



在线全文

中西协同糖尿病下肢动脉疾病防治体系的构建*

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【摘要】 糖尿病下肢动脉疾病(diabetic lower extremity arterial disease, DLEAD)具有低诊断、低知晓、低治疗、高致残及高致死的现状。临床缺乏完善的防治手段及综合技术体系,使其成为现阶段临床糖尿病防控的瓶颈问题。中医治疗DLEAD具有辨证论治、整体调节的优势,但缺乏全程病机认识及统一规范的证候标准;中药治疗该疾病具有多靶点多通路网络效应,但优势环节不明确;中医药可延缓DLEAD发生发展,但疗效评价体系不完善,缺乏高质量循证医学证据和临床共识指南。因此,基于中医“治未病”思想,本研究聚焦DLEAD的防控难题,构建了集预防、诊疗、机制与应用于一体的中西医协同防治DLEAD技术体系,以提升DLEAD临床防控效果,开创中西医协同在慢病领域的新范式。

【关键词】 糖尿病下肢动脉疾病 中西医结合 治未病

Construction of the Chinese-Western Synergistic System for the Prevention and Treatment of Diabetic Lower Extremity Arterial Disease

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【Abstract】 Diabetic lower extremity arterial disease (DLEAD) is characterized by a low rate of diagnosis, low awareness, low treatment rate, high disability rate, and high mortality. Due to a lack of comprehensive prevention and treatment strategies or an integrated technological system, DLEAD has become a bottleneck in the prevention and control of diabetes mellitus at present. Traditional Chinese medicine (TCM) treatment of DLEAD offers the advantages of syndrome differentiation, evidence-based treatment, and holistic regulation. However, it lacks a comprehensive understanding of the through-course pathogenesis and unified standardized syndrome criteria. TCM treatment of DLEAD exerts multi-target and multi-pathway network effects, but the advantageous links are still not fully understood. TCM treatments can delay the onset and development of DLEAD, but the efficacy evaluation system remains incomplete. Furthermore, there is a lack of high-quality evidence-based medical evidence and clinical consensus and guidelines. Therefore, based on the idea of zhi wei bing, or treating the disease before it develops, in Chinese medicine, and focusing on the prevention and control of DLEAD, we have constructed a synergistic technical system that integrates traditional Chinese and Western medicine for the prevention and control of DLEAD. This system integrates prevention, diagnosis, treatment, mechanisms, and applications, so as to enhance the clinical effects of DLEAD prevention and control, and to create a new paradigm for collaborative traditional Chinese medicine and western medicine in the field of chronic disease management.

【Key words】 Diabetic lower extremity arterial disease Integration of traditional Chinese medicine and western medicine Preventive treatment of disease

中国糖尿病患者数量已突破1.4亿,约占全球患者总数的26.8%,防控形势严峻。糖尿病下肢动脉疾病

(diabetic lower extremity arterial disease, DLEAD)作为糖尿病特异性血管并发症,其病理基础源于慢性高血糖引发的代谢紊乱及血管内皮功能障碍,该疾病不仅是糖尿病足溃疡进展为截肢的独立危险因素,更通过系统性动脉粥样硬化机制显著增加主要不良心血管事件发生风险^[1]。但DLEAD早期症状较为隐匿,导致其早期诊断的缺失和漏诊率的居高不下。目前,针对DLEAD的防控体系尚不完善,少有针对性临床指南指导治疗,缺乏全程综合防控

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体系。在此背景下,中医“治未病”思想在DLEAD的临床防控中展现出了独特的优势,强调“风险预估-早期诊断”“方案优化-节点管理”“全程干预-三级防控”等策略。同时,构建中西协同DLEAD防治技术体系,有望打破当前DLEAD低诊断率、低知晓率、低治疗率以及高致残率的困境。

1 DLEAD临床现状

下肢动脉疾病(lower extremity arterial disease, LEAD)在糖尿病患者中患病率为19.5%~35.4%,是导致糖尿病足部溃疡和下肢截肢,特别是高位截肢和再次截肢的重要原因^[2]。与非糖尿病患者相比,糖尿病患者发生下肢动脉粥样硬化性病变的危险性增加2倍,导致截肢的风险增加7~15倍^[3]。不仅如此,DLEAD确诊1年后心血管事件发生率达21.1%,5年下肢并发症死亡率达55%^[4],合并LEAD患者5年生存率仅60%~70%,远低于非LEAD患者。而且,DLEAD早期症状不明显,易被忽视。因DLEAD诊断需借助超声、血管造影等检查,基层医疗机构普及度低,诊断困难。随着DLEAD病情进展,可能出现间歇性跛行等表现,但易误诊。由于早期症状不明显,易被其他症状所掩盖而忽视,且缺乏相关早诊依据,无法有效识别,漏诊率高达近50%^[4]。

2 DLEAD防治现状

2.1 DLEAD当前防治方案临床获益有限

2型糖尿病防治指南建议,DLEAD防治需综合考虑血糖、血脂、血压、凝血等因素^[5],并适当抗血小板治疗,依赖多药物组合,治疗繁杂。而且多重药物使用增加了医疗成本和药物不良作用风险:出血风险^[6-8]、肝肾功能损害^[9-13]、胃肠道不适等不良反应^[14-17]。当血管闭塞后,介入手术即时效果较好,可迅速恢复血供,但费用高昂,且需综合考虑症状、全身及血管条件,并非所有患者均可达到预期疗效,术后可能再狭窄^[3,18-19]、闭塞。介入术后1年通畅率仅为13.4%^[20],2年全因死亡率7.2%,5年全因死亡率则高达14.7%^[21-22],难以保证血管长期畅通。故DLEAD治疗难度大、治疗费用高,患者依从性低^[23]。尽管现行指南基于循证医学原则构建了DLEAD多维度管理框架,但临床实践仍面临多重挑战:其一,血管介入与代谢调控等多学科干预存在时序协同障碍,导致介入治疗窗口期与代谢指标调控周期匹配失当;其二,动态风险分层体系尚未完善,缺乏针对不同病程阶段及并发症风险的量化评估指标;其三,患者长期随访数据表明,由于自我管理能力不足、健康宣教不到位及家庭-社区支持体系缺位等原因,

患者规范治疗依从性衰减率增高,显著影响预后改善。

2.2 DLEAD治疗手段持续更新,长期安全性和有效性尚待验证

随着医疗技术创新,除了上述传统药物治疗和介入手术外,药物涂层球囊(drug-coated balloon, DCB)技术、血管内超声消融技术、冷冻球囊消融技术等^[24-25]新兴治疗手段逐渐应用于临床,并取得了一定的疗效。例如,首都医科大学宣武医院谷涌泉教授率先报告了应用自体骨髓干细胞治疗严重下肢缺血的临床应用^[26-27];中国医学科学院血液病医院黄平平教授则报告了应用自体外周血干细胞治疗下肢动脉硬化性闭塞症^[28];基于“leave nothing behind”理念的DCB治疗技术,在糖尿病患者长期随访中展现出了卓越的性能^[29]。虽然上述新技术在创伤性、围术期并发症发生率等方面展现出临床优势,但需注意其疗效持续性呈现时间依赖性衰减特征,且不同糖化血红蛋白分层患者的远期预后存在显著异质性,这都有待进一步确认。

DLEAD在临床诊断、治疗方面存在的现实困境导致了低诊断率、低知晓率、低治疗率、高致残率和新兴技术还需长期安全验证的现状,使其成为临床糖尿病综合防控中的重难点问题。

3 DLEAD防治缺乏全程综合防控体系

在DLEAD发生进展中,糖脂代谢异常导致的动脉粥样斑块形成是其始动环节,“动脉粥样斑块形成-血管狭窄-血管闭塞”是病程中三个重要节点。因此,DLEAD临床干预的关键在于如何全程持续阻止粥样斑块发生、遏制进程及避免介入后的再狭窄。虽然当前临床实践已建立基于国际指南(如ESC 2024外周动脉疾病管理共识)的分期干预策略^[30],涵盖抗血小板聚集、血脂调控及血运重建等标准疗法,但各阶段治疗手段仍呈现显著的离散性特征,尚未形成覆盖“斑块初发-管腔狭窄-术后再狭窄”全病程的整合式管理路径。防控方案的不足与待完善使DLEAD临床综合防治指南少有发布,近10年仅有糖尿病患者外周动脉疾病的诊治意见书^[31]、糖尿病足溃疡合并下肢血管病变的外科诊疗全国专家共识(2024版)^[32]、糖尿病性周围血管病变中医诊疗指南^[33]、糖尿病足病中西医结合诊疗指南^[34]等。因此,临床亟需DLEAD综合防控指南的明确指导。

4 中医防治DLEAD现状

DLEAD是糖尿病基础之上引发的动脉粥样硬化病变,与中医消渴导致的脉痹、脱疽、痈疽具有相似性。饮

食失节,脾胃运化失职,脾不散精,气血生化乏源,水湿痰浊内生,积热内蕴,暗消津液,发为消渴,热邪炼液为痰,熬血成瘀,痰瘀相互搏结,伤及脉壁,致脉厚坚硬而道窄,血行阻滞,发为脉痹;或有禀赋不足,先天阴弱,加之调养不当,情志不节,发为消渴,同时气虚无力推动血行而成瘀,虚热又可灼津为痰,使痰瘀内生,从而促发脉络阻滞^[35]。

4.1 中医防治DLEAD具有优势, 但缺乏全程病机观

中医治疗DLEAD经验丰富,具有辨证论治、整体调节的优势,但缺乏全程病机认识及统一规范的证候标准。中医药防控DLEAD积累了丰富的经验,通过辨证论治对DLEAD不同阶段和证型进行针对性治疗,具有整体调节的优势。沈雪然^[36]发现,益气养阴法可有效改善2型糖尿病血管病变的炎症状态,延缓2型糖尿病血管并发症的发生发展;刘海立等^[37]应用活血通络散延缓了糖尿病下肢血管病变患者的病情进展;唐亮等^[38]应用参芪活血汤可改善血液流变学和血管内皮功能。不仅如此,穴位贴敷^[39-40]、中药熏洗^[41-42]、针灸^[43-44]等方法还可针对DLEAD患者具体症状进行综合治疗。但当前对DLEAD的病机认识不统一,对疾病发生发展的全程病机演变规律不清晰,缺乏统一的证候规范标准。这导致治疗时可能缺乏针对性的治疗方案,影响治疗效果。

4.2 中医具有多靶点效应, 但优势环节不明确

中医以其独特的多靶点多通路网络效应在医疗领域展现出较大潜力,但在防治DLEAD方面存在作用机制、靶点通路、优势环节不明确的问题。中医药治疗往往依赖复杂成分体系,通过多个靶点协同作用达到治疗效果,这种综合效应使得精准识别并确认具体的靶点通路变得尤为困难。中医药的作用机理涵盖了改善微循环、抗炎、抗凝、调节血脂等多个方面,但这些机理背后的具体分子机制尚未完全明晰,仍需深入研究。DLEAD作为一种发病机制复杂,涉及多环节、多通路、多靶点的疾病,尽管中医药在防治DLEAD方面展现出一定潜力,但其在此过程中的优势环节及具体作用方式有待进一步明确。

4.3 中医可延缓DLEAD发生发展, 但疗效评价体系不完善

中医药在延缓DLEAD发生发展方面具有显著优势,但疗效评价体系不完善,缺乏高质量循证医学证据和临床共识指南,制约其进一步的发展应用。高质量循证医学证据不仅是中医药疗效得以验证的关键,也是中医药走向国际的重要基础。中医临床疗效评价因其独特的辨证论治体系,强调个体化、动态化的诊疗模式,相较于现代医学而言更为复杂。在中医药现代化和全球化的进程中,尽管名老中医的个人经验在疗效评价中占据重要地

位,但这种依赖个人经验的评价方式显然难以被以“量化”为核心的现代主流医学所接受。如何构建科学、客观、量化的中医药疗效评价体系,成为当前中医药领域亟待解决的关键问题。具体而言,亟需探索并确立多维度的评价指标:一方面,需整合现代医学认可的客观量化指标(如踝肱指数、趾肱指数、经皮氧分压、血管超声检查显示的斑块负荷与血流动力学参数、下肢动脉CTA/MRA影像学改变等),以反映血管结构与功能的客观改善;另一方面,须将中医药干预下患者主观感受的改善(如肢体疼痛、麻木、冷感、间歇性跛行距离与时间、生活质量评分等)进行标准化、量表化评估(如采用视觉模拟评分VAS、步行问卷、中医证候积分表等),实现症状的量化表达。关键在于构建主客观指标有机结合的评价模型,通过设定核心指标集,建立统一规范的证候疗效评价量表,并结合动态随访监测指标变化趋势,形成既能体现中医整体调节和症状改善特色,又能被现代医学理解和认可的综合性疗效评价框架。因此,迫切地需要开展高质量的循证评价研究,从而更好地发挥中医药在DLEAD防治领域的特色和优势。

5 中西协同DLEAD防治体系的构建

DLEAD自然进展路径契合“治未病”的“未病-既病-变病-瘥复”理论框架。通过融合中医证候演变规律与现代生物标志物,构建“病-证-症”研究体系及多模态智能辨证模型,实现疾病风险精准预警和早期干预。同时,优化出以中医药为核心、强调疾病关键节点管理的中西协同全程方案,为构建综合防治技术体系奠定基础(图1)。

5.1 全程干预, 三级防控

中医“治未病”的核心思想涵盖“未病先防”“既病防变”“瘥后防复”三大方面,贯穿疾病全过程,并深刻影响着中医对疾病全过程的处理策略。DLEAD的临床进展路径“糖尿病-下肢动脉斑块形成-血管狭窄/闭塞-介入术后再次狭窄”正是中医“治未病”理论中“未病-既病-变病-瘥复”的体现^[35, 45]。这一对应关系不仅揭示了DLEAD疾病发展的自然规律,也为中医药治疗DLEAD提供了理论基础。近年来,现代中医学者基于这一理论框架,对DLEAD进行了深入的临床实践探索,并初步证实了中医药在治疗DLEAD方面确有疗效^[41, 46-47]。但报道内容多局限于疗效观察^[41, 48-50]、名老中医的经验总结^[47, 51],少有严谨、科学的随机对照试验设计^[34]。这直接导致中医药治疗DLEAD的临床证据不足,难以被广泛认可和推广应用。因此,未来中医药治疗DLEAD的研究应更加注重科学设计,积累高质量临床证据,以促进其在实际临床中的广泛应用。

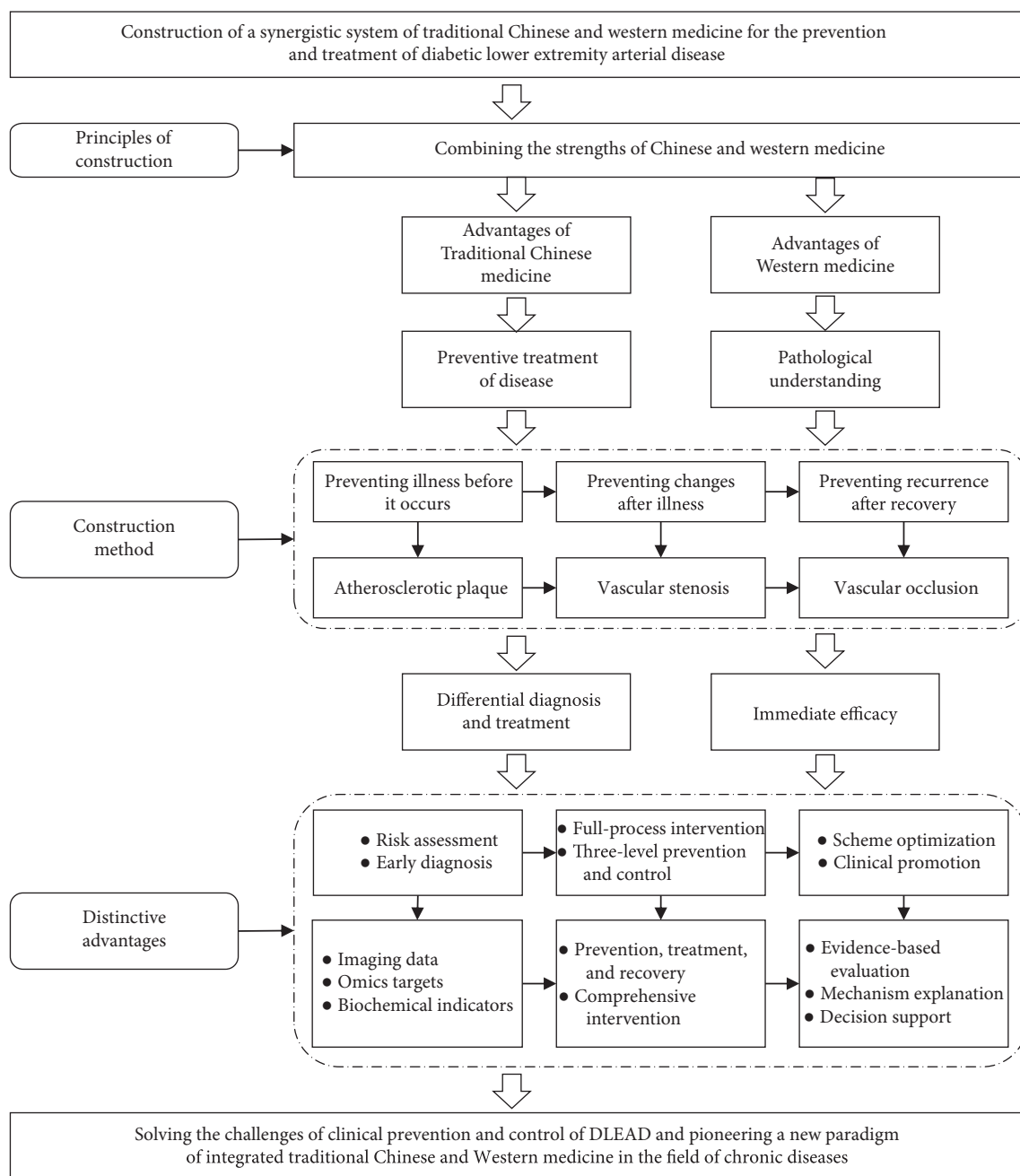


图 1 中西协同糖尿病下肢动脉疾病防治体系的构建思路图

Fig 1 Conceptual diagram of the construction of a DLEAD prevention and treatment system based on integrated traditional Chinese and western medicine

5.2 风险预估, 早期诊断

中医传统辨证方法综合患者症状、体征、病机及体质等多重因素。中医证候演变能全面展示“未病-已病-变病-瘥复”的疾病全程动态规律,在预测DLEAD进展与转归方面展现出了良好的判别作用。然而,在实际推广应用,这一方法不可避免地受到个人临证经验、中医基础储备等专业因素的限制。而现行生化指标、影像资料及组学靶标与证候具有相关性。因此,探索DLEAD“未病-已病-变病-瘥复”的证候演变规律,发现具有预警靶标作用的血浆蛋白标志物^[35, 45]具有重要意义。我们团队近

期开展的多中心横断面研究发现:气虚、阴虚是贯穿2型糖尿病及其大血管病变全程的基础证候要素;痰湿、血瘀则是其血管病变程度加重及疾病进展的关键证候要素,其分布频率随病变程度升高而增加。这为证候演变规律提供了初步实证^[52]。课题组将进一步结合“病-证-症”的概念,建立“病-证-症”结合下DLEAD全程双向队列和全病程的证候研究体系,提取核心证型,对高风险人群进行预警提示和对疾病关键节点的风险因素进行综合预判、精准描述。通过融合中医诊断学与现代流行病学,筛选生物靶标与关键分子,并在此基础上构建多模态智能辨

证模型, 这可为精确预判疾病风险及早期干预提供有力支持。

5.3 方案优化, 节点管理

国内首个DLEAD筛查研究项目——China-DiaLEAD是迄今为止国际上样本量最大的关于DLEAD的流行病学研究, 对超过10 000例糖尿病患者进行了深入调查, 探索DLEAD的临床特点, 推动对中国DLEAD患者的早筛查、早诊断及早干预^[4]。另一方面, 开展多项中西医结合防治糖尿病大血管病变的多中心、双盲、安慰剂、随机对照试验研究, 明确以中医药为核心的糖尿病大血管病变“三态”防治方案疗效, 验证其在糖尿病大血管病变“未病先防”“既病防变”疾病演变中的作用优势^[35, 45]。在此基础上, 将现有的DLEAD防治方案进行处方优化与关键节点的关注, 全面贯彻“治未病”的全程防控原则, 结合中医药优势, 发挥中西医协同特色, 形成了具有显著临床疗效和原创特色的全程干预方案。这一方案将为全面构建中西协同防治DLEAD的技术体系奠定坚实的基础。

6 小结

以“治未病”思想为核心理念, 通过中医整体调控与西医靶向干预的协同路径, 构建中西医协同防治DLEAD的技术体系。具体而言: ①在预防阶段发挥中医“辨证施治”的动态风险评估优势, 结合西医生物标志物检测实现精准预判; ②在诊疗环节采用中药多靶点调节、联合西医血运重建技术, 形成互补干预; ③机制研究整合中医气血理论与现代血管生物学, 揭示中医理论的科学内涵。针对DLEAD防控中早期筛查灵敏度不足、血运重建后再狭窄率高、药物治疗靶点单一这三大关键问题, 该体系通过: 风险预判模块(融合舌脉特征与影像组学)、循证评价模块(引入中医证候疗效指标)、机制阐释模块(建立病证结合动物模型)、辅助决策模块(制定分期结合辨证方案)四大板块, 最终实现辨证有效率提升和血运重建后再狭窄率降低。同时, 在体系构建的过程中注重方案的推广接受性与便利性, 对中药复方药物进行机制说明, 并研发中西医协同多模态智慧辅助决策系统, 提供个性化的诊疗建议, 形成可供推广的临床智能辅助决策平台。这将极大地推动DLEAD防控工作的深入开展, 为患者带来更为精准、有效的治疗服务。

基于上述, 不仅可解决DLEAD防诊治的关键问题, 更作为典范, 开创中西医协同在慢病领域的新范式, 促进跨学科融合与科研成果转化, 为提升医疗健康服务水平树立新的里程碑, 切实指导DLEAD防控实践; 促进中医药的科学作用与国际影响力, 推动经济与社会效益全面

提升, 对健康中国战略实施具有重大推进作用。

* * *

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