Stručni rad / Professional article

Protokol za liječenje akutnog infarkta miokarda s elevacijom ST-segmenta u Međimurskoj županiji

Protocol for the treatment of acute ST-segment elevation myocardial infarction in the County of Međimurje

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SAŽETAK: Međimurska županija jedna je od prvih županija u Republici Hrvatskoj koja se uključila u projekt liječenja akutnog infarkta miokarda s elevacijom ST-segmenta (STEMI) putem Hrvatske mreže primarne perkutane koronarne intervencije. U tu svrhu, nakon američkih i europskih smjernica, još 2006. god. uredili smo vlastiti Protokol za liječenje STEMI i u tiskanom ga obliku podjelili svim članovima Hrvatskog liječničkog zbora u županiji. Godine 2012. preuredili smo protokol, sukladno novostima iz Smjernicama Europskog kardiološkog društva za STEMI i revaskularizaciju miokarda. Svrha ovog članka je precizirati i standardizirati prehospitalni postupak i time osigurati siguran i brz transport pacijenta do intervencijskog centra.

SUMMARY: The County of Međimurje is one of the first counties in the Republic of Croatia which is involved in the project of treatment of acute ST-segment elevation myocardial infarction (STEMI) through the Croatian Primary Percutaneous Coronary Intervention Network. For this purpose, following the adoption of American and European guidelines, we adapted our own Protocol for the treatment of STEMI in 2006 and distributed it in printed form to all members of the Croatian Medical Association in the County. In 2012, we have rearranged the protocol according to the novelties from the European Society of Cardiology Guidelines for STEMI and myocardial revascularization. The purpose of this article is to specify and standardize pre-hospital process, thereby ensuring a safe and quick transport of patients to the intervention center.

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Akutni koronarni sindrom (ACS) predstavlja značajan javnozdravstveni problem zbog visoke stope morbiditeta i mortaliteta. ACS većinom nastaje zbog rupture nestabilnog aterosklerotskog plaka s posljedičnom trombozom koja djelomično ili potpuno zatvori lumen koronarne arterije. Distalno od mjesta tromboze dolazi do ishemije srčanih mišičnih stanica. Ukoliko je ishemija dovoljno intenzivna i dovoljno dugotrajna nastat će nekroza miokarda te u tom slučaju govorimo o akutnom infarktu miokarda (AIM). Ako nekroze ne nastupi radi se o nestabilnoj angini pektoris. Aktualno najpouzdaniji biokemijski marker nekroze miokarda je porast troponina, posebice visokoosjetljivog troponina.

Unutar ACS razlikujemo nekoliko kliničkih entiteta:

1. AIM s elevacijom ST-segmenta ili novonastalim, odnosno predmnijevano novonastalim blokom lijeve grane (STEMI)
2. AIM bez elevacije ST spojnice (NSTEMI)
3. Nestabilna angina pektoris
4. Iznenadna srčana smrt

Dijagnoza ACS se postavlja temeljem kliničke slike, nalaza 12 kanalnog EKG te karakterističnom dinamikom troponina.

Acute coronary syndrome (ACS) represents a significant public health problem due to high rate of morbidity and mortality. ACS mostly occurs as a consequence of rupture of unstable atherosclerotic plaque with subsequent thrombosis, which partially or completely closes the coronary artery lumen. Ischemia of cardiac muscle cells occurs distally from the place of thrombosis. If ischemia is intense and long enough, myocardial necrosis will occur and in that case we speak of acute myocardial infarction (AMI). If necrosis does not occur, this is characterized as unstable angina pectoris. The currently most reliable biochemical marker of myocardial necrosis is the elevation of troponin, especially highsensitive troponin.

Within the ACS, we distinguish between several clinical entities:

1. ST-segment elevation myocardial infarction or newly occurred, or the supposedly newly occurred left bundle branch block (STEMI)
2. Non ST-segment elevation myocardial infarction (NSTEMI)
3. Unstable angina pectoris
4. Sudden cardiac death

U oko 25% bolesnika s AIM prvi simptom može biti srčani arest. STEMI čini oko 30-40 % slučajeva ACS.

Suvremeni pristup u liječenju bolesnika sa STEMI čini rana reperfuzija, odnosno uspostavljanje ponovnog protoka kroz okludiranu koronarnu arteriju, koja se može postići primjenom fibribnolitika ili primarne perkutane koronarne intervencije (pPCI). Fibrinolizom (uz primjenu t-PA, streptokinaze) uspije se postići reperfuzija okludirane arterije u samo 50% slučajeva. Fibrinoliza nije definitivno liječenje STEMI, jer čak i nakon uspješnog otapanja ugruška, obično zaostaje rezidualna stenoza aterosklerotskim procesom. U rijetkim slučajevima STEMI može doći do spontane lize tromba. Primjena pPCI ima za cilj otvaranje odgovorne koronarne arterije mehaničkim putem na način da se ona dilatira uz/bez aspiracije trombotskih masa i distalne protekcije te u većini slučajeva u nju implantira stent.[1]

Za uspjeh reperfuzije ključno je da ona bude poduzeta unutar 12 sati od početka tegoba. Svako odgađanje njezine primjene drastično smanjuje uspjeh liječenja i povećava smrtnost takvih bolesnika ("vrijeme je miokard"). To se posebice odnosi na pacijente koji se jave unutar 2 sata od početka tegoba i imaju EKG sliku anteroseptalnog ili anterolateralnog STEMI.[2] Da bi uspjeh liječenja bolesnika sa STEMI bio što veći, potrebno je unutar županije organizirati snažan "lanac preživljenja" za bolesnike koji dožive AIM izvan zdravstvenih ustanova, a takvi čine većinu.[3] Karike ovog lanca su: rano prepoznavanje problema i alarmiranje Hitne medicinske pomoći (HMP); rano poduzimanje mjera bazičnog kardiopulmonalnog oživljavanja (CPR); rana primjenu defibrilacije za bolesnike kojima je ona neophodna; rana primjena naprednih mjera reanimacije; rano razmatranje mogućnosti primjene reperfuzijske terapije uz hitan transport u tercijarni centar ukoliko je bolesnku indicirana pPCI, odnosno u Županijsku bolnicu (ŽB) Čakovec ukoliko nije. Lanac preživljenja predstavljaju:

• sami bolesnici te članovi njihovih obitelji ili slučajni očevidci;

• timovi HMP, odnosno obiteljske medicine;

• dežurni liječnici Internog odjela i koronarne jedinice ŽB Čakovec;

• timovi tercijarnog centra u ovom slučaju Kliničke bolnice Dubrava.

Snaga lanca ovisi o snazi njegove najslabije karike!

Prema smjernicama ESC i Hrvatskog kardiološkog društva (HKD) pPCI predstavlja metodu izbora za liječenje bolesnika sa STEMI te je u tom smislu potreban što žurniji transport svih podesnih bolesnika u tercijarni centar (za Međimursku županiju to je KB Dubrava Zagreb) i to na način da od prvog kontakta bolesnika s medicinskom službom (prvog snimljenog EKG) pa do napuhavanja balona u koronarnoj arteriji ne prođe više od 90 minuta!

U tu je svrhu većinu bolesnika potrebno transportirati direktno u KB Dubrava zaobilazeći Hitni bolnički odjel (HBO) Županijske bolnice Čakovec.

Prehospitalni postupak kod bolesnika sa STEMI

1. Bolesnici koji osjećaju simptome koji upućuju na STEMI (bol ili pritisak iza grudne kosti sa ili bez širenja u ruke, vrat, donju čeljust ili epigastrij; osjećaj zaduhe; osjaćaj slabosti i

Diagnosis of ACS is made on the basis of clinical presentation, the 12-lead ECG finding and the characteristic dynamic of troponin. In around 25% of patients with AMI, the first symptom may be the cardiac arrest. STEMI accounts for 30-40% of cases of ACS.

Modern approach to the treatment of patients with STEMI is the early reperfusion, or re-establishment of flow through the occluded coronary artery, which can be achieved by applying fibribnolytic drugs or primary percutaneous coronary intervention (pPCI). By applying fibrinolysis (by applying t-PA, streptokinase) we can achieve reperfusion of occluded artery in only 50% of cases. Fibrinolysis is not a definite treatment of STEMI, because even following the successful clot dissolution, there is usually a residual stenosis which occurs following the atherosclerotic process. In rare STEMI cases a spontaneous clot lysis can occur. The application of pPCI is aimed at opening the responsible coronary artery mechanically in the manner that it is dilated with/without aspiration of thrombotic masses and distal protection and in most cases a stent is implanted in it.[1]

In order to perform reperfusion successfully, it is important that it should be performed within 12 hours from the onset of symptoms. Any delay of its application drastically reduces the success of the treatment and increases mortality of these patients ("the time is myocardium"). This is particularly true for the patients who come within 2 hours after the onset of symptoms and have anteroseptal or anterolateral STEMI.[2] For the purpose of achieving more successful treatment of patients with STEMI, it is necessary to organize a "chain of survival" within the county for patients who have a AMI outside of medical institutions, and there are most of such patients.[3] Links of this chain are: early detection of problems and alerting Emergency Medical Service (EMS); early undertaking measures of basic cardiopulmonary resuscitation (CPR); early use of defibrillation for patients for whom it is necessary; early application of advanced resuscitation measures; early consideration of the possibility of applying reperfusion therapy with emergency transport to the tertiary center if pPCI is indicated, or to the Čakovec County Hospital (ČCH) if pPCI is not indicated. The chain of survival includes:

• patients themselves and their family members or accidental eyewitnesses;

• EMS teams or family medicine service;

• doctors on duty in the Department of Internal Medicine and Coronary Care Unit of the ČCH;

• teams of the tertiary center, in the case, of the University Hospital Dubrava

The power of the chain depends on the strength of its weakest link!

According to the guidelines of ESC and the Croatian Cardiac Society (CCS), pPCI is a method of choice for the treatment of patients with STEMI and in this sense an urgent transport of patients suitable for pPCI to the tertiary center is required (for the County of Međimurje this is the University Hospital Dubrava, Zagreb) in the manner that no longer than 90 minutes may elapse from the first contact of a patient with medical care service (the first recorded ECG) till the inflation of the balloon in the coronary artery!

For this purpose, the majority of patients need to be transported directly to the University Hospital Dubrava avoiding the Emergency Hospital Department (EHD) of the ČCH.

Prehospital procedure in patients with STEMI

1. Patients who have symptoms indicating STEMI (pain or pressure behind the sternum, spreading or not spreading

klonulosti; preznojavanje; mučnina; vrtoglavicu i omaglicu) trebaju alarmirati HMP ili najbliži tim obiteljske medicine; u pogledu transporta prednost treba dati transportu vozilom HMP;

2. Stručni tim koji prvi dođe u kontakt sa bolesnikom poduzet će mjere CPR ukoliko su one potrebne;

3. Svim bolesnicima suspektnim na AIM potrebno je dati da sažvaču i progutaju tbl acetilsalicilne kiseline od 300 mg, ukoliko za to nema kontraindikacije; ukoliko bolesnici redovito uzimaju acetilsalicilnu kiselinu u dozi od 100 mg dovoljno je dati samo redovitu dnevnu dozu; Bolesnicima koji će se direktno transportirati u KB Dubrava zbog pPCI uz acetilsalicilnu kiselinu potrebno je dati i klopidrogel 600mg ili prasugrel 60mg ili tikagrelor 160 mg;

4. Unutar 10 minuta od prvog kontakta s pacijentom snimiti 12-kanalni EKG u svrhu potvrde dijagnoze STEMI te isti telemetrirati postojećom tehnologijom (npr. Lifepack) u Koronarnu jedinicu KB Dubrava. U slučaju da dijagnoza STEMI nije sigurna EKG je potrebno telemetrirati u Koronarnu jedinicu ŽB Čakovec i dalje postupiti po uputi dežurnog liječnika.

Liječnik prvog kontakta uz to treba:

— orijentirati se o osnovim hemodinamskim parametrima: arterijski tlak, centralni puls, prisustvo znakova šoka.

— uzeti osnovne anamnestičke podatke od bolesnika, a naročito: točno vrijeme početka tegoba; da li je do sada liječen zbog koronarne bolesti srca; orijentirati se o glavnim čimbenicima kardiovaskularnog rizika kod bolesnika te o komorbiditetu (naročito maligne bolesti, terminalni stupnjevi srčanog, bubrežnog ili jetrenog zatajivanja, teška cerebrovaskularna bolest i sl.).

— pacijentu u najkraćim crtama objasniti postupak pPCI i zatražiti pristanak na ovakav oblik liječenja.

— nakon nekoliko minuta od slanja EKG nazvati dežurnog liječnika u Koronarnoj jedinici KB Dubrava ili dežurnog liječnika u Koronarnoj jedinici ŽB i dalje postupati prema njihovim uputama.

5. Postaviti barem jedan venski put uz održavanje istog infuzijom kristaloidne otopine;

6. Ukoliko nema kontraindikacije primijeniti preprat brzodjelujućeg nitrata sublingvalno u svrhu smanjenja boli;

7. Za analgeziju koristiti morfij u dozi od 4-6 mg i.v.(1 amp. razrijediti u 20 ml štrcaljki s fiziološkom otopinom) te prema potrebi istu dozu ponoviti do max. 20 mg u prehospitalnoj fazi liječenja. Ukoliko bolesnik povraća ordinirati i.v. Ampulumetoklopramida (Reglan) ili tietilperazina (Torecan);

8. svim bolesnicima ordinirati kisik u protoku od najmanje 4 L/min preko maske ili nosnog katetera;

9. Tijekom transporat obavezno kontrolirati: arterijski tlak; saturaciju kisika preko pulsnog oksimetra te EKG preko monitora;

Cijeli prehospitalni postupak ne bi trebao trajati duže od 15 minuta!

Ukoliko je bolesniku indicirana pPCI te je hemodinamski stabilan i transportibilan i suglasan s ovom metodom liječenja, transportirat će se direktno u KB Dubrava s odogovarajućom uputnicom za bolničko liječenje, odgovarajućim sanitetskim vozilom ("reanimobil") uz pratnju liječnika i medicinskog sestre/tehničara HMP bez dolaska u HBO ŽB Čakovec. Tijekom transporta prema potrebi kontaktirati dežurnog liječnika u Koronarnoj jedinici KB Dubrava.

into the arms, neck, lower jaw or epigastrium; feeling dyspnea; feeling week and exhausted; sweating; feeling nausea; vertigo and dizziness) should alert EMS or the nearest family medicine team; in terms of transport the priority should be given to the EMS transport vehicle;

2. The expert team that is the first to come into contact with the patient will perform the CPR procedures if they are necessary;

3. All patients with suspected AMI should be given 300mg of aspirin to chew and swallow, if there are no adverse effects of them; if patients regularly take aspirin in a dose of 100 mg it is enough to administer only the regular daily dose; The patients who will be directly transported to the University Hospital Dubrava for pPCI should in addition to aspirin, they should be also given 600mg clopidogrel or 60mg prasugrel or 160mg ticagrelor.

4. Within 10 minutes from the initial contact with a patient, a12-lead ECG should be recorded for the purpose of making the diagnosis of STEMI and it should be telemetered by the existing technology (e.g. Lifepack) to the Coronary Care Unit of the University Hospital Dubrava. In the event that the diagnosis of STEMI is uncertain, ECG needs to be telemetered to the Coronary Care Unit of the ČCH and further procedures should be undertaken as instructed by a physician on duty.

The first contact physician should also:

— focus on basic hemodynamic parameters: blood pressure, central pulse, presence of shock.

— take the basic anamnestic data from patients, especially: the exact time of onset of symptoms; whether the patient has been treated for coronary artery disease; focus on major cardiovascular risk factors in patients and on comorbidity (especially malignant diseases, end stages of heart, kidney or liver failure, severe cerebrovascular disease, etc.).

— the pPCI procedure is briefly explained to a patient who is requested to give a consent to this type of treatment.

— after a few minutes from the moment of sending ECG, a physician on duty in the Coronary Care Unit of the University Hospital Dubrava or Coronary Care Unit of the ČCH are to be called and the procedure is to be undertaken according to their instructions.

5. At least one venous access is to be implanted while maintaining the venous access by the infusion of crystalloid solution;

6. If there are no adverse effects, the preparation of fast-acting nitrates taken sublingually is to be used as to reduce pain;

7. Morphine in a dose of 4-6 mg i.v. for analgesia (1 amp. to be diluted in 20 ml syringe with saline solution) is to be used, and if necessary, the same dose to the max. 20 mg is to be repeated in the pre-hospital phase of treatment. If a patient vomits, an i.v. ampoule of metoclopramide or thiethylperazine is to be administered;

8. All patients are to be administered oxygen in the flow of at least 4L/min by mask or nasal catheter;

9. During the transport, the following must be controlled: blood pressure, oxygen saturation via pulse oximeter and ECG via monitor;

The whole pre-hospital procedure should not last longer than 15 minutes!

If pPCI is indicated, and the patients is hemodynamically stable, capable of being transported, and accepts this method of treatment, he/she will be transported directly to the University Hospital Dubrava with the appropriate referral for the hospital treatment, by appropriate ambulance ("reanimobile"), accompanied by EMS physician and nurses without coming to EHD of the ČCH. During the transport, if neces-

Ukoliko dijagnoza STEMI nije jasna, ukoliko je bolesnik hemodinamski nestabilan i rizičan za transport ili zbog komorbiditeta postoji sumnja o indiciranosti PCI ili ako to odluči dežurni liječnik Internog odjela bolesnik će se uputiti u HBO ŽB Čakovec. Ukoliko dežurni liječnik Internog odjela uz konzultaciju kardiologa matične ustanove ili dežurnog kardiologa KB Dubrava, dijagnosticira STEMI te procijeni da je bolesnik podesan za PCI organizirat će transport odgovarajućim kolima HMP na način da od dolaska bolesnika u HBO pa do polaska u tercijarni centar, po mogućnosti, ne prođe više od 30min.

Ukoliko je dežurni liječnik Internog odjela liječnik prvog kontakta provest će sve mjere navedene u prehospitalnom postupku!

Ukoliko bolesnik nije podesan za pPCI primit će se u Koronarnu jedinicu ŽB Čakovec.

Dijagnoza STEMI

1. Klinička slika koja upućuje na ACS

2. EKG kriteriji STEMI:

— Elevacija ST-segmenta u najmanje dva uzastopna odvoda koji odgovaraju određenoj lokalizaciji (anteroseptalni, anterolateralni, inferiorni) za najmanje 1mV (1 mm) u svim odvodima osim V2-V3 gdje je kriterij elevacije >2 mm za muškarce i >1,5 mm za žene;

— Depresija ST-segmenta u V1-V2 za najmanje 1mV (1mm) kod čiste posteriorne lokalizacije;

— Novonastali ili predmnijevano novonastali kompletni blok lijeve grane (LBBB).[4]

Ukoliko prvi EKG nije dijagnostički, a bolesnik je i dalje simptomatski te klinička slika s visokim stupnjem vjerojatnosti upućuje na STEMI, potrebno je serijski snimati 12 kanalni EKG u intervalima od 5-10 minuta! Liječnik prvog kontakta će se u tom slučaju konzultirati sa dežurnim liječnikom Internog odjela glede daljeg postupanja sa pacijentom.

Kod bolesnika s inferiornom lokalizacijom (elevacija ST-segmenta u D2, D3, aVF) potrebno je učiniti i desne prekordijalne odvode te tražiti znakove infarkta desne klijetke (elevacija ST-segmenta u V4R).

Ukoliko bolesnik od ranije ima LBBB ili je nosilac trajnog elektrostimulatora ili se sumnja na izolirani posteriorni STEMI, kao i u svakom drugom slučaju sumnje na infarkt miokarda uz nejasan EKG, potrebno je učiniti hitnu ehokardiografiju.

Ukoliko se bolesnik planira za pPCI nije potrebno vađenje krvi za biokemijske pretrage u ŽB Čakovec.

Primarna PCI

Svim bolesnicima sa STEMI treba razmotriti za primjenu pPCI ukoliko od početka tegoba pa do predmnijevanog dolaska u tercijarni centar nije prošlo više od 12 sati.

Kod pacijenata koji dolaze između 12-24 h, a u nekim slučajevima i do 60 sati od početka tegoba, posebno ako imaju bolove, ritmičku i/ili hemodinamsku nestabnost potrebno je također razmotriti za primjenu PCI5 u konzultaciji s invazivnim kardiologom u KB Dubrava. Apsolutno je indicirano primjeniti pPCI u bolesnike kod kojih postoji kontraindikacija za liječenje fibrinolitikom!

Svi bolesnici s teškim stupnjem srčanog zatajivanja, uključujući i kardiogeni šok, zahtjevaju hitnu invazivnu obradu i

sary, a doctor on duty in the Coronary Care Unit of the University Hospital Dubrava is to be contacted.

If the diagnosis of STEMI is not clear, if a patient is hemodynamically unstable and risky to transport or is suspected of indication of PCI due to comorbidity or if such a decision is made by a physician on duty in the Department of Internal Medicine, the patient will be referred to the EHD of the ČCH. If a physician on duty in the Department of Internal Medicine in consultation with a cardiologist in the principal institution or a cardiologist on duty in the University Hospital Dubrava makes a diagnosis of STEMI and determines that the patient is suitable for PCI, the transport by appropriate EMS vehicle will be organized in the manner that from the moment of arrival of a patient to the EHD to the departure to tertiary center, where possible, no longer than 30 min should elapse.
If a doctor on duty in the Department of Internal Medicine is the first contact doctor, all measures listed in the prehospital procedure are to be conducted!
If a patient is not suitable for pPCI, he/she will be admitted to the Coronary Unit of the ČCH.

STEMI diagnosis

1. the clinical presentation that suggests an ACS

2. ECG criteria of STEMI:

— ST-segment elevation in at least two consecutive leads that fit a specific localization (anteroseptal, anterolateral, inferior) by at least 1mV (1mm) in all leads except V2-V3, where the elevation criterion is >2mm for men and >1.5 mm for women;

— ST-segment depression in V1-V2 by at least 1 mV (1mm) in case of posterior localization;

— The new-onset or the presumed new-onset left bundle branch block (LBBB).[4]

If the first ECG is not diagnostic, while a patient is still symptomatic and the clinical presentation with a high degree of probability suggests STEMI, a standard 12-lead ECG should be recorded in series at intervals of 5-10 minutes! The first contact physician will in this case consult a physician on duty in the Internal Medicine Department regarding further treatment of the patient.

In patients with inferior localization (ST-segment elevation in D2, D3, aVF) it is also necessary to do the right precordial leads and look for signs of right ventricular myocardial infarction (ST-segment elevation in V4R).

If a patient has a history of LBBB or is the holder of a permanent pacemaker, or an isolated posterior STEMI is suspected and in every other case of suspected myocardial infarction with unclear ECG, it is necessary to perform an urgent echocardiography.

If a patient is to undergo pPCI, the extraction of blood for biochemistry blood tests in the ČCH is not necessary.

Primary PCI

The pPCI application should be considered for all patients with STEMI if from the onset of symptoms to the supposed arrival in the tertiary center elapsed no more than 12 hours.

In patients who come between 12 and 24 hours, and in some cases up to 60 hours from the onset of symptoms, especially if they have pains, rhythmic and/or hemodynamic instability, the application of PCI5 should be reconsidered in consultation with an invasive cardiologist in the University

intervencijsku ili rjeđe kardiokirurško revaskularizaciju, najčešće uz prethodnu hemodinamsku stabilizaciju primjenom inotropne potpore, umjetne ventilacije, intraaortne balonske pumpe te po potrebi ECMO potpore. Ukoliko, unatoč svega, nema oporavka srčane funkcije, a nije nastalo ireverzibilno neurološko, odnosno terminalno zatajenja drugih organa valja razmotriti nadomještanje srčane funkcije arteficijalnim mehaničkim srcem (LVAD terapija) o čemu se odluka donosi u tercijarnom centru.[6]

Za pPCI nisu podesni:

— Bolesnici čije tegobe traju duže od 12 sati, a uspiju se stabilizirati medikamentoznom terapijom;

— Bolesnici s terminalnim srčanim, renalnim ili jetrenim zatajivanjem;

— Bolesnici u uznapredovalom stupnju maligne bolesti;

— Bolesnici s teškom cerebrovaskularnom ili psihijatrijskom bolešću koji nisu sposobni shvatiti postupak PCI i dati adekvatan pristanak;

— Bolesnici koji ne pristaju na predloženi način liječenja.

Životna dob nije zapreka za pPCI ukoliko je bolesnik dobrog prethodnog funkcionalnog statusa, klinički podesan te ukoliko to želi!

U slučaju dvojbe glede indiciranosti primarne PCI konzultirat će se dežurni kardiolog KB Dubrava ili po potrebi kardiolog ŽB Čakovec.

Fibrinolitička terapija

Za sve bolesnike koji nisu prikladni za pPCI treba razmotriti primjenu fibrinolitičke terapije (prednost ima fibrin specifični t-PA — Alteplaza).

Apsolutne su kontraindikacije za primjenu fibrinolitika:

— Anamneza bilo kojeg intrakranijskog krvarenja u bilo koje vrijeme;

— Anamneza ishemijskog cerebrovaskularnog inzulta u posljednja 3 mjeseca;

— Anamneza značajne tupe ozljede glave ili lica odnosno op. zahvata u posljednja 3 mjeseca;

— Nekontrolirana arterijska hipertenzija (RR viši od 180/110 mmHg);

— Sumnja na disekciju aorte;

— Bilo koje aktivno krvarenje (izuzev menstrualnog).

Relativne su kontraindikacije:

— Aktualno uzimanje antikoagulantne profilakse;

— Nedavna invazivna ili kirurška procedura;

— Produžena CPR (više od 10 minuta);

— Poznata hemoragična dijateza;

— Trudnoća;

— Proliferativna diabetička retinopatija;

— Aktivni peptički ulkus;

— Anamneza teške hipertenzije.

Ukoliko je bolesnik bilo kada primio streptokinazu kao fibrinolitik obavezno koristiti t-PA (Alteplaza)

Odluku o fibrinolitičkoj terapiji donosi dežurni liječnik internog odjela ukoliko bolesnik sa STEMI nije prikladan za pPCI!

Fibrinolitička terapija, aplicira se prema protokolu navedenom u Uputi o lijeku, strogo poštujući apsolutne kontraindikacije!

Hospital Dubrava. It is absolutely indicated to apply pPCI in patients in whom there are contraindication of fibrinolytic therapy.

All patients with a severe degree of heart failure, also including cardiogenic shock, require urgent invasive workup and interventional or more rarely cardiosurgery revascularization, usually with prior hemodynamic stabilization by applying inotropic support, mechanical ventilation, intra-aortic balloon pump and as necessary, ECMO support. If, despite everything, cardiac function is not recovered and no irreversible neurological or end stage failure of other organs occurred, we should consider the process of replacing the cardiac function by artificial mechanical heart (LVAD therapy) which is decided upon by the tertiary center.[6]

The below patients are not considered suitable for the pPCI:

— Patients whose symptoms last longer than 12 hours, and are managed to be stabilized by the drug therapy;

— Patients with end-stage cardiac, renal or liver failure;

— Patients in advanced stage of malignant disease;

— Patients with severe cerebrovascular or psychiatric disease who are unable to understand the PCI procedure and give appropriate consent;

— Patients who do not agree to the proposed manner of treatment;

The age is not an obstacle for pPCI if a patient has a good prior functional status, is clinically fit and if he/she wishes that.

In case of doubt regarding the indication of primary PCI, a cardiologist on duty in the University Hospital Dubrava or if necessary, a cardiologist from the ČCH should be consulted.

Fibrinolytic therapy

For all patients who are not suitable for pPCI, we should consider the application of fibrinolytic therapy (preferably a fibrin-specific t-PA - Alteplase).

The absolute contraindications of application of fibronolytics are:

— History of any intracranial hemorrhage at any time;

— History of ischemic stroke in the last 3 months;

— History of significant blunt head or face injury or a surgical procedure in the last 3 months;

— Uncontrolled hypertension (BP greater than 180/110 mmHg);

— Suspected aortic dissection;

— Any active bleeding (except menstrual bleeding).

The relative contraindications are:

— Current administration of anticoagulant prophylaxis;

— Recent invasive or surgical procedure;

— Prolonged CPR (more than 10 minutes);

— Known haemorrhagic diathesis;

— Pregnancy;

— Proliferative diabetic retinopathy;

— Active peptic ulcer;

— History of severe hypertension.

If a patient has at any time received streptokinase as fibrinolytic drug, the t-PA (Alteplase) is to be used.

A decision on fibrinolytic therapy is made by a physician on duty in the Department of Internal Medicine, if a patient with STEMI is not suitable for pPCI.

Fibrinoliza nije konačno STEMI. Nakon neuspješne fibrinolize bolesnika treba hitno (unutar 3 sata) transportirati u tercijarni centar zbog tzv. spašavajuće (rescue) PCI. Ukoliko je fibrinoliza uspješna, unutar 24h treba učiniti koronarografiju te, ovisno o nalazu rezidualne stenoze, odgođenu PCI.

Zaključak

Primarna PCI predstavlja značajan napredak u liječenju bolesnika sa STEMI u pogledu smanjenja smrtnosti i pojave reinfarkta. Fibrinolitička terapija prema aktualnim smjernicama služi kao alternativa za bolesnike koji nisu podesni za PCI i nije definitivno liječenje STEMI.

Međimurska Županija u suradnji sa tercijarnim centrom KB Dubrava dio je Hrvatske mreže pPCI i raspolaže zadovoljavajućim tehničkim, kadrovskim i komunikacijskim predispozicijama za suvremeno liječenje bolesnika sa STEMI u skladu sa smjernicama ESC i HKD. U tom je smislu i ovaj protokol podložan promjenama u budućnosti ovisno o daljem razvoju i napretku kardiološke struke na ovom području.

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Fibrinolytic therapy is applied according to the protocol specified in the Information on Drugs, strictly observing absolute contraindications!

Fibrinolysis is not the final treatment of STEMI. After failed fibrinolysis, a patient needs to be urgently (within 3 hours) transported to a tertiary center for the rescue PCI. If case of successful fibrinolysis, coronarography needs to be performed within 24 hours and depending on a finding of residual stenosis, a delayed PCI needs to be performed.

Conclusion

Primary PCI represents a significant advancement in the treatment of patients with STEMI in reducing mortality and occurrence of reinfarction. Fibrinolytic therapy is according to current guidelines used as an alternative for patients who are not suitable for PCI, and it is no definitive treatment of STEMI.

The County of Međimurje in collaboration with the tertiary center of the University Hospital Dubrava is the part of the Croatian pPCI Network and has sufficient technical, personnel and communication resources for the modern treatment of patients with STEMI in accordance with the ESC and CCS guidelines. In this respect, this protocol is subject to changes in the future depending on a further development and advancement of the cardiology profession in this area.

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