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Table of Contents

本期导读	3
新春贺辞	4
CASA 数字化智库与数字化图书馆项目	5
文献速递	8
临床麻醉核心危机管理与疑难病例探讨 (PBLD)	9
原创文章 (Original Article)	
Dexmedetomidine in Dental Surgery for Patients with Intellectual Disability	13
征稿信息	20

本期封面： *Antarctica* Henry Liu （刘恒意） 摄影作品

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尊敬的读者：

感谢您正在阅读本期CASA协会的刊物。鉴于本刊并未设定同行评审（peer review）机制，于本刊所投及发表的学术文章可仍于今后发于Peer Review刊物。已正式发表的文章亦可于本刊物转载。本编辑部鼓励专业同行积极投稿，为我们麻醉事业的发展努力。

We appreciate your attention to this issue of CASA's publication. As this journal does not employ a peer review process, academic articles submitted and published in this journal retain the potential for future publication in peer-reviewed journals. Additionally, officially published articles may be reprinted in this journal. The editorial board strongly encourages our colleagues to actively submit articles and contribute to the advancement of anesthesiology.

本期导读

2026年新春佳节之际，国际华人麻醉学院(ICAA)会长孟令忠教授与美国华人麻醉医学会(CASA)会长王景平教授，代表各自机构，向海内外麻醉领域同仁发表新春致辞。两位会长衷心祝愿各位同仁在新的一年里，身体健康，工作顺利，万事如！

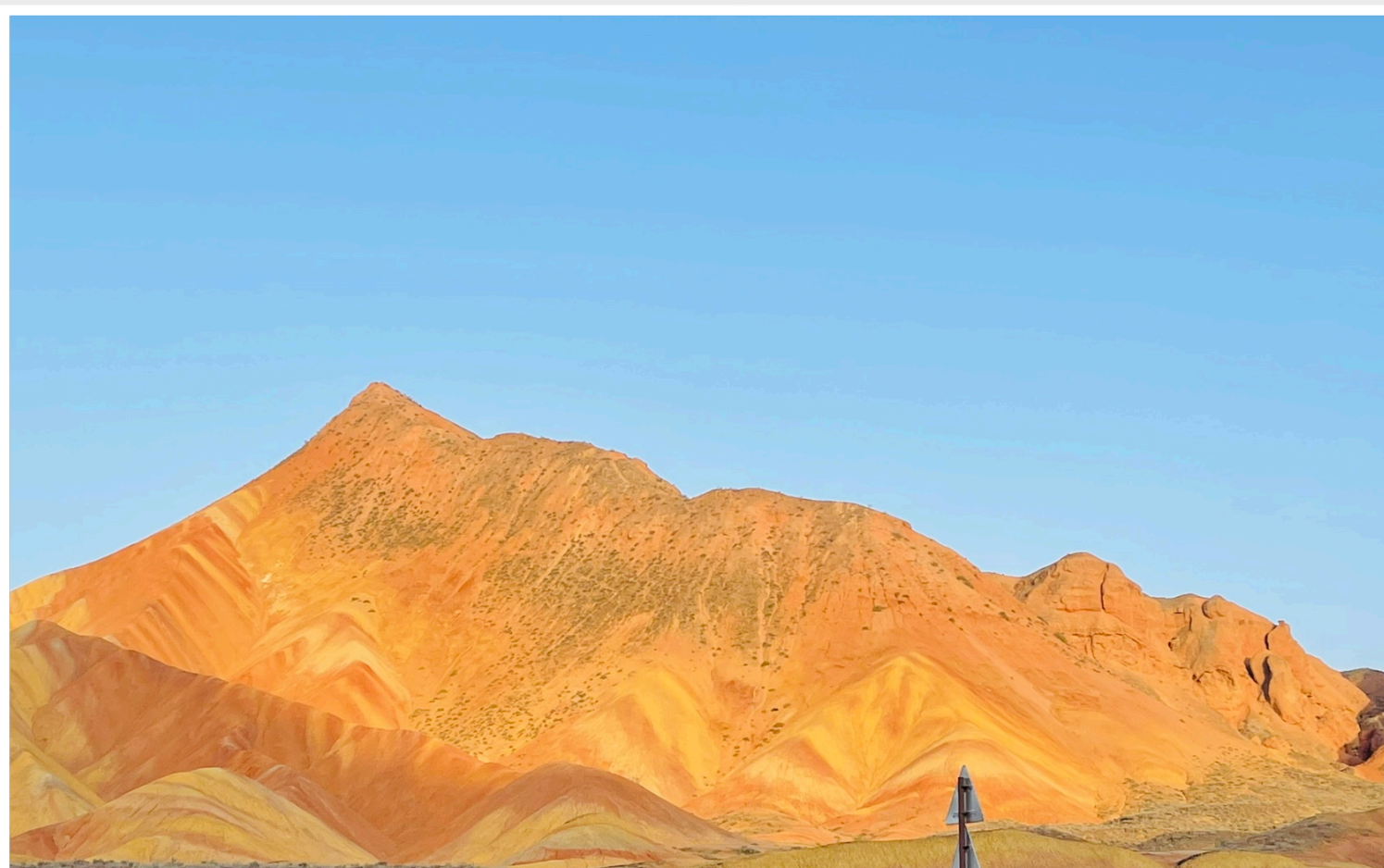
本期我们想和大家分享一个令人振奋的消息：由会长王景平发起，理事会成员李娟担任项目总架构师的CASA数字化智库和数字化图书馆项目正式上线 (<https://casa-library.notion.site/casa>)。这个项目旨在打造一个便捷高效的数字化平台，方便大家查阅资料、交流学习。项目底层架构设计和具体使用路径都已详细说明，希望能够帮助各位成员更好地参与到平台的建设和使用中，共同完善和丰富CASA的数字化资源。期待大家的积极参与和宝贵建议！

本期文献速递为大家带来了一篇由CASA会长王景平撰写的病例报道，讨论了在麻醉诱导期间由于颈动脉窦休克而引发的心脏骤停。

本期特别推出临床麻醉核心危机管理与疑难病例探讨(PBLD)专栏，旨在为麻醉医师提供宝贵的经验和参考。本专栏精选了美国麻醉执业委员会认证麻醉医师(ABA)群的经典实战案例，涵盖了多种极端情境下的气道管理和GLP-1引起的误吸的处置。

本期的原创文章来自会长王景平的未发表文章，深入探讨了dexmedetomidine (右美托咪定)在智力缺陷患者牙科手术中的应用，为相关领域的临床实践提供了宝贵的参考。

本期封面及插图均是来自于我们CASA前会长 Henry Liu (刘恒意) 的摄影作品。



(Henry Liu 摄影作品，张掖七彩丹霞)



国际华人麻醉学院



美国华人麻醉医学会

2026丙午馬年 新春贺辞

尊敬的海内外华人麻醉同道、前辈及朋友们：

万马奔腾开胜景，春风浩荡展宏图。值此2026丙午马年新春佳节到来之际，国际华人麻醉学院（ICAA）和美国华人麻醉医学会（CASA）向全球华人麻醉学工作者及围术期医学专家致以最诚挚的节日问候和新春祝福！

回首过去的一年，我们见证了围术期医学的跨越式发展。从精准的大脑保护到术后早期康复（ERAS）的深化，从手术室内的安全守护到多学科协作的临床拓展，华人麻醉学者在世界舞台上肩负着日益重要的使命。尤其是AI技术与数字化医疗的深度融合，正以前所未有的速度为麻醉学科注入动力，展现出科研与临床交相辉映的辉煌前景。展望马年，我们满怀信心：志存高远，扬鞭奋进。希望广大同道继续探索麻醉机制的深层奥秘，优化患者的全程舒适化服务。协同创新，一马当先。我们倡议进一步加强跨国界、跨学科的合作，提升全球华人学者的学术影响力。

在这个举杯同庆的时刻，衷心祝愿大家：在新的一年里，学术成就如骏马奔腾，百尺竿头；在临床工作中，为生命保驾护航，平安顺遂；在日常生活中，家庭和睦，身体健康，万事如意！

国际华人麻醉学院

美国华人麻醉医学会

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CASA 数字化智库与数字图书馆项目

发起人：王景平

项目总架构师：李娟

第一部分：【项目缘起与战略愿景】

撰文：王景平 (CASA President)

在医学知识高速迭代与人工智能技术迅猛发展的时代背景下，学术共同体的核心竞争力，正在从“信息获取能力”转向“知识组织能力”与“学术协同能力”。作为面向全球华人麻醉医师的专业学术平台，CASA 始终致力于推动循证医学理念传播、临床实践标准化以及跨区域学术合作。在这一愿景之下，建设一个具有持续更新能力、结构化表达能力与智能检索能力的数字化学术基础设施，已成为学会发展的必然选择。

CASA 数字化智库与数字图书馆项目，正是在这一背景下应运而生。我们希望通过构建“多维文献矩阵”，将分散在不同期刊、指南与专家经验中的高价值知识进行系统整合与长期沉淀，使其从“可获取的信息”，转变为“可复用的知识资产”。这一平台不仅服务于临床决策与教学培训，也将逐步成为 CASA 学术品牌与集体智慧的重要载体。

本项目的另一核心目标，是以开放共建的方式，汇聚每一位 CASA 成员的学术贡献。我们特别设置专家文献入口，鼓励各位将代表性研究与临床经验纳入体系化归档，使个体成果在共同体中形成长期影响力。同时，借助 AI 驱动 的文献雷达与动态更新机制，持续追踪学科前沿，构建“当下与历史并存”的知识生态。

可以说，CASA 数字化智库不仅是一个数据库平台，更是一项面向未来的学术基础工程。它承载着我们对知识传承的责任、对学科发展的判断，也体现了 CASA 在全球华人麻醉领域中的组织力与引领力。

CASA 理事会成员李娟医生将对本项目的底层架构设计与具体使用路径进行详细说明，帮助各位成员更高效地参与、使用并共同完善这一平台。

期待各位的积极参与与持续共建。



第二部分：【核心架构与亮点】

撰文：李娟 (项目总架构师)

欢迎来到 CASA 官方倾力打造的全新数字平台！为了让大家在繁重的临床工作中最高效地获取前沿知识，我们采用了极简的模块化架构设计。强烈建议大家仔细阅读图书馆首页导航，也可以跟着这份指南，滑动指尖，马上开启您的学术漫游之旅：

📖 第一站：学会官方发声阵地 | CASA Bulletin (会刊)

进门第一站，是咱们学会的官方文化与学术阵地。

看什么： 一键翻阅历届 CASA 官方会刊。从学术大咖的深度访谈、前沿进展，到学会的最新动态，尽收眼底。

体验： 历史期刊完美数字化归档，告别在微信聊天记录里苦苦翻找 PDF 文件的烦恼，随时随地触达核心资讯。



🔥 第二站：临床实战的巅峰对决 | Case of the Month (每月经典病例)

这是我们极具生命力的“实战橱窗”。

看什么： 精选自ABA/CASA微信群的真实高危/复杂病例讨论（已严格执行 HIPAA 脱敏）。

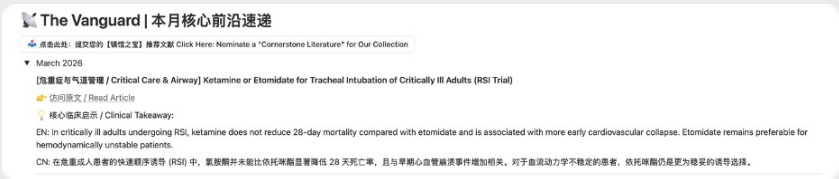
亮点： 卡片式沉浸阅读，全方位呈现顶尖高手的临床思辨过程，不讲废话，全是实战干货！



📡 第三站：顶级学术前沿哨所 | The Vanguard (本月核心前沿速递) (新增模块：这里是整个图书馆的“心脏起搏器”与雷达阵列)

看什么： 每月从全球顶级医学期刊（NEJM, Lancet, Anesthesiology, BJA 等）中精准拦截、提纯最具颠覆性、最能改变临床实践的核心文献。

体验： 告别信息过载与 PubMed 盲查。配有极简的双语提炼与核心要点（Takeaways），让您在手术室更衣室的 5 分钟内，瞬间掌握本月全球麻醉界最火热的学术焦点。您甚至可以通过“提交镇馆之宝”按钮，推荐您读到的顶级文献！



🏛️ 第四站：您的超级学术外脑 | 核心亚专科文献雷达往下划，进入整个图书馆最硬核的“引擎区”。

当前进度： 首期重磅上线【❤️ 心脏麻醉旗舰版】。产科、小儿、区域阻滞等其他亚专科版块正在紧锣密鼓地筹备中。后续我们也将定向邀请各专科领域的顶级大咖入驻专家席位，敬请期待！

特邀指导专家 置顶推荐：北美华人圈心脏麻醉泰斗医生重磅推荐阅读文献，有人工复核过的AI双语解读版。

文献矩阵安排： 告别海量低效检索！我们采用了高阶的“矩阵式”分类架构，精准收录各大亚专科最新、最权威的 Guidelines 和 Top RCTs。

检索神器： 平台自带超级过滤标签（Tags），您可以根据疾病、术式或管理要点（如 TEE、凝血管理等）进行多维度的交叉筛选，一秒定位您需要的核心文献。



第五站：智库背后的星光 | 专家委员会与青年战队

饮水思源，这套庞大知识库的运转离不开两股核心力量的交汇：

👑 专家委员会 (Senior Advisory Board): 感谢为平台提供学术“定海神针”作用的资深专家顾问团，他们是 CASA 学术传承的灵魂与灯塔。

🔥 临床内容架构师 (Clinical Content Architects): 这是在幕后为您搭建底层架构、梳理核心文献的 CASA 青年医生团队。我们通过数字化手段连接北美华人麻醉智慧，也随时张开双臂，欢迎更多充满热情的年轻力量加入我们！

CASA数字图书馆访问说明

为保护知识产权及确保学术交流环境的纯净，CASA数字图书馆即日起正式启动“会员专属保护机制”。目前图书馆仅对CASA会员开放，访问密码将通过会员群及内部邮件定期发放。

我们将采取“定期更新密码”的动态管理方式，确保核心资源不外泄。请各位会员留意群内公告，获取最新动态密钥。
CASA持续为您提供最前沿的临床基建支持！

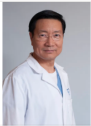
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+ New page

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文献速递 (蒋天宇 撰稿)

Carotid Sinus Hypersensitivity–Induced Cardiac Arrest in a Young Patient During Anesthesia Induction: A Case Report

Wang M, Zhao J, **Wang J**. Carotid Sinus Hypersensitivity-Induced Cardiac Arrest in a Young Patient During Anesthesia Induction: A Case Report. *A A Pract*. 2026 Feb 5;20(2):e02156. doi: 10.1213/XAA.0000000000002156. PMID: 41642942.

(本文原作者为CASA现任会长王景平)

Introduction

Carotid sinus hypersensitivity (CSH) is a clinical condition defined by an exaggerated hemodynamic response, specifically a heart pause of 3 seconds or a systolic blood pressure drop of 50 mm Hg, following stimulation of the carotid sinus. While it is rare in younger populations, the condition predominantly affects older males and is classified as Carotid Sinus Syndrome (CSS) when symptoms like syncope or near-fainting occur. Given the risk of life-threatening bradycardia and hypotension during surgical procedures, a comprehensive perioperative assessment and proactive preventive strategies are vital for ensuring patient safety under anesthesia.

Case Presentation

A 33-year-old female with an expanding sella turcica lesion experienced two episodes of profound bradycardia and cardiovascular collapse during anesthetic induction, characterized by a heart rate of 15 bpm and undetectable blood pressure. These events happened twice immediately following mask ventilation and the jaw thrust maneuver in the sniffing position. This suggests an exaggerated carotid sinus reflex rather than an anaphylactic or primary cardiogenic etiology. Immediate stabilization was achieved through brief chest compressions and the cessation of manual airway manipulation, followed by

prompt endotracheal intubation. The surgical procedure subsequently proceeded without further hemodynamic instability, and the patient was discharged on postoperative day five following unremarkable cardiac and biochemical evaluations.

Discussion

The unexpected cardiovascular collapse in this healthy 33-year-old was attributed to an exaggerated carotid sinus reflex triggered by the mechanical strain of neck hyperextension and a jaw thrust maneuver during airway management. While anaphylaxis and opioid-induced vagal reactions were considered, the immediate stabilization upon ceasing mask ventilation and the absence of cutaneous symptoms or elevated tryptase levels pointed specifically to carotid sinus hypersensitivity (CSH). CSH is classified into 3 subtypes: cardioinhibitory, vasodepressor, and mix type. Ultimately, this case highlights the necessity for vigilant monitoring and a high index of suspicion for CSH even in young, asymptomatic patients during cervical positioning or airway manipulation to prevent life-threatening perioperative emergencies.

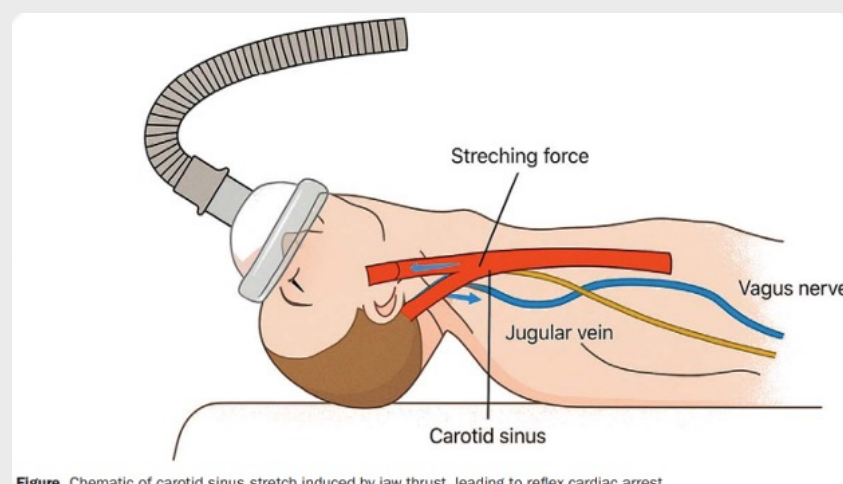


Figure. Cchematic of carotid sinus stretch induced by jaw thrust, leading to reflex cardiac arrest.

临床麻醉核心危机管理与疑难病例探讨 (PBLD) (李娟 曲歌 撰稿)

记美国麻醉执业委员会认证麻醉医师群经典实战案例

李娟 曲歌 记录整理

摘要

围术期麻醉管理中，困难气道、灾难性出血、手术室外麻醉及罕见药理危象均可导致严重并发症甚至死亡。本文基于多例真实临床情境，系统总结气道危机处理、出血性休克中的气道策略、GI 麻醉误吸风险防控及类癌危象的围术期处理，并结合所提供文献进行循证讨论，旨在提升麻醉医生在复杂环境下的危机资源管理能力。

Case 1

极度困难气道中纤支镜可视但导管无法推进的处理策略

Background

清醒纤维支气管镜插管 (awake fiberoptic intubation, AFOI) 长期被视为预计困难气道管理的重要策略，但在临床实践中仍可能出现导管无法沿镜体推进等失败情况，造成气道失控风险。

Case presentation

一名 BMI 60 患者，伴颈后及后枕部弥漫性感染，颈部活动受限，张口受限且存在饱胃风险。计划清醒纤支镜插管。使用视频纤支镜后虽能清晰识别声门及气管，但反复尝试均无法将气管导管顺利送入气管。

Anesthetic management

麻醉团队识别失败原因为：纤支镜柔软导致轴向支撑不足及导管与声门结构撞击。采取策略包括：

- 更换外径更大的纤支镜以增强支撑
- 使用口咽通气道固定镜体路径

- 助手实施 jaw thrust 改善气道开放
- 尝试 LMA 引导纤支镜插管
- 预备外科气道作为救援方案

Outcome

最终通过辅助装置与调整导管推进策略成功建立气道，未出现低氧或气道丢失。

Discussion

AFOI 虽被认为是困难气道管理的金标准，但其失败率并非可忽略。回顾性研究显示 AFOI 失败率约为 3.5%，主要原因包括导管无法通过声门、患者不耐受及气道出血等因素

【1】。本病例中出现的“镜过而管不过”现象，亦为 AFOI 典型失败机制之一。

导管推进困难的核心机制在于导管外径明显大于纤支镜，推进过程中容易发生声门撞击和组织嵌顿。相关研究指出，在纤支镜引导插管时，导管推进速度及推进方式均会影响气道损伤和成功率，缓慢推进可减少组织创伤并改善操作成功率

【2】。此外，既往病例报道亦显示，即使成功进入气管，导管仍可能无法推进，需要放弃操作并考虑替代气道策略【3】。

ASA 困难气道指南强调：困难气道管理应采取多方案准备，限制反复尝试次数，并及时转入替代策略，包括清醒技术、声门上气道辅助及外科气道准备【4】。本病例的处理符合指南核心原则，即在识别失败后迅速转换策略并维持氧合。

因此，本病例提示：

- 1) AFOI 并非绝对成功技术
- 2) 导管推进失败是关键风险点
- 3) 困难气道管理核心在于策略切换而非单一技术
- 4) 预先准备 rescue airway 至关重要

Case 2

灾难性出血情境中的气道建立与危机资源管理

Background

围术期大出血可迅速导致气道污染、视野丧失及窒息，是麻醉相关死亡的重要原因之一。

Case presentation

扁桃体术后大出血导致气道血液淹没

Anesthetic management

关键措施包括：

- 双吸引系统清除血液
- 气泡定位声门进行盲性插管
- RSI 建立气道
- MDT 协作快速止血
- 启动 massive hemorrhage protocol

Outcome

通过快速气道建立与止血协作，患者避免窒息与循环崩溃。

Discussion

大出血相关气道管理的核心挑战在于可视化丧失。研究指出，大量气道出血是气道相关死亡的重要原因，传统喉镜和纤支镜均可能因血液遮挡而失败【5】。因此需采用替代策略，包括声门上气道辅助、盲插管及紧急外科气道等。

围术期 massive hemoptysis 处理强调快速气道控制、肺隔离及多学科协作，其死亡率可超过 50%，提示其严重性

【6】。选择性主支气管插管或支气管阻塞器可有效防止对侧肺污染，是关键救命措施【7】。

同时，大出血管理不仅是气道问题，更涉及系统性危机管理。APSF 指出，出血是手术室死亡主要原因之一，结构化“Code Hemorrhage”响应可显著改善沟通与决策效率【7】。此外，侵入性操作如气管切开术中亦可能出现大出血，需要快速压迫与转外科处理【8】。

本病例体现以下核心原则：

- 1) 气道污染情境下应接受“非可视化插管”现实
- 2) 双吸引 + 气泡追踪是有效策略
- 3) 早期 MDT 协作决定预后
- 4) 结构化 hemorrhage protocol 可降低死亡率

Case 3

GI 麻醉中饱胃与 GLP-1 相关误吸风险

Background

GLP-1 受体激动剂的广泛使用使围术期胃排空延迟问题日益突出。

Case presentation

两情景：

- 胃肠动力障碍患者 NPO 48h 仍大量胃液
- 肠镜过程中胆汁性误吸并低氧

Anesthetic management

- 清醒插管建立气道
- Trendelenburg 体位 + 吸引
- 琥珀胆碱解除喉痉挛

- 胃超声评估胃内容物

Outcome

及时处理避免严重吸入性肺炎。

Discussion

GLP-1 激动剂可显著延迟胃排空，其机制为胃运动抑制及幽门张力改变，从而增加麻醉误吸风险【9】。即使遵循禁食指南，仍可能存在胃内固体残留，导致误吸事件发生【10】。

共识指南指出，围术期应对 GLP-1 患者进行风险评估并采取误吸缓解策略，包括气道保护及个体化麻醉计划【11】。同时，病例系列报告显示，GLP-1 使用者在麻醉时可出现固体胃内容物残留，是误吸的重要危险因素【10】。然而，大型队列研究发现，GLP-1 使用与术后吸入性肺炎并无显著相关性，提示风险可能存在异质性【12】。因此临床管理需基于个体风险评估而非一刀切停药。

胃超声被认为是评估胃内容物的客观工具，可辅助决定是否实施 RSI 或清醒插管【9】。本病例中清醒插管策略有效避免了误吸。

核心启示：

- 1) 禁食不等于空胃
- 2) GLP-1 时代 GI 麻醉风险显著变化
- 3) 胃超声是关键风险评估工具
- 4) 气道保护优先于程序推进

Case 4

支气管活检诱发类癌危象

Background

类癌危象为神经内分泌肿瘤围术期潜在致命并发症。

Case presentation

支气管肿瘤活检过程中患者突发潮红、低血压及支气管痉挛，诊断为类癌危象。

Anesthetic management

- 即刻 Octreotide 静推并持续泵入
- 血管活性药支持
- 糖皮质激素辅助
- 术前准备 Octreotide

Outcome

危象得到控制，患者恢复稳定。

Discussion

类癌危象由肿瘤释放血管活性物质引起，可表现为血流动力学不稳定和支气管痉挛，是围术期严重并发症【13】。系统评价显示，其发生率可达约 20%，并与术后并发症增加相关【14】。

传统观点认为 Octreotide 可预防危象，但前瞻性研究及荟萃分析均提示其预防效果存在争议，常规预防并未显著降低危象发生率【13】【14】。然而，一旦危象发生，Octreotide 仍被认为是主要治疗手段。

类癌肿瘤可分泌多种生物活性物质，包括血清素、组胺及激肽等，这些介质可导致剧烈血流动力学变化并对常规升压药反应差【15】。因此，麻醉医生需在术前识别风险并做好药物准备。

本病例强调：

- 1) 活检操作即可诱发危象
- 2) Octreotide 仍是救治核心药物
- 3) 常规升压药可能效果有限
- 4) 对不明肿瘤应保持高度警惕

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(Henry Liu 摄影作品, Antarctica)

Original Article (原创文章)**Dexmedetomidine in Dental Surgery for Patients with Intellectual Disability**Yilin Liu¹, Ming-Yue Li, MD^{2,3}, Meikun Wang, MD^{2,4}, Sarah Ahmed⁵, and Jing-Ping Wang, MD PhD²

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Abstract**Background and Objective**

Patients with intellectual disability (ID) undergoing dental surgery face distinct perioperative challenges, including heightened anxiety, limited cooperation, hemodynamic variability, and an elevated risk of postoperative delirium. Traditional sedatives may inadequately balance efficacy and safety in this population. Dexmedetomidine, a selective α_2 -adrenergic agonist, offers sedative, anxiolytic, and analgesic effects with minimal respiratory depression. This review evaluates the role of dexmedetomidine in dental procedures for patients with ID, focusing on its effectiveness, safety profile, and clinical outcomes.

Methods

A narrative review was conducted using PubMed and related databases. Studies involving the use of dexmedetomidine in dental surgery or among patients with ID were identified and synthesized. Relevant English-language articles were selected following a screening of titles, abstracts, and full texts.

Key Content and Findings

Current evidence indicates that dexmedetomidine provides effective sedation, facilitates improved patient cooperation, and supports smoother recovery. Its minimal impact on respiratory function and relatively stable hemodynamic profile make it advantageous for use in ID patients. However, the potential for bradycardia and hypotension necessitates vigilant monitoring. Existing studies are limited by small sample sizes and heterogeneity in methodology, precluding definitive conclusions.

Conclusions

Dexmedetomidine shows promise as a sedative agent for dental surgery in patients with intellectual disability. Further research, including standardized protocols and randomized controlled trials, is essential to determine optimal dosing strategies and confirm long-term safety.

Keywords

Dexmedetomidine; dental surgery; Intellectual disability; Sedation; Safety

Introduction

Intellectual disability (ID) is a neurodevelopmental disorder affecting 1–2% of the global population [1, 2]. Individuals with ID face healthcare barriers and commonly have poor oral health due to limited self-care [3]. Pediatric dental surgery often involves sedation challenges including anxiety, cooperation, and emergence delirium [4], which are amplified in patients with ID due to communication difficulties, behavioral issues, and frequent need for general anesthesia [5]. These patients require

vigilant monitoring because of altered physiological responses during anesthesia [5].

Dental procedures vary from local anesthesia to deep sedation or general anesthesia depending on complexity and cooperation [6, 7]. Sedation in ID patients is frequently needed for behavior management, complicating anesthetic choices. General anesthesia is effective and safe for extensive dental treatments in special needs children, with agents like propofol and sevoflurane offering stable hemodynamics and respiratory safety [5, 8, 9].

Dexmedetomidine, a selective α_2 -agonist, provides sedation mimicking natural sleep with minimal respiratory depression, alongside anxiolysis and analgesia, and reduces postoperative agitation [10]. Despite its promise, sedation in ID remains complex due to behavioral and medical comorbidities [11]. Evaluating dexmedetomidine's effects on cooperation, airway safety, hemodynamic stability, postoperative delirium, and recovery is crucial.

Existing data from pediatrics, adult, and limited ID-specific studies are heterogeneous in protocols and outcomes. A focused synthesis is needed to guide evidence-based sedation practices for dental surgery in patients with intellectual disabilities.

Objective

This review aims to summarize the role of dexmedetomidine in dental surgery, with a particular emphasis on patients with intellectual disability (ID). Evidence from both pediatric and adult surgical settings is considered to provide a comprehensive overview. The discussion will address dexmedetomidine's pharmacological properties, clinical applications, and comparisons with other commonly used sedatives. By consolidating heterogeneous findings and highlighting existing knowledge gaps, this review seeks to inform anesthetic practice and identify priorities for future research in this specialized population.

Methods

A systematic search was conducted using Google Scholar with keywords such as "Dexmedetomidine" and "dental surgery." Articles were selected based on their relevance to the sedation of patients using dexmedetomidine, with particular attention to sedation protocols, dosing methods, and routes of administration. Safety profiles of dexmedetomidine were compared against other sedative agents such as midazolam, focusing on respiratory and hemodynamic effects. Outcomes related to sedation

effectiveness, patient cooperation, recovery profiles, and adverse events were extracted and analyzed.

To ensure comprehensive coverage, the reference lists of selected articles were also reviewed to identify additional pertinent studies. Inclusion was limited to English-language publications addressing the use of dexmedetomidine in dental or oral and maxillofacial surgical procedures, including those involving individuals with intellectual disabilities across pediatric and adult populations.

Pharmacological Mechanism of Dexmedetomidine

Dexmedetomidine is a highly selective α_2 -adrenergic receptor agonist that exerts sedative, anxiolytic, and analgesic effects primarily through inhibition of norepinephrine release in the locus coeruleus. This mechanism produces a state of cooperative sedation resembling natural sleep[12]. Unlike γ -aminobutyric acid (GABA) agonists such as benzodiazepines, dexmedetomidine does not cause significant respiratory depression, making it particularly advantageous in patients with airway management challenges[13].

Pharmacokinetics and Pharmacodynamics

Dexmedetomidine has a distribution half-life of approximately 6 minutes and an elimination half-life of 2–3 hours[14]. Although its onset is slower than midazolam, it provides smoother, more cooperative sedation. Compared with clonidine, dexmedetomidine demonstrates a shorter half-life and more predictable sedative effect[15]. When administered intranasally at 1 $\mu\text{g/kg}$ approximately 45–60 minutes before induction, it provides effective sedation, though onset may be delayed and dose-dependent bradycardia or hypotension can occur[16].

Metabolism occurs hepatically via glucuronidation and CYP2A6, distinguishing it from benzodiazepines, which are metabolized predominantly through CYP3A4. This pharmacokinetic profile minimizes interactions with enzyme-inducing antiepileptics (e.g., carbamazepine, phenytoin), an

important consideration in patients with intellectual disability who frequently require such agents. Consequently, dexmedetomidine offers a more predictable sedative profile in this population[17].

Routes of Administration

Oral administration remains the preferred route for premedication, while intramuscular injection is an alternative in non-cooperative patients, typically given 45–60 minutes before surgery. Intranasal dexmedetomidine (1–2 µg/kg) has emerged as a noninvasive and effective option, supported by multiple pediatric meta-analyses demonstrating reliable sedation and a favorable safety profile [18].

For short-term ICU sedation, the manufacturer recommends a loading dose of 1.0 µg/kg infused over 10 minutes, followed by a maintenance infusion of 0.2–0.7 µg/kg/h. Perioperative dosing requires adjustment for age, comorbidities, and surgical complexity[19, 20]. Notably, only the intravenous route is FDA-approved (Precedex®), while oral and intranasal applications remain off-label.

Clinical Use of Dexmedetomidine

Dexmedetomidine is increasingly employed as a premedication for anxiolysis and smoother induction in pediatric and special-needs patients. Its cooperative sedation facilitates separation from caregivers, venous cannulation, and inhalational induction, while minimizing agitation and respiratory complications. Intraoperatively, it provides hemodynamic stability, opioid-sparing effects, and minimal respiratory depression. Postoperatively, it reduces nausea, vomiting, agitation, and airway events, thereby improving recovery safety in vulnerable populations.

Dexmedetomidine in Pediatric Dental Surgery

Children with intellectual disabilities often exhibit heightened preoperative anxiety, sensory sensitivities, and poor cooperation, necessitating pharmacologic premedication.

Keles and Kocaturk (2017) evaluated oral dexmedetomidine (1 µg/kg) in 50 children aged 2–6 years undergoing dental surgery[21]. Dexmedetomidine significantly improved parental separation and mask acceptance scores at 30 and 45 minutes post-administration compared with placebo. By 45 minutes, 94% of dexmedetomidine-treated patients achieved satisfactory sedation versus 52% in controls.

A meta-analysis by Zhang et al. (2025) synthesized data from 496 pediatric patients across three RCTs [22]. Dexmedetomidine was superior to both placebo and midazolam in achieving adequate preoperative sedation and reducing emergence delirium, with no reported bradycardia or hypoxemia in two trials.

Mountain et al. (2011) compared oral dexmedetomidine (4 µg/kg) with midazolam (0.5 mg/kg) in children aged 1–6 years [23]. Although sedation and cooperation were similar between groups, dexmedetomidine was associated with more stable hemodynamics and fewer side effects.

Intranasal dexmedetomidine (2 µg/kg) also provides effective, noninvasive sedation for pediatric dental procedures, as demonstrated by Lee et al. (2016) [24]. Notably, respiratory drive remained intact across studies, underscoring its excellent respiratory safety profile.

Dexmedetomidine's ability to reduce postoperative shivering, agitation, and opioid requirement further enhances recovery quality [21, 25]. While effects on emergence delirium vary between studies, aggregated data indicate a modest overall benefit.

Dexmedetomidine in Adult Oral and Maxillofacial Surgery

In adults, dexmedetomidine's sedative, analgesic, and sympatholytic effects are valuable in oral and maxillofacial (OMF) surgery. Liu et al. (2022) studied 120 patients ≥ 65 years undergoing OMF procedures under general anesthesia [26]. Although perioperative dexmedetomidine infusion (0.5 $\mu\text{g/kg}$ loading; 0.4 $\mu\text{g/kg/h}$ maintenance) did not significantly reduce postoperative delirium incidence, it lowered pain scores at 6, 12, and 24 hours and improved subjective sleep quality.

Mishra et al. (2016) compared IV dexmedetomidine and midazolam in 60 adults undergoing ambulatory OMF procedures [6]. Taylor et al. (2020) compared a standard intravenous (IV) sedation regimen (midazolam, fentanyl, and propofol) with and without dexmedetomidine in 12 adults undergoing outpatient dentoalveolar surgery [27]. Dexmedetomidine produced stable sedation, lower heart rate and blood pressure, and greater patient relaxation, though midazolam remained superior for amnesia. Both agents showed comparable recovery profiles and no significant respiratory differences.

Overall, dexmedetomidine represents a viable alternative to benzodiazepines for adult OMF procedures, particularly when hemodynamic stability and respiratory safety are prioritized.

Use in Patients with Intellectual Disabilities

Patients with intellectual disabilities (ID), including autism spectrum disorder, present unique anesthetic challenges due to tactile aversion, communication barriers, and behavioral dysregulation. Although limited, emerging evidence supports dexmedetomidine's utility in this population.

Tanaka et al. (2024) reported successful intranasal dexmedetomidine (1.5 $\mu\text{g/kg}$) use in an adult with ID intolerant of oral midazolam, enabling smooth sevoflurane mask induction [28]. Lubisch et al. (2009) evaluated 315 pediatric patients with autism and neurobehavioral disorders undergoing procedural sedation [29]. Mean doses were $1.4 \pm 0.6 \mu\text{g/kg}$ (induction) and $2.6 \pm 1.6 \mu\text{g/kg}$ (total). Dexmedetomidine achieved 98.7%

sedation success, with only seven patients requiring cardiovascular intervention and one transient airway event.

Tabesh et al. (2024) randomized 50 adults with ID undergoing dental and maxillofacial surgery to dexmedetomidine infusion (2 $\mu\text{g/kg/h}$) versus control [30]. Dexmedetomidine provided greater hemodynamic stability and reduced postoperative agitation without delaying recovery. Similarly, Cant et al. (2023) observed effective sedation and low opioid use in 16 children with autism receiving dexmedetomidine premedication [25].

Collectively, these findings highlight dexmedetomidine's advantages in ID populations, stable hemodynamics, preserved respiratory function, and improved perioperative cooperation, though vigilance for bradycardia and hypotension remains essential.

Practical Considerations and Future Directions

Effective dosing varies by route and patient characteristics. Oral doses range 1–4 $\mu\text{g/kg}$, while intranasal administration (2 $\mu\text{g/kg}$) reliably achieves sedation in pediatric patients. Intravenous use typically involves 0.5–1 $\mu\text{g/kg}$ loading followed by 0.2–0.7 $\mu\text{g/kg/h}$ infusion. Continuous respiratory and hemodynamic monitoring is mandatory, particularly during IV administration.

Behavioral and sedation scoring systems (e.g., Ramsay Sedation Scale, PAED) should guide titration. Integration of dexmedetomidine into multimodal anesthesia regimens can reduce perioperative opioid and benzodiazepine requirements, providing smoother recoveries and fewer respiratory complications.

Future investigations should include large-scale randomized controlled trials to define optimal dosing, compare administration routes, and evaluate population-specific protocols for children, elderly, and ID patients.

Conclusion

Dexmedetomidine is a versatile, well-tolerated sedative with broad applicability in oral and maxillofacial surgery. Its cooperative sedation, respiratory safety, and hemodynamic stability make it particularly valuable for pediatric and intellectually disabled patients. Continued research should aim to establish standardized, evidence-based dosing regimens and expand its role within multimodal anesthetic strategies to optimize safety and patient outcomes.

Table 1 The search strategy summary

Items	Specification
Date of search	08/20/2025
Databases and other sources searched	PubMed, Google Scholar, Web of SCI, library of HAVARD University, library of JILIN University
Search terms used	Search terms: (dexmedetomidine) AND (oral and maxillofacial surgery OR dental anesthesia) AND (intellectual disability OR special needs) Filters: Filters applied: Adaptive Clinical Trial, Address, Books and Documents, Case Reports, Classical Article, Clinical Conference, Clinical Study, Clinical Trial, Clinical Trial Protocol, Collected Work, Comment, Comparative Study, Congress, Consensus Development Conference, Consensus Development Conference, NIH, Controlled Clinical Trial, Guideline, Interview, Meta-Analysis, Multicenter Study, News, Newspaper Article, Observational Study, Review, Scientific Integrity Review, Systematic Review, Observational Study, Veterinary, English, from 01/01/2010-03/31/2025
Timeframe	01/01/2000-03/31/2025
Inclusion and exclusion criteria	Inclusion: English language reviews, editorials, correspondence, trials, and case reports related to exclusion: non-English language reviews, Animal studies
Selection process	Authors independently reviewed the titles and abstracts based on the inclusion criteria
Additional	Reference lists of included studies were hand-searched

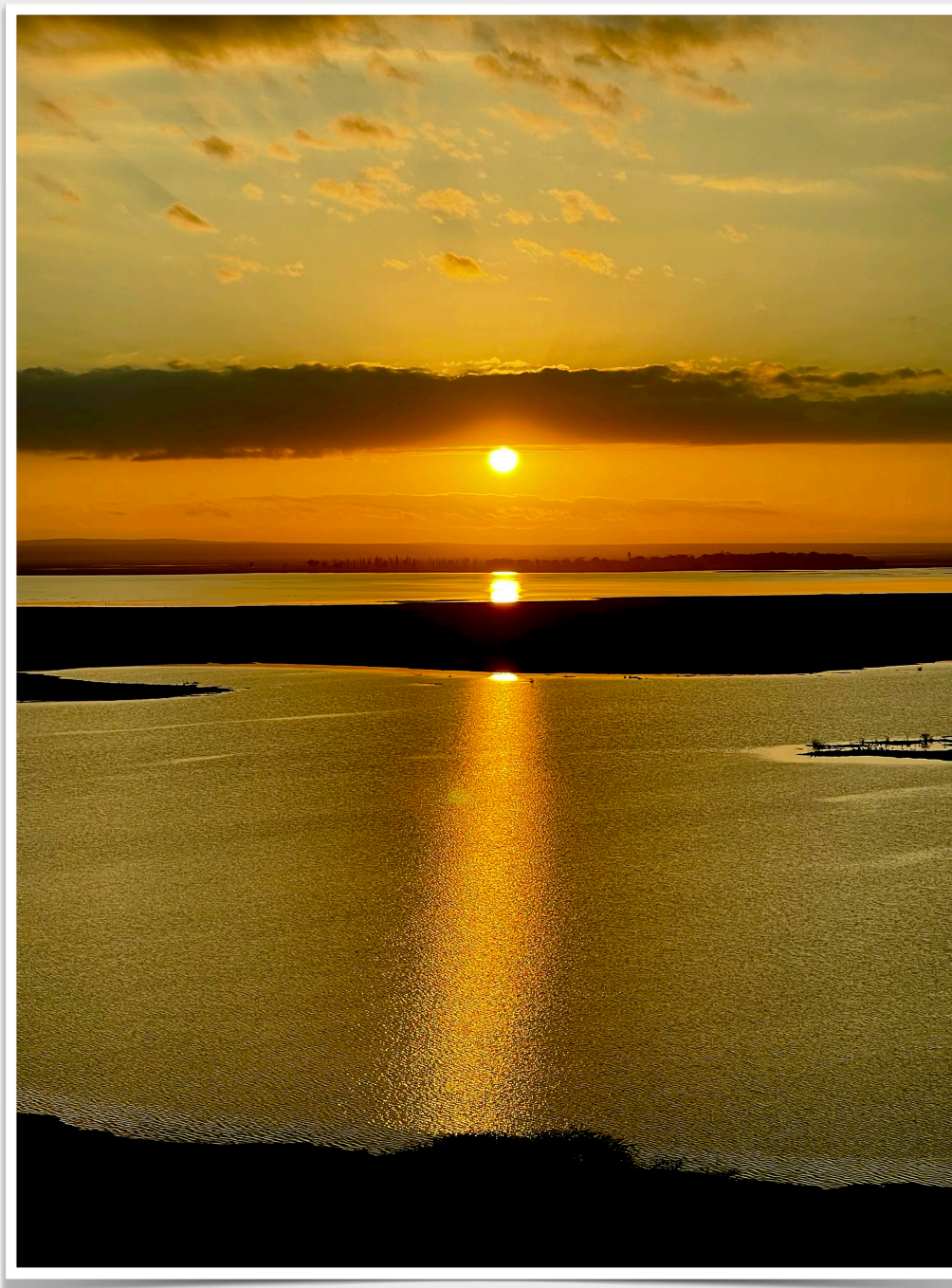
Table 2. Clinical Application of Dexmedetomidine in OMF

Agent	Route	Dose in the study	Medication time	Setting/Population	Study-specific finding
Dexmedetomidine	Oral	1 µg/kg	Premedication	Pediatric outpatient dental procedures	Effective premedication; satisfactory sedation and behavior; stable hemodynamics. (Kees & Kocaturk, 2017)
Dexmedetomidine	Intranasal	2 µg/kg for 30 min pre- GA	Premedication	Pediatric dental treatment under GA	Satisfactory sedation; hemodynamic stability; practical non-IV route. (Lee et al., 2016)
Dexmedetomidine	Intranasal	1.5 µg/kg	Premedication	Adults with intellectual disability, dental case	Enabled cooperation and smooth induction as premedication. (Tanaka et al., 2024)
Dexmedetomidine	IV	1 µg/kg over 10 min; 0.5 µg/kg/h	bolus and continuous maintenance	Adult day-care OMF under local anesthesia	Sedation comparable to midazolam; lower HR/BP; higher relaxation/patient preference; similar SpO ₂ /RR. (Mishra et al., 2016)
Midazolam	IV	0.08 mg/kg bolus; 0.05 mg/kg/h	bolus and continuous maintenance	Adult day-care OMF under local anesthesia	Similar sedation depth; more amnesia; higher HR/BP than Dexmedetomidine. (Mishra et al., 2016)
Dexmedetomidine	IV	0.5 µg/kg over 10 min; 0.4 µg/kg/h (stop 30 min pre-end)	From 10 min before induction of anesthesia to 30 min before the end of surgery	Elderly patients undergoing OMF under GA	No reduction in POD; lower postoperative pain scores and improved sleep; similar adverse events. (Liu et al., 2022)
Dexmedetomidine	IV	4 µg/kg/hr	Premedication	Adults' outpatients undergoing dentoalveolar surgery	Lowered BP and HR and increased anesthesia time (Taylor et al., 2020)

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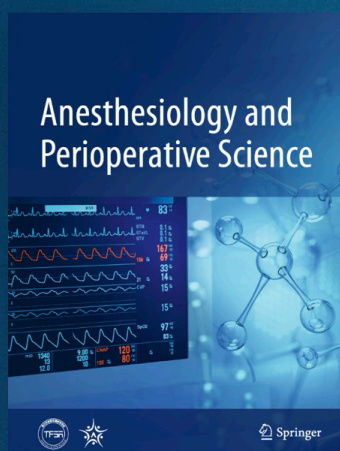


(Henry Liu 摄影作品, Tarangire National Park, Tanzania)

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主编 刘进 教授



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