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下肢静脉曲张的诊断和手术方式

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摘　要

下肢静脉曲张(VV)是一种常见疾病，表现为下肢的静脉扩张和曲张，通常伴随有疼痛、肿胀和不适等症状。该疾病的发生与多种因素有关，包括遗传、性别、年龄、肥胖和久站等。在诊断静脉曲张时，临床医生通常会考虑多种因素，包括患者的病史、体格检查和影像学检查。影像学检查在VV的诊断中起着关键作用，常用的影像学检查方法包括彩色多普勒超声、数字减影血管造影(DSA)、计算机断层扫描静脉成像(CTV)和磁共振静脉成像(MRV)，需根据病人具体情况选择检查方式。VV的治疗方法包括保守治疗和手术治疗。保守治疗通常采用压迫疗法和药物治疗，旨在缓解症状和改善生活质量。手术治疗包括大隐静脉高位结扎、剥脱等外科手术、内源性激光消融(EVLA)、射频消融(RFA)、泡沫硬化疗法(UGFS)、和胶粘疗法(氰基丙烯酸酯粘合)等方式，这些方法可有效切除或阻止反流的隐静脉，进而缓解静脉功能不全症状，因其各自的优势均有广泛应用。VV诊断方式及手术方式的选择仍存在一些争议，需要进一步研究达成共识。

关键词

下肢静脉曲张，诊断，手术方式

Diagnosis and Surgical Interventions for Varicose Veins in the Lower Extremities

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Abstract

Varicose veins (VV) of the lower extremities represent a prevalent medical condition characterized by

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the dilation and varicosity of veins in the lower limbs, frequently accompanied by symptoms such as pain, swelling, and discomfort. The etiology of this condition is multifactorial, with contributing factors including genetic predisposition, gender, age, obesity, and prolonged periods of standing. The diagnostic process for varicose veins typically involves a comprehensive assessment by the clinician, incorporating the patient's medical history, physical examination, and relevant imaging studies. Imaging is integral to the diagnosis of varicose veins (VV), with frequently employed modalities including color Doppler ultrasound, digital subtraction angiography (DSA), computed tomography venography (CTV), and magnetic resonance venography (MRV). The selection of these imaging techniques is tailored to the individual patient. The management of VV encompasses both conservative and surgical approaches. Conservative management typically involves the use of compression therapy and pharmacological interventions aimed at alleviating symptoms and enhancing quality of life. Surgical interventions for venous insufficiency encompass a range of procedures, including high saphenous vein ligation, stripping, endovenous laser ablation (EVLA), radiofrequency ablation (RFA), ultrasound-guided foam sclerotherapy (UGFS), and cyanoacrylate adhesive closure. These techniques are efficacious in eliminating or halting reflux in saphenous veins, thereby alleviating the symptoms associated with venous insufficiency. Their widespread adoption is attributed to the distinct advantages each method offers. The selection of diagnostic and surgical approaches for varicose veins continues to be a subject of debate, necessitating additional research to achieve a consensus.

Keywords

Varicose Veins of the Lower Extremities, Diagnosis, Surgical Approach

1. 引言

下肢静脉曲张(VV)是慢性静脉功能不全(CVI)的常见表现，这种情况的特点是静脉拉长、扭曲和突出，主要发生在腿部，可导致各种症状[1]。女性在下肢静脉曲张的发病率上明显高于男性，尤其是在怀孕和激素变化的影响下，女性的静脉系统更容易受到损害，导致静脉功能不全的发生[2]。患者常常会感到下肢沉重、疼痛，伴随瘙痒或灼烧感，这些症状在长时间站立后会加重。此外，静脉曲张还可能导致更严重的并发症，如感染、腿部溃疡、静脉血栓等[3]静脉曲张的病理生理学涉及静脉瓣膜功能不全，导致静脉回流和静脉压升高，这可能导致浅表静脉的扩张和静脉曲张的发展。VV 发展的因素包括遗传易感性、肥胖、长时间站立或坐着，以及激素的影响，特别是在女性中[4] [5]。CEAP 分类系统将静脉曲张分为六个等级，分别为 C0 至 C6。这一分类系统不仅为临床医生提供了一个标准化的工具来评估和描述慢性静脉疾病(CVD)，而且在国际上得到了广泛的应用[6]。根据大隐静脉功能不全的回流模式分为四种类型：类型 1 (大隐静脉回流不涉及踝部和股静脉交汇处)、类型 2 (回流涉及踝部但股静脉交汇处正常)、类型 3 (回流涉及股静脉交汇处但踝部正常)和类型 4 (回流同时涉及股静脉交汇处和踝部) [7]。VV 患者的超声检查显示，表浅系统回流、深静脉回流和穿通静脉回流的分布模式与疾病的严重程度密切相关。下肢静脉曲张是一种复杂的疾病，其发生与多种因素密切相关。积极干预下肢静脉曲张，可以有效预防静脉曲张的进一步发展及其并发症[3] [8]。

下肢静脉曲张是一种常见的静脉疾病，其诊断方式多种多样，主要包括临床评估、影像学检查和功能性测试等。首先，临床评估是诊断的基础，医生通常会通过询问病史和进行体格检查来了解患者的症状和病情。常见的症状包括下肢肿胀、疼痛、沉重感以及皮肤变化等，这些症状在长时间站立或坐着后

可能会加重[3]。影像学检查在下肢静脉曲张的诊断中起着重要作用。超声波检查，尤其是多普勒超声，是评估静脉功能和血流状态的标准方法。通过超声，可以清晰地观察到静脉的结构变化、瓣膜功能以及是否存在血栓等情况[9]。此外，计算机断层扫描(CT)和磁共振成像(MRI)也可用于更复杂的病例，帮助医生更好地理解静脉的解剖结构和病变情况[10]。功能性测试如静脉压力测量和光反射流变图(LRR)等也被广泛应用于静脉曲张的诊断中。这些测试可以提供有关静脉血流动力学的重要信息，帮助医生评估静脉功能的严重程度和制定相应的治疗方案[11]。在某些情况下，医生可能还会使用血管造影等侵入性检查来进一步确认诊断，尤其是在怀疑存在深静脉血栓或其他复杂情况时[12]。综上所述，下肢静脉曲张的诊断需要综合考虑临床表现、影像学检查和功能性测试的结果，以便制定个体化的治疗方案。随着医学技术的进步，越来越多的非侵入性检查方法被应用于临床，极大地提高了诊断的准确性和效率。

下肢静脉曲张是一种常见的血管疾病，影响着大量患者的生活质量。治疗方法多种多样，包括保守治疗和手术治疗。保守治疗通常包括穿戴压缩袜、改善生活方式(如避免长时间站立)、药物治疗等。这些方法虽然能在一定程度上缓解症状，但对于已经形成的静脉曲张效果有限。因此，许多患者最终选择手术治疗，以达到更好的效果。手术治疗的选择包括传统的静脉剥除术、激光治疗、射频消融等。近年来，微创技术逐渐成为主流，因其创伤小、恢复快、并发症少而受到广泛欢迎。此外，静脉曲张的治疗还需要考虑患者的个体差异和病情的严重程度。对于一些轻度的静脉曲张，可能只需定期监测和保守治疗，而对于重度的静脉曲张，手术干预则是必要的。研究表明，手术治疗能够显著改善患者的生活质量，减少并发症的发生[13] [14]。因此，医生在制定治疗方案时，应综合考虑患者的具体情况，选择最合适的治疗方法。

2. 下肢静脉曲张(VV)的诊断

2.1. 临床评估

临床症状的评估是下肢静脉曲张诊断的重要组成部分。研究表明，患者常常会报告腿部沉重、疼痛、肿胀等症状，这些症状的严重程度可以通过临床评估工具进行量化。例如，Aberdeen Varicose Vein Questionnaire (AVVQ)被广泛用于评估下肢静脉曲张对患者生活质量的影响，其中文版在中国患者中显示出良好的信效度[14]。此外，VEINES-Sym 问卷也被用于评估与静脉曲张相关的症状，包括腿部的疼痛和不适感[15]。

2.2. 影像学检查

1) 彩色多普勒超声：彩色多普勒超声可以确定下肢静脉反流的程度，并为手术提供直接的指导和帮助，是 VV 诊断的首选方法。这项检查安全、无创且快速[16] [17]。通过多普勒超声评估下肢静脉系统的血流动力学特征，可以有效地识别静脉功能不全的部位，从而为手术方案的制定提供重要依据[18]。此外，多普勒超声在评估静脉瓣功能和识别静脉解剖变异方面也具有重要作用，这对于制定个体化的治疗方案至关重要[19]。近年来，随着微创治疗技术的发展，结合多普勒超声的手术方法已成为治疗 VV 的标准之一[20]。

2) 数字减影血管造影(DSA)：数字减影血管造影(DSA)是检测 VV 的金标准，但它是一种侵入性程序。尽管如此，DSA 在下肢静脉畸形、复杂静脉功能不全和髂静脉疾病的直观性和准确性方面具有显著优势[21]。此外，DSA 还可以与其他影像学技术结合使用，以提高诊断的准确性和安全性[22]。

3) 计算机断层扫描静脉成像(CTV)、磁共振静脉成像(MRV)：计算机断层扫描静脉成像(CTV)及磁共振静脉成像(MRV)可用于评估静脉阻塞性疾病，并以良好的准确性评估静脉解剖和功能显示，类似于静脉造影。两者特别适合用于外源性压迫，例如肿瘤性疾病[23] [24]。MRV 能够在不使用对比剂的情况下

进行成像，对于对比剂过敏或肾功能不全的患者尤为重要[25]。CTV 能够有效评估静脉的解剖变异，帮助外科医生在手术前更好地了解患者的静脉结构[26]。MRV 在评估肢体静脉疾病方面也显示出了良好的效果，能够准确识别静脉血栓和其他病变[27]。

2.3. 功能性测试

功能性测试如静脉压力测量和光反射流变图(LRR)被广泛应用。这些测试能够提供关于静脉血流动力学的重要信息，帮助医生评估静脉功能。静脉压力测量可以帮助医生了解静脉回流的情况，从而判断是否存在静脉功能不全。通过对静脉压力的监测，医生能够识别出静脉内的异常压力变化，这对于制定治疗方案至关重要。相关研究显示，静脉压力的变化与静脉功能的损害密切相关，尤其是在慢性静脉疾病患者中[28]。光反射流变图(LRR)作为一种非侵入性检测方法，能够实时监测静脉血流的动态变化。研究表明，LRR 在评估静脉功能方面具有良好的敏感性和特异性，能够有效区分不同类型的静脉疾病。通过对静脉血流的定量分析，LRR 能够提供有关静脉功能状态的详细信息，从而为临床决策提供支持[29]。功能性测试如静脉压力测量和光反射流变图在静脉曲张的诊断中发挥着重要作用。

3. 下肢静脉曲张(VV)的手术治疗

3.1. 大隐静脉高位结扎剥脱术

高位结扎大隐静脉从根本上消除了由隐静脉瓣膜功能不全引起的反流，原则上适用于所有 C2 级及以上的患者。该术式的优点在于适用人群广泛且微创手术成本低，适合在经济发展较差的基层地区推广[30]。这种治疗效果显著，而且在临床实践中显示出良好的患者满意度和较低的并发症发生率，目前是最广泛使用的技术之一[31]。该传统手术与新兴技术相比，虽然在某些方面的效果相似，但手术的安全性和经济性使其在资源有限的地区更具吸引力[32]。而缺点则包括创伤大、切口大、疼痛程度高以及住院时间长，且可导致一些并发症，如疼痛、出血、隐神经损伤等。为减少并发症的发生，首先，可通过结合高位结扎和激光消融，可以在减少并发症的同时提高治疗效果[33]。其次，在进行大隐静脉剥脱时，使用超声引导的肿胀麻醉可以显著减少手术中的出血和创伤[34]及针对隐神经损伤的预防措施包括术前超声检查和仔细的解剖分离[35]。

3.2. 内源性激光消融(EVLA)

内源性激光消融(EVLA)通过对静脉内膜施加热损伤来阻塞曲张静脉。这种方法的效果与传统外科手术相当，具有操作简单、微创、美观、住院时间短、康复快以及门诊日间手术等优点[36]。研究表明，EVLA 在减少术后并发症、低复发率、缩短恢复时间和提高患者满意度方面表现优异[37]。EVLA 作为一种新兴的治疗技术，已逐渐取代传统的静脉剥除术，成为治疗静脉功能不全的首选方法之一[36]。但也存在一些缺点。首先，EVLA 需要使用局部麻醉，可能导致患者在手术过程中感到不适。其次，EVLA 的技术要求较高，操作不当可能导致并发症，如血肿、神经损伤和静脉再通等[38]。此外，EVLA 的治疗效果可能受到静脉直径的影响，大直径静脉的治疗成功率相对较低[39]。为改善这些并发症，可结合其他治疗方法可以有效降低风险并提高治疗效果、使用能量水平高于 80 J/cm 的治疗减少再通率以及神经损伤可以通过神经转移手术进行修复，这为处理此类并发症提供了新的治疗选择[40] [41]。

3.3. 射频消融(RFA)

射频消融是一种通过发生器和导管产生热量的技术，导致电极接触范围内局部高温，从而造成血管内皮损伤，最终导致血管闭合，并引发纤维化。射频消融(RFA)在减少术后疼痛和住院时间方面表现出色[42]，

不仅能有效治疗大隐静脉功能不全，还能降低并发症的发生率，改善患者的生活质量[43]。此外，与传统的手术方法相比，RFA 的术后并发症发生率较低，且患者在术后恢复期间的疼痛感受也显著减轻[44]。RFA 的成功率与静脉的直径、治疗次数以及术后并发症的发生率密切相关[45]。尽管 RFA 在治疗大隐静脉方面具有良好的效果，但在特定情况下，如静脉直径较大或存在其他并发症时，治疗方案的选择应更加谨慎[46]。射频消融是一种微创技术，但仍可能引发一些并发症，RFA 的并发症包括但不限于深静脉血栓形成(DVT)、局部神经损伤、热诱导血栓形成(EHIT)等[47]。对于 RFA 引起的局部神经损伤，术前的解剖映射和术中对神经结构的保护显得尤为重要。热诱导血栓形成(EHIT)也是 RFA 治疗中的一个重要并发症，研究显示 EHIT 的发生率为 3.4%，且大多数情况下为 1 级，通常在一个月内自行消失[48]。因此，术后对患者进行定期随访和超声检查是必要的，以便及时发现和处理这些并发症。

3.4. 泡沫硬化疗法

泡沫硬化剂通过直接损伤内皮细胞，导致纤维化闭合，从而消除或减少局部静脉高血压。这种疗法适用于所有类型的下肢静脉曲张，尤其适合那些无法耐受外科手术的患者[49]，具有操作快速简便的优点。泡沫硬化疗法在治疗下肢静脉曲张方面具有良好的临床效果，能够有效改善患者的症状和外观[50]。

泡沫硬化剂在治疗下肢静脉曲张方面的有效性与传统手术相当，且在某些情况下甚至优于传统手术[51]。此外，泡沫硬化疗法的安全性广泛认可，但在某些情况下可能会出现局部疼痛、色素沉着和皮肤硬化等轻微并发症。为了预防和减少这些并发症，首先，患者在接受泡沫硬化疗法时，需避免在高温环境下进行，以减少皮肤反应的风险。对于局部疼痛，可以建议患者在治疗后使用冷敷[52]。其次，色素沉着的发生与患者的肤色和治疗后的护理有关[53]，患者应在治疗后采取有效的防晒措施，以减少紫外线对皮肤的影响，从而降低色素沉着的风险。此外，在治疗过程中应使用适当的泡沫浓度和体积，以避免因过量使用而引发的并发症[52]。如果出现皮肤硬化，建议患者及时就医，进行专业的评估和处理。最后，对于严重的并发症，如深静脉血栓形成，应密切监测患者的症状，并在必要时采取相应的治疗措施[52]。通过以上措施，可以有效预防和管理泡沫硬化疗法中的轻微并发症，确保患者的安全和治疗效果。

3.5. 胶粘疗法(氰基丙烯酸酯粘合)

胶水通过粘附大隐静脉来防止隐静脉的反流，对下肢静脉曲张具有明确的治愈效果，且具有微创、简单和快速的优点[54] [55]。氰基丙烯酸酯闭合技术是一种非热性治疗方法，能够有效避免传统治疗中常见的热相关并发症，如神经损伤[54]。氰基丙烯酸酯在治疗 VV 时，能够在不使用肿胀麻醉和术后压迫的情况下，达到良好的闭合效果[55] [56]。氰基丙烯酸酯注射的技术成功率高，且并发症发生率低，适合那些不适合传统手术的患者[57]。在治疗大隐静脉功能不全时，虽然成功率较高，但仍需注意其可能引发的并发症，如深静脉血栓形成[58]。孤立的大隐静脉血栓形成也被认为可能会进展为深静脉血栓或肺栓塞，这进一步强调了在使用胶水治疗时需谨慎考虑的风险[59]。超声引导下的氰基丙烯酸酯注射，可以更精确地定位和处理病变静脉，从而减少对周围组织的损伤，降低血栓形成的风险。此外，术后适当的压迫治疗和早期活动也被认为是预防 DVT 的重要措施[60]。胶水治疗提供了一种有效的治疗选择，但其潜在的风险必须在临床决策中予以重视。

下肢静脉曲张(VV)是最常见的外周静脉疾病之一，可能会引起多种伴随症状。随着影像学技术的不断进步，VV 的类型和程度的诊断变得更加容易。治疗方面，针对 VV 的多种内血管管理方法已被提出，包括非热非肿胀技术，这些技术已被证明与传统的激光或射频消融技术具有相似的效果。因此，随着对 VV 理解的深入和治疗技术的进步，患者的预后有望得到改善。

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