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## ROTACIONA ATEREKTOMIJA - NAČIN PRIPREME TEŠKO KALCIFIKOVANIH LEZIJA KORONARNIH ARTERIJA

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**Sažetak:** Kalcifikovane lezije koronarnih arterija i dalje predstavljaju veliki izazov u interventnoj kardiologiji. Znak su uznapredovale ateroskleroze, povezane su sa višesudovnom bolešću i prisustvom složenih lezija, uključujući dugačke lezije, hronične totalne okluzije i bifurkacije. Danas postoji nekoliko strategija za modifikaciju kalcifikovanih lezija pre perkutane koronarne intervencije. One se mogu podeliti na strategije bez aterektomije i strategije sa aterektomijom. U strategije bez aterektomije ubrajamo modifikacione balone i intravaskularnu litotripsiju. Strategije sa aterektomijom su usmerene na fizičko uklanjanje plaka i obuhvataju rotacionu aterektomiju, koronarnu orbitalnu aterektomiju, lasersku koronarnu aterektomiju. Rotaciona aterektomija je endovaskularna procedura tokom koje dolazi do ablacije plaka napredovanjem rotirajućeg abrazivnog burr-a. Upotreba rotacione aterektomije kod teško kalcifikovanih lezija je povezana sa većim proširenjem dijametra krvnog suda, većim poprečnim presekom lumena i sa manje finalnih rezidualnih stenozama nakon implantacije stenta. Teško kalcifikovane ostijalne i bifurkacione lezije one su zahtevnije za perkutanu intervenciju, sa čestim komplikacijama kao što su transfer plaka, akutna okluzija bočne grane i neoptimalna apozicija ili ekspanzija stenta. U takvim slučajevima intervencije sa modifikacijom kalcifikovanog plaka uz upotrebu rotacione aterektomije su se pokazale kao uspešnije, bilo da se tretira samo glavna grana ili i glavna i bočna. Ovaj rad prikazuje pacijentkinju sa kalcifikovanom lezijom ostijuma prednje descendentne arterije koja je odbila kardiohiruršku revaskularizaciju i kod koje inicijalna perkutana koronarna intervencija nije uspešno izvedena. Nakon toga učinjena je perkutana koronarna intervencija uz upotrebu rotacione aterektomije. Dobijen je optimalan angiografski rezultat sa normalnim koronarnim protokom. Pacijentkinja je otpuštena nakon urađene intervencije bez komplikacija. Pažljivo izvedena rotaciona aterektomija se može uspešno koristiti u tretmanu zahtevnih kalcifikovanih lezija ostijalnih segmenta koronarnih arterija sa visokim stepenom efektivnosti i bezbednosti.

**Ključne reči:** kalcifikovane lezije, ostijalne lezije, rotaciona aterektomija

### Uvod

Koronarne kalcifikacije nastaju kada se kalcijum nakuplja u plaku koronarnih arterija. Češće su kod starijih, kod pacijentata sa dijabetesom, bubrežnom slabošću, kao i sa prethodnom kardiovaskularnom revaskularizacijom [1,2]. Kalcifikovane lezije koronarnih arterija i dalje predstavljaju izazov u interventnoj kardiologiji. Iz četrnaest studija sa stentovima koji oslobađaju lekove dobijen je podatak da je učestalost umereno do teško kalcifikovanih lezija oko 30% od ukupnog broja lezija. Kalcifikovane koronarne arterije su znak uznapredovale ateroskleroze, povezane su sa višesudovnom bolešću i prisustvom složenih lezija, uključujući dugačke lezije, hronične totalne okluzije i bifurkacije [3]. Akumulirani mineralni sadržaj u kalcifikovanom plaku povećava učestalost komplikacija tokom procedure tako što

otežava pasažu i dovodi do asimetrične ili nepotpune ekspanzije balona i stentova, takođe dovodi do malpozicije stentova, povećavaju postproceduralne komplikacije kao što su restenoza i tromboza stenta [4,5].

Ovaj rad prikazuje pacijentkinju sa kalcifikovanom lezijom ostijuma prednje descendentne arterije (eng. left anterior descending, LAD) i perkutanu koronarnu intervenciju (eng. percutaneous coronary intervention, PCI) uz pomoć rotacione aterektomije (RA).

### Prikaz slučaja

Pacijentkinja starosti 83 godine je primljena u našu ustanovu zbog akutnog infarkta miokarda sa elevacijom ST segmenta inferiorne lokalizacije. Tegobe su počele sat vremena pre prijema. Ovo je bila prva manifestacija koronarne

## ROTARY ATHERECTOMY - METHOD OF PREPARATION OF HEAVILY CALCIFIED CORONARY ARTERY LESIONS

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**Summary:** Calcified lesions of coronary arteries still represent a major challenge in interventional cardiology. The sign is advanced atherosclerosis, associated with multivessel disease and the presence of complex lesions, including long lesions, chronic total occlusions, and bifurcations. Today, there are several strategies for modifying calcified lesions before percutaneous coronary intervention. They can be divided into strategies without atherectomy and strategies with atherectomy. Non-atherectomy strategies include modification balloons and intravascular lithotripsy. Atherectomy strategies are aimed at physical plaque removal and include rotary atherectomy, coronary orbital atherectomy, and laser coronary atherectomy. Rotational atherectomy is an endovascular procedure during which plaque ablation occurs by advancing a rotating abrasive burr. The use of rotational atherectomy in severely calcified lesions is associated with greater dilatation of vessel diameter, larger lumen cross-section, and fewer final residual stenoses after stent implantation. Heavily calcified ostial and bifurcation lesions are more demanding for percutaneous intervention, with frequent complications such as plaque transfer, acute side branch occlusion, and suboptimal stent apposition or expansion. In such cases, interventions with modification of the calcified plaque with the use of rotational atherectomy have been shown to be more successful, whether only the main branch or both the main and side branches are treated. This paper presents a patient with a calcified lesion of the ostium of the anterior descending artery who refused cardiosurgical revascularization and in whom the initial percutaneous coronary intervention was not successfully performed. After that, percutaneous coronary intervention was performed using rotary atherectomy. An optimal angiographic result with normal coronary flow was obtained. The patient was discharged after the intervention without complications. Carefully performed rotational atherectomy can be successfully used in the treatment of demanding calcified lesions of the ostial segments of the coronary arteries with a high degree of effectiveness and safety.

**Key words:** calcified lesions, ostial lesions, rotational atherectomy

### Introduction

Coronary calcifications occur when calcium builds up in the plaque of the coronary arteries. They are more common in the elderly, in patients with diabetes, renal insufficiency, as well as with previous cardiovascular revascularization [1,2]. Calcified coronary artery lesions continue to represent a challenge in interventional cardiology. Fourteen studies with drug-eluting stents showed that the frequency of moderately to severely calcified lesions is about 30% of the total number of lesions. Calcified coronary arteries are a sign of advanced atherosclerosis, associated with multivessel disease and the presence of complex lesions, including long lesions, chronic total occlusions, and bifurcations [3]. Accumulated mineral content in calcified plaque increases the

frequency of complications during the procedure by obstructing passage and leading to asymmetric or incomplete expansion of balloons and stents, also leading to malposition of stents, increasing postprocedural complications such as restenosis and stent thrombosis [4,5].

This paper presents a patient with a calcified lesion of the ostium of the anterior descending artery (left anterior descending, LAD) and percutaneous coronary intervention (PCI) with the help of rotational atherectomy (RA).

### Case report

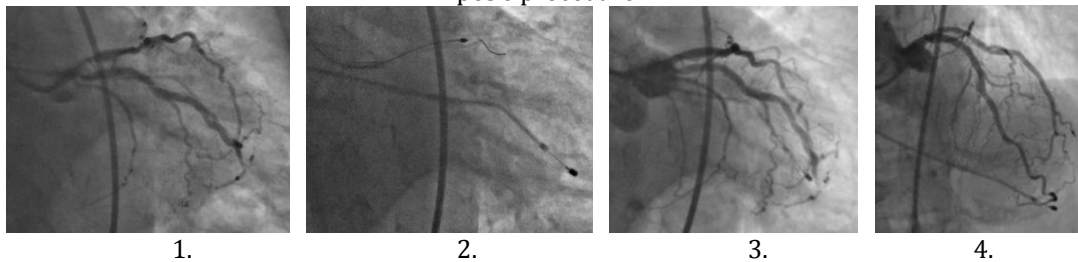
An 83-year-old female patient was admitted to our institution due to acute myocardial infarction with inferior ST segment elevation. The complaints started an hour

bolesti. Pacijentkinja se prethodno lečila od arterijske hipertenzije, dijabetesa. Odmah po prijemu urađena je hitna selektivna koronarografija kojom je registrovana okludirana desna koronarna arterija (eng. right coronary artery, RCA) uz značajnu kalcifikovanu leziju LAD, kao i ostijuma ramusa intermedijusa (RI). U istom aktu urađena je primarna PCI RCA sa implantacijom dva stenta sa oslobađanjem leka uz preklop (2,75x12mm, 2,75x18mm). Ehokardiografski je registrovana hipokinezija bazalne polovine inferiornog zida i inferiornog septuma i apikalne trećine anteriornog septuma, uz očuvanu globalnu sistolnu funkciju. Pacijentkinja je tretirana dvojnog antiragregacionom terapijom, niskomolekularnim heparinom, beta blokatorom, inhibitorom angiotenzin konvertujućeg enzima, dihidropiridinskim blokatorom kalcijumskih kanala, statinom i optimizovana je antidijabetesna terapija. Medicinska dokumentacija je prezentovana kardiohirurškom konzilijumu koji je indikovao hirušku revaskularizaciju miokarda dvostrukim aortokoronarnim bajpasom (LAD i RI), što je pacijentkinja odbila, te joj je predložena PCI LAD i RI. U drugom aktu tokom iste hospitalizacije pokušana je PCI. Urađena je predilatacija ostijuma RI semi-komplijantnim balonom 2,5x15mm. Pokušaj predilatacije ostijuma LAD ne-komplijantnim balonom 3,5x15mm, kao i semi-komplijantnim balonima 2,0x15mm i 1,5x10mm nije bio uspešan, jer baloni nisu prošli

kalcifikovanu leziju. S obzirom da nije registrovana disekcija u levom koronarnom sistemu, da je pacijentkinja sve vreme anginoznih tegoba, hemodinamski i ritmološki stabilna, a elektrokardiografski bez znakova ishemije, od dalje intervencije se odustalo i indikovano je pokušaj RA-e ostijalne LAD sa eventualnom PCI LAD.

Mesec dana nakon akutnog događaja pacijentkinja je ponovno primljena u našu ustanovu radi planirane intervencije. Intervencija je urađena desnim femoralnim pristupom. Glavno stablo je kanulisano kateterom vodičem EBU (eng. Extra Back-Up) 3,5 7F. Radna žica je prošla leziju i plasirana u distalni segment LAD. Preko mikrokatera Corsair Pro radna žica je zamenjena Extra Support Rota žicom. Urađena je rotablacija kalcifikovane lezije ostijuma LAD burrom 1,5mm na 150000 rpm (eng. rotation per minute) sa tri ponavljanja maksimalnog trajanja do 15s. Rota žica zamenjena je radnom žicom. Druga radna žica je pozicionirana u distalni segment RI radi protekcije. Lezija ostijalne LAD je zatim predilatirana ne-komplijantnim balonom 3,0x20mm. Implantirana su dva stenta sa oslobađanjem leka uz preklop od glavnog stabla prema LAD (3,5x22mm, 3,0x30mm) sa proksimalnom optimizacijom stenta u glavnom stablu ne-komplijantnim balonom 5,0x15mm. Dobijen je optimalan angiografski rezultat sa normalnim koronarnim protokom. Pacijentkinja je otpuštena trećeg dana hospitalizacije bez komplikacija.

Slike 1. Angiografski nalaz pre procedure; 2. RA kalcifikovane lezije ostijuma LAD; 3. i 4. Angiografski nalaz posle procedure



#### Diskusija

Za dijagnostiku kalcifikovanih lezija koronarnih arterija može se koristiti nekoliko neinvazivnih i invazivnih metoda: skenerska koronarografija (eng. computed tomography coronary angiography, CTCA), selektivna koronarografija, intravaskularni ultrazvuk (eng. intravascular ultrasound, IVUS) i optička koherentna tomografija (eng. optical coherence

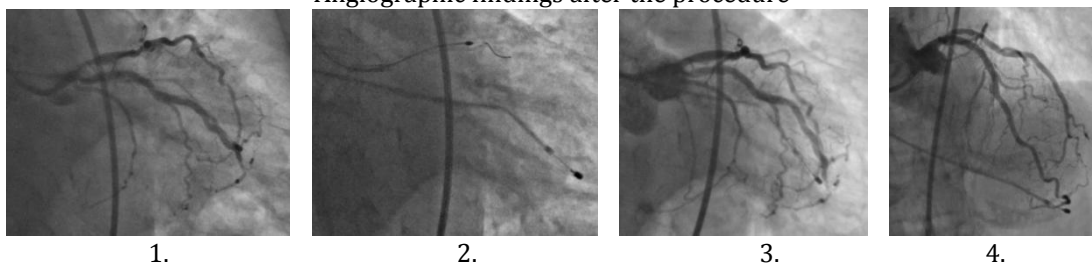
tomography, OCT). Selektivna koronarografija često potcenjuje kalcifikovane lezije, pri čemu ovom metodom nije moguće proceniti dubinu kalcijuma u plaku [6]. Na fluoroskopiji koronarna kalcifikacija je radio-neprovidna, primećuje se pre ubrizgavanja kontrasta, a uglavnom se radi o cirkumferentnoj leziji [7]. IVUS i OCT su dve invazivne metode koje daju bolje podatke o dubini i rasporedu kalcijuma u plaku.

before admission. This was the first manifestation of coronary disease. The patient was previously treated for arterial hypertension and diabetes. Immediately after admission, an emergency selective coronary angiography was performed, which registered an occluded right coronary artery (RCA) with a significant calcified lesion of the LAD, as well as the ostium of the ramus intermedius (RI). In the same act, primary PCI RCA was performed with the implantation of two drug-eluting stents with a flap (2.75x12mm, 2.75x18mm). Echocardiographically, hypokinesia of the basal half of the inferior wall and the inferior septum and the apical third of the anterior septum was registered, with preserved global systolic function. The patient was treated with dual antiplatelet therapy, low-molecular-weight heparin, beta blocker, angiotensin-converting enzyme inhibitor, dihydropyridine calcium channel blocker, statin, and antidiabetic therapy was optimized. The medical documentation was presented to the cardiosurgical council, which indicated surgical revascularization of the myocardium with double aortocoronary bypass (LAD and RI), which the patient refused, and PCI LAD and RI was proposed to her. In the second act, during the same hospitalization, PCI was attempted. Predilatation of the RI ostium was performed with a 2.5x15mm semi-compliant balloon. An attempt to predilate the LAD ostium with a non-compliant balloon 3.5x15mm, as well as with semi-compliant balloons 2.0x15mm and 1.5x10mm was not successful, because the balloons did not pass the calcified lesion. Given

that no dissection was registered in the left coronary system, that the patient had anginal complaints all the time, was hemodynamically and rhythmologically stable, and electrocardiographically without signs of ischemia, further intervention was abandoned and an attempt at RA of the ostial LAD with eventual PCI of the LAD was indicated.

One month after the acute event, the patient was readmitted to our institution for a planned intervention. The intervention was performed through the right femoral approach. The main stem is cannulated with a guide catheter EBU (Eng. Extra Back-Up) 3.5 7F. A working wire was passed through the lesion and placed in the distal segment of the LAD. Via the microcatheter, the Corsair Pro working wire was replaced with an Extra Support Rota wire. A rotablation of the calcified lesion of the ostium was performed with a 1.5mm LAD burr at 150,000 rpm (eng. rotation per minute) with three repetitions of a maximum duration of up to 15s. Rota wire was replaced by working wire. A second working wire is positioned in the distal segment of the RI for protection. The ostial LAD lesion was then predilated with a non-compliant 3.0x20mm balloon. Two flap drug-eluting stents were implanted from the main stem to the LAD (3.5x22mm, 3.0x30mm) with proximal optimization of the stent in the main stem with a non-compliant balloon 5.0x15mm. An optimal angiographic result with normal coronary flow was obtained. The patient was discharged on the third day of hospitalization without complications.

Pictures 1. Angiographic findings before the procedure; 2. RA calcified lesions of the LAD ostium; 3. and 4. Angiographic findings after the procedure



#### Discussion

Several non-invasive and invasive methods can be used to diagnose calcified lesions of the coronary arteries: computed tomography coronary angiography (CTCA), selective coronary angiography, intravascular ultrasound (IVUS) and optical coherence

tomography tomography, OCT). Selective coronary angiography often underestimates calcified lesions, and with this method it is not possible to assess the depth of calcium in the plaque [6]. On fluoroscopy, coronary calcification is radio-opaque, it is observed before contrast injection, and it is mostly a circumferential

Karakteristike lezije koje možemo dobiti pomoću OCT-a, a koje mogu sugerisati da će biti potreban tretman sa RA-om su: maksimalna cirkumferencija kalcifikata  $>180^\circ$ , maksimalna debljina  $>0.5\text{mm}$ , dužina  $>5\text{mm}$  [8]. Indikacija za RA-u može biti i nemogućnost pasaže lezije balonima ili nedovoljna ekspanzija balona prilikom pripremanja lezija za PCI.

Danas postoji nekoliko strategija koje se koriste za modifikaciju kalcifikovanih lezija pre PCI procedure i mogu se podeliti na strategije bez aterektomije i strategije sa aterektomijom. U strategije bez aterektomije ubrajamo modifikacione balone (ne-komplijantne, takozvane scoring, takozvane cutting balone) kao i intravaskularnu litotripsiju. Ove metode tretiraju leziju frakturom, sečenjem ili ciljanom disekcijom. Strategije sa aterektomijom su usmerene na fizičko uklanjanje plaka i obuhvataju RA-u, koronarnu orbitalnu aterektomiju, lasersku koronarnu aterektomiju [9].

RA je endovaskularna procedura tokom koje dolazi do ablacije plaka napredovanj rotirajućeg abrazivnog burra. Ova metoda je prisutna već tri decenije, ali se izuzetno retko koristi u kliničkoj praksi. Prema dostupnim podacima upotreba RA-e u Evropi i SAD je u 1-3% od ukupnog broja PCI procedura [10]. Iako randomizovana ispitivanja, kako sa metalnim [11], tako i sa stentovima sa oslobađanjem leka [12,13], nisu pokazala smanjenu učestalost dugoročnih ishemijskih događaja kod rutinske upotrebe RA-e, upotreba RA-e kod teško kalcifikovanih lezija je povezana sa većim proširenjem dijametra krvnog suda, većim poprečnim presekom lumena i sa manje finalnih rezidualnih stenoza nakon implantacije stenta [14]. 2018. godine su objavljeni rezultati PREPARE-CALC studije koji su pokazali neinferiornost RA-e u odnosu na modifikacione balone u pogledu gubitka lumena u stentu devet meseci nakon PCI sa implantacijom modernih stentova koji oslobađaju lek, kao i superiornost RA-e u pogledu uspešnosti procedure [15].

Glavna indikacija za primenu RA-e jeste modifikacija teško kalcifikovanih koronarnih lezija sa ciljem pripremanja lezije za dalju angioplastiku i implantaciju stenta. Češće se koristi pri ponovnoj intervenciji, ali u retrospektivnim poređenima je pokazano da, ukoliko se RA koristi kao primarna metoda, redukuje se trajanje procedure (prosečna redukcija 19min), vreme fluoroskopije (prosečna

redukcija 18min), kao i upotrebljena zapremina jednog kontrastnog sredstva (prosečna redukcija 70ml) [16]. U apsolutne kontraindikacije za ovu metodu spadaju CTO koja onemogućava pasažu žice, venski graft, akutna tromboza, šok i hipotenzija. Postojanje disekcije koronarne arterije nije apsolutna kontraindikacija. Treba biti oprezan kod teške disfunkcije leve komore, teške koronarne bolesti, bolesti nezaštićenog glavnog stabla, dužina lezije preko 25mm, kao i ugao lezije  $>45^\circ$  [17].

Što se tiče ostijalnih i bifurkacionih lezija one su često zahtevnije za rad, sa mogućim transferom plaka, akutnom okluzijom bočne grane i neoptimalnom apozicijom ili ekspanzijom stenta. U takvim slučajevima intervencije sa modifikacijom kalcifikovanog plaka uz upotrebu RA-e su se pokazale kao uspešnije, bilo da se tretira samo glavna grana ili i glavna i bočna [18,19,20,21].

Prilikom izbora katetera vodiča sistem 6F je adekvatan za veličinu burra 1,75mm i manje. Za veći burr je neophodan kateter vodič od 7F. Transradijalni pristup je povezan sa sličnom stopom uspešnosti kao i transfemoralni pristup [22,23]. Pasaža lezije sa Rota žicom je moguća ali izazovna. Inicijalni prolazak sa radnom žicom koja se potom može zameniti preko mikrokatetera sa Rota žicom je lakši način pasaže same lezije. Ukoliko nije moguće proći leziju sa mikrokateterom onda treba pokušati primarno pasažu lezije sa Rota žicom, a potom u slučaju uspešne pasaže RA-u uraditi sa najmanjim burrom od 1,25mm. Rota žice su dostupne u dve verzije, kao Extra Support i Floppy. Extra Support Rota žica se koristi kod ostijalnih i distalnih lezija radi bolje podrške [24]. Veličina burra za RA-u se određuje prema veličini krvnog suda u kojem se nalazi lezija. Rezultati STRATAS i CARAT studija ukazuju da manji burr (odnos veličina burr : koronarna arterija  $<0,7$ ) omogućava angiografski i proceduralan uspeh ekvivalentan većem burru, a sa manje komplikacija [25,26]. Preporučuje se upotreba burra kod koga je odnos veličine sa veličinom arterije koja se tretira 0,4-0,6 [24]. Pored izbora optimalne veličine, za uspešnu proceduru je potrebna i adekvatna brzina rotacije burra (140000 do 150000 rpm), sa kratkim ablacijama ( $<20\text{s}$ ) i pauzama između ablacija, kao i izbegavanje pada brzine rotacije za više od 5000 rpm. RA se smatra završenom kada poslednji manevar burrom protekne bez otpora. Nakon uspešne RA-e preporučuje se ugradnja

lesion [7]. IVUS and OCT are two invasive methods that provide better data on the depth and distribution of calcium in the plaque. The characteristics of the lesion that we can obtain using OCT, which may suggest that treatment with RA will be needed, are: maximum circumference of the calcification >180°, maximum thickness >0.5mm, length >5mm [8]. An indication for RA can be the impossibility of passage of the lesion with balloons or insufficient expansion of the balloon when preparing the lesion for PCI.

Today, there are several strategies used to modify calcified lesions before the PCI procedure and can be divided into non-atherectomy and atherectomy strategies. Strategies without atherectomy include modification balloons (non-compliant, so-called scoring, so-called cutting balloons) as well as intravascular lithotripsy. These methods treat the lesion by fracture, cutting, or targeted dissection. Atherectomy strategies are aimed at physical plaque removal and include RA, coronary orbital atherectomy, laser coronary atherectomy [9].

RA is an endovascular procedure during which plaque ablation occurs by advancing a rotating abrasive burr. This method has been around for three decades, but is extremely rarely used in clinical practice. According to the available data, the use of RA in Europe and the USA is in 1-3% of the total number of PCI procedures [10]. Although randomized trials with both metal [11] and drug-eluting stents [12,13] did not show a reduced incidence of long-term ischemic events with the routine use of RA, the use of RA in severely calcified lesions is associated with a higher by expanding the diameter of the blood vessel, with a larger cross-section of the lumen and with fewer final residual stenoses after stent implantation [14]. In 2018, the results of the PREPARE-CALC study were published, which showed the non-inferiority of RA compared to modification balloons in terms of in-stent lumen loss nine months after PCI with the implantation of modern drug-eluting stents, as well as the superiority of RA in terms of procedural success [15].

The main indication for the use of RA is the modification of severely calcified coronary lesions with the aim of preparing the lesion for further angioplasty and stent implantation. It is more often used during re-intervention, but

retrospective comparisons have shown that, if RA is used as the primary method, the duration of the procedure is reduced (average reduction 19 min), fluoroscopy time (average reduction 18 min), as well as the volume of iodine contrast medium used (average reduction reduction 70ml) [16]. Absolute contraindications for this method include CTO that prevents wire passage, vein graft, acute thrombosis, shock and hypotension. The presence of coronary artery dissection is not an absolute contraindication. Care should be taken with severe left ventricular dysfunction, severe coronary disease, disease of the unprotected main stem, lesion length over 25mm, and lesion angle >45° [17].

As for ostial and bifurcation lesions, they are often more demanding to work with, with possible plaque transfer, acute side branch occlusion, and suboptimal stent apposition or expansion. In such cases, interventions with the modification of the calcified plaque with the use of RA have been shown to be more successful, whether only the main branch or both the main and side branches are treated [18,19,20,21].

When choosing a guide catheter, the 6F system is adequate for a burr size of 1.75 mm and smaller. A 7F guide catheter is required for a larger burr. The transradial approach is associated with a similar success rate as the transfemoral approach [22,23]. Passage of the lesion with a Rota wire is possible but challenging. An initial passage with a working wire that can then be replaced via a microcatheter with a Rota wire is an easier way to pass the lesion itself. If it is not possible to pass the lesion with a microcatheter, then you should try primarily to pass the lesion with a Rota wire, and then, in case of successful passage, do the RA with the smallest burr of 1.25 mm. Rota wires are available in two versions, Extra Support and Floppy. Extra Support Rota wire is used in ostial and distal lesions for better support [24]. The size of the burr for RA is determined by the size of the blood vessel in which the lesion is located. The results of the STRATAS and CARAT studies indicate that a smaller burr (burr size ratio: coronary artery <0.7) enables angiographic and procedural success equivalent to a larger burr, with fewer complications [25,26]. It is recommended to use a burr in which the ratio of the size to the size of the artery to be treated is 0.4-0.6 [24]. In addition to choosing the optimal size, a successful procedure also requires an adequate

stenta sa oslobađanjem leka. Praćenje 1176 pacijenata tretiranih RA od 2002. do 2013. godine je pokazalo da su pacijenti tretirani implantacijom stentova sa oslobađanjem leka imali >50% niži rizik za veliki neželjeni kardiovaskularni događaj [27].

U našoj ustanovi se uradi oko 20 RA godišnje, sa uspešnošću od 95%. Sve procedure su indikovane nakon prethodno neuspešnih pokušaja PCI. U ovom slučaju RA je urađena nakon neuspešnog pokušaja pasaže najmanjeg balna kroz kalcifikovanu leziju ostijalne LAD. Procedura je izvedena transfemoralnim

pristupom sa upotrebom katetera vodiča od 7F, Extra Support Rota žice, burr-a veličine 1,5mm sa brzinom rotacije 150000 rpm. Po uspešnoj RA implantirani su stentovi sa oslobađanjem leka.

#### ZAKLJUČAK

Pažljivo izvedena rotaciona aterektomija se može uspešno koristiti u tretmanu zahtevnih kalcifikovanih lezija ostijalnih segmenta koronarnih arterija sa visokim stepenom efektivnosti i bezbednosti. Upotreba drugih komplementarnih metoda zajedno sa rotacionom aterektomijom povećava uspešnost procedure.

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rotation speed of the burr (140000 to 150000 rpm), with short ablations (<20s) and pauses between ablations, as well as avoiding a drop in rotation speed for more than 5000 rpm. The RA is considered complete when the last burr maneuver passes without resistance. After successful RA, implantation of a drug-eluting stent is recommended. A follow-up of 1176 patients treated for RA from 2002 to 2013 showed that patients treated with drug-eluting stents had a >50% lower risk of a major adverse cardiovascular event [27].

In our institution, about 20 RAs are performed per year, with a success rate of 95%. All procedures are indicated after previously unsuccessful attempts at PCI. In this case, RA was performed after an unsuccessful attempt to

pass the smallest balloon through the calcified lesion of the ostial LAD. The procedure was performed through a transfemoral approach using a 7F guide catheter, Extra Support Rota wire, a 1.5mm burr with a rotation speed of 150000 rpm. After successful RA, drug-eluting stents were implanted.

#### CONCLUSION

Carefully performed rotational atherectomy can be successfully used in the treatment of demanding calcified lesions of the ostial segments of the coronary arteries with a high degree of effectiveness and safety. The use of other complementary methods together with rotary atherectomy increases the success of the procedure.

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