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缺血性卒中形成下肢深静脉血栓的危险因素研究进展

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摘　要

脑卒中是急性脑血管病引起的局部脑功能障碍，静脉血栓形成是指深静脉内血液发生异常凝结，大量研究表明，深静脉血栓形成是急性脑卒中的常见并发症，近年来，关于缺血性脑卒中形成下肢深静脉血栓的危险因素的研究越来越多，故本文就缺血性卒中形成下肢深静脉血栓的危险因素研究进展作一综述，以期为相关领域研究提供参考。

关键词

缺血性脑卒中，下肢深静脉血栓

Progress in the Study of Risk Factors for the Formation of Lower Extremity Deep Vein Thrombosis in Ischemic Stroke

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Abstract

Stroke is a local cerebral dysfunction caused by acute cerebrovascular disease, and venous thrombosis

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refers to the abnormal coagulation of blood in the deep veins, and a large number of studies have shown that deep vein thrombosis is a common complication of acute stroke. In recent years, there has been more and more research on the risk factors for the formation of lower limb deep vein thrombosis in ischemic stroke, so this paper makes a review of the research progress on the risk factors for the formation of lower limb deep vein thrombosis in ischemic stroke. Therefore, this article makes a review of the research progress, in order to provide a reference for the research in related fields.

Keywords

Cerebral Ischemic Stroke, Deep Vein Thrombosis of the Lower Limbs

1. 引言

脑卒中是急性脑血管病引起的局部脑功能障碍，其临床症候持续超过 24 小时。卒中包括缺血性卒中和出血性卒中，缺血性卒中是全球死亡和残疾的主要原因之一[1]。中国卒中学会公布的数据显示，中国脑血管病的死亡率为 149.49/10 万，具有高发病率、高致残率、高死亡率和高复发率的特点[2]。深静脉血栓形成是指深静脉内血液发生异常凝结，进而阻碍静脉血液的正常回流，这一病理过程可能伴随有特定的临床症状和体征，也可能在部分患者中不显现任何明显表现。静脉血栓栓塞(VTE)是深静脉血栓形成(DVT)和肺动脉栓塞(PE)的统称，具有严重的短期和长期并发症，可能表现为 DVT 后形成的血栓后综合征，或是因 PE 导致的循环功能衰竭而引发的死亡[3] [4]。研究表明，深静脉血栓形成是急性脑卒中的常见并发症[5]，近年来，关于缺血性脑卒中形成下肢深静脉血栓的危险因素的研究越来越多，因此，本文就缺血性卒中形成下肢深静脉血栓的危险因素进行总结。

2. 深静脉血栓形成及对缺血性卒中的影响

血栓形成的三个主要因素是血流模式的紊乱、促进凝血的凝血因子和血管内皮损伤[6]。静脉溶栓激活机体的凝血机制，导致血小板活化和聚集[7]。再通后，由于再灌注血管内皮细胞的部分损伤，局部栓子没有完全清除。血栓脂质核心的暴露进一步促进血小板聚集，甚至溶栓药物引起的纤溶系统失衡也可能导致再通血管的再闭塞和新鲜血栓的形成。另一方面，纤维蛋白血栓在血栓形成期间与大量凝血酶结合。一旦血栓溶解，发生反馈激活，大量凝血酶释放，导致血栓溶解后处于高凝状态，进一步导致血栓形成。DVT 是脑卒中患者院内常见的严重并发症之一[8]，是一种由于血液在深静脉内异常凝固所导致的静脉回流受阻的疾病，其特点在于静脉血液流动受阻。值得注意的是，有高达 40%的脑卒中患者在入院接受治疗的三周时间窗口内，可能会遭遇深静脉血栓形成的情况[9]，可因此出现肺动脉栓塞、血栓后综合征等，显著影响患者的生活质量甚至导致死亡[10]。脑梗死发生后，患者若长期卧床，往往导致下肢血流速度显著减缓，血液趋于凝滞状态，进而触发内源性凝血系统的激活[11]。这一连串的生理变化极易促使下肢深静脉血栓的形成，不仅显著增加了肺栓塞的风险，对生命构成严重威胁，还可能导致偏瘫等后遗症的发生，直接对患者的脑梗死预后产生不利影响[11]。

3. 缺血性卒中形成下肢深静脉血栓的危险因素

急性脑梗死患者并发 DVT 常见于小腿肌肉静脉、腓骨静脉和胫骨后静脉[12]，发生的中位时间为 10.5

d，肾衰、住院时间是影响急性脑梗死患者发生 DVT 的独立危险因素[13]，合并高血压、糖尿病、体重指数 ≥ 25 kg/m^2、脱水剂使用次数 ≥ 4 次/d、NIHSS 评分 ≥ 16 分、合并感染是脑梗死患者发生下肢深静脉血栓的危险因素[14] [15]，既往 VTE 病史、癌症、卒中前残疾、腿部无力、脑梗死病变体积增加、低 BI、D-二聚体、CRP 和同型半胱氨酸水平升高与 VTE 风险增加相关[15]。严重卒中、D-二聚体水平较高、血糖较高和住院时间较长的患者更容易发生无症状 DVT [16]。卒中急性期后 DVT 发病的独立危险因素为年龄 ≥70 岁、卧床不起、Wells 评分 ≥2 分、下肢 NIHSS 评分 ≥3 分、BI 评分低和 D-二聚体浓度升高[17]。

不动是一个关键危险因素[18]。特别是，患者在卒中病房接受监测，并在静脉溶栓后严格卧床 24 小时。体重指数每增加 10 个单位，VTE 风险增加 3 倍[19]，感染与 VTE 风险增加 2~4 倍相关[20] [21]。D-二聚体水平增加了约 4 倍，可能是 DVT 发生的指标[22]，年龄(≥65 岁)、卧床、女性和 DVT 危险性评分 ≥ 2，对该类人群进行 DVT 监测和预防干预是十分必要的[23]。新发展的 DVT 增加了中风后 3 个月的死亡率。深静脉血栓还会导致静脉后腿部和静脉曲张溃疡。口服避孕药(OCP)是年轻女性血栓形成的最重要原因，血栓形成的风险在 OCP 开始的四个月内增加[24]。激素替代治疗(HRT)的使用导致 VTE 风险增加 2 倍，尤其是在治疗的第一年。肥胖可能会限制继发于身体脂肪的静脉回流，从而阻碍有效的血流。脂肪组织也具有促炎、促血栓形成和低纤溶作用。已经发现 DVT 的风险与体重成正比，体重不足受试者的总体风险降低，肥胖受试者的风险显著更高[25] [26]。恶性肿瘤也是众所周知的 DVT 的原因[27] [28]。大约 20%的症状性深静脉血栓形成患者患有已知的活动性恶性肿瘤[29]。接受血管内机械血栓切除术的缺血性卒中患者发生深静脉血栓形成的风险可能增加，尤其是如果他们年龄较大(≥60.5 岁)、女性、下肢肌肉无力(医学研究委员会量表中<3 级)、血栓切除术时间较长(≥65.5 min)、血浆 D-二聚体水平较高(≥1.62 mg/L)。血栓切除术后应尽快预防深静脉血栓形成[30]。

4. 缺血性卒中形成下肢深静脉血栓的防治

肌张力增加、甘油三酯水平与 DVT 发生的保护作用相关[31]。在急性脑梗死后，腿部静脉血栓的发展可能早在 48 小时和第二周[32] [33]。间歇性气动压迫装置已被证明可预防 DVT [34]，康复和抗凝治疗可预防卒中后深静脉血栓形成的发生。急性缺血性卒中患者使用 LMWH 或普通肝素预防有可能将症状性 DVT 的发生率降低 70%，将致死性和非致死性 PE 的发生率降低 30% [35]。肢体肌力 <3 级、脱水剂的使用、伴颈动脉斑块及血小板计数、TC、TG 升高等危险因素的患者进行下肢 DVT 监测和防治是十分必要的[36]。

5. 缺血性卒中形成下肢深静脉血栓的检验

相关标志物凝血酶－抗凝血酶复合物(TAT)、纤溶酶 α2 纤溶酶抑制剂复合物(PIC)、血栓调节蛋白(TM)、组织纤溶酶原激活物－纤溶酶原激活物抑制剂-1 复合物(tPAI-C)、纤维蛋白(原)降解产物(FDP)和 D-二聚体(DD)水平异常成为临床上分析血栓性病变的重要参考指标，并在深静脉血栓、心血管疾病、弥散性血管内凝血(DIC)等的应用中获益。这些指标能反映血管内皮受损、血液高凝、纤溶状态，相较于常规指标：凝血酶原时间(PT)、活化部分凝血活酶时间(APTT)、凝血酶时间(TT)、纤维蛋白原(FIB)等的变化，出现更早、更灵敏，因而对血栓形成的警示更及时，遗漏更少[37]。D2 聚体对急性脑梗死患者合并 LDVT 存在一定预测价值[38]。心源性卒中是与 D-二聚体水平升高相关的独立因素。由于 D-二聚体在急性缺血性卒中患者中升高，并且由于溶栓和卒中机制影响 D-二聚体水平，其对于检测急性缺血性卒中患者的 DVT 可能不太有用[39]。

6. 结语

深静脉血栓形成在卒中患者中是一个常见且严重的并发症，但通过有效的预防措施，这一风险是可

以显著降低的。我们需要不断研究和优化预测方法，以便更准确地评估卒中患者的 DVT 风险。早期评估卒中患者的深静脉血栓(DVT)风险，关键在于识别高风险人群。通过综合患者信息，如卧床时间、基础疾病等，利用风险评估体系筛选出高风险者。随后，结合患者实际情况，制定个性化预防措施，如健康教育、肢体活动、气压治疗及必要时使用抗凝药物，以降低 DVT 风险，改善预后。因此，针对急性缺血性卒中中深静脉血栓形成的高风险群体，早期实施预防措施在临床医学上具有至关重要的意义。

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