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高龄冠状动脉 CTO 患者 PCI 治疗的可行性及安全性*

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摘要 目的:探讨高龄冠状动脉慢性闭塞性病变(CTO)患者经皮冠状动脉介入治疗(PCI)的可行性和安全性。**方法:**连续入选 2007 年 07 月至 2012 年 07 月南京市第一医院年龄 ≥ 80 岁,因冠状动脉 CTO 病变行 PCI 治疗的患者,回顾性分析和比较患者的基线特征、病变特征、手术经过和手术相关并发症。**结果:**共有 69 例高龄 CTO 患者,平均年龄为 82.17 ± 2.70 岁,男性 57 例(82.6%)。14 例患者同时存在 2 支 CTO 病变血管,21 例患者闭塞近端钙化,24 例患者闭塞近端迂曲,5 例患者为原支架内闭塞。30 例经桡动脉途径行 PCI 治疗。51 例患者手术成功,手术成功率为 73.91%。有 7 例患者发生冠脉穿孔,其中 1 例出现心脏压塞并院内死亡。**结论:**即使通过适当选择患者,80 岁以上高龄患者 PCI 治疗冠状动脉 CTO 病变的手术成功率可以接受,但手术风险较高,需在有经验的心导管中心谨慎开展。

关键词:经皮冠状动脉介入治疗;慢性闭塞性病变;高龄患者

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Feasibility and Safety of PCI of CTO Lesions in Elderly Patients*

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ABSTRACT Objective: To investigate the feasibility and safety of the percutaneous coronary intervention (PCI) of chronic total occlusion lesion (CTO) in elderly patients. **Methods:** From July 2007 to July 2012, elderly patients (≥ 80 years old) required PCI because of CTO in Nanjing First Hospital were enrolled in this study. The baseline characteristics, angiographic results, interventional procedures as well as procedural complications were retrospectively analyzed. **Results:** Totally, 69 elderly patients with CTO lesions were enrolled with mean age of 82.17 ± 2.70 years. Among them, 57 patients (82.6%) were males. 14 patients had two concurrent CTO vessels. Severe calcification in 21 patients and vessel tortuosity in 24 patients were found proximal to occlusion. In-stent occlusion was found in 5 patients. Cardiac catheterization was accessed in 30 patients through the transradial arteries. Procedural success was achieved in 51 cases (73.91%). Coronary perforation occurred in 7 cases and 1 case died of cardiac tamponade in hospital. **Conclusion:** Although procedural success rate of PCI in elderly CTO patients was acceptable after patient selection, the risk remains high and cautions should be taken to this elderly cohort even in experienced catheterization centers.

Key words: Percutaneous coronary intervention; Chronic total occlusion lesion; Elderly patients

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前言

冠心病是老年性疾病,但高龄患者在冠心病治疗中的代表性并不强^[1]。目前仅有少数注册研究比较了年龄 >70 岁患者的经皮冠状动脉介入治疗(percutaneous coronary intervention, PCI)和冠状动脉搭桥术(coronary artery bypass grafting, CABG)获益及风险^[2-6],仅一个研究是在 80~89 岁患者(Octogenarian)中进行的^[7]。心胸外科协会(the Society of Thoracic Surgeons, STS)积分和欧洲心脏手术风险分析评分(the European System for Cardiac Operative Risk Evaluation, EuroSCORE)均提示高龄是增加外科手术风险的危险因素,因为高龄患者常常同时存在其他系统合并症。因此,越是高龄的患者越有可能从侵袭性小

的手术中更多获益。PCI 开通慢性闭塞性病变(chronic total occlusion lesion, CTO)能够改善患者生活质量和提高患者生存率,但对高龄患者的获益及风险尚不确定。因此,本研究观察 80 岁以上高龄患者 PCI 治疗 CTO 病变的疗效及安全性。

1 方法

1.1 患者入选和排除标准

连续入选 2007 年 07 月至 2012 年 07 月南京市第一医院 69 例年龄 ≥ 80 岁因冠状动脉 CTO 病变行 PCI 治疗的患者,排除标准为患者拒绝 PCI 治疗,抗血小板药物及抗凝药物禁忌。

1.2 药物及 CTO 病变 PCI 治疗

患者根据冠心病二级预防原则用药,术前服用负荷剂量的

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氯吡格雷 300 mg, 术后氯吡格雷 75 mg 和阿司匹林 100 mg 每日一次维持。患者术中均给予肝素 100U/kg, 维持活化的凝血时间(activated clotting time, ACT)大于 300 ms。手术者根据患者病情和血流动力学状态决定是否使用主动脉内球囊反搏(intra-aortic balloon pump, IABP)。手术者根据病变决定是否使用血管内超声(intravascular ultrasound, IVUS)。所有患者术中均植入第一代药物洗脱支架。

1.3 CTO 及最终手术过程成功定义

CTO 定义为 TIMI 血流 0-1 级, 闭塞时间 >3 月的冠状动脉病变。技术成功定义为导丝和球囊通过闭塞血管段, 成功开通血管并植入支架, 最终 TIMI 血流 2-3 级, 残余狭窄 <30%。

1.4 数据提取和影像分析

CTO 手术高龄患者基线特征及临床资料由冠心病随访组两名独立的研究助理提取, 病变特征及手术过程由两名介入手术医生进行分析。

1.5 统计分析

所有统计使用 SPSS 16.0 统计软件, 连续性变量以均数±标准差表示, 分类变量以百分比表示。

2 结果

2.1 患者基线特征

69 例高龄患者平均年龄为 82.2±2.7 岁, 最大年龄 96 岁, 其中男性 57 例(82.6%), 患者基线左心室收缩功能正常, 平均左室射血分数(ejection fraction, EF)52.9±13.1%, 患者危险因素(高血压、糖尿病及高脂血症), 以往 PCI 及 CABG 手术史及冠心病第一诊断详见表 1。

表 1 临床特征

Table 1 Clinical characteristics

Variables	n=69
Gender (Male)	57(82.6%)
Age (yrs)	82.2± 2.7
Hypertension	51(73.9)
Diabetes	18(26.1)
Hyperlipidemia	7(10.1)
Prior PCI	12(17.4)
Prior CABG	2(2.9)
Unstable Angina	49(71)
Stable Angina	6(8.7)
Obsolete Myocardial Infarction (OMI)	22(31.9)
Acute Myocardial Infarction(AMI)	0
Ejection Fraction (EF,%)	52.9± 13.1

2.2 患者病变特征

冠脉造影提示该组高龄 CTO 患者中, 有 14 例患者同时存在 2 支 CTO 病变血管, 21 例患者闭塞近端钙化, 24 例患者闭塞近端迂曲, 5 例患者为原支架内闭塞, 多数 CTO 病变存在同侧、对侧或双侧侧枝循环, 详见表 2。

表 2 血管造影提示 CTO 病变特征

Table 2 Characteristics of CTO lesion by angiography

Variables	n=69
Number of CTO Vessels	
1 Vessel	55(79.7%)
2 Vessels	14(20.3%)
3 Vessels	0
Proximal Severe Calcification	21(30.4%)
Proximal Occlusion Torsion	24(34.8%)
Ipsilateral Collateral	34(49.3%)
Contralateral Collateral	47(68.1%)
Bilateral Collateral	30(43.5%)
In-stent Occlusion	5(7.2%)

2.3 手术结果

69 例高龄 CTO 患者中 30 例经桡动脉途径行 PCI 治疗, 首次拟开通的靶病变分别为 LM 1 例, LAD 31 例, LCX 14 例, RCA 23 例, 对于 2 支 CTO 病变血管的患者分次行 PCI 手术(staged PCI), 分次手术的靶血管详见表 3。51 例患者手术成功, 手术成功率为 73.9%。有 7 例发生冠脉穿孔, 1 例冠脉穿孔出现心脏压塞并行心包穿刺术后转外科, 抢救无效院内死亡。手术过程、手术效果及并发症详见表 3。

表 3 手术过程、手术效果及并发症

Table 3 Procedural outcomes and complications

Variables	n=69
Transradial access	30(43.5%)
Initial PCI for CTO vessel	
LM	1
LAD	31
LCX	14
RCA	23
Staged PCI for CTO vessel	
LAD	3
LCX	5
RCA	6
Usage of IABP	8(11.6%)
Usage of IVUS	13(18.8%)
Coronary Perforation	7(10.1%)
Cardiac Tamponade	1(1.4%)
Pericardiocentesis	1(1.4%)
Interventional Success rate (%)	51(73.9%)
Hematoma	0
Access Site Bleeding	0
In-hospital Death	1(1.4%)

3 讨论

不管是西方国家还是中国,人口老龄化问题日益严重。该年龄组患者冠心病发病率高,随着 PCI 手术数量逐渐增多,越来越多的高龄患者接受了 PCI 治疗^[8],但当前高龄患者 PCI 治疗的有效性和安全性数据有限,高龄患者在临床研究中纳入比例不足。在中国,目前缺乏高龄 CTO 患者 PCI 治疗的临床数据。因此,本研究观察了近年来南京市第一医院 80 岁以上高龄患者 PCI 治疗冠状动脉 CTO 病变的疗效及安全性。本研究纳入的高龄患者平均年龄达 82.17 ± 2.70 岁,最大年龄 96 岁。高龄冠心病患者与相对年轻的患者相比,合并症更多,冠状动脉病变更弥漫^[9]。对于择期手术患者,高龄患者 PCI 手术中风险差异很大,主要受到心功能不全、肾功能不全、糖尿病和超高龄(年龄 ≥ 85 岁)的影响。较之相对年轻的患者,术后出现死亡(3.8% vs. 1.1%),Q 波心肌梗塞(1.9% vs. 1.3%),中风(0.58% vs. 0.23%),肾功能不全(3.2% vs. 1.0%)以及血管并发症(6.7% vs. 3.3%)的几率增加^[10]。对于无保护左主干病变(ULMCA)病变,高龄患者 PCI 治疗的全因死亡率,非致死性心肌梗死,不良心脏事件(MACE)与 CABG 相当,而且,PCI 治疗患者住院时间缩短、早期中风发生率低,但 TVR 较 CABG 升高^[11]。

荟萃分析提示近年来新的 CTO 技术和器械迅速发展,使得开通 CTO 病变的成功率较以往明显提高^[12]。对于 CTO 病变这一特殊、高危病变类型,高龄患者的报道不多,只有少量回顾性数据总结了高龄 CTO 患者 PCI 的临床获益和风险,目前尚无随机对照研究发表。本研究结果提示,中国高龄 CTO 患者中,同时存在 2 支 CTO 病变血管、闭塞近端钙化,闭塞近端迂曲等增加手术难度和风险的病变特征相对常见。本组患者手术成功率达 73.91%,提示在有经验的心导管室,高龄患者 CTO 病变血运重建率可以接受。但有 7 例患者发生冠脉穿孔,1 例冠脉穿孔出现心脏压塞并行心包穿刺术后转外科,抢救无效院内死亡。一项多中心联合研究^[13]连续回顾性观察了 1,791 例分别来自美国、意大利和韩国 3 个心脏中心的 CTO 患者,并随访了患者 5 年的 PCI 治疗效果,其中 213 例患者年龄 ≥ 75 岁,与年龄 < 75 岁的患者相比,手术成功率相似,63.8% vs. 69.1%, $P = 0.12$,在 77 例(36.2%)手术失败的高龄患者中,20 例(9.2%)出现了冠脉穿孔,文中未提及院内死亡数据,仅报道高龄手术失败组 5 年死亡率为 24.6%。即便如此,手术成功的高龄患者 MACE 事件较手术失败患者低,由此提示,高龄 CTO 患者同样能够从 PCI 血运重建中长期获益。

CTO 病变血运重建后再狭窄发生率较非闭塞血管高^[14]。De Felice 等^[15]报道 CTO 患者植入 DES 和 BMS 后 18 个月出现死亡、心肌梗死、靶病变血运重建的复合终点分别为 8.1%和 21.6%, $P = 0.005$; 3 年期随访时分别为 18% 和 28%, $P < 0.05$ ^[16]。多中心随机对照研究 GISSOC II-GISE^[17]提示,DES 较 BMS 能够获得更大的最小管腔直径(MLD),低的晚期管腔丢失(LL),以及低的再狭窄率和再闭塞率,2 年随访患者 MACE 事件减少,这主要得益于靶血管(TVR)血运重建和靶病变(TLR)血运重建减少。Patel 等^[18]的研究结果则发现与 BMS 相比,植入 DES 能够减少 CTO 病变患者死亡率。Zellerhoff 等^[19]报道在 DES 时代,CTO 组与非 CTO 组平均 6.6 月随访期的死亡率、并发症和

血运重建相似。因此本研究的所有患者均植入 DES,患者长期预后随访目前正在进行中。

正如 2013 年美国麻省总医院的 Robert W. Yeh 教授在一篇社论中所言,高龄 CTO 患者的治疗充满不确定性,但世界人口学特征的老龄化迁移不可避免^[20]。因此本研究观察了 DES 时代 80 岁以上中国高龄患者 PCI 治疗冠状动脉 CTO 病变的疗效及安全性,发现通过适当选择患者,尽管 PCI 治疗成功率可以接受,但手术风险较高,需在有经验的心导管中心谨慎开展。

参考文献(References)

- [1] Serruys PW, Morice MC, Kappetein AP, et al. Percutaneous coronary intervention versus coronary-artery bypass grafting for severe coronary artery disease[J]. N Engl J Med, 2009, 360(10): 961-972
- [2] Ghenim R, Roncalli J, Tidjane AM, et al. One-year follow-up of nonrandomized comparison between coronary artery bypass grafting surgery and drug-eluting stent for the treatment of unprotected left main coronary artery disease in elderly patients (aged ≥ 75 years) [J]. J Interv Cardiol, 2009, 22(6): 520-526
- [3] Rittger H, Rieber J, Kogler K, et al. Clinical outcome and quality of life after interventional treatment of left main disease with drug-eluting-stents in comparison to CABG in elderly and younger patients[J]. Clin Res Cardiol, 2011, 100(5): 439-446
- [4] Palmerini T, Barlocco F, Santarelli A, et al. A comparison between coronary artery bypass grafting surgery and drug eluting stent for the treatment of unprotected left main coronary artery disease in elderly patients (aged ≥ 75 years)[J]. Eur Heart J, 2007, 28 (22): 2714-2719
- [5] Capodanno D, Caggegi A, Capranzano P, et al. Comparative one-year effectiveness of percutaneous coronary intervention versus coronary artery bypass grafting in patients < 75 versus ≥ 75 years with unprotected left main disease (from the CUSTOMIZE Registry)[J]. Am J Cardiol, 2012, 110(10): 1452-1458
- [6] Shimizu T, Ohno T, Ando J, et al. Mid-term results and costs of coronary artery bypass vs drug-eluting stents for unprotected left main coronary artery disease[J]. Circ J, 2010, 74(3): 449-455
- [7] Rodes-Cabau J, Deblois J, Bertrand OF, et al. Nonrandomized comparison of coronary artery bypass surgery and percutaneous coronary intervention for the treatment of unprotected left main coronary artery disease in octogenarians [J]. Circulation, 2008, 118 (23): 2374-2381
- [8] Wang TY, Masoudi FA, Messenger JC, et al. Percutaneous coronary intervention and drug-eluting stent use among patients ≥ 85 years of age in the United States[J]. J Am Coll Cardiol, 2012, 59(2): 105-112
- [9] Alam M, Virani SS, Shahzad SA, et al. Comparison by meta-analysis of percutaneous coronary intervention versus coronary artery bypass grafting in patients with a mean age of ≥ 70 years [J]. Am J Cardiol, 2013, 112(5): 615-622
- [10] Batchelor WB, Anstrom KJ, Muhlbaier LH, et al. Contemporary outcome trends in the elderly undergoing percutaneous coronary interventions: results in 7,472 octogenarians. National Cardiovascular Network Collaboration[J]. J Am Coll Cardiol, 2000, 36(3): 723-730

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- intracavitary irradiation, neoadjuvant chemotherapy alone or radiotherapy) combined with surgery for patients with stage Ib2 and IIa2 cervical cancer[J]. Asian Pac J Cancer Prev, 2013, 14(4): 2377-2381
- [6] Fujiwara K, Monk B, Devouassoux-Shisheboran M. Adenocarcinoma of the Uterine Cervix: Why Is it Different? [J]. Curr Oncol Rep, 2014, 16(12): 416
- [7] Aragona A M, Soderini A H, Cuneo N A. Defining the concept of locally advanced squamous cell carcinoma of the vulva: a new perspective based on standardization of criteria and current evidence [J]. J Gynecol Oncol, 2014, 25(4): 272-278
- [8] Liu R, Wang X, Tian J H, et al. High dose rate versus low dose rate intracavity brachytherapy for locally advanced uterine cervix cancer [J]. Cochrane Database Syst Rev, 2014, 10: D7563
- [9] Li Z, Yang S, Liu L, et al. A comparison of concurrent chemoradiotherapy and radiotherapy in Chinese patients with locally advanced cervical carcinoma: a multi-center study [J]. Radiat Oncol, 2014, 9: 212
- [10] Marosevic G, Ljuca D, Osmic H, et al. Inter-application displacement of brachytherapy dose received by the bladder and rectum of the patients with inoperable cervical cancer [J]. Radiol Oncol, 2014, 48(2): 203-209
- [11] Touboul C, Skalli D, Guillo E, et al. Treatment of cervical cancer [J]. Rev Prat, 2014, 64(6): 802-806
- [12] Vizza E, Corrado G, Zanagnolo V, et al. Neoadjuvant chemotherapy followed by robotic radical hysterectomy in locally advanced cervical cancer: a multi-institution study [J]. Gynecol Oncol, 2014, 133(2): 180-185
- [13] Minig L, Patrono M G, Romero N, et al. Different strategies of treatment for uterine cervical carcinoma stage IB2-IIIB [J]. World J Clin Oncol, 2014, 5(2): 86-92
- [14] Chao A, Lin C T, Lai C H. Updates in systemic treatment for metastatic cervical cancer [J]. Curr Treat Options Oncol, 2014, 15(1): 1-13
- [15] Yang M, Zeng Y, Shen Z, et al. Clinical characteristics and efficiency of interventional therapy for coronary artery involvement in Takayasu's arteritis [J]. National Medical Journal of China, 2014, 94(24): 1874-1877
- [16] Yu H, Stavas J M. The role of interventional radiology in management of benign and malignant gynecologic diseases [J]. Obstet Gynecol Surv, 2013, 68(10): 691-701
- [17] Murata S, Mine T, Sugihara F, et al. Interventional treatment for unresectable hepatocellular carcinoma [J]. World J Gastroenterol, 2014, 20(37): 13453-13465
- [18] Molla N, AlMenieir N, Simoneau E, et al. The role of interventional radiology in the management of hepatocellular carcinoma [J]. Curr Oncol, 2014, 21(3): e480-e492
- [19] Ghaemmaghami F, Saleh-Gargari S, Sahebdel B, et al. Risk factors and clinical aspects of recurrent invasive cervical carcinoma [J]. J Obstet Gynaecol India, 2012, 62(6): 674-678
- [20] Levitchi M, Charra-Brunaud C, Quetin P, et al. Impact of dosimetric and clinical parameters on clinical side effects in cervix cancer patients treated with 3D pulse-dose-rate intracavitary brachytherapy [J]. Radiother Oncol, 2012, 103(3): 314-321

(上接第 7153 页)

- [11] Conrotto F, Scacciarella P, D'Ascenzo F, et al. Long-term outcomes of percutaneous coronary interventions or coronary artery bypass grafting for left main coronary artery disease in octogenarians (from a Drug-Eluting stent for Left main Artery registry substudy) [J]. Am J Cardiol, 2014, 113(12): 2007-2012
- [12] Patel VG, Brayton KM, Tamayo A, et al. Angiographic success and procedural complications in patients undergoing percutaneous coronary chronic total occlusion interventions: a weighted meta-analysis of 18,061 patients from 65 studies [J]. JACC Cardiovasc Interv, 2013, 6(2): 128-136
- [13] Hoebbers LP, Claessen BE, Dangas GD, et al. Long-term clinical outcomes after percutaneous coronary intervention for chronic total occlusions in elderly patients (≥ 75 years): five-year outcomes from a 1,791 patient multi-national registry [J]. Catheter Cardiovasc Interv, 2013, 82(1): 85-92
- [14] Valenti R, Vergara R, Migliorini A, et al. Predictors of reocclusion after successful drug-eluting stent-supported percutaneous coronary intervention of chronic total occlusion [J]. J Am Coll Cardiol, 2013, 61(5): 545-550
- [15] De Felice F, Fiorilli R, Parma A, et al. Clinical outcome of patients with chronic total occlusion treated with drug-eluting stents [J]. Int J Cardiol, 2009, 132(3): 337-341
- [16] De Felice F, Fiorilli R, Parma A, et al. 3-year clinical outcome of patients with chronic total occlusion treated with drug-eluting stents [J]. JACC Cardiovasc Interv, 2009, 2(12): 1260-1265
- [17] Rubartelli P, Petronio AS, Guiducci V, et al. Comparison of sirolimus-eluting and bare metal stent for treatment of patients with total coronary occlusions: results of the GISSOC II-GISE multicentre randomized trial [J]. Eur Heart J, 2010, 31(16): 2014-2020
- [18] Patel MR, Marso SP, Dai D, et al. Comparative effectiveness of drug-eluting versus bare-metal stents in elderly patients undergoing revascularization of chronic total coronary occlusions: results from the National Cardiovascular Data Registry, 2005-2008 [J]. JACC Cardiovasc Interv, 2012, 5(10): 1054-1061
- [19] Zellerhoff C, Schneider S, Senges J, et al. Sirolimus-eluting stents in the treatment of chronic total coronary occlusions: results from the prospective multi-center German Cypher Stent Registry [J]. Clin Res Cardiol, 2008, 97(4): 253-259
- [20] Yeh RW, Drachman DE. Coronary chronic total occlusion in the elderly: demographic inevitability, treatment uncertainty [J]. Catheter Cardiovasc Interv, 2013, 82(1): 93-94