·儿童口腔疾病专栏 · 综述·

全身麻醉下乳牙牙髓治疗研究进展

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【摘要】 随着临床需要及家长观念的转变,越来越多患儿接受全身麻醉下牙科治疗。这类患儿牙髓炎或根尖周炎的发生率较高,为提高治疗成功率、减少重复全身麻醉发生率,需慎重选择牙髓治疗方式。本文就全身麻醉下乳牙治疗特点及牙髓治疗方式选择进行综述。

【关键词】 儿童口腔医学; 全身麻醉; 乳牙; 牙髓治疗; 冠部修复

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Research progress in pulp therapy of primary teeth under general anesthesia

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【**Abstract**】 With the change of clinical needs and parents' attitudes, more and more children receive dental treatment under general anesthesia. The incidence rate of pulpitis or periapical inflammation in these children is relatively high. In order to improve the success rate of treatment and reduce the incidence of repeated general anesthesia, pulp treatment plan should be carefully selected. This paper reviews the characteristics of primary teeth treatment and the selection of pulp therapy plan under general anesthesia.

【**Key words**】 Pedodontics; General anesthesia; Primary teeth; Pulp therapy; Crown restoration

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龋病是危害我国儿童口腔健康第一大疾病[1],龋病若不及时治疗,可能发展成牙髓病、根尖周病等,严重影响患儿口腔及全身健康[2]。临床上部分儿童无法在非药物行为管理或轻度镇静下完成口腔治疗,需运用牙科全身麻醉技术(dental general anesthesia,DGA)[3]。DGA可一次性治疗全口多颗患牙,改善患儿口腔健康及生活质量,由于DGA费用高、牙齿治疗量大、全身麻醉时间延长可能增加麻醉风险,在治疗术式的选择上应谨慎,尽量避免二次手术治疗。本文针对全身麻醉下乳牙治疗特点和牙髓治疗方式选择进行综述。

一、全身麻醉下乳牙治疗特点

DGA是采用麻醉药物使患者在无意识状态下进行口腔疾病治疗的一种行为管理技术。DGA可以有效控制疼痛,一次性完成口内多颗患牙的治疗,适用于对口腔治疗重度畏惧患儿、低龄儿童、智力障碍儿童及其他不适宜采用镇静治疗的患儿[4-5]。研究表明,心理或全身健康情况可能会影响患牙治疗方式的选择,如某些特殊儿童由于患有系统性疾病,需要接受其他药物、手术和康复治疗等,这些因素若对患牙预后或口腔卫生造成不利影响,可能促使医生对患牙采取更激进的治疗方法,比如进行拔牙而不是保守治疗,以提高治疗成功率[6]。

全身麻醉是否会对儿童大脑发育造成损害仍是家长及医务人员关心的问题[7]。欧洲麻醉协会(European Society of Anesthesiology,ESA)发布的共识表明,目前还没有足够证据证明现有的麻醉方法会对患儿脑部发育造成不利影响[8]。儿童接受短时间全身麻醉治疗是安全的[9-10]。美国食品药品监督管理局(Food and Drug Administration,FDA)于2016年提出,使用某些镇静剂或进行全身麻醉可能会影响3岁以下儿童大脑发育,特别是超过3 h的手术。全身麻醉时间是影响神经发育的危险因素[11],由于患牙数量多,在制定DGA治疗计划时,应尽量缩短手术时间、降低麻醉风险。

全身麻醉牙科治疗后,龋齿复发风险较高。Takriti等[12]研究表明,DGA治疗6个月后患牙重复治疗率为12.9%。Zhao等[13]的研究报告称,进行DGA治疗6个月、1年和2年后龋齿复发率分别为25.53%、37.23%和56.38%。为减少龋病复发,避免重复进行全身麻醉,除了定期复查及关注口腔预防保健[14],还需结合患儿全身健康情况、患牙情况和家长意愿等

因素,对患儿进行完善的术前检查并制定合理的治疗方案[15]。

二、全身麻醉下乳牙牙髓治疗方式选择

接受全身麻醉下牙科治疗的儿童多患有重度低龄儿童龋,乳牙龋发展速度快,自觉症状不明显,常发展成牙髓炎或根尖周炎才引起关注。研究表明,使用DGA治疗的学龄前儿童,其患龋率及牙髓坏死发生率明显高于其他儿童[16]。这类儿童无法在门诊局部麻醉下进行治疗,若治疗失败,可能需要进行二次全身麻醉手术治疗[17-20]。目前,关于DGA乳牙牙髓治疗方案选择的研究较少,各种牙髓治疗方法的适应证存在部分重叠,不同治疗团队提供的牙科治疗方法不同[21-22]。因此,总结DGA下各种乳牙牙髓治疗方式适用范围、成功率及优缺点,可为今后DGA治疗方案的制定提供参考。

1. 盖髓术:盖髓术可分为直接盖髓术(direct pulp capping, DPC)和间接牙髓治疗(indirect pulp therapy, IPT)。DPC是指将药物直接覆盖于暴露牙髓,从而保存牙髓活力的治疗方法,主要适用于外伤露髓或意外露髓,且露髓孔小于1 mm的无症状患牙。目前,乳牙DPC的适应证还未达成共识[23],相关循证医学研究证据质量较低,对于具有龋齿复发高风险的DGA治疗患儿来说,不推荐采用DPC。IPT是指有意识地保留深龋近髓部分龋坏牙本质,将氢氧化钙、MTA等生物相容性材料覆盖于龋损处,以抑制龋病进展,从而保存牙髓活力的治疗方法[23]。主要适用于深龋近髓且无不可逆性牙髓炎症状或体征的患牙。

根据美国儿童牙科协会(American Academy of Pediatric Dentistry, AAPD)指南[24],IPT和牙髓切断术都是治疗深龋近髓或可逆性牙髓炎乳牙的可行选择。DGA下深龋近髓选择IPT的优势在于治疗费用低、术后疼痛少[22]、手术时间短。患儿年龄、患牙术前敏感性、近髓点位置与IPT的成功率有关,年龄越大、患牙术前越敏感、近髓点位于邻面髓壁或轴壁时,IPT成功率越低[22],接受DGA治疗的患儿常无法配合进行术前口内检查及影像学检查,难以预测牙髓状态,使得误诊可能性增加。有研究表明,全身麻醉下乳牙IPT与牙髓切断术的成功率差异无统计学意义(P=0.234)[25]。Coll等[26]的研究发现,无论使用何种牙髓切断术药物,IPT成功率均高于牙髓切断术。Chen等[22]报道,IPT和iRoot BP Plus牙髓切断术治疗深龋近髓乳磨牙24个月成功率差异无统计学意义。Fang等[27]研究显示,IPT随访48个月的成功率显著高于硫酸铁牙髓切断术。目前,直接比较IPT和牙髓切断术用于DGA下深龋近髓乳牙的疗效对比研究较少,主要为回顾性研究,虽然有研究认为IPT的成功率更高,但由于缺乏随机对照,在治疗中存在将龋坏程度更重的患牙归为牙髓切断组的可能,从而导致IPT成功率被高估。未来仍需深入进行IPT与牙髓切断术在DGA下乳牙深龋近髓治疗的长期疗效对比研究。

2. 牙髓切断术:牙髓切断术(pulpotomy)是指去除冠部感染牙髓组织,将药物如甲醛甲酚、MTA、iRoot BP等覆盖于牙髓创面以保存根部健康牙髓的治疗方法[23]。主要适用于牙髓活力正常、无不可逆性牙髓炎症状且影像学检查无根尖周低密度影的露髓患牙。

在乳牙龋病治疗过程中,约有40.06%的患牙会出现露髓现象[28]。AAPD指南推荐使用牙髓切断术治疗深龋露髓乳牙[24]。正确判断牙髓状态是牙髓切断术治疗成功的关键,目前尚缺乏客观可靠指标,主要根据临床体征和影像学检查评估乳牙牙髓活力[29-30]。乳牙对疼痛等自觉症状不明显,且接受DGA治疗的患儿往往难以配合检查,无法运用牙髓活力测试取得可靠信息。研究表明,龋损颜色能够预测牙髓状态,颜色越深,牙髓活力可能越好[31]。牙髓切断术的成功率与牙髓断面止血时间有关,止血时间越长则失败风险越高,当止血时间大于3 min时,应谨慎选择使用牙髓切断术[32]。有学者报道,牙髓断面质地、出血颜色有助于判断牙髓状态,牙髓不成形、出血为暗红色提示牙髓呈炎症或坏死状态[33]。影像学检查也是辅助判断牙髓切断术禁忌证的重要方法,X线片可提供龋损范围、髓角位置、根尖周状况和继承恒牙情况等信息,有利于制定合理的治疗方案[21]。

牙髓切断术与乳牙根管治疗术的适应证存在部分重叠,在深龋露髓乳牙治疗方案的选择上,AAPD推荐使用牙髓切断术[24],但临床上仍有医生倾向于使用根管治疗术[20,34]。牙髓切断术的优点在于既消除了感染牙髓,也最大限度地保留了健康根髓,有利于乳牙继续行使正常生理功能以及牙根正常吸收与替换,对继承恒牙的影响较牙髓摘除术小[35]。牙髓切断术操作步骤少,有利于缩短全身麻醉手术时间,且整体治疗费用较根管治疗低。牙髓切断术的缺点在于牙髓状态不易判断,缺乏客观可靠指标,特别是在全身麻醉治疗过程中,医生没有足够时间充分止血判断牙髓状态,容易误诊导致治疗失败。治疗中牙髓断面超过3 min仍不能止血需改行牙髓摘除术[32],使治疗时间较直接行根管治疗更长。因此,在全身麻醉下选择应用牙髓切断术时需谨慎评估。

研究表明,全身麻醉下应用牙髓切断术治疗深龋露髓乳牙的成功率为96.97%[36]。一项Meta分析结果显示,牙髓切断术和根管治疗术在乳切牙深龋露髓治疗成功率上差异无统计学意义,但根管治疗术在影像学表现上失败的可能性更高[34]。随着MTA、iRoot BP、Biodentine等生物陶瓷材料的出现及应用,牙髓切断术的成功率有所增加[37-38]。有报道指出,全身麻醉下MTA牙髓切断术治疗乳牙深龋露髓短期效果优于Vitapex根管治疗[35,39]。现有DGA下乳牙深龋露髓不同治疗方式的疗效对比研究较少,随访时间大多不超过2年,不同治疗方式的长期疗效还有待进一步证实。

3. 乳牙根管治疗术:乳牙根管治疗术(root canal therapy of primary teeth)是指通过根管预备和药物消毒去除根管内感染物质,并用可吸收材料充填根管,防止发生根尖周病或促进根尖周病变愈合的治疗方法[23]。主要适用于牙髓炎症涉及根髓、牙髓坏死和根尖周炎症但具有保留价值的患牙。

DGA术前需对患儿进行口腔检查和影像学检查,以排除根管治疗手术禁忌证。牙冠破坏严重无法修复、髓室底穿孔、根尖周炎症累及继承恒牙胚、牙根吸收超过根长1/3都不应行根管治疗。对于无法配合进行检查的患儿,可在全身麻醉药物起效后,使用移动式X射线机对患牙进行影像学检查,

虽然此法会延长全身麻醉时间,增加麻醉风险,但可减少因盲目操作而导致手术失败及二次全身麻醉手术的发生[21,40]。

AAPD指南推荐使用根管治疗术治疗牙髓感染乳牙[24]。与不可逆性牙髓炎相比,患有根尖周炎的乳牙根管治疗失败率更高[41]。Jiang等[20]研究发现,DGA治疗12个月后,乳牙根管治疗成功率为88.9%。Zhao等[13]报道称DGA下乳牙根管治疗24个月后的成功率为90%。Songvejkasem等[42]研究结果显示,根管治疗失败多发生在术后3年内,DGA下接受根管治疗的乳牙5年成功率为81.4%。尽管根管治疗是牙髓感染乳牙的推荐治疗方法,一些临床医生更倾向于在DGA下拔除牙髓受累乳牙。根管充填糊剂吸收速率快于乳牙根管吸收[23],导致根尖部形成细菌通道,容易引起牙根吸收、根尖周炎等问题。根管治疗所需治疗时间较拔牙长、步骤多,导致DGA手术治疗时间延长,可能会增加麻醉风险及术后并发症的发生[20],且会降低手术室利用率,增加需要DGA治疗患儿的等待治疗时间,加重医疗系统资源负担。以往的研究结果表明,DGA下通常会选择拔牙治疗牙髓感染患牙,特别是残障儿童[12,43-45]。拔牙的技术敏感性低、治疗时间短、费用少,可避免因根管治疗失败造成重复全身麻醉治疗。近年来随着微创理念的发展,为避免乳牙过早脱落影响患儿口腔健康及生活质量,残障儿童拔牙次数有所减少[21,46]。特殊儿童可在相关专科医师指导下决定治疗方法。对于根尖周炎患牙较多的患儿,需先进行完善的术前检查,若剩余牙体组织太少无法修复、炎症累及继承恒牙胚、牙根吸收超过根长1/3等,则建议拔除后根据缺牙位置、继承恒牙萌出时间等综合考虑制定间隙管理方案。若考虑保留患牙,则需完善根管治疗后行冠部修复[47]。目前,关于DGA下乳牙根管治疗成功的相关因素研究较少,有研究认为,术前患牙根尖周低密度影的广泛程度与乳牙根管治疗的成功率呈负相关[39],全身麻醉术前的影像学检查必不可少。

三、冠部修复

牙髓治疗取得长期成功需要严密有效的冠部修复(crown restoration)[48]。目前,国内外常用的牙髓治疗后冠部修复方式主要为复合树脂和金属预成冠(stainless steel crown,SSC)[49]。复合树脂与牙体组织颜色接近,较为美观,由于树脂材料聚合收缩应力大,容易形成微渗漏,导致复合树脂脱落和继发龋的发生[50]。金属预成冠固位性及边缘封闭性较好[49],不易脱落或发生继发龋,但SSC美观性较差,预成冠较薄易磨损造成穿孔,若口腔卫生较差或冠颈部边缘不密合,容易导致牙龈炎。

研究表明,复合树脂的使用率越高,DGA术后4年内龋齿复发的可能性越大[51]。患有全身疾病的重度低龄儿童龋患儿,其复合树脂修复治疗失败的风险更高[52]。与其他修复材料相比,DGA治疗中使用SSC修复乳牙具有更高的成功率[20,53]。Zhao等[13]研究显示,SSC的2年成功率为97.26%,与复合树脂修复相比,SSC边缘封闭性更好,成功率更高。有学者认为,SSC的失败通常是由于牙髓治疗失败造成的[18]。但也有研究表明,牙髓治疗不会显著影响DGA下SSC修复患牙的成功率[54]。AAPD指南推荐DGA下牙髓治疗后使用SCC修复患牙[55]。Shih等[56]学者研究发现在DGA下一次进行8个SCC修复后,患儿大约在1个月后重新达到咬合平衡且对其颞下颌关节功能无明显影响。但SSC并不适用于所有患儿,对于镍铬金属过敏、全身疾病需定期行磁共振成像(MRI)检查、美观要求高或患牙接近替换期的患儿,可考虑选择复合树脂进行修复治疗[57-58]。

综上所述,随着临床需要及家长观念转变,越来越多患儿接受DGA下牙科治疗。这类患儿多患有重度低龄儿童龋,牙髓炎或根尖周炎的发生率较高,为提高成功率、减少重复全身麻醉下牙科治疗发生,需谨慎选择乳牙牙髓治疗方式。各种牙髓治疗方式的适应证存在部分重叠,结合DGA治疗的特点,目前还没有统一的治疗方案。未来需要进一步研究对比DGA下各牙髓治疗方法的长期疗效,探索提高成功率的相关预测指标,为今后提供更有效安全的DGA治疗提供参考。

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