

左心耳封堵术常见并发症及其防治

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【摘要】 对于不适合长期口服抗凝血药治疗的心房颤动患者, 左心耳封堵术已成为预防脑卒中的替代策略。左心耳封堵术相关主要手术并发症在实践中相对较少(1%~2%), 但一旦发生会造成一定的伤残率和死亡率, 所以左心耳封堵术者必须对以下潜在的并发症有充分的了解, 并对其做好相应的预防及处理措施。现就左心耳封堵术相关主要手术并发症及其防治做一综述, 旨在为临床诊疗提供参考。

【关键词】 心房颤动; 左心耳封堵术; 并发症; 防治

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Common Complications of Left Atrial Appendage Closure and Its Prevention and Treatment

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【Abstract】 Left atrial appendage closure (LAAC) has emerged as an alternative strategy for stroke prevention in patients with atrial fibrillation who are poor candidates for long-term oral anticoagulants. The main surgical complications related to LAAC are relatively few in practice (1%~2%), but once they occur, there will be a certain rate of disability and mortality. Therefore, LAAC surgeons must have a full understanding of the following potential complications, and take corresponding prevention and treatment measures. In this paper, the main surgical complications related to LAAC and their prevention and treatment are reviewed in order to provide reference for clinical diagnosis and treatment.

【Key words】 Atrial fibrillation; Left atrial appendage closure; Complications; Prevention and treatment

心房颤动(房颤)是世界上最常见的心律失常。房颤对患者生活质量、心力衰竭及血栓栓塞性卒中和全因死亡率有显著影响。由房颤引起的脑卒中的比例从 50~59 岁的 1.5% 突然增加到 80~89 岁的 23.5%。大量文献表明, 91%~100% 的非瓣膜性房颤患者血栓形成于左心耳^[1]。房颤的治疗对心脏病学和电生理学专家已成为一个真正的挑战。虽然口服抗凝血药是目前房颤预防脑卒中的标准方案, 但由于出血风险、依从性和成本等各种原因, 尤其是老年房颤患者服用抗凝血药依从性较差^[2], 仍有 50% 的患者被认为不适合使用口服抗凝血药^[3]。对于有出血高风险或不能耐受口服抗凝血药的房颤患者, 左心耳封堵术(left atrial appendage closure, LAAC)是降低血栓栓塞

事件风险的替代疗法^[4]。2019 年 AHA 房颤患者管理指南^[5]和 2020 年 ESC 房颤诊断和管理指南^[6]明确指出, LAAC 尤其适用于有高危卒中风险且有长期抗凝治疗禁忌证的非瓣膜性房颤患者(推荐等级 II b)。欧洲一家大型注册中心报道了封堵器高的植入成功率(98.5%), 30 d 内可接受的手术相关并发症发生率为 4%^[7]。然而, 植入过程中可能会导致严重的并发症, 并且器械相关血栓形成可能不是一个良性的发现^[8]。

1 心包积液和心脏压塞

心包积液是 LAAC 中最常见的并发症^[3,9-10], 积液量大时可致心脏压塞, 需紧急行心包穿刺引流, 必要时应及时切开心包减压或开胸修补^[11]。美国全国性回顾性队列研究显示, 心包积液和心脏压塞的概率分别

为 2.9% 和 0.5% 左右^[3]。

发生心包积液和心脏压塞并发症的原因与 LAAC 操作和封堵器有关,包括:(1)房间隔穿刺时刺破心房或主动脉根部;(2)导丝或导管操作不当刺破左心房或心耳;(3)封堵器放置过程中操作不当导致前端刺破心耳;(4)封堵器牵拉或回收过程中用力过猛撕裂或划破心耳^[12]。在 LAAC 中,动作要轻柔缓慢,过程要谨慎细心。

急性心脏压塞病情凶险,术者要能识别其最早和最微妙的迹象和症状。行经胸超声心动图(transthoracic echocardiography, TTE)检查明确诊断后,首先应立即行心包穿刺引流;若出血量较大和较快时,需置入猪尾导管持续心包引流,同时作静脉自体血回输。以上措施仍无改善时,应在保持引流的基础上尽早行外科心包切开引流术并修补破口。

2 封堵器脱落

封堵器脱落是 LAAC 最严重的并发症之一,多发生在围手术期内^[12]。已有研究报道,器械脱落致栓塞的概率约 0.24%^[13]。封堵器释放后可从左心耳封堵处移位至左心房、左心室和主动脉,可能与封堵器选择不当、左心耳过大、封堵器放置太靠外和封堵器预装不稳固有关。封堵器脱落至胸主动脉或腹主动脉时临床上可无任何表现,但可在 TTE 检查时发现。封堵器脱落至左心房或左心室内可引起二尖瓣功能障碍或左心室流出道梗阻,症状表现为心悸和胸闷等,严重者出现室性心律失常,甚至危及生命。

详细评估左心耳大小和轴向选择合适封堵器,确保封堵器与推送杆链接牢靠,严格遵守封堵器的释放原则,如 PASS 和 COST 原则等,可最大限度地降低封堵器移位的发生率。

封堵器移位后能否经导管取出,取决于移位的位置及术者手术经验。约 2/3 的栓塞装置不能经皮移除,需外科手术移除^[14]。封堵器移位于左心室、主动脉和左心房的概率分别为 43%、43% 和 14%。移位至左心房和主动脉内的封堵器,大多可经导管取出;移位至左心室并固定在左心室的封堵器,建议外科开胸取出。

3 空气栓塞

在 LAAC 中,空气栓塞发生的概率为 5%,但在临床大多数情况下,它是一个隐秘的事件。空气栓塞可能导致一些不严重和严重的事件,如短暂的冠状动脉缺血、低血压、脑卒中甚至死亡^[15-16]。三种重要的原因可导致左心房置管过程中的空气栓塞:(1)无意的空气注入;(2)尽管冲洗导管或打开排气口,但仍有空气滞留;(3)由于大气压力和心脏内部压力之间的梯

度差,导致空气的侵入。前两种原因在很大程度上都不可预测,因此很难避免。全麻期间的镇静可降低左心房压力,从而增加空气栓塞的风险。由于镇静引起的上呼吸道塌陷,胸内压进一步降低,这一情况被放大。此外,建议使用呼气末正压进行插管和通气,以避免上气道塌陷。一旦发生空气栓塞,需患者保持仰卧,给予高压氧治疗。脑空气栓塞多为短期性,在长期随访中通常不会有后遗症^[16]。

4 血栓形成

术中在封堵器表面和左心房内出现血栓常见原因包括:(1)术前未抗凝或抗凝不充分;(2)术中导管和导丝肝素化盐水冲洗不够;(2)手术时间过长,疏于活化凝血时间监测和补充肝素不及时;(3)患者高凝体质或存在肝素抵抗;(4)术前或术中左心房/左心耳内血栓未及时发现。因此,在将封堵器送入左心房前,活化凝血时间必须达到 250 s 以上,且每 20 分钟需监测 1 次;若术中发现左心耳或心腔内血栓形成,立即停止手术,随访活化凝血时间,必要时增加肝素。

在左心耳关闭后的随访中可能发现封堵器上有血栓形成,既往研究中其发生率为 2.0% ~ 7.2%^[8,17-18]。封堵器相关血栓(device related thrombus, DRT)是 LAAC 治疗的致命弱点,此时卒中和系统性栓塞的风险增加 3 倍^[18]。Boersma 等^[19]的研究显示,大部分(2.5%)DRT 为非流动的层状血栓,部分(1.1%)为流动的带蒂血栓,少数(0.5%)无特殊形态。在目前的登记中,DRT 发生率差异很大,这可能是由于不同的样本量,对 DRT 的定义缺乏共识,报告的偏倚,不同的成像方法及随访频率等引起^[8]。

DRT 的风险可通过封堵器内皮化来减轻,然而,这一过程很难评估,并随血流动力学变化而变化。DRT 的预测因素包括先前短暂性脑缺血发作或脑卒中、永久性房颤、较大的左心耳直径和心力衰竭。对于高风险患者,修改 LAAC 后抗凝策略是否可降低 DRT 的发生率,目前尚不清楚。口服抗凝血药治疗 DRT 的理想选择和治疗时间窗仍未知。国内专家共识推荐对 DRT 患者须加强使用抗凝血药至少 6 周。

5 封堵器残余分流

封堵器残余分流(per-device leak, PDL)是 LAAC 的一个重要限制。PDL 发生的可能因素包括闭合装置尺寸过小或过大,装置错位或移位,闭合装置植入浅(离轴),左心耳开口高度椭圆化,内皮化不完全^[20-21]。既往报告的 PDL 发生率为 0% ~ 63%,这取决于 LAAC 设备的类型以及监测的频率和方式^[22]。PDL 直径>5 mm 通常被用于定义不完全 LAAC,它的发生率很低。相反,PDL 直径<5 mm 通常不认为是封堵失

败,尽管它的发生率较高^[23]。在 LAAC 失败的患者和那些有 PDL 的患者中,血栓栓塞事件的风险更高,即使 PDL 直径 <5 mm 也被证明是如此^[24-25]。Mohanty 等^[25]对 PDL 患者的随访过程中,在 6 个月时经食管超声心动图发现,32% 的 PDL 已自行完全闭塞,另有 25.9% 的 PDL 出现了不完全的自发性闭塞。

既往 PDL 发生率报告数据中的矛盾暴露了成像方式的局限性和适当的封堵器尺寸的重要性。术者借助经 TTE 和 CT 扫描获得足够的左心耳解剖成像,进而选择合适型号的封堵器,可把 PDL 发生率降到最低。

随着房颤患者卒中预防领域的不断发展,需继续深入了解如何最好地处理术后残余漏。在此之前,建议继续 TTE 监测和临时开始抗凝治疗。识别 PDL,并采用最佳抗凝策略(在无禁忌证的情况下)或再次经皮封堵治疗 PDL,以降低患者血栓栓塞事件的风险,这非常重要。

Della Rocca 等^[24]的最新研究发现,不理想的 LAAC 导致的 PDL 可用心型隔膜封堵器有效地封堵,同时心型隔膜封堵器封堵左心耳是安全的,无围手术期和术后并发症、器械脱出或栓塞。此外,对于左心耳解剖结构不符合常规封堵器最小解剖标准的患者,该装置可能是常规封堵器植入的安全替代品。Horton 等报道了首个使用血管内线圈的经导管 PDL 闭塞的可行性队列研究,该研究发现:(1)可拆卸线圈封闭 PDL 是安全的,且与设备和操作相关的并发症发生率很低;(2)左心耳缠绕术可使 90% 以上的患者完全或几乎完全关闭 PDL,总 PDL 大小减少约 93%;(3)随访期间未见器械相关血栓形成、线圈迁移和栓塞^[26]。

6 血管并发症

与股静脉相关的血管并发症包括穿刺部位出血、血肿、动静脉瘘、假性动脉瘤、深静脉血栓和感染,有荟萃分析显示其发生率为 8.6%^[21]。超声引导下的静脉穿刺是目前常用的穿刺方法,与触诊引导穿刺相比,超声引导下的静脉穿刺中,大大小小的血管并发症发生率都较低。手术后,静脉通道的闭合通常采用 8 字形缝合和直接加压。另一种选择是使用基于缝线的血管闭合装置,有报道称,与单独手动压迫相比,该方法可显著地减少长时间卧床休息的患者数量和降低血肿发生的频率^[27]。动脉穿刺在 LAAC 程序中是不需要的,应避免。部分股动脉假性动脉瘤或股动静脉瘘通过局部压迫血管闭合破口不成功,需置入覆膜支架或外科手术修补破口。

7 小结

众多临床试验表明,LAAC 预防房颤患者发生脑

卒中是可行的,LAAC 具有操作简便易行、创伤小和成功率高等众多优点,有望在临床上广泛应用^[28]。从事 LAAC 的相关医务人员应能早期识别其主要的并发症,如心包积液/心脏压塞、空气栓塞、脑卒中和器械栓塞,并掌握相应的治疗方法,包括器械回收技能^[29]。相信随着器械的不断改进、术者经验的积累和操作的规范化,在可预见的未来,LAAC 围手术期及术后并发症的发生率会明显降低,LAAC 指南推荐级别会不断提高,LAAC 最终将改善更多患者的预后。

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