

血栓抽吸在急性 ST 段抬高型心肌梗死中的研究进展

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【摘要】 冠状动脉粥样硬化斑块破裂及其所导致的血栓形成是急性 ST 段抬高型心肌梗死的病理生理学基础, 及时有效的再灌注治疗是治疗的关键。经皮冠状动脉介入术是开通闭塞血管、改善患者预后的重要治疗手段, 然而仍有 1/3 的患者在植入支架后心肌未得到有效的灌注, 目前较公认的观点是血栓和斑块脱落引起微循环栓塞而导致无复流现象的发生, 无复流的发生与患者的不良预后相关, 增加心源性死亡、心力衰竭、恶性心律失常、住院期间死亡的发生率。血栓抽吸能够减少无复流的发生, 但是对于患者临床预后的影响仍存在争议。现主要对血栓抽吸在急性 ST 段抬高型心肌梗死中的应用现状及进展进行综述。

【关键词】 血栓; 血栓抽吸; 心肌再灌注; 心肌梗死; 无复流

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Thrombus Aspiration in the Treatment of Acute ST-segment Elevation Myocardial Infarction

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【Abstract】 ST-segment elevation myocardial infarction is characterized by plaque rupture and occlusion of the infarct artery with thrombus. Reperfusion of myocardial tissue is the main goal of primary percutaneous coronary intervention (PPCI) with stent implantation in the treatment of acute ST-segment elevation myocardial infarction. Although PPCI has contributed to a dramatic reduction in cardiovascular mortality, normal myocardial perfusion is not restored in approximately one-third of these patients. Several mechanisms may contribute to myocardial reperfusion failure, in particular distal embolization of the thrombus and plaque fragments failure. No-reflow is associated with poor prognosis in patients with increased cardiac death, heart failure, malignant arrhythmia death during hospitalization. Aspiration thrombectomy during PPCI has been proposed to prevent embolization in order to improve these outcomes. Even though numerous international studies have been conducted, there are conflicting results on the clinical impact of aspiration thrombectomy during PPCI. In particular, the data on long-term clinical outcomes are still inconsistent. In this review, we have carefully analyzed literature data on thrombectomy during PPCI, taking into account the most recent studies.

【Key words】 Thrombus; Thrombectomy; Myocardial reperfusion; Myocardial infarction; No-reflow

1 冠状动脉内血栓性质及其与预后的关系

冠状动脉粥样硬化斑块破裂及其所导致的血栓形成是急性心肌梗死的主要病理生理学基础^[1]。冠状动脉内血栓的成分主要包括纤维蛋白、血小板、红细胞、白细胞、胆固醇结晶等成分。血栓的成分与缺血的时间相关, 随着缺血时间的延长, 血栓中的纤维蛋白成分增加, 而血小板的成分减少^[2]。不同部位产

生的血栓的主要成分不同, 左前降支内血栓含血小板成分多, 而右冠状动脉内血栓的红细胞所占的比例高^[3]。血栓的性质与远端栓塞、心肌灌注、左心功能、远期病死率相关。富含红细胞成分的血栓是远端栓塞的独立预测指标^[4], 血栓中中性粒细胞比例高的患者心肌灌注差、心功能差^[5]。而高血栓负荷、陈旧性血栓均是不良预后的独立预测指标^[6-7]。理论上, 在

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急诊经皮冠状动脉介入术(PCI)过程中应用血栓抽吸装置对冠状动脉内血栓进行抽吸,应该能够改善患者的临床预后。

2 血栓负荷的评价

血栓负荷根据心肌梗死溶栓试验(thrombolysis in myocardial infarction, TIMI)血栓分级可以分为 5 级^[8]:0 级,无血栓;1 级,管腔显影模糊;2 级,血栓长度为血管直径的 1/2;3 级,血栓长度为血管直径 1/2~2 倍;4 级,血栓长度>2 倍血管直径;5 级,病变完全闭塞。上述分级存在缺陷,对于完全闭塞的病变,如果本身狭窄严重,血栓负荷不一定是最重的,因而对于完全闭塞的病变,有人将导丝通过后、球囊未扩张前再次造影评价血栓负荷^[9]。

3 血栓抽吸装置及其作用原理

目前临床上常用的血栓抽吸装置可以分为手动抽吸装置和机械抽吸装置,不同的血栓抽吸装置各有优缺点。手动抽吸装置是利用注射器手动抽吸产生负压从而将冠状动脉内的血栓抽出,如 DIVER、EXPORT 抽吸导管,人工抽吸装置价格便宜、操作简单、相对安全,同样也适用于老年患者^[10],但是存在抽吸力度小、抽吸效率不高的缺点^[11]。常用的机械抽吸装置有 X-Sizer 和 AngioJet。X-Sizer 利用导管远端的螺旋形切割刀片将血栓切碎后真空抽吸将血栓移出体外^[12],X-Sizer 存在冠状动脉穿孔的风险。AngioJet 血栓装置则是利用导管尖端喷射的生理盐水将血栓击碎利用流变学原理将血栓移出。机械血栓抽吸导管较人工血栓抽吸导管在清除血栓方面更加彻底^[13],但是价格更贵。

4 人工血栓抽吸的应用及最新进展

多项研究表明在急性心肌梗死介入治疗中应用人工血栓抽吸装置能够提高 ST 段的回落率,改善心肌灌注水平^[14-16]。早期的临床研究和荟萃分析提示常规血栓抽吸能够改善患者的生存率^[17-19]。2008 年的 TAPAS 研究将 1 071 例急性 ST 段抬高型心肌梗死(STEMI)患者随机分为血栓抽吸组+PCI 组和常规 PCI 组。随访 30 d 血栓抽吸组病死率降低,随访 1 年心源性死亡及非致命性心肌梗死发生率血栓抽吸组均低于常规 PCI 组,该研究提示常规的血栓抽吸能够改善患者的远期预后^[18]。来自 Noman 等^[17]的研究支持血栓抽吸能够降低患者的病死率,但是当以缺血 180 min 作为亚组分析时发现,血栓抽吸仅能使缺血时间<180 min 的患者获益。

随后开展的大量以病死率为临床终点的研究均未得出阳性结果^[20-22]。2013 年的 TASTE 研究纳入

7 244 例 STEMI 患者,随机分为血栓抽吸联合 PCI 组与单纯 PCI 组。随访 30 d 血栓抽吸组全因死亡率为 2.8%,单纯 PCI 组为 3.0%,两组全因死亡率无统计学差异^[23]。随访 1 年的结果也提示常规血栓抽吸并未减少全因死亡率、再发心肌梗死、支架内血栓的发生率^[21]。TOTAL 研究纳入 10 732 例 STEMI 患者,180 d 的结果显示常规的血栓抽吸并未减少心源性死亡、支架内血栓、靶血管再次重建的发生,相反血栓抽吸组脑卒中的发生率高于未抽吸组^[24]。最近公布随访 1 年的结果也提示常规血栓抽吸并未改善患者的长期预后并有可能增加脑卒中的风险^[25]。

5 机械血栓抽吸导管在临床的应用

机械血栓抽吸导管的抽吸效率高^[26],早期的研究提示机械血栓抽吸增加患者的病死率^[27],但在高血栓负荷的患者中能够减少再发心肌梗死和脑卒中的发生^[28]。2004 年纳入 100 例患者的随机对照研究中应用 AngioJet 装置进行抽吸,结果提示机械血栓抽吸组的 ST 段回落、TIMI 帧数、心肌灌注显像、心肌梗死面积均优于未抽吸组^[29]。两项大型的研究评价机械血栓抽吸在急性心肌梗死介入治疗中的应用得出的结果不一致。AIMI 研究中纳入 480 例患者,应用第一代 AngioJet 血栓抽吸导管,显示使用机械血栓抽吸组心肌梗死的面积增加,主要不良心血管事件(major adverse cardiovascular events, MACE)的发生率更高^[30]。而 JETSTENT 研究中纳入 501 例高血栓负荷(血栓积分≥3)的患者,结果显示机械血栓抽吸组 ST 段回落率更高,MACE 事件发生率^[31]。目前尚缺乏大型的研究进一步评价机械血栓抽吸导管在急性心肌梗死介入治疗中的应用。

6 血栓抽吸联合药物治疗

药物联合血栓抽吸能够改善心肌的灌注。INFUSE-AMI 研究中,入选 2009 年 11 月~2011 年 12 月间来源于 6 个国家 37 个中心的 345 例 STEMI 患者,入选标准为发病时间在 4 h 内且病变部位在前降支近段或中段的患者。将患者随机分为血栓抽吸+阿昔单抗组、血栓抽吸组、阿昔单抗组和对对照组共 4 个组。利用心脏磁共振成像测量 30 d 后的左室质量百分比。结果提示血栓抽吸联合冠状动脉内应用阿昔单抗能够减少心肌梗死面积^[32]。然而随访 1 年的结果提示血栓抽吸联合冠状动脉内应用阿昔单抗能够显著减少心力衰竭的发生,但是对患者的病死率无影响^[33]。同样,REOPEN-AMI 研究评价血栓抽吸后冠状动脉内注射腺苷或硝普钠对微循环的影响,该研究共纳入 240 例 TIMI 血流在 0/1 级的患者,随机分为 3 个组,分别于血栓抽吸后冠状动脉内注射腺苷、硝普钠、生理盐水。结

果显示血栓抽吸后冠状动脉内注射大量腺苷可以显著改善微循环,但是对 MACE 事件无影响^[34]。

基于 TASTE 研究的结果及既往的试验研究结果,2014 年欧洲血运重建指南将血栓抽吸在急性心肌梗死介入治疗中的使用作为 II b A 类推荐,不推荐在急性心肌梗死介入治疗中常规使用血栓抽吸装置^[35]。临床中对血栓负荷较重的进行血栓抽吸,而非常规应用。在临床中对于究竟何种人群使用血栓抽吸、何时抽吸、选择何种血栓抽吸导管等值得进一步研究。

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压力导丝在慢性完全闭塞病变介入治疗中的临床应用价值

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【摘要】压力导丝在冠状动脉内测定的血流储备分数(fractional flow reserve, FFR)能客观准确评价心肌缺血与冠状动脉病变的关系,已是目前导管室评价冠状动脉病变是否引起心肌缺血的“金标准”。FFR被公认为评价冠状动脉生理功能的指标。FFR已在冠状动脉单支血管孤立病变、多支血管病变、弥漫性病变、分叉病变、左主干病变、稳定性缺血性心脏病患者及急性冠状动脉综合征患者中得到了广泛应用,且被多个随机对照研究证实。基于FFR做出的冠状动脉介入治疗策略更安全、经济,更能改善患者的症状和预后。目前,国内尚无FFR在慢性完全闭塞病变介入治疗中的应用价值的相关研究;国外仅有关于FFR在慢性完全闭塞病变中应用的个别报道和小样本的观察研究;国内外尚无大规模、大样本的临床研究,现就FFR在慢性完全闭塞病变介入治疗中的应用价值做一探索和研究。

【关键词】压力导丝;慢性完全闭塞病变;血流储备分数;侧支循环

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Clinical Application of Pressure Wire in Chronic Total Occlusion Intervention

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【Abstract】Fractional flow reserve (FFR) can be measured in coronary by pressure wire. FFR can evaluate the relationship between myocardial ischemia and coronary lesions objectively. FFR is regarded as “the gold standard” of myocardial ischemia. FFR is recognized as physiological index of myocardial ischemia. FFR has been widely used in coronary isolated lesions, multiple lesions diffuse lesion, bifurcation lesions, left main lesions, stable coronary artery disease and acute coronary syndromes, which had been confirmed by multiple random controlled studies. The strategies of intervention based on FFR were safer and more economic, which also can improve the symptoms of patients. At present, we have not study the clinical application value of pressure wire in chronic total occlusion intervention in domestic center.

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