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前庭神经鞘瘤术后并发症的研究进展

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摘 要

随着显微外科技术的发展，前庭神经鞘瘤术后并发症发生率逐渐降低，但仍不可避免。近年来，国外有许多对前庭神经鞘瘤术后并发症的研究。该文对前庭神经鞘瘤术后并发症研究进展作一综述。

关键词

前庭神经鞘瘤，并发症，脑脊液漏

Progress in the Study of Postoperative Complications of Vestibular Schwannomas

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Abstract

With the development of microsurgical techniques, the incidence of postoperative complications of vestibular schwannomas has gradually decreased, but they are still inevitable. In recent years, there have been many studies on postoperative complications of vestibular schwannomas abroad. This article gives a review of the progress of research on postoperative complications of vestibular schwannomas.

Keywords

Vestibular Schwannoma, Complications, Cerebrospinal Fluid Leakage

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1. 引言

前庭神经鞘瘤(即前庭神经施旺细胞瘤)是一类组织病理学良性的施旺细胞瘤，常起源于前庭下神经。前庭神经鞘瘤是最常见的颅内肿瘤之一，在大多数研究中其发病率约占颅内肿瘤的 8%~10% [1] [2]，占小脑桥脑角肿瘤的 65%~95% [1] [3]，年发病率约为 1.4/10 万[2]。由于核磁等影响学技术的发展，其发病率在过去的几十年间逐渐上升，且确诊时肿瘤体积逐渐缩小[4]。前庭神经鞘瘤常在 30 岁之后出现典型症状，且 95%以上都属于单侧起病，在神经纤维瘤病 2 型中，以双侧前庭神经瘤发病为标志。大多数肿瘤早期症状为同侧感觉神经性听力下降和耳鸣，常见的症状另有平衡障碍、头痛、面部麻木、面肌无力、复视、恶心呕吐、味觉改变等，常见的体征有角膜反射异常、眼球震颤、面部感觉障碍、异常眼球运动等[5]。常行脑部核磁平扫加增强扫描得以确诊，肿瘤大小常使用 Koos 分级[6]进行评估，如行手术治疗，可使用颞骨薄层 CT 以明确局部骨性解剖结构。

根据术前病人的一般情况、年龄及自然病史等，可选择期待疗法、放射治疗、显微外科或化疗等治疗方式[7]。其中显微外科手术治疗有颅中窝入路、乙状窦后入路及经迷路入路三种基本手术入路。显微外科治疗最常见的术后并发症是脑脊液漏与脑膜炎、面瘫、头痛、前庭功能障碍、小脑和脑干损伤以及血管并发症等。随着显微技术的发展和围手术期管理的进步，前庭神经鞘瘤术后并发症发生率逐渐降低，但同其他外科手术一样，尽管有先进的高科技设备、精细的显微手术器械和高度发达的神经成像技术，前庭神经鞘瘤显微手术仍然存在各种显著的并发症[3]。成熟的外科技术是预防术后并发症的关键，除此之外，早期诊断和治疗对于前庭神经鞘瘤术后并发症的处理是至关重要的。以下为前庭神经鞘瘤术后常见并发症的探讨。

2. 脑脊液漏

脑脊液漏是前庭神经鞘瘤术后常见的并发症。文献报道术后脑脊液漏率从 2%到 30%不等[8] [9] [10] [11] [12]。脑脊液漏可发生于皮肤切口，可以经鼓膜裂口形成脑脊液耳漏，或是通过咽鼓管形成脑脊液鼻漏或向下到咽后壁。大多数病例可在 1 周内确诊，也有报道脑脊液漏发生于术后数年[5]。术后脑膜炎的发生与脑脊液漏呈显著相关性，术后脑脊液漏可增加脑膜炎的风险[13]。许多报道讨论了导致脑脊液漏形成的多种因素，目前国外[14] [15]已有单中心研究机构显示了 BMI 与术后脑脊液漏的关联，并证实了 BMI 升高是前庭神经鞘瘤术后脑脊液漏的重要危险因素；还有研究发现肿瘤大小、性别、手术时间、手术入路与脑脊液漏发生率有显著关系；Russel 和 Kinaci 等[16] [17]人认为，肿瘤越大、女性和手术时间越长，脑脊液泄漏的风险越大；Slattery [18]等显示手术入路与脑脊液漏率相关，其中乙状窦后入路的脑脊液漏率最高。其中最值得注意的是最近有许多研究[19] [20] [21] [22]揭示颞骨气化因素在前庭神经鞘瘤术后脑脊液漏中的影响。总之，前庭神经鞘瘤术后脑脊液漏的发生受到多因素的影响，包括患者特征和解剖结构、手术计划和技术以及肿瘤特征。其中关于手术入路的决定也由许多因素驱动，包括外科医生经验、肿瘤特征和其他解剖学考虑。

2.1. 脑脊液漏的发生途径

最常见的途径为通过顶端气房到达鼓室或咽鼓管；也可经过骨迷路，包括经水平半规管或后半规管，

起其中后半规管是磨除内听道骨质后最常见的耳漏通道；可经迷路周围气房进入乳突窦；在开颅过程中经开放的乳突气房[23]。可见迷路周围气化因素在前庭神经鞘瘤术后脑脊液漏中发挥着重要作用。手术中向外磨除越多的内听道后壁，脑脊液漏可能越常见[20]。

2.2. 颞骨气化因素对脑脊液漏的影响

有研究表明[24] [25]在乙状窦后入路肿瘤切除术后，2.2%至 5.7%的患者发生了脑脊液漏。最重要的来源是内耳道附近的气室，这些气室必须钻孔以暴露肿瘤。脑脊液漏的发生将增加脑膜炎的风险[26]，大约 75%的病例需要手术干预，并延长住院时间。现国内外已有大量文献研究术后并发症脑脊液漏的影响因素。一些研究寻找危险因素并评估了各种预防措施，颞骨气化程度成为主要因素[27] [28]。Celikkanat 等人[28]和 Yamakami 等人[29]报道了在颞骨高度气化的情况下，脑脊液漏的发生率较高。Stieglitz 等人[30]发现，CT 上颞骨气化体积与脑脊液漏之间存在显著相关性：颞骨气化量每增加 10%，脑脊液漏风险增加 26%。根据 Lennart 团队的研究[28] [29] [30]，颞骨高度气化的患者比其他患者更容易发生脑脊液漏。该团队考虑广泛的颞骨气化可被判断为术后脑脊液漏发生的危险因素。Hoffman 等人[27]报道了一系列 381 例患者中未钻孔内听道后壁时无脑脊液漏病例，而钻孔内听道后壁后仅有 16%。他们间接证明了内听道后壁对脑脊液漏发展的重要性。乳突气房对乙状窦后入路很重要，因为它们可以向后内侧延伸到乙状窦。因此，在颅骨切除术过程中，它们通常已经被打开，应进行细致的密封以避免脑脊液漏[24]。

2.3. 脑脊液漏的治疗

部分脑脊液漏可自行停止[12]，治疗方法包括非手术治疗和手术治疗。非手术治疗包括抬高床头，行腰大池引流术缓解颅内压，促进漏口的愈合，值得注意的是腰大池引流有发生脑膜炎的风险。大部分脑脊液漏的病人均可通过保守治疗得以好转。若保守无效，出现持续性的脑脊液漏，此时最好的办法就是手术探查并进行修复及封堵。文献中提出了许多修复内听道的方法，包括脂肪移植、肌肉移植、骨蜡、纤维蛋白胶、钛网、磷酸钙和羟基磷灰石钙骨水泥等[9] [31] [32]，都取得了不错的效果。

3. 脑膜炎

脑膜炎是前庭神经鞘瘤术后的常见并发症。据报道，前庭神经鞘瘤术后脑膜炎的发生率 2%~10% [33] [34] [35]。虽然致死率很低，但能明显延长患者的住院时间，患者的医疗费用增加，重返工作岗位的时间延长，社会负担增加，早期发现和早期治疗对促进患者术后康复显得尤为重要[3]。脑膜炎分为无菌性脑膜炎和细菌性脑膜炎，据文献报道，脑脊液阳性培养率约为 33% [36]，许多培养结果为阴性的脑膜炎病例可能是细菌性脑膜炎[33] [34]。我们可以尝试采用一些更灵敏的方法，如聚合酶链反应技术来提高 CSF 培养的阳性率。术后脑脊液漏与脑膜炎的风险有关，有研究表明脑脊液漏的发生将脑膜炎的风险从 3%增加到 14% [37]，Kourbeti 等[38]研究发现，脑脊液漏对脑膜炎的发生无显著影响，总的来说，脑脊液泄漏似乎是脑膜炎的一个明显的危险因素。有研究揭示肿瘤大小是前庭神经鞘瘤术后脑膜炎的影响因素，然而具体机制尚不清楚[33]。也有相关研究发现手术时间延长、术中出血量较大，术后脑膜炎发生的可能越大[39] [40]；考虑麻醉下患者的免疫功能受到抑制[41]；手术时间较长，术者易疲劳，增加术区感染的风险；术中大量失血后，常进行异体输血，但异体输血会使免疫抑制复杂化，免疫力下降的患者抗感染能力降低，容易发生脑膜炎[39] [42]。

前庭神经鞘瘤术后细菌性脑膜炎可给予第三代头孢及万古霉素经验性治疗，通过培养和药敏试验对病原菌进行鉴定后，优化抗生素治疗。当已经开始抗生素治疗时，可辅助使用皮质醇激素，可显著降低听力损失和神经系统后遗症，目前不建议新生儿使用地塞米松[5] [43]。其它辅助治疗不建议使用甘露醇、

对乙酰氨基酚、抗癫痫药物或高渗盐水，低温治疗和甘油治疗细菌性脑膜炎是禁忌，在某些患者中，使用颅内压/脑灌注压监测和治疗可以挽救生命，但不能推荐作为常规管理，并且可能会造成伤害。不推荐使用免疫球蛋白、肝素和活化蛋白 C 进行辅助治疗[36] [43]。

4. 颅内血管并发症

颅内血管并发症是严重的术后并发症，可能造成灾难性的后果。包括脑内血肿、硬膜下出血、硬膜外血肿和缺血等，如果不立即治疗，这些并发症可能导致死亡。急性颅内出血的主要后果是颅内压升高导致意识丧失、偏瘫、瞳孔固定或扩大、呼吸窘迫、心动过缓或收缩期高血压[13]。任何这些迹象的识别都应该导致早期干预，大多数颅内出血需要在 CT 扫描后立即行手术治疗[44]。缺血性并发症可能是动脉或静脉起源，并可能影响脑干或小脑半球[45]。肿瘤与脑干和小脑的粘连是肿瘤－脑界面小血管微损伤的原因。因此，在肿瘤切除过程中，小心翼翼地保护蛛网膜平面对于保存基底下血管至关重要，小动脉穿支必须避免电凝，以防止脑干梗死[13] [45]。

5. 头痛

文献中前庭神经鞘瘤术后头痛的发生率变化很大，从 0 到 77%不等，这取决于手术方式和术后评估时间[46] [47] [48] [49] [50]。术后头痛的发生主要见于经乙状窦后入路的患者，然而，术后头痛的起源与手术入路的关系尚不清楚[50]。许多引起症状的因素可能有：切口、硬脑膜粘连至颈部肌肉或皮下组织、硬脑膜紧张或肌肉痉挛[13] [50] [51]。有报道[52]显示，内听道后壁钻孔过程中骨尘进入颅后窝的脑脊液循环可能是乙状窦后入路后发生头痛的重要因素。为了防止患者术后头痛，可通过持续冲洗和吸引来细致清洁骨尘，但 Ren 等[49]的研究并不支持这一结论。在术后头痛的情况下，与康复科、神经科、疼痛科合作的多学科管理，甚至替代方法(如针灸)是有一定帮助的。

6. 脑神经功能障碍

6.1. 面神经功能障碍

前庭神经鞘瘤术后面神经功能障碍的风险不能完全消除，在前庭神经鞘瘤手术切除后，仍存在显著的短暂性面神经功能障碍[53]。可以用 House-Brackmann 分级量表进行面神经功能地临床分级，I~III 级为可以接受的功能状态。手术入路、肿瘤和面神经的相对位置和肿瘤大小是影响术后面神经功能的主要因素[54] [55]。立体定向放射治疗术后出现面神经功能障碍的比例，相对于手术治疗更低[53]。立体定向放射治疗后可出现放射性脑神经病变，半数病人经过激素治疗后，一般在出现症状后 3~6 月得以缓解。通过使用术中面神经功能监测，前庭神经鞘瘤术后面神经功能 I~III 级可达 90%以上[56]。保留面神经功能的手术技术包括早期识别神经根进出区，以及在切除面神经上肿瘤部分时要非常小心。对于面神经严重受压的病例，术中需要残留与面神经粘连严重的肿瘤，以保留面神经的完整性，术后的面神经功能一般较差。如果面神经功能在几个月后仍未恢复或不能达到预期，交叉吻合是面神经麻痹恢复的最佳措施和最广泛使用的技术。舌下－面神经吻合术可以保护眼睛，使面部色调改善等，患者能获得正常的面部张力和自主运动[13] [34] [57]。

6.2. 前庭蜗神经功能障碍

前庭神经鞘瘤术后听力保留的关键取决于肿瘤的大小和术前听力水平，当肿瘤直径 ＞1 cm 时，保留听力的机会很小，总的来说，术后听力保留率为 30%~70% [13] [58] [59]。术中使用脑干听觉诱发电位监测可能会提高听力保留率，但外科医生对解剖的了解和手术的细致程度仍是手术成功的关键因素[60]。相

关荟萃分析表明，无论采用何种技术，在中位随访 6~7 年后，几乎 60%的患者可以实现听力保存[61]。术前眩晕可由周围病变(内耳或前庭神经)引起；然而，它也可能有中央(小脑)起源。小肿瘤更常与外周性眩晕相关，而大肿瘤，尤其是那些生长缓慢的肿瘤，会造成小脑脑干的压迫，从而导致中枢性眩晕[3]。前庭病变的术前诊断可预测术后代偿结果[62] [63]。有研究[64]认为，患者的年龄被认为是乙状窦后前庭神经鞘瘤显微手术后前庭代偿紊乱的重要因素[65]。中枢性病变的患者可能会有较长时间的代偿，而周围病变的患者在手术前可能会出现代偿[3]。术后眩晕一般是由前庭神经横断引起的急性传入神经障碍引起的。随着时间的推移，它有逐渐改善的趋势[65] [66]。术中试图保护前庭神经功能的手术，与不那么注意前庭神经保护的手术相比，效果无明显差异[13]。大多数术后单侧前庭神经功能丧失的病人，可以在很大程度上通过正常的对侧传入进行代偿[65] [67]。因肿瘤手术造成小脑脑干损伤引起术后眩晕或共济失调的病人，术后面对的障碍更多[68]。因此，术中避免小脑脑干损伤是预防前庭代偿紊乱的关键。对于顽固性眩晕或共济失调的病人，有文献建议与治疗梅尼埃病类似，直切切断前庭神经，有一定的治疗效果[69] [70]。

6.3. 其它神经功能障碍

三叉神经损伤引起的面部疼痛或麻木，发生率较低，常见个案报道[71] [72]，部分患者因牙疼症状明显，常前往牙科首诊，而延误治疗[73]。有文献认为前庭神经鞘瘤术前面部疼痛很可能是由神经血管冲突引起的，在此类病例中，除切除肿瘤外，应始终行微血管减压术[72]。外展神经功能障碍是大肿瘤前庭神经鞘瘤手术比较少见的并发症。在切除大的前庭神经鞘瘤时，后组颅神经可能会受到损伤，包括舌咽神经、迷走神经和副神经，但这种损伤不常见，且多发生于切除较大肿瘤时。急性后组神经损伤可导致吞咽困难和呼吸困难。必要时，术后可在 ICU 观察数天，警惕患者术后的呼吸困难。鼻胃管可提供营养或防止误吸的危险。

尽管出现并发症的病例中，大肿瘤的比例占多数。总的来说，在过去的几十年里，前庭神经鞘瘤显微手术并发症的发生率急剧下降。然而，在进行手术时，应明确告知患者可能出现的并发症，从收益和风险等方面进行评估。合理的病例选择、细致的手术技术和精心的术后护理是降低前庭神经鞘瘤显微手术各种并发症发生率的关键[3] [13] [34]。

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