to the Internal Medicine Department. Given the new circumstance we shall see what the results in 2014 will be like not only in healthcare, but also in tourism, because tourists' and tour operators' comments may appear on the websites about medical insecurity in our medical facilities on the coast.

8. Ivanaša M, Miličić D, Nikolić-Heitzler V, Bergovec M, Babić Z, Tršinski D. Liječenje akutnog infarkta miokarda u Hrvatskoj - sadašnje stanje i kako ga unaprijediti. *Medix*. 2005;58:115-8.
9. Harold JG, Bass TA, Bashore TM, et al.; Presidents and Staff of American College of Cardiology Foundation; American Heart Association; Society of Cardiovascular Angiography and Interventions. ACCF/AHA/SCAI 2013 update of the clinical competence statement on coronary artery interventional procedures: a report of the American College of Cardiology Foundation/American Heart Association/American College of Physicians Task Force on Clinical Competence and Training (writing committee to revise the 2007 clinical competence statement on cardiac interventional procedures). *Circulation*. 2013;128:436-72.
10. PLIVAMED.net [Web stranica na internetu]. Zagreb, Hrvatska. [Pristupljeno 29.10.2013.]. Babić Z. Radna skupina za akutni koronarni sindrom HKD-a. Raspoloživo na: <http://www.plivamed.net/vijesti/clanak/8426/Radna-skupina-za-akutni-koronarni-sindrom-HKD-a.html>.
11. Prvulović Đ. Farmakoinvazivna strategija i njeno mjesto u zbrinjavanju bolesnika s akutnim infarktom miokarda s elevacijom ST-segmenta. *Cardiol Croat*. 2013;8(12):414-23.
12. Widimsky P, Wijns W, Fajadet J, et al.; European Association for Percutaneous Cardiovascular Interventions. Reperfusion therapy for ST elevation acute myocardial infarction in Europe: description of the current situation in 30 countries. *Eur Heart J*. 2010;31:943-57.
13. Aasa M, Henriksson M, Dellborg M, et al. Cost and health outcome of primary percutaneous coronary intervention versus thrombolysis in acute ST-segment elevation myocardial infarction-Results of the Swedish Early Decision reperfusion Study (SWEDES) trial. *Am Heart J*. 2010;160(2):322-8.
14. Go AS, Mozaffarian D, Roger VL, et al.; American Heart Association Statistics Committee and Stroke Statistics Subcommittee. Heart disease and stroke statistics—2013 update: a report from the American Heart Association. *Circulation*. 2013;127:e6-e245.
15. Fox KA, Eagle KA, Gore JM, et al.; GRACE and GRACE2 Investigators. The Global Registry of Acute Coronary Events, 1999 to 2009 - GRACE. *Heart*. 2010;96:1095-101.
16. Steg PG, James SK, Atar D, et al.; Task Force on the management of ST-segment elevation acute myocardial infarction of the European Society of Cardiology (ESC). ESC Guidelines for the management of acute myocardial infarction in patients presenting with ST-segment elevation. *Eur Heart J*. 2012;33:2569-619.
17. McManus DD, Gore J, Yarzebski J, et al. Recent trends in the incidence, treatment, and outcomes of patients with STEMI and NSTEMI. *Am J Med*. 2011;124:40-7.
18. Mirić D, Novak K, Kovačević LM, et al. In-hospital mortality of patients with acute myocardial infarction before and after introduction of PCI in Split University Hospital Center, Croatia. *Coll Antropol*. 2013;37:207-12.
19. Giunio L, Vuković I, Duplancić D, et al. [Primary percutaneous coronary intervention (pPCI) in hospital without regional cardiac surgery support, data from Split region]. *Liječ Vjesn*. 2012;134:75-8.
20. Strozzi M, Bulum J, Ernst A, et al. [Overall and therapy specific mortality of patients hospitalized for acute myocardial infarction in Zagreb University Hospital Centre]. *Liječ Vjesn*. 2007;129:260-4.
21. Moreno R, Jimenez-Valero S, Sanchez-Recalde A, et al. Periprocedural (30-day) risk of myocardial infarction after drug-eluting coronary stent implantation: a meta-analysis comparing cobalt-chromium and stainless steel drug-eluting coronary stents. *EuroIntervention*. 2011;6:1003-10.
22. Koshi R, Strozzi M. Stent thrombosis between drug-eluting and bare-metal stents. *Cardiol Croat*. 2013;8:283.
23. Dangas G, Mehran R, Kkolis S, et al. Vascular complications after percutaneous coronary interventions following hemostasis with manual compression versus arteriotomy closure devices. *J Am Coll Cardiol*. 2001;38:638-41.
24. Choussat R, Black A, Bossi I, et al. Vascular complications and clinical outcome after coronary angioplasty with platelet IIb/IIIa receptor blockade. Comparison of transradial vs transfemoral arterial access. *Eur Heart J*. 2000;21:662-7.
25. Philippe F, Larrazet F, Meziane T, et al. Comparison of transradial vs. transfemoral approach in the treatment of acute myocardial infarction with primary angioplasty and abciximab. *Catheter Cardiovasc Interv*. 2004;61:67-73.
26. Opća bolnica Dubrovnik [Web stranica na internetu]. Dubrovnik, Hrvatska. [Pristupljeno 04.07.2013.]. Arhiv. Raspoloživo na: <http://www.bolnica-du.hr/clanak1.php?id=443>

HRVATSKO KARDIOLOŠKO DRUŠTVO

HRVATSKA KUĆA SRCA
CROATIAN HEART HOUSE

**Vi imate pitanje?
Mi imamo odgovor!**

www.kardio.hr

Najčešća pitanja bolesnika o srčanom udaru,
koronarografiji i perkutanoj koronarnoj intervenciji