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· 鼻整形专题 ·

鼻整形术后并发症的循证医学分析

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摘要:鼻整形术是全球主流的美容外科手术之一,临床在追求美学效果的同时,对鼻部通气功能的改善关注度持续提升。鼻整形手术复杂度较高,术后易出现多种并发症,为患者带来心理、生理及经济层面的多重负担。本文系统梳理鼻整形术后并发症防控的循证医学证据,从围手术期管理、移植物选择、形态结构修复及鼻部功能保护4个维度展开论述。围手术期联合药物干预、神经阻滞、物理冷疗可有效控制出血、疼痛等早期并发症,跨鼻中隔缝合可替代传统鼻腔填塞。自体软骨与人工植入物均存在特异性术后并发症,驼峰复发、鼻尖及鼻背畸形需借助精准外科技术予以矫正。同时,临床需警惕医源性鼻气道阻塞、嗅觉减退等功能并发症。未来可结合人工智能技术与循证医学路径,进一步提升鼻整形手术的安全性与精准度。

关键词:鼻整形;并发症;植入物;结构畸形;鼻功能

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Evidence-based analysis of postoperative complications of rhinoplasty

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Abstract: Rhinoplasty is one of the mainstream cosmetic surgical procedures worldwide. Clinically, while pursuing aesthetic outcomes, the focus on improving nasal function has been continuously increasing. The complexity of rhinoplasty predisposes patients to various complications, imposing physical, psychological and economic burdens on them. This paper systematically reviews evidence-based medical evidence regarding postoperative complications of rhinoplasty, focusing on perioperative management, implant selection, morphological and structural repair, and protection of nasal function. Perioperative interventions including medication, nerve block and cold therapy can effectively control early complications such as hemorrhage and pain. Transseptal suture can replace traditional nasal packing. Both autologous cartilage and synthetic implants have specific postoperative complications. Hump recurrence, nasal tip and nasal dorsum deformities require correction with precise surgical techniques. Meanwhile, iatrogenic nasal airway obstruction and hyposmia should be cautiously prevented in rhinoplasty. In the future, the integration of artificial intelligence and evidence-based medicine can further improve the safety and precision of rhinoplasty.

Keywords: Rhinoplasty; Complications; Implants; Structural deformities; Nasal function

鼻整形术是目前全球开展最为广泛的美容外科手术之一。近十年来,全球手术与非手术鼻整形的临床应用量均呈持续上升趋势^[1-2]。当代鼻整形的发展趋势显示,临床在追求美学效果的同时,对鼻气道功能改善的关注度也不断提升^[3]。但手术的复杂性也伴随着多种多样的潜在并发症风险,这些并发症会给患者带来巨大的心理、功能与经济负

担^[4-5]。目前鼻整形领域蓬勃发展,患者的需求不断提升要求鼻整形医生不但要对鼻部解剖、生理及美学知识具备精深的理解,同时要深入了解各类术式的相关并发症——从术后早期的出血、水肿,到移植物相关问题、结构性畸形、功能受损等远期难题。为实现诊疗标准化、降低手术风险、优化手术效果,循证医学实践的重要性不言而喻。本综述旨在总结

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分析当前鼻整形领域术后并发症的预防、处理与治疗相关循证证据,通过系统分析围手术期药物干预、移植材料选择策略、初次与修复鼻整形手术的外科技术,为鼻整形医生提供一套全面的鼻整形术后并发症循证证据,以提升鼻整形手术的安全性与患者满意度。

1 围手术期并发症

术中和术后早期并发症主要为出血、水肿、瘀斑与疼痛,对其进行科学有效管理是保障鼻整形术患者恢复顺利、提高满意度的基础。越来越多的证据表明,采用药物、局部阻滞麻醉技术与特定围手术期操作相结合的多模式干预方案效果显著,这些策略能够优化手术视野可视度、减轻患者不适感并缩短恢复周期。

1.1 出血及肿胀的药物干预

药物干预中,氨甲环酸与糖皮质激素在减少术中出血、抑制术后炎症方面的应用得到了广泛研究。多项系统综述和荟萃分析证实,氨甲环酸可有效减少术中出血量,同时缓解术后水肿与瘀斑^[6-7],其静脉注射、局部外用、局部浸润等多种给药途径均被证实有效^[8]。尽管多数证据均强力支持氨甲环酸的应用,但有一项随机对照试验显示,其对出血量的减少无统计学意义,这提示临床仍需进一步研究以优化其使用方案^[9]。同理,地塞米松、甲泼尼龙等糖皮质激素的围手术期应用,被证实可显著减轻术后48~72 h内的水肿与瘀斑^[10-12]。尽管目前关于糖皮质激素对水肿远期消退的获益尚不明确^[13],但其短期改善效果已得到充分证实。基于上述证据,美国耳鼻咽喉头颈外科学会发布的临床实践指南将围手术期全身使用糖皮质激素列为外科医生的临床可选方案之一^[14]。除上述两种药物外,有证据表明术前使用去氨加压素也可改善止血效果,获得更清晰的手术视野^[15-16]。

1.2 术中及术后疼痛管理

局部阻滞麻醉技术已成为现代鼻整形术围手术期镇痛方案的核心组成部分。临床实践证实,规范实施局部神经阻滞可减少术中与术后镇痛药物的使用剂量,进而降低全身使用阿片类药物带来的不良反应。荟萃分析显示,蝶腭神经节阻滞可显著降低术后疼痛评分、减少急救镇痛药物的使用,同时通过减少术中出血优化手术视野^[17-18];围手术期眶下神经与滑车下神经阻滞,也能有效减轻术后疼痛,降低

患者麻醉苏醒期躁动的发生率^[19]。超声引导颧上颌神经阻滞等更先进的技术,也被证实可减少术中阿片类药物用量,缩短患者在麻醉后恢复室的停留时间^[20]。对比研究表明,中央面部阻滞在缓解患者术后疼痛、减轻水肿与瘀斑方面,效果可能优于全鼻阻滞^[21]。现有证据充分支持,将这些神经阻滞技术纳入多模式镇痛策略,可提升鼻整形患者舒适度^[22-23]。

1.3 术后物理干预及护理

物理干预与术后护理方式的改进,在鼻整形术后水肿与瘀斑的规范化管理中发挥着重要作用。术中采用冷生理盐水冲洗术区,可通过收缩局部毛细血管,减少术后瘀斑并缓解术后早期疼痛^[24]。有研究报道,术后通过鼻模实施外部加压、振动治疗等其他物理手段,也能在术后早期显著减轻水肿、瘀斑与疼痛^[25]。术后护理领域的一项重大变革是摒弃常规鼻腔填塞,临床实践指南与多项荟萃分析均指出,鼻腔填塞在止血方面获益有限,反而会增加患者不适感、疼痛与睡眠障碍,还会提高鼻腔粘连的发生风险^[5,26-27]。跨鼻中隔褥式缝合现已成为成熟的替代方案,其预防鼻中隔血肿的效果与鼻腔填塞相当,且能显著减轻术后疼痛,降低鼻腔粘连发生率^[28];鼻内硅胶夹板是另一类替代方案,可维持鼻中隔术后位置,同时通过在组织愈合期物理分离鼻黏膜表面,减少鼻腔粘连的形成。现有证据均强烈支持,临床应避免常规鼻腔填塞,优先采用跨鼻中隔褥式缝合等创伤更小的替代方案,以改善患者术后恢复体验。

2 移植与植入物相关并发症

移植与植入物材料的选择,是决定鼻整形术短期与远期效果的关键因素。移植和植入物相关的吸收、弯曲、感染、穿出等并发症,也是导致鼻整形修复手术失败的最常见原因之一。临床实践中,在自体、同种异体与合成材料间选择时,需综合权衡材料的生物相容性、结构稳定性、材料可获得性,以及供区损伤的潜在风险。

2.1 自体软骨相关并发症

自体软骨可从鼻中隔、耳廓或肋软骨取材,因其具有良好的生物相容性,常被视为鼻整形中结构性移植物的金标准。但不同取材部位的软骨均存在独特的问题:肋软骨取材充足、质地坚硬,却存在较高的弯曲风险,有研究表明,弯曲是其最常见并发症,其次为吸收与感染^[29-30]。临床已发展出多种技术

以降低该风险,如多层移植物技术的弯曲发生率低于单块软骨雕刻技术^[31],"X形"鼻尖移植物等创新雕刻方法也能有效改善这一问题^[32]。耳廓软骨质地较软,适用于鼻尖精细化塑形,但用于维持鼻尖突出度时,其远期吸收率显著高于肋软骨^[33]。为解决实心移植物易导致的轮廓不规则、移植物显形等问题,软骨碎块移植技术在临床逐渐普及。筋膜包裹的软骨碎块移植物(筋膜可取自颞肌、腹直肌或同种异体真皮)被广泛应用于鼻背移植^[34-35],但该技术可能出现移植物部分吸收、移位、可触及的轮廓不规则等问题^[36]。软骨的碎裂程度是影响手术效果的关键,重度粉碎的软骨移植物吸收率与修复手术率显著更高^[37]。临床还探索将软骨碎块与富血小板纤维蛋白联合使用,作为生物辅助手段提升移植物的存活率与稳定性,相关研究显示,该方法在减少软骨吸收、优化手术效果方面前景良好^[38-39]。

2.2 同种异体材料相关并发症

同种异体材料是自体移植物的主要替代选择,其取材充足,且不会造成供区损伤。临床常用的同种异体移植物包括新鲜冷冻同种异体肋软骨、辐照同种异体肋软骨以及脱细胞真皮基质、脱细胞筋膜基质等。多项研究表明,新鲜冷冻同种异体肋软骨用于初次与修复鼻整形术均安全、便捷,感染、吸收、弯曲的发生率较低,患者满意度高^[40-42];针对辐照同种异体肋软骨的分析也显示,其远期总体并发症发生率低,最常见的不良事件为移位与需要二次修复手术^[43]。值得注意的是,对比分析发现,在隆鼻术中,自体肋软骨与辐照同种异体肋软骨的弯曲、吸收、感染发生率无统计学差异^[44]。加工后的同种异体筋膜,也被证实是鼻背掩饰与增高的安全、可靠选择,荟萃分析与大样本队列研究均显示,其吸收与感染发生率低^[45-46]。此外,冻干同种异体骨被成功应用于鞍鼻畸形矫正,能实现持久的鼻背增高效果,患者满意度高,且无明显吸收^[47]。上述研究结果表明,在严格筛选患者的前提下,同种异体组织可作为可靠的现成材料应用于临床。

2.3 人工植入物的并发症

硅胶、膨体聚四氟乙烯、多孔高密度聚乙烯等合成人工植入物取材便捷、易塑形,适用于鼻背增高术,但这类材料的使用也伴随一系列独特的远期并发症。相关临床分析显示,人工合成植入物的并发症包括感染、移位、穿出以及需要实施修复手术等^[48-49]。其中,硅胶植入物尤其易引发迟发性炎症反应与纤维包膜形成,进而导致包膜挛缩、鼻体缩短

与严重的美学畸形^[50-51]。研究表明,质地更柔软的硅胶植入物引发的炎症与纤维化反应更轻微^[52],但若需取出硅胶植入物,通常需同时行包膜切除术,以松解挛缩的软组织包膜,防止畸形进一步加重^[53]。膨体聚四氟乙烯、多孔高密度聚乙烯等多孔植入物允许组织长入,虽能提升稳定性,但会增加取出难度。膨体聚四氟乙烯在创伤性鼻畸形等特定情况下用于鼻背增高效果良好,并发症发生率低^[54-55];但多孔高密度聚乙烯在亚洲人群鼻整形术中用于鼻中隔延伸移植时,会导致鼻中隔原生L型支撑结构的远期破坏,需采用自体软骨进行复杂的二期重建手术^[56]。聚二氧六环酮板等可吸收植入物可用于鼻中隔支撑,但在吸烟患者中使用时,术后早期并发症风险显著升高^[57]。上述研究结果提示,临床选择合成植入物时需谨慎筛选患者,并向患者充分告知远期风险。

2.4 术后感染

术后感染是鼻整形术的严重并发症之一,修复手术的感染发生率(3.63%)显著高于初次手术(0.19%)^[58],当手术中使用人工合成材料、进行鼻中隔穿孔修补等复杂重建手术时,感染风险会进一步升高。精准识别致病菌是实现抗生素有效治疗的关键。研究表明,对取出的感染假体进行细菌培养,其致病菌检出率显著高于传统的鼻黏膜拭子或创面分泌物培养,在已接受抗生素治疗的患者中尤为明显^[59],该方法能为抗生素精准治疗提供更可靠的依据。植入物感染的处理通常需要外科干预,传统方案为二期重建术,即先取出植入物,待创面愈合后再行重建;但现有证据表明,在取出植入物的同时,采用自体软骨移植物行一期即时重建术是可行且有效的^[60-61],该方案并发症发生率低,还能避免软组织挛缩与瘢痕形成给延期重建带来的困难。临床应谨慎使用预防性抗生素,指南建议术后使用时长不超过24 h^[5,62];对于感染高风险病例,术前鼻腔筛查培养有助于制定个性化的抗生素预防方案,降低感染发生率。

3 形态与结构性并发症

鼻整形术的远期美学效果取决于鼻支架的稳定性与软组织包膜愈合的可预测性。鼻背轮廓不规则、鼻尖位置异常、畸形复发等形态与结构性并发症是导致患者不满并接受修复手术的常见原因。深入了解这些畸形的发病原因,是制定有效预防与矫正

策略的关键。

3.1 保留鼻背式鼻整形术后驼峰复发

保留鼻背式鼻整形术因避免切除鼻背关键支撑区,理论上能塑造更自然的鼻背美学线条,减少轮廓不规则的发生,因此受到部分鼻整形医生的青睐。该技术通过下压法、下降法等方式修整鼻中隔与骨性鼻锥的深层结构^[63],但也存在特有的驼峰复发并发症,其成因包括鼻背组织松解不充分、鼻中隔切除不足或软骨支架的组织记忆性^[64-65]。预防该并发症的策略主要围绕五大核心原则:严格筛选适应证患者、处理解剖学阻挡点、实现鼻中隔稳定固定、分级选择手术技术、采用辅助手段控制鼻背形态^[66]。术前计算机断层扫描分析有助于筛选适宜患者;研究发现,鼻骨较短、驼峰角较小的患者手术效果更理想。改良式低鼻中隔条形切除鼻中隔矫正术、确保鼻中隔与鼻棘牢固固定等外科改良手段,已被证实能显著降低驼峰复发率^[67-68]。部分研究显示,与传统结构性鼻整形术相比,保留鼻背式鼻整形术的鼻背轮廓不规则发生率更低,但也有研究发现其驼峰复发率更高,这也凸显了该类手术对操作技术的高要求。

3.2 鼻尖与鼻翼形态异常

鼻尖与鼻翼是相互关联的复杂结构,即使是轻微的不对称或轮廓异常,也可能让患者产生严重的美学不满。鼻尖上区畸形(鹦鹉嘴畸形)是鼻修复手术最常见的原因之一,其成因包括鼻背鼻中隔切除不足、鼻尖支撑力不够或鼻尖上区瘢痕组织过度增生^[69-70]。对其的预防与矫正需保证鼻尖的突出度与立体感,外部鼻尖上区缝合等技术适用于皮肤较厚的患者,可有效控制软组织的重新贴合^[71]。鼻尖下垂由鼻尖支撑力不足导致,临床可采用鼻中隔延伸移植术、去旋转移植术等结构性手段控制鼻尖位置与旋转度^[72]。选择聚丙烯不可吸收缝线等合适的移植术固定缝线材料,对维持鼻尖远期旋转度至关重要,在皮肤较厚的患者中更是如此。榫卯技术也是设定鼻尖旋转度的有效方法,但外科医生需在术中适当过度矫正,以弥补术后可预见的旋转度丢失。鼻翼退缩、切迹等鼻翼畸形,可通过结构性移植术矫正;鼻翼退缩可采用铰接式鼻翼缘移植术联合 V-Y 推进术^[73],鼻翼凹陷与鼻前庭软组织三角切迹可采用鼻翼缘移植术^[74]。

3.3 歪鼻矫正术后复发

歪鼻矫正是鼻整形术中最具挑战性的操作之一,术后畸形复发率较高^[75-76],手术成功的关键在

于矫正鼻中隔偏曲并稳定鼻中段结构。撑开移植术是鼻中段重建的核心手段,可拓宽内鼻阀区,塑造对称的鼻背美学线条^[77-78]。对于严重鼻中隔偏曲且无法原位矫正的病例,体外鼻中隔矫正术(即鼻中隔软骨取出、矫正后再重新植入)是一种有效的技术^[79-80],而重新植入鼻中隔软骨的缝合固定技术改良,也提升了该手术的安全性与可重复性^[81]。鼻中段不对称多由上外侧软骨先天性发育不对称导致^[82],鼻背驼峰切除术后可能出现的开放鼻背畸形,需精细重建以防止鼻背塌陷与不对称。该畸形传统上采用外侧截骨术处理,但在骨性鼻锥狭窄的患者中应用效果不佳,临床可选择自体骨粉填充缺损^[83],或通过撑开皮瓣、张力跨越缝合使上外侧软骨复位,重建鼻背结构^[84]。对凸侧上外侧软骨行三角形切除等针对性治疗,可在保留内鼻阀功能的同时,有效矫正鼻中隔偏曲^[85]。

4 通气、嗅觉障碍等功能并发症

除美学需求外,鼻整形术的核心目标之一是保留或改善鼻部功能。医源性气道阻塞、嗅觉障碍等功能并发症会严重影响患者的生活质量,因此,细致的术前评估与采用保留功能的鼻整形技术,是避免此类不良结局的关键。

4.1 医源性鼻气道阻塞

鼻气道阻塞是鼻整形术的严重功能并发症,可由手术引发或加重,其主要原因是鼻阀区塌陷,常由鼻外侧壁功能不全或鼻背驼峰切除术后内鼻阀区稳定性受损导致^[86]。临床诊疗指南建议,术前需对鼻部功能进行全面评估,包括内、外鼻阀区的检查^[87]。鼻外侧壁功能不全的外科矫正需采用基于解剖结构的规范化方案,临床实践证实,采用外侧脚内翻皮瓣、鼻翼支撑移植术、鼻翼缘移植术等技术的阶梯式策略,能显著改善患者报告结局^[87]。撑开移植术与撑开皮瓣是重建鼻中段、支撑内鼻阀的基础技术,可有效预防或矫正鼻瓣区塌陷;此外,修复卷轴韧带复合体对支撑鼻内、外鼻阀均至关重要^[88]。对于鼻入口处阻塞的特定病例,梨状孔扩大术是安全、有效的辅助手术^[89]。

4.2 嗅觉减退

鼻部手术的操作区域与嗅觉系统解剖位置邻近,因此存在医源性嗅觉功能障碍的潜在风险。尽管鼻中隔矫正术、鼻整形术等鼻部手术总体上能改善术前嗅觉减退患者的嗅觉评分,但一项系统综述

与荟萃分析显示,手术诱发的嗅觉减退发生率仍达到2.7%,这一比例不容忽视^[90]。该结果也揭示了常规临床实践与研究中的一大短板,即客观、系统的嗅觉评估尚未成为标准流程。对耳鼻咽喉科医疗事故诉讼的分析显示,嗅觉丧失是患者对医生提起诉讼的重要原因,在鼻部手术后尤为常见^[91],相关案件的经济赔偿金额往往较高。这些司法先例凸显了一个关键点:在所有鼻整形术患者的知情同意过程中,必须将嗅觉障碍(包括部分或完全失嗅)的风险作为核心内容告知患者。全面的术前沟通并记录相关内容,对患者教育至关重要。

5 结论与展望

鼻整形术并发症的管理是推动鼻整形领域发展的重要措施,本综述整合了大量文献证据,证实积极的多模式干预方案是优化手术效果的关键。合理使用氨甲环酸、糖皮质激素等药物,可有效缓解水肿、出血等早期并发症;摒弃常规鼻腔填塞,转而采用跨鼻中隔缝合等替代方案,是在不降低安全性的前提下提升患者舒适度的重大进步;在结构重建领域,自体、同种异体与合成材料的争议仍在继续,各类材料均有其独特的风险获益比,自体软骨仍是可靠的金标准,但其弯曲、供区损伤等并发症,推动了外科技术的创新与新鲜冷冻软骨、加工筋膜等同种异体替代材料的应用。

展望未来,鼻整形术并发症管理的发展方向将是标准化与个性化的双重追求。该领域的下一个发展前沿或将由技术创新驱动,人工智能、机器学习与深度学习算法的整合,有望彻底改变临床实践^[92]。这些技术可分析海量的患者特征、外科技术与手术效果数据,预测鼻背轮廓不规则、鼻尖位置异常等特定并发症的发生概率,为外科医生提供辅助。但这一前景的发展也要求临床医生做好患者期望值管理,避免人工智能生成的图像使患者产生不切实际的手术期望。最终,将这些先进的预测工具与标准化的循证临床路径相结合,将开启鼻整形术的新时代,实现手术精准度、安全性的提升,让手术效果更可预测、患者满意度更高。

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