

· 临床研究 ·

冠状动脉严重钙化病变旋磨术后植入药物洗脱长支架的长期临床疗效观察

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【摘要】目的 探讨冠状动脉(简称“冠脉”)旋磨术联合药物洗脱长支架用于治疗严重冠脉钙化病变的安全性及有效性。**方法** 入选2010年1月至12月因严重冠脉钙化而行冠脉旋磨术联合药物洗脱长支架植入治疗的患者。观察患者的手术成功率, 围术期并发症及术后主要心血管事件(包括心源性死亡、心肌梗死、靶病变血运重建)的发生率。**结果** 共21例严重冠脉钙化病变患者接受了冠脉旋磨术联合药物洗脱长支架植入治疗, 年龄(65.2 ± 6.9)岁。合并高血压病16例(76.2%), 糖尿病7例(33.3%), 肾功能不全1例(4.8%)。旋磨部位共植入35枚国产药物支架(1.75枚/部位), 最短支架长度为28mm, 病变部位平均支架总长度为48($29 \sim 66$)mm, 仅1例因旋磨头未能通过病变而放弃, 手术成功率为95.2%(20/21)。术中1例出现冠脉痉挛, 1例出现胸痛伴心率减慢; 术后1例出现消化道出血。住院期间无心血管事件发生, 平均随访26个月, 仅1例(4.8%)患者于术后第2个月发生急性心肌梗死, 余患者病情稳定。**结论** 冠脉旋磨术联合药物洗脱长支架植入术治疗严重冠脉钙化病变可取得很高的手术成功率, 是治疗钙化病变安全、有效的方法。

【关键词】 冠状动脉疾病; 药物洗脱支架; 冠状动脉旋磨术; 钙化病变

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Rotational atherectomy followed by long drug-eluting stent implantation for severe coronary artery calcified lesions: a long-term clinical observation

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【Abstract】Objective To assess the safety and efficiency of long-term outcome after rotational atherectomy (RA) followed by long drug-eluting stent (DES) implantation in severe calcified coronary lesions. **Methods** Patients with severe calcified coronary lesions treated with RA followed by long DES in our department between January and December 2010 were enrolled. Their procedural success rate, preoperative complications, and postoperative major adverse cardiovascular events (MACE, including cardiac death, myocardial infarction and target lesion revascularization) were recorded and analyzed. All patients were available for our long-term follow-up. **Results** Twenty-one patients with complex calcified coronary lesions were treated with RA followed by long DES, with age of (65.2 ± 6.9)years. There were 16 patients (76.2%) having hypertension, 7 (33.3%) having diabetes mellitus and 1 (4.8%) having chronic renal failure. There were totally 35 stents implanted in 20 calcified coronary lesions (1.75 per lesion). One patient did not finish the operation due to the drill head could not go through the lesion. The overall procedure success rate was 95.2% (20/21). The shortest length of the implanted stent was 28 mm, and the average length of total stent /lesions was 48 mm (ranging from 29 to 66 mm). The preoperative complications included 1 case of coronary spasm, and 1 case of chest pain with decreased heart rate, and the postoperative complication only had 1 case of gastrointestinal bleeding. There was no patient having the incidence of in-hospital MACE. During a median follow-up period of 26 months (ranging 20 to 31 months), only 1 patient (4.8%) had acute myocardial infarction at 1 month after operation, and the other were in stable sound condition. **Conclusion** RA followed by long DES implantation appears to be feasible and effective in treatment of complex calcified coronary lesions, with a high rate of procedural success and low incidence of MACE in a long-term period.

【Key words】 coronary artery disease; drug-eluting stents; coronary rotational atherectomy; calcification lesions

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冠状动脉(简称“冠脉”)旋磨术(rotational atherectomy, RA)是冠脉介入治疗中十分有效的去除斑块技术之一,但由于支架植入无论在短期效果还是在长期再狭窄方面都具有明显的优势,RA等去斑块技术曾经有一段时间被忽视,少到只占冠脉介入治疗的1%^[1,2]。不过对于冠脉内钙化病变,特别是严重性冠脉钙化病变,支架植入手术成功率低,并发症发生率高^[3],是经皮冠脉介入治疗(percutaneous coronary intervention, PCI)的难题。RA联合冠脉内长支架植入术治疗冠脉严重、复杂钙化病变疗效如何,相关研究文献不多。本研究旨在观察和分析对严重钙化病变采用RA联合冠脉内长支架植入治疗的短期和长期效果。

1 对象与方法

1.1 研究对象

入选2010年1月至12月在武汉亚洲心脏病医院住院的严重冠脉钙化、有心肌缺血症状的冠心病患者(符合世界卫生组织临床命名标准化联合专题组报告《缺血性心脏病的命名及诊断标准》)。严重钙化定义为在心脏搏动和停搏时均可清楚看到冠脉狭窄部位沿冠脉管壁走行一致的钙化影^[4,5]。排除既往冠脉搭桥、冠脉支架植入史和严重肝肾功能不全患者。所有患者均签署知情同意书,该研究也获得了武汉亚洲心脏病医院伦理委员会的同意。

1.2 研究方法

1.2.1 冠脉造影及药物用法 术前口服负荷量氯吡格雷300mg、阿司匹林肠溶片300mg,术中注射普通肝素100U/kg。用Judkins法行选择性冠脉造影。在注射造影剂之前动态观察有高密度条状钙化影存在,并且与血管走行一致,直径减少 $\geq 70\%$ 为冠脉介入治疗标准。术后继续给予口服阿司匹林肠溶片100mg/d及氯吡格雷75mg/d等冠心病二级预防用药。

1.2.2 RA方法 选用7F或8F导引导管。应用旋磨导引钢丝。对于该导丝通过病变困难的患者可使用其他指引导丝先行通过,再转换为旋磨导引钢丝。旋磨装置选用1.25~2.0mm旋磨头。术中采用高压注射0.9%氯化钠溶液润滑和冷却旋磨系统,间断性地向冠脉内注射硝酸甘油以防冠脉痉挛。术中旋磨转速为150 000~180 000r/min,在病变部位前后(推送和回撤)移动,每次旋磨时间应控制在30s内。先用直径较小的磨头,再更换较大的磨头,防止转速突然下降超过5000r/min,旋磨成功后视情况行球囊扩张术,然后植入药物洗脱支架。手术成功标准:术后

残余狭窄 $< 30\%$,TIMI血流分级为3级。无死亡、急性心肌梗死、急诊冠脉旁路移植术(coronary artery bypass grafting, CABG)等并发症。

1.2.3 术后随访 随访方式为门诊随访或电话随访,所有患者术后1, 3, 6, 12, 24, 36个月各随访1次,询问有无心绞痛发作,记录主要心血管事件(包括心源性死亡、心肌梗死、靶病变血运重建)发生情况,并复查心电图及心脏超声心动图。

2 结果

2.1 一般资料

共入选21例患者,男性11例,女性10例,年龄(65.2 ± 6.9)岁。合并高血压病16例(76.2%),糖尿病7例(33.3%),肾功能不全1例(4.8%),陈旧性脑梗死4例(19.0%),吸烟10例(47.6%),高脂血症8例(38.1%),其中同时合并高血压病、糖尿病和陈旧性脑梗死2例(9.5%)。稳定型心绞痛2例(9.5%),急性心肌梗死4例(19.0%),不稳定型心绞痛15例(71.4%)。

2.2 靶血管特征与介入情况

21例行RA治疗的患者中,17例(81.0%)为三支病变,其余4例(19.0%)为双支病变。靶血管病变均为前降支C型钙化病变(4例为急性前降支闭塞病变),血管狭窄程度 $\geq 90\%$ 的患者共13例(61.9%),包括1例慢性完全闭塞患者。除1例因旋磨头不能通过病变而放弃手术外,其余20例(95.2%)患者均成功完成RA。该20例患者行旋磨术后再行冠脉腔内成形术(percutaneous transluminal coronary angioplasty, PTCA),均成功植入药物洗脱支架。旋磨部位共植入药物洗脱支架35枚(1.75枚/部位),单一支架长度为28~36mm,另于非旋磨血管植入药物洗脱支架12枚。旋磨头大小为1.25~2.0mm,旋磨后行PTCA,球囊扩张压力为(12.2 ± 2.8) atm,旋磨部位植入支架的总长度(旋磨部位植入单一支架的长度或两个及两个以上相连支架长度之和)为29~66(48.3 ± 12.7) mm。术中发生冠脉痉挛1例(4.8%),经冠脉内注射硝酸甘油后缓解;1例(4.8%)行旋磨术时出现明显胸痛,伴一过性心率下降,经静脉注射吗啡3mg、阿托品0.5mg后缓解;1例患者于术后第2天出现消化道出血,停用低分子肝素钙及阿司匹林肠溶片,氯吡格雷加量为150mg/d,予以抑酸、护胃治疗后好转。无围术期冠脉穿孔、急性心肌梗死、急诊CABG及死亡病例。

2.3 随访结果

所有患者进行了(26.8 ± 4.4)个月的随访,最短随访时间为20个月,最长为32个月。1例患者因术后第2天出现消化道出血,遂停药阿司匹林肠溶片,出院后服用的抗血小板药物仅为氯吡格雷(150mg/d),术后2个月发生了急性前壁心肌梗死,保守治疗后病情稳定;1例于术后1年出现小面积脑出血,治疗后无后遗症;余患者于随访期间病情稳定,无急诊及住院事件发生。

3 讨论

ERBAC研究显示旋磨术比球囊成型术具有更高的短期成功率,但主要缺血并发症和治疗后6个月的再次血管重建率较高^[6]。同时出于安全考虑,许多心血管介入专家不建议使用RA技术。这使得RA只占冠脉介入治疗的1%~3%^[1,2]。随着药物洗脱支架的应用,虽然药物洗脱支架植入较球囊扩张无论在短期效果还是在长期再狭窄方面都具有明显的优势,但是医生们发现,对于高度钙化的冠脉病变,不仅球囊/支架输送、扩张困难,而且支架血栓和再狭窄的发生几率亦升高;支架不能充分扩张,导致亚急性血栓发生率增高^[7];采用高压球囊扩张时还容易发生夹层和血管壁破裂^[3]。RA可使严重钙化斑块碎裂,使斑块结构得到改良,支架植入术前采用RA技术可以提高支架植入成功率。近年来RA重新被人们所重视。

严重钙化病变使支架不能完全覆盖血管内膜,在支架与内膜之间留有缝隙,易造成血栓形成和再狭窄,增高扩张压力则可能增加血管夹层的发生率,甚至导致血管破裂^[3]。另外,如果球囊预扩张不完全,易造成支架卡在钙化的缝隙内,造成支架脱落、变形、损伤。RA可通过去除弹性差的钙化和纤维斑块成分,增大血管内腔,改善血管壁顺应性,提高支架通过成功率,并且在无明显损伤管壁的情况下增加支架植入后的最小腔内径,降低再狭窄和支架血栓的风险。文献显示,在球囊无法通过或扩张的严重钙化病变中,RA的成功率为89%~98%。朱国英等^[8]对79例患者的86处病变行旋磨加球囊扩张术,手术成功率为96.2%。新近的报道显示^[9-12],旋磨术总成功率为96.7%~98.0%。本组报道旋磨成功率为95.2%,与文献报道类似。

冠脉长病变是指病变长度 $\geq 20\text{mm}$ 的冠脉病变,长度 $> 20\text{mm}$ 的支架为长支架。Kobayashi等对725例冠脉弥漫病变患者支架置入后随访1年发现,20~35mm支架和 $> 35\text{mm}$ 支架的再狭窄率分别为34.6%、

47.2%($P < 0.01$),多因素方差分析显示支架段越长,再狭窄率越高^[13]。国内文献报道,平均冠脉病变长度为(39.1 ± 6.7)mm植入支架后6~10个月造影随访显示再狭窄率为26.9%^[14]。文献报道,研究者对采用单个长支架或多个支架相邻接覆盖整个病变的方法治疗的患者进行了为期1年的观察,结果发现两者间无论总再狭窄率还是心血管事件发生率均无明显差异^[15]。

关于RA联合药物洗脱支架治疗冠脉钙化病变的国内外文献不少,但国内文献未报道植入支架的长度,最新国外文献报道的RA联合药物洗脱支架治疗冠脉钙化病变的支架长度为32mm^[1]。SPORT研究^[16]显示RA联合支架植入的成功率均高于球囊扩张联合支架植入(93.4%和88%, $P = 0.01$),但住院期间主要心脏不良事件发生率、6个月造影支架再狭窄率和靶血管血运重建率没有显著差别。最新报道,高度钙化病变联合RA和紫杉醇药物涂层支架,1年无心脏事件和无靶血管血运重建事件生存率达94%^[17]。文献报道,RA联合支架植入治疗严重钙化病变,经长期随访,其靶病变重建率为6.2%~10.6%^[1,17,18]。本组病例均为严重钙化病变,病变弥漫,植入最短的支架也达28mm,旋磨部位植入支架的总长度(48.3 ± 12.7)mm,手术成功率为98%。在平均26个月的长期随访过程中,除1例患者在术后第2个月出现急性心肌梗死事件(可能与该患者术后出现消化道出血而减弱了抗血小板药物的应用有关),余19例患者(95%)病情平稳,无心血管事件(包括心源性死亡、心肌梗死、靶病变血运重建)发生。这可能与技术的改进和我们采用最新的手术器材有关,也可能与选择了合适的旋磨头有关。最新文献^[11]报道,当旋磨头与病变血管比例为0.5~0.7,术中收缩压维持在100mmHg(1mmHg = 0.133kPa)以上时,能明显降低术中并发症及心血管事件。本组病例所选用的旋磨头为1.25~2.0mm。由于选用的旋磨头相对较小,并采用缓慢间断推进旋磨头,反复给予冠脉内硝酸甘油、地尔硫革等方法,内膜撕裂、无血流及缓慢血流等并发症发生率均较低。

总之,我们认为对于严重复杂钙化病变,有经验的术者采用RA联合药物洗脱长支架植入的治疗策略,其手术成功率高,并发症发生率低,长期随访心血管事件发生率低,是安全、有效的治疗手段。

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