

Impact of thrombus aspiration conjugative with Anisodamine for the

Prevention of No-reflow phenomenon following primary Percutaneous coronary intervention

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Abstract: Objective: We sought to evaluate the combination therapy of thrombus aspiration plus anisodamine in prevention of No-reflow phenomenon during percutaneous coronary intervention. method: from October 2009 to June, 143 consecutive patients with STEMI who received manual thrombus aspiration were involved in a

Double Center prospectively analysis. The patients were treated with anisodamine (1000 µg/kg) plus Tirofiban (pg/kg) (Group A, n = Tirofiban and pg/kg alone (group B, n = respectively. The drugs were selectively injected into the infarct-related artery (IRA), through the occlusion to the distal segment via the Thrombus Aspiration

Therapy catheter advanced MTO the IRA. Primary endpoints were postprocedural corrected thrombolysis in myocardial frame count (infarction). The proportion of complete >70% ST-segment resolution (STR) myocardial blush Grade 2~3 (MBG) post PCI. Secondary endpoints included peak value of creatine kinase-MB, TIMI flow grade; 6-month outcome including left ventricular ejection fraction (LVEF), as well as cardiac death target vascular revascularization, Re-infarction and their combination as major adverse cardiac events (MACE). result: Baseline characteristics were not different between two groups. Compared to group B, Group A had ① A lower corrected TIMI coronary frame count ($P < 0.02$), ② a higher proportion of complete ST-segment Resolution ($P < 0$).

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③ a better myocardial blush 2-3 grade ratio ($P = 0$), and ④ A lower peak creatine kinase-MB ($P < 0$),

There is no difference in TIMI 3 flow grade between the two groups ($P > 0.05$). No differences were found in

Cardiac Death, re-infarction, MACE, between the two groups during 6-month follow-up. Only a improvement trend in group A ($P < 0.05$). Nevertheless, LVEF at 6 months is higher in group A ($P < 0.01$). Conclusion:

Preventive intracoronary Administration of Anisodamine 1000 µg via thrombus aspiration catheter can improve myocardial reperfusion for acute STEMI with initial TIMI 2 treated with primary PCI.

Keywords: ST elevation myocardial infarction; no-reflow Phenomenon; Primary percutaneous coronary Intervention; thrombus Aspiration; anisodamine

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Direct percutaneous coronary intervention (PCI) is acute ST-elevation myocardial infarction (STEMI) the preferred treatment for an acute coronary syndrome. However, and interventional microcirculation disorders make the

long-term benefits of therapy clear. The occurrence of no recurrence in the For a "" "" is a 0.6%~5%, in direct PCI over 50% patients may not have duplicate flow, even after PCI post-TIMI blood flow 3-level of patients has a phase. When part is not able to achieve complete perfusion of the myocardial level().

the current prevention policy without a stream is not yet determined. Joint thrombus extraction catheter and platelet glycoprotein IIb/IIIa receptor antagonist possible real. Now the best myocardial perfusion. However, infuse-amine research results show, to front wall STEMI patient Row Direct PCI procedure Intra-coronary injection of acyclovir in the with combined thrombus aspiration does not decrease Heart infarct area, Improve clinical results. Anisodamine (ANI) Show beneficial effects in preliminary study of no multiplexing foran). Previous studies have mainly observed the inverse of this treatment strategy for non-complex flow effect, and currently not seen thrombus aspiration catheter combined with Anisodamine Prevent no-streaming reports. This preview, random, Double-blind research aim to evaluate in-pump injection of Anisodamine (1 YG) to STEMI patient directly PCI. The preventive effect of no multiple flow in operation.

1. objects and methods

1.1 objects

2009-10-2012-North China Petroleum Administration General Hospital Heart Department of Medicine and Hebei Medical University Second Hospital Department of Cardiology, onset HINSIDERS directly PCI Acute ST segment Elevation myocardial infarction patients. selection criteria: ① typical chest pain 30 min. above; ② at least 2 continuous electrocardiogram ST section elevation >1 mm and/or heart-front area lead to >2 mm; ③ Basic angiography (TIMI) blood flow <2 level. exclusion standard: ① cardiogenic shock: systolic pressure [mmHg (1 mmHg = 0.133 kPa)] beyond 90 mmHg, or require a vein to make use a step-up drug or an aortic aneurysm to reverse the stroke; ② bleeding tendencies History; ③ in the past 6 major surgery in the week; ④ in the past 6 Stomach intestinal or genitourinary tract haemorrhage ⑤ Cerebral Vascular Events in the year; ⑥ platelet count $100 \times 10^9 / L$; ⑦ kidney function is not fully defined for serum creatinine >2.5 mg/DL; ⑧ Slow hemodialysis renal failure, Pregnancy; ⑨ Recovery after thrombolytic failure PCI; ⑩ exists a divisional or clopidogrel contraindication; ⑪ Cannot provide informed consent book.

1.2 Method

patients who meet the criteria for inclusion adopt a random numeric table method 1:1 randomly divided into two groups. use a thrombus suction catheter (Zeek, Zeon Medical company, Tokyo, Japan) repeated thrombus pumping in the lesion area suction. Suction catheter will be withdrawn after suction is removed, with heparin brine flush after flushing again to the narrow area of the criminal's blood vessel, then the drug, the object is injected into the criminal blood vessel by a thrombotic suction cavity. A Group all Example, first to Mountain Yellow 2X5yG/L Saline Total 5ml Quick Injection, after ROM class ten 拮抗剂 /kg, dissolve in 1ml Saline, on 2 min internal slow thrombus suction catheter push; B Group Example, first give 5ML heparin saline injection, after ROM class Ten Jug/kg, dissolve in 1ml Saline, in 2 min With thrombus suction catheter push. Two groups of patients PCI replace ROM class 0., $100 \mu g \cdot kg^{-1} \cdot min^{-1}$ intravenous drip. data analysis by intentional treatment Analysis. after the drug was injected, the operation was followed by a "" regulation for coronary angioplasty, once there is no multiplexer Any drug other than anisodamine can be used according to experience. Continuous monitoring of ECG during surgery, blood pressure. All patients prior to Operation oral aspirin 100mg, Clopidogrel 75mg. Postoperative all standard treatment for coronary heart disease, includes a aspirin forest, clopidogrel, statin drugs, nitrate ester, β_1 -receptor antagonists agent, angiotensin converting enzyme inhibitor/vasopressin receptor blockers.

1.3 Observation Indicator

Primary Endpoint: ① corrected TIMI Count Frames (CTFC) ② postoperative min ST section full drop rate; ③ myocardial perfusion after Operation color rating 3 The ratio of the level. correction TIMI count frames and myocardium color rating. Blinded by two experienced intervention experts analyze. two level endpoints including CK-MB (Creatine phosphate kinase isoenzyme) peak, 6 monthly follow-up major cardiovascular

events(MACE,Harrowrevascularization,Heart Terrier again,death)and left ventricular ejection fraction(LVEF).

1.4 Statistics Processing

The estimate of the sample content is based on the primary endpoint,to make the two groupsofDirectPCIpostoperativeCTFCThe difference between is aframe,assumes that each groupis set to a standard deviation offrame,Check level5%,Verify effectiveness80%,Each group needs to be randomly assigned at least-patients.theContinuous variable comparison between is usedFcheck,before and after medication,Centerrate comparison using repeated measurement variance analysis,Thecategory variable usesthe χ^2 "and/w/^rcheck.Clinical follow-up data main heart illevent compound endpoint usingkaplan-meiermethod to survive curveparse,Group difference applicationLogrankcheck.useSPSS[]0software for statistics.P <0.is statistically significant for differences Semantic.

2. Results

2.1 Basic Clinical and angiographic features

altogether146patients selected,AGroup1patient with emergency coronary arterybypass surgery,BGroup2cases only arthritic dilatation,72case EntrySelectAGroup,,case selectedBGroup.forClinical and angiographic situations seetable1,The age between two groups,sex,coronary Heart riskfactor and from symptom torevascularization,Rake The blood vessels and between the two groupspreoperativeTIMIlevels of blood flow no statistically significant(table1).

2.2 Surgery related indicators

Both groups of surgeries successfully completed.AGroup afterctfcMingless thanBGroup(23 ± 8 than 28 ± 7 , $P < 0$;AGroup after OperationMBG2~3Thelevel ratio is significantly higher thanBGroup(8%morethan5,Corpse < 0.05 ;Acomplete between the two groups3The drop rate is statisticallydiff(a.8%than5%, $P < 0$;however,two groups of postoperativettimi3level no significant difference(.3%thanA.4%, $[P > 0.05]$ table2).Compare the length and width of the brackets between the two groupsframe diameter and use aspirin when discharged from hospital,, clopidogrel, receptorblockerlag agent,convert enzyme inhibitor,The proportions of stating are not the same.statistically significant.

2.3 Feasibility and security

injectableanisodamine1minsignificantly increases the blood pressure and heart ratePlus($P < 0.$ * * * () * [*] (+)*,to lengthen the hemodynamics of the drug over timewith fade,afteruse5~TenminThe increment in is small(Table3).NeitherGroup has serious bleeding complications,minor bleed inAGroup Send

Live3Example(4.2%andBGroup5Example(7.04%,two groups of lightThere is no statistically significant difference between micro-bleed.

2.4 6monthly follow-up

left ventricular function:left ventricular ejection fractionATheGroup is higher thanBGroup

(60 ± 7 ratio 51 ± 6 , $P < 0$.(Table1;MACE:6Month

Follow-upKaplan-MeierThecurve displays,Athe group and theBfor the groupMACEon directPCIPostoperative2Thebar curve appears to have a separate trend holdingcontinue to after6months(diagram1).AGrouponMACE3example(417%,Bgroup occursMACE5example(7.04%,Althoughreduced values close to5 0,but there wasno statistically significant difference between the two groups($P > 0$,cardiac death,Re-myocardial infarction and Harrow-vascular weightbuildAThe group is1.39% (1/72),1.39%(1/72)and1.39% (1/72),BGroup to2.82% (2/71),1.41%(1/71)and2.82% (2/71),Comparison between two groups no statisticsmeaning($P > 0$)Chart1).

3. Discussion

The results of this study show: ① after blood clot aspiration suction cavity injection of drugs to lesion distal vessel is safe and good tolerance to prescription method. ② thrombus suction catheter Union Mountain yellow scopamine can improve myocardial perfusion after operation, reduce infarct size, increase PCI post-operation 6 month left ventricular systolic function, MACE thing. The item incidence shows a downward trend.

There is no compelling evidence of evidence-based medicine to support the use of blood tube expansion drug prevention. No relapse, clinically applied drugs, such as glycosides, sodium nitroprusside. The reason for your poor performance may be: ① microcirculation disorder that worsens after no recurrence^[6], ② true cut mechanism not yet clear. Multiple factors participate in a no-stream-free send birth procedure, include platelet aggregation, remote thromboembolism, microcirculatory spasm, neutrophil padding, ischemia-reperfusion injury(), and without the drug mechanism single_, cannot resolve all pathophysiology questions. Best prevention strategy should be able to prevent or reduce blood vessel recanalization after the "microcirculation disorder". Currently recognized effective precautions, including blood plug suction and platelet glycoprotein IIb/IIIa receptor antagonists, but in direct PCI using coronary artery injection of acyclovir in combination with thrombus suction catheter, does not reduce infarct size. Improving clinical results⁴. This may be because the distal thromboembolism is only a part of the stream without a relapse reason.

The anisodamine is a cholinergic receptor antagonist, has improved effect of microcirculation. Previous studies confirmed that the effect of anisodamine is clear. Show improved no multiplexing, accordingly, we speculate that the coronary injection of anisodamine may produce better prevention of no multiplexing. vs. Previous research, this study has the following characteristics: first, over previous, injection of anisodamine in the event of no recurrence, and the present study was given to prevent no recurrence when no recurrence was taken, preventing the occurrence of multiple streams. second, in previous research, anisodamine main If you inject the coronary artery by means of a guide tube, drugs may be primary. The is distributed to the aorta root and the non infarct related vessels. This study after a thrombus suction catheter is used to suck the thrombus, direct the anisodamine inject to reach the distal end of the occlusion rake lesion, to ensure high consistency, degree of anisodamine enters lesion distal coronary artery. Such a small dose local effect may be equal to or greater than non-selective. To give greater doses. A good clinical outcome of this study is likely to be since anisodamine can change the pathophysiology of no-reflux.

Previous studies on the treatment of no-reflux doses of anisodamine in Zhongshan are still inconclusive, in animal model study from ~5 years report. These studies, final cumulative dose of anisodamine is a pre-operation, but is based on coronary blood flow after medication and myocardial perfusion ratings to determine, before. Small sample, self to reverse STEMI patient line direct PCI. No multiplexed research causes fixed dose 1g. The anisodamine displays the results of the contrast, ctf and MBG significantly improved(). This study uses a fixed dose of anisodamine, instead of weighing the dose based on weight is simpler and easy. The advantage of using local distal injection is that you can accurately inject the drug without taking a with near-end blood flow. More important. Yes. This study shows that injectable anisodamine can moderately increase blood pressure and heart rate, increase coronary artery perfusion pressure ultimately improve myocardial water plain perfusion.

Inject anisodamine with a thrombus suction catheter, can not only change goodness TIMI blood rating, and can improve. The indicator of the function that reflects the coronary artery micro-blood cycle, such as correcting TIMI count. The number of frames (ctf) and myocardium color perfusion grading (MBG). Acute myocardial infarction dead patients PCI postoperative MBG and CTFC, have been proven with ST section drop. The myocardial infarct size estimated by the peak method, myocardial sound no-reperfusion defined by contrast surgery, left ventricular function and long term fatality rate related(°). This research shows A group after operation MBG, and ctf significantly better than B group.

The limitations of this study include: ① This study shows A group is significantly low CK-MB peak, reflect myocardial perfusion MBG, ctf, and ST paragraph drop trend show better, hints for saving more myocardium, may improve

clinical outcomes. results show A Group on PCI 6 Month MACE only shows an improvement trend but no has statistical significance, may be due to insufficient sample size for validation MACE lack sufficient statistical strength, requires a larger sample. Predictive of the amount of, Random study. ② does not use a cardiac MRI to show like or myocardial Contrast-Direct, Quantitative indicators for evaluating myocardium microcirculation perfusion.

Summary, This study is the first to use a thrombus suction catheter combined with a mountain scopolamine Prevention Direct PCI no multiplexing in operation. This early step research results show, Direct PCI intraoperative thrombus suction catheter in operation fire 1000 jug Shanliang is an effective prevention of no multiplexing, security Policy slightly.

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Table 2 two groups of Apache II rating and iCa Horizontal comparison

Constituencies	Number of cases	APACHE II rating/divide	iCa/(mmol L ⁻¹)
Surviving group	41	15.6±9.7	1.08±0
Death Group	14	23.4±5.2 ¹⁾	1.01±0.06 ¹⁾

compared to live groups, Dpco..

Increase in calcium chelate, is one of the causes of blood calcium decline⁽²⁾. infection level related to decreased blood free calciumⁿ³⁾.

According to the Literature report, ICU Patient, Low serum calcium incidence 15%~88%^{n-α}, This study is, 5, show ICU Patient Low Normal for calcium deficiency. iCa level as clinical monitoring for critically ill patients Important reference indicator for critical patients with low blood calcium prognosis bad, Tip in the treatment of critically ill patients, should be highly value, actively and reasonably correct hydro-electrolyte, acid-base balance disorder, Maintaining internal environmental stability should be a key factor for successful treatment.

To summarize, early on APACHE II rating vs. iCa level evaluation, to ICU Patient survival prognosis and treatment are important meaning.

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