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· 专题研究 ·

免充气经口腔镜甲状腺癌根治术的临床研究

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摘要

背景与目的: 经口腔镜甲状腺手术由于是经自然腔道手术, 体表无疤痕, 中央区淋巴结清扫无视野盲区, 经临床推广至今, 受到广大医生及患者的欢迎。但传统的经口腔镜采用CO₂充气的方法维持手术操作空间, 空间小, 容易产生烟雾, 影响视野, 且相对于其他入路, 经口腔镜更容易出现CO₂相关并发症。因此, 采用免充气的方法进行手术可能是更好的选择。为此, 本中心设计了一种新的方法——经皮悬吊三孔免充气经口腔镜技术进行甲状腺癌手术, 经过不断改良后, 此项技术趋于成熟。本文通过回顾性分析, 探讨此项技术的可行性与安全性, 以期为临床决策提供参考。

方法: 回顾性分析2020年10月—2022年3月在中国科学技术大学附属第一医院西区(安徽省肿瘤医院)头颈肿瘤外科接受免充气经口腔镜甲状腺癌手术患者的临床资料。术中采用自制悬吊拉钩、改良穿刺器进行手术。

结果: 共纳入106例甲状腺乳头状癌患者, 男11例, 女95例; 平均年龄(35.5±8.1)岁; 单侧甲状腺切除91例、甲状腺全切除15例; 行中央区淋巴结清扫106例、行侧颈淋巴结清扫7例。单纯腔镜甲状腺手术时间(163.9±49.1)min, 腔镜甲状腺手术联合侧颈淋巴结清扫时间(331.0±103.9)min。术后中央区淋巴结清扫数(8.6±6.1)枚, 单侧侧颈淋巴结清扫数(19.4±7.6)枚。术后住院(5.4±1.4)d。术后一过性发音嘶哑1例、淋巴漏1例, 无术后出血、感染、永久性神经损伤等并发症发生。

结论: 免充气经口腔镜技术无CO₂相关并发症, 采用自制悬吊拉钩可以维持足够的手术操作空间, 应用改良的穿刺器减少了器械干扰, 增加了腔镜吸引器便于手术操作。

关键词

甲状腺肿瘤; 甲状腺切除术; 自然腔道内镜手术

中图分类号: R736.1

Clinical study of gasless transoral endoscopic surgery for thyroid cancer

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Abstract

Background and Aims: Since transoral endoscopic thyroidectomy is performed via a natural cavity, there is no scar on the body surface, and no blind spots of the visual field in the central neck area. So, it well-accepted by doctors and patients. However, the traditional transoral endoscopic thyroidectomy

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using CO₂ inflation to maintain the surgical space has a narrow working cavity with easy smoke generation, which affects the vision. In addition, compared with other approaches, transoral endoscopic thyroidectomy is more prone to CO₂-related complications. Therefore, the use of gasless method for endoscopic surgery may be a better choice. For this reason, our center has designed a new method to perform gasless transoral endoscopic thyroidectomy by percutaneous suspension and three-hole endoscopic surgery technique. After continuous improvement, this technique has matured considerably. This paper discusses the feasibility and safety of this technique through a retrospective analysis, so as to provide a reference for clinical decision-making.

Methods: The clinical data of patients who underwent non-inflatable transoral endoscopic surgery for thyroid cancer in the Department of Head and Neck Oncology, the First Affiliated Hospital of University of Science and Technology of China (Anhui Cancer Hospital) from October 2020 to March 2022 were retrospectively analyzed. The operation was performed with a self-made suspension retractor and modified trocar.

Results: A total of 106 patients with papillary thyroid carcinoma were included. Of the patients, 11 cases were males and 95 cases were females with a mean age of (35.5±8.1) years; 91 cases underwent unilateral thyroidectomy, and 15 cases underwent total thyroidectomy; 106 cases received central lymph node dissection, and 7 cases received selective neck lymph node dissection. The operative time for endoscopic thyroidectomy alone was (163.9±49.1) min, and for endoscopic thyroidectomy combined with lateral neck lymph node dissection was (331.0±103.9) min. The number of resected lymph nodes in the central area was 8.6±6.1 and in the unilateral neck was 19.4±7.6 after operation. The length of postoperative hospital stay was (5.4±1.4) d. Transient hoarseness and lymphatic leakage occurred in one case each after the operation, and no postoperative complications such as bleeding, infection, and permanent mental nerve injury occurred.

Conclusion: Gasless transoral endoscopic thyroidectomy has no CO₂-related complications. The use of self-made suspension hooks can maintain enough operation space. The application of an improved trocar reduces the interference of instruments, and the added endoscopic aspirator is convenient for surgical operation.

Key words

Thyroid Neoplasms; Thyroidectomy; Natural Orifice Endoscopic Surgery

CLC number: R736.1

经口腔镜甲状腺手术由于是经自然腔道手术, 体表无疤痕, 由于手术视野处于头尾角度, 中央区淋巴结清扫无视野盲区^[1-2], 经临床推广至今, 受到广大医生及患者的欢迎^[3-6]。但传统的经口腔镜采用 CO₂ 充气的方法维持手术操作空间, 空间小, 容易产生烟雾, 影响视野, 并且, 相对于其他入路, 经口腔镜更容易出现 CO₂ 相关并发症^[7-9]。此外, 由于经口腔镜手术操作空间较小, 传统的充气穿刺器底座较粗, 器械更容易干扰, 增加了手术难度。以上这些弊端限制了经口腔镜的临床推广。笔者中心自 2018 年开始, 由王圣应教授团队^[10]设计发明了经皮悬吊三孔免充气经口腔镜甲状腺手术技术, 经过数年的探索与改进, 技术趋

于成熟。本文回顾性分析接受免充气经口腔镜甲状腺手术患者的临床资料, 旨在对此项技术的特点、可行性、安全性进行总结。

1 资料与方法

1.1 一般资料

2020 年 10 月—2022 年 3 月中国科学技术大学附属第一医院西区(安徽省肿瘤医院)头颈肿瘤外科开展了 106 例免充气经口腔镜甲状腺癌手术。患者术前均行颈部彩超、CT、喉镜、甲状腺功能等检查, 术前均行穿刺细胞学检查。纳入标准: (1) 有美容需求; (2) 分化型甲状腺癌肿瘤直径

≤2 cm, 未侵及邻近器官组织, 侧颈Ⅱ区未见淋巴结转移。排除标准: (1) 既往有颈部放疗史; (2) 隆颈手术史; 口腔畸形, 口腔感染; (3) 甲状腺髓样癌、未分化癌^[11-13]。术前告知所有患者手术方式及手术风险, 并签署手术知情同意书。本研究通过本院伦理委员会批准。

1.2 手术器械

传统内镜手术器械: 超声刀、分离钳、电钩、

内镜吸引器、普通电刀、10 mm 直径, 30° 镜的高清内镜系统。免充气内镜特殊器械: 自制免充气内镜穿刺器 1 套 (图 1); 2 mm 克氏针自制皮肤悬吊拉钩、2 mm 克氏针自制内镜甲状腺拉钩、2.5 mm 克氏针自制内镜甲状腺拉钩 (图 2)、手术头架、无菌绷带。

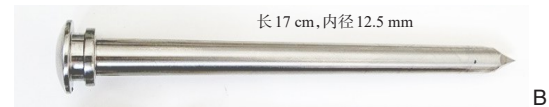
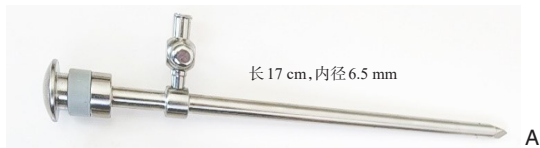


图 1 免充气内镜专用穿刺器 A: 操作孔穿刺器; B: 观察孔穿刺器

Figure 1 Special trocar for gasless transoral endoscopic thyroidectomy A: Trocar for operation; B: Trocar for observation

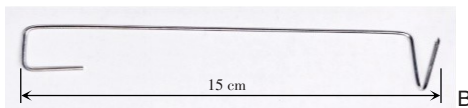
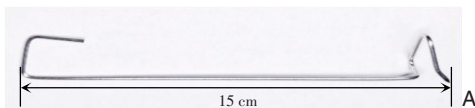


图 2 免充气经口腔镜克氏针自制拉钩 A: 2 mm 克氏针自制皮肤悬吊拉钩; B: 2 mm 克氏针自制内镜甲状腺拉钩; C: 2.5 mm 克氏针自制胸锁乳突肌拉钩

Figure 2 Self-made gasless endoscopic retractor with Kirschner needle A: Self-made skin suspension retractor with 2 mm Kirschner needle; B: Self-made endoscopic thyroid retractor with 2 mm Kirschner needle; C: Self-made sternocleidomastoid muscle retractor with 2.5 mm Kirschner needle

1.3 手术方法

1.3.1 麻醉及体位 患者取仰卧位颈部过伸, 经口插管气管内全麻, 气管导管固定于右侧口角, 保护眼、鼻, 碘伏消毒皮肤及口腔。铺巾, 放置手术头架, 套上内镜保护套并缠绕绷带, 头架置于患侧平喉结水平, 作为悬吊支架。主刀坐在患者头侧, 扶镜手站于主刀右侧。

1.3.2 建立操作空间 取三孔法经口腔前庭进行手术, 观察孔位于下唇距离齿唇沟 15 mm 处、两侧操作孔位于靠近两侧口角唇缘处。观察孔为一屋顶样切口, 先直视下用电刀分离, 沿下唇肌间隙分离找到下颌骨骨面, 紧贴下颌骨游离到骨面转折处。用大号血管钳经观察孔隧道置入分离颏下皮瓣, 预建操作空间。经口腔切口置入 3 个免充气专用穿刺器沿颈部皮下间隙在喉结平面汇合。用电钩扩大操作空间, 使用内镜吸引器负压吸引排烟并辅助显露。在喉结附近稍作分离皮瓣, 经皮穿刺置入皮肤悬吊拉钩, 用绷带固定于手术室头架上。继续拓展操作空间, 建腔范围两侧需要显露胸锁乳突肌前缘, 下界超过胸骨上凹。建腔完毕后用电钩拓宽观察孔隧道, 将内镜吸引器经观察

孔切口置入到观察孔穿刺器左边, 持续负压吸引排烟 (图 3-4)。

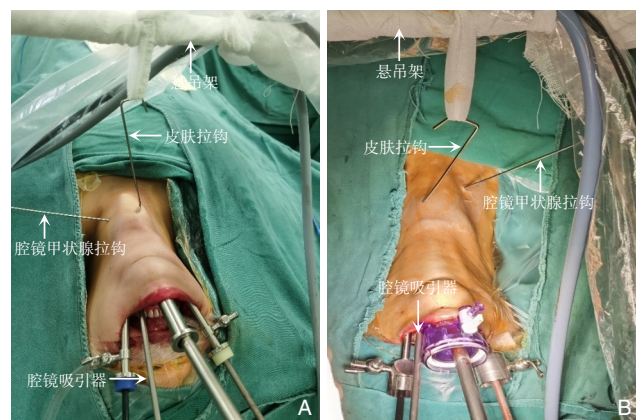


图 3 经皮悬吊三孔免充气经口腔镜甲状腺手术示意图 A: 采用免充气专用穿刺器手术, 器械干扰小; B: 采用传统免充气穿刺器手术

Figure 3 Schematic diagram percutaneous suspension three-hole non-inflatable transoral endoscopic thyroid surgery A: Special trocar for gasless transoral endoscopic thyroidectomy with reduced instrument interference; B: Traditional trocar for gasless transoral endoscopic thyroidectomy



图4 免充气经口腔镜甲状腺癌根治术(采用悬吊系统建腔,完成甲状腺整块切除,只需两人即可完成手术)

Figure 4 Gasless transoral endoscopic thyroidectomy for thyroid cancer (space creation with the suspension devices, and completion of en bloc resection the thyroid requiring only two surgeons)

1.3.3 甲状腺、中央区及侧颈淋巴结清扫 打开颈白线,游离甲状腺外侧,置入自制的腔镜甲状腺拉钩,显露颈总动脉。离断甲状腺峡部及甲状腺悬韧带,显露甲状腺上极,离断甲状腺上动脉。保护上甲状旁腺,在喉返神经入喉点找到喉返神经,继续向下全程显露。离断 Berry 韧带,切除甲状腺并清扫中央区淋巴结,尽量原位保护下甲状旁腺。术毕,经观察孔置入标本袋取出标本,冲洗术腔,放置引流管(图5-6)。

1.4 统计学处理

应用 SPSS 19.0 统计软件进行数据分析,用均数 ± 标准差 ($\bar{x} \pm s$) 表示正态分布的计量资料,中位数表示偏态分布的计量资料,例数 (百分比) [n (%)] 表示计数资料。



图5 免充气经口腔镜甲状腺癌侧颈淋巴结清扫 A: 悬吊建腔; B: II区清扫体外情况; C: II区清扫后手术视野

Figure 5 Endoscopic lateral neck dissection via the gasless transoral approach A: Surgical space creation by suspension; B: The outside view of level II lateral neck dissection; C: View after level II lateral neck dissection

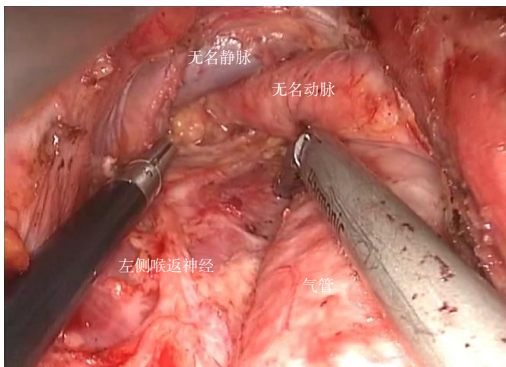


图6 免充气经口腔镜甲状腺癌中央区淋巴结清扫

Figure 6 Central lymph node dissection via the gasless transoral approach

2 结果

2.1 患者资料及相关临床指标

共纳入 106 例患者,男 11 例,女 95 例;平均年龄 (35.5 ± 8.1) 岁;平均肿瘤直径 (0.8 ± 0.5) cm,其余手术相关结果详见表 1。

2.2 术后并发症

本组患者术后未出现感染、出血、永久性甲状旁腺损伤、永久性颈神经损伤等并发症。1 例出现术后发音嘶哑,2 个月内恢复;1 例右侧侧颈淋巴结清扫术后出现淋巴漏,术后 2 周痊愈(表 2)。

表1 患者资料及相关临床指标

Table 1 General data and relevant clinical variables of patients

指标	数值
性别[n(%)]	
男	11(10.4)
女	95(89.6)
年龄(岁, $\bar{x}\pm s$)	35.5±8.1
肿瘤直径(cm, $\bar{x}\pm s$)	0.8±0.5
手术时间(min, $\bar{x}\pm s$)	
甲状腺癌手术(甲状腺切除+中央区清扫)	163.9±49.1
甲状腺癌手术+侧区清扫	331.0±103.9
手术方式[n(%)]	
一侧腺叶切除	91(85.8)
甲状腺全切除	15(14.2)
中央区淋巴结清扫	106(100.0)
侧颈淋巴结清扫	7(6.6)
术后住院时间(d, $\bar{x}\pm s$)	5.4±1.4
术后病理	
甲状腺乳头状癌[n(%)]	106(100.0)
中央区淋巴结清扫数(枚, $\bar{x}\pm s$)	8.6±6.1
单侧侧颈淋巴结清扫数(枚, $\bar{x}\pm s$)	19.4±7.6

表2 术后并发症情况[n (%)]

Table 2 Postoperative complications [n (%)]

术后并发症	数值
永久性甲状旁腺功能减退	0(0.0)
喉返神经损伤	1(0.9)
永久性神经损伤	0(0.0)
术后感染	0(0.0)
术后出血	0(0.0)
术后淋巴漏	1(0.9)

3 讨论

传统腔镜手术基本都是采用CO₂充气的方法维持手术操作空间,或者联合悬吊的方法建腔^[14-15],但是由于CO₂充气的弊端,近年来也受到了质疑,因此,如果能够用免充气的方法完成手术将是更好的选择。由于技术难度较大,搜索文献,关于免充气经口腔镜甲状腺手术的文献报道国内外仅有数篇^[16-20]。2013年Nakajo等^[16]率先报道8例免充气经口腔镜甲状腺手术。该研究采用的是经皮悬吊法,经口腔前庭单孔进行手术,由于该方法系单孔腔镜手术,器械干扰明显,手术难度较大,之后未再报道。2019年Park等报道^[17]了经口悬吊免充气经口腔镜甲状腺手术,该研究是采用了特

制悬吊拉钩经口腔观察孔悬吊,三孔的方法进行手术。这种方法,经口悬吊的拉钩需要特殊定制,拉钩会占用观察孔隧道空间,并且该方法仍然采用传统穿刺器,器械干扰还是没有解决。本中心经过数年的研究,对悬吊器械及穿刺器进行改良,试图解决以上问题,现就具体改进的要点进行分类讨论。

3.1 空间的维持

免充气腔镜手术维持空间的方法有多种,其中最简单的方法就是克氏针经皮悬吊。但这种方法存在一定弊端:首先,克氏针非三维立体,其悬吊可以保证宽度空间,但是缺乏手术野的前后纵深空间,因此,对于颈部比较长的患者,1根克氏针悬吊往往不足以维持手术操作空间,可能需要2~3根,留下更多的针眼;其次,克氏针悬吊一旦固定好之后,无法进行旋转调整^[16]。因此,笔者团队采用了2 mm克氏针自制的皮肤悬吊拉钩进行悬吊,该设计可以确保拉钩在悬吊过程中不会滑出。相对于克氏针悬吊,拉钩悬吊只需要1个针眼;由于拉钩为三维立体结构,具有前后及左右空间,空间感更好,整个手术只需要1个拉钩就可以维持有效的空间;且拉钩方向可根据手术空间需要进行旋转调整。笔者团队针对腔镜甲状腺拉钩也进行改良,采用2 mm直径克氏针自制,这种拉钩尾端也有钩,可以借助绷带悬吊在头架上,拉钩无需助手把持,在行甲状腺甚至侧颈淋巴结清扫的时候,只需要主刀与扶镜手即可完成手术,节约人力成本。在进行侧颈淋巴结清扫时,经口腔镜需从胸锁乳突肌内侧缘入路进行清扫,由于胸锁乳突肌下端较宽,传统腔镜甲状腺拉钩不足以维持空间需求,因此,笔者又设计了专门悬吊胸锁乳突肌下端的拉钩,这种拉钩采用2.5 mm克氏针自制,拉钩更加宽大,可以满足III/IV区淋巴结清扫的需求。当然,由于胸锁乳突肌较长,在做II区清扫的时候,需要在局部增加一个普通的腔镜甲状腺拉钩,以满足II区清扫的空间需求。

3.2 烟雾排除技巧

排烟的方法有多种,早期笔者团队采用操作孔穿刺器侧孔接负压吸引排烟^[10],这种方法由于操作孔还要置入器械操作,空隙较小,从而影响排烟效果。在此基础上,笔者在观察孔隧道的左侧,观察孔穿刺器旁边置入腔镜吸引器持续负压吸引,这种方法使排烟通畅,且可以根据手术的

需求动态调整,吸引器可放置在超声刀附近,排烟效果更好。此外,增加的腔镜吸引器相当于术者左手可以同时使用两个器械,减少术中切换器械频次。在行中央区淋巴结清扫时,吸引器可以由扶镜手把持推挤气管辅助显露,使清扫更彻底。本组中央区淋巴结清扫(8.6 ± 6.1)枚,比Chen等^[21]之前报道充气经口腔镜中央区清扫(6.8 ± 3.9)枚更多。此外,国外有报道^[22]采用4个穿刺器进行手术,虽然增加了1个器械,但是这种方法由于又增加了1个穿刺器,器械干扰可能更明显。

3.3 穿刺器的改良

早期笔者团队^[10]采用传统的穿刺器进行手术。传统穿刺器由于带有防漏气密封圈,底座较粗,在经口腔镜手术过程中器械干扰明显,不便于手术操作。由于免充气腔镜操作空间为开放式,不需要密封圈,因此可对穿刺器重新设计改良。笔者团队重新设计了免充气腔镜穿刺器,去除底座密封圈,让穿刺器“瘦身”,可明显减少器械干扰;且穿刺器内径增粗,气体流通量更好,有助于更好地排烟^[23]。由于下颌骨阻挡、传统的充气腔镜器械干扰及只有两个操作孔器械操作的限制条件,经口腔镜侧颈淋巴结清扫难度较大,视野盲区较大,只能清扫IV区与部分III区,清扫范围不够,因此,国际上有关经口侧颈淋巴结清扫的文章很少^[24-25]。笔者团队^[23]于2019年率先开展了首例免充气经口腔镜侧颈淋巴结清扫,经过不断探索改进,目前已经可在手术操作过程中常规显露颌下腺、副神经,完成部分II区清扫。II区清扫的难点在于如何越过下颌骨屏障进行操作,笔者发现,可将下唇下移,拓宽观察孔隧道,这样可以越过下颌骨屏障进行操作;同时,由于采用新型穿刺器,器械干扰小,可通过观察孔隧道置入更多的器械辅助操作。这种方法,如果采用充气维持空间,观察孔隧道会漏气,手术空间会塌陷。采用经观察孔隧道置入拉钩的方法,拉钩会占用观察孔隧道的空间,干扰器械操作。因此,在侧颈清扫方面,经笔者改良方法更具优势。本组病例单侧侧颈淋巴结清扫数量为(19.4 ± 7.6)枚,明显优于Tan等^[24]报道的充气经口腔镜侧颈淋巴结清扫的(10.9 ± 2.8)枚。

3.4 手术并发症与安全性

相比于充气经口腔镜,免充气经口腔镜无CO₂相关并发症,避免了血管破裂后气体栓塞的风险。

由于可应用强负压吸引,并且增加了腔镜吸引器,手术烟雾较少,操作更加便捷,降低了手术难度。同时,强负压吸引可迅速排除能量器械产生的气溶胶,理论上可降低肿瘤的种植风险,更符合肿瘤的治疗原则。在遇见血管破裂出血时,腔镜吸引器可由扶镜手把持,压住血管控制出血,便于主刀腾出左、右手较为轻松地处理出血点。在做侧颈淋巴结清扫时,充气经口腔镜由于手术腔内正压,淋巴管往往塌陷,不便于发现术中出现的淋巴漏,免充气腔镜脉管处于正常充盈状态,更容易发现淋巴漏。因此,理论上免充气经口腔镜相对于充气手术更加安全。但是,由于本组病例较少,并且是单中心经验,缺乏循证医学依据,尚需进一步的随机对照研究进行验证。

综上所述,免充气经口腔镜技术无CO₂相关并发症,应用改良的穿刺器减少了器械干扰,增加了腔镜吸引器,便于手术操作,该技术的推广有助于缩短学习曲线、拓展应用范围,具有良好的临床应用前景。

利益冲突:所有作者均声明不存在利益冲突。

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