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· 甲状腺外科专题研究 ·

## 经颈下口腔前庭联合腋窝入路内镜甲状腺手术6例报告

陶龙, 阮剑

(湖北省武汉市第一医院 甲乳外科, 湖北 武汉 430030)

### 摘要

**背景与目的:** 近年来, 各种颈部无痕的甲状腺手术逐渐成熟, 经口腔前庭入路全内镜甲状腺手术 (TOETVA) 由于其路径短、清扫淋巴结方便彻底、体表无痕, 逐渐受到医生及患者的青睐。然而, 在笔者团队前期开展的TOETVA患者中发现, 部分术后有不同程度的颈部麻木感、下唇运动功能减退、水肿变形、颈部瘢痕增生变硬等不适, 于是团队后期采用5 mm内镜进行经口腔甲状腺手术, 并加入腋窝通道辅助手术和取出标本, 即经口腔联合腋窝入路全内镜甲状腺手术 (AcaTOETVA), 当面对颧骨过于突出的患者, 口腔观察孔隧道比较难建立时, 采用颈下5 mm切口建立观察孔隧道, 行经颈下口腔前庭联合腋窝入路内镜甲状腺手术 (SaAcaTOETVA)。本文通过总结行该术式的有限病例, 初步探讨该术式的可行性及优缺点。

**方法:** 回顾性分析6例武汉市第一医院甲乳外科2020年9月—11月完成SaAcaTOETVA患者的临床资料。

**结果:** 6例患者均顺利完成手术, 其中3例行甲状腺左侧腺叶切除术+左侧中央区淋巴结清扫, 1例行甲状腺右侧腺叶切除术+右侧中央区淋巴结清扫, 1例行甲状腺右侧腺叶近全切除术, 1例行甲状腺双侧腺叶近全切除术, 手术时间100~155 min, 术中出血量10~20 mL, 术后住院时间3 d, 患者无喉返神经损伤, 无皮下血肿、颧神经损伤、颧部及嘴唇麻木、颧部肿胀、低钙血症、吞咽困难、CO<sub>2</sub>气体栓塞、切口感染延迟愈合等并发症发生, 1例患者出现颈部小范围瘀青, 为操作孔穿刺所致, 于1周内恢复。术后1个月随访, 患者颈下切口愈合良好, 正常站立位时, 切口隐藏于颈下及腋窝, 相对隐蔽不易被发现, 患者对颈下及腋窝切口满意, 术后复查未发现肿瘤种植、复发或转移。

**结论:** 采用SaAcaTOETVA安全可行, 是AcaTOETVA的特殊情况的重要补充, 具有切口较隐蔽、美观的特点, 但5 mm内镜的清晰度问题以及初始建腔空间较小的问题, 可能会影响该术式的推广应用。

### 关键词

甲状腺肿瘤; 甲状腺切除术; 内窥镜; 经口腔入路

中图分类号: R736.1

## Submental and axillary channel-assisted transoral endoscopic thyroidectomy vestibular approach: a report of 6 cases

TAO Long, RUAN Jian

(Department of Breast and Thyroid Surgery, Wuhan First Hospital, Wuhan 430030, China)

### Abstract

**Background and Aims:** Various neck scarless surgeries have gradually matured in recent years. Transoral endoscopic thyroidectomy via vestibular approach (TOETVA) has gained popularity among

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作者简介: 陶龙, 湖北省武汉市第一医院住院医师, 主要从事甲状腺疾病方面的研究。

通信作者: 阮剑, Email: rj666688@aliyun.com

doctors and patients due to its shorter path, convenient and thorough lymph node dissection, and absence of visible scars. However, in the initial TOETVA cases the authors' team performed, some patients experienced varying degrees of chin numbness, reduced lower lip mobility, swelling and deformation, and hardening of chin scars after operation. Therefore, the team adopted a 5 mm endoscope for transoral thyroid surgery, supplemented by an axillary approach for assistance and specimen retrieval. This combined method is termed the axillary channel-assisted transoral endoscopic thyroidectomy vestibular approach (AcaTOETVA). For patients with a prominent chin bone, where establishing the oral observation channel is difficult, a 5 mm submental incision is made to create the observation channel to perform submental and axillary channel-assisted transoral endoscopic thyroidectomy vestibular approach (SaAcaTOETVA). This paper summarizes the limited cases of this surgical method to explore its feasibility, advantages, and disadvantages preliminarily.

**Methods:** The clinical data of 6 patients who underwent SaAcaTOETVA in the Breast and Thyroid Surgery Department of Wuhan First Hospital from September to November 2020 were retrospectively analyzed.

**Results:** All 6 patients completed the surgery. Among them, 3 patients underwent left thyroid lobectomy with left central lymph node dissection, 1 patient underwent right thyroid lobectomy with right central lymph node dissection, 1 patient underwent near-total right thyroid lobectomy, and 1 patient underwent near-total bilateral thyroid lobectomy. The surgery duration ranged from 100 to 155 min, intraoperative blood loss was 10 to 20 mL, and the postoperative hospital stay was 3 d. No patients experienced recurrent laryngeal nerve injury, subcutaneous hematoma, chin nerve injury, chin and lip numbness, chin swelling, hypocalcemia, swallowing difficulties, CO<sub>2</sub> embolism, or delayed wound healing. One patient had a small bruise on the chin due to a puncture of the operation hole, which resolved within a week. On one-month postoperative follow-up, the submental incision healed well, and when standing normally, the incisions were hidden under the chin and in the armpit, making them relatively inconspicuous. Patients were satisfied with the submental and axillary incisions, and postoperative examinations found no tumor implantation, recurrence, or metastasis.

**Conclusion:** SaAcaTOETVA is safe and feasible and is an important supplement to AcaTOETVA for specific cases. It features relatively hidden and aesthetically pleasing incisions. However, issues with the clarity of the 5 mm endoscope and the initially small working space may affect the widespread adoption of this surgical method.

**Key words**

Thyroid Neoplasms; Thyroidectomy; Endoscopes; Transoral Approach

**CLC number:** R736.1

1997年Hüscher等<sup>[1]</sup>在内镜下行甲状腺切除术,去除了传统甲状腺手术造成的颈部切口,达到了颈部无手术疤痕的效果,近年来由于患者对手术美容性的要求越来越高,内镜甲状腺手术便成了甲状腺外科的热点之一。内镜甲状腺手术经历了多种入路的发展历程,其在入路方式上的变化主要包括颈前小切口内镜辅助入路(Miccoli手术)<sup>[2]</sup>、胸乳入路<sup>[3]</sup>、全乳晕入路<sup>[4]</sup>、腋窝入路<sup>[5]</sup>、经口腔入路<sup>[6]</sup>等。经口腔前庭入路全内镜甲状腺手

术(transoral endoscopic thyroidectomy vestibular approach, TOETVA)由于其路径短、清扫淋巴结方便彻底<sup>[7-8]</sup>、体表无痕,逐渐受到各大医疗团队及患者的青睐<sup>[9]</sup>。本团队创新性采用5 mm内镜行经口腔联合腋窝入路全内镜甲状腺手术(axillary channel-assisted transoral endoscopic thyroidectomy vestibular approach, AcaTOETVA)<sup>[10]</sup>,该术式由于减少了口腔及颈部皮下组织损伤,从而有利于减少术后患者口唇及颊下周围水肿、麻木,同时减

少了口唇周围肌肉损伤，从而有利于患者术后口唇周围运动功能恢复，该术式口腔三切口均采用“钻孔”法置入内镜穿刺器建立手术通道，然而由于人体颧骨突起，尤其是当患者颧骨较为宽大、突起时，此处采用“钻孔”法建立通道比较困难。2018年Chen等<sup>[11]</sup>报告了经颧下前庭入路内镜甲状腺手术(transoral and submental thyroidectomy, TOaST)，其将10 mm观察孔由口腔前庭移至颧下区域，受此启发，本团队在进行AcaTOETVA前会对患者的颧下条件进行评估，如果患者颧骨过于宽大、突出时，将5 mm观察孔由口腔前庭移至颧下区域，即颧下前庭联合腋窝入路内镜甲状腺手术(submental and axillary channel-assisted transoral endoscopic thyroidectomy vestibular approach, SaAcaTOETVA)。本文将本团队于近期开展的6例SaAcaTOETVA的情况总结报告如下。

## 1 资料与方法

### 1.1 一般资料

回顾性分析2020年9—11月在湖北省武汉市第一医院甲状腺乳腺外科接受SaAcaTOETVA的6例甲状腺肿物患者的临床、病理与随访资料。6例患者中，女性5例，男性1例；年龄范围：25~49岁。术前甲状腺结节最大径为4.5 cm（范围：0.4~4.5 cm）。术前喉镜检查未见异常，超声及增强CT未见颈部淋巴结及远处器官转移。该项研究已经告知患者手术风险及签署相关知情同意书，相关技术已获得本院伦理批准（批号：武卫一院论审[2023]14号）。

### 1.2 适应证与禁忌证

适应证：(1) 良性结节，最大径<7 cm；(2) 分化型甲状腺癌，最大径<2.5 cm，无颈侧区淋巴结转移及全身远处器官转移；(3) 无颈部手术史及放射史；(4) 无甲状腺功能亢进或甲状腺功能减退；(5) 无瘢痕增生疾病。禁忌证：(1) 甲状腺功能亢进；(2) 肿瘤侵犯毗邻结构如气管、食管或组织粘连严重；(3) 术前辅助检查提示颈侧区淋巴结转移或远处器官转移<sup>[12-13]</sup>。

### 1.3 手术方法

术前30 min预防性予以甲硝唑1 g静脉滴注。全身麻醉下，患者处仰卧位，双臂内收，颈部呈稍过仰伸位，经口置入神经监护气管插管，并固定插管与口腔正中位置，头部贴膜保护眼睛、鼻

腔、耳道及面部皮肤、头发（图1A）。0.5%碘伏消毒头部手术区，1%碘伏消毒颈部及胸部手术区，铺无菌巾，主刀医师坐于患者头侧12点钟方向，第一助手坐于患者头侧1点钟方向，器械护士处患者头侧10点钟方向。0.25%碘伏消毒口腔2次后再用0.9%生理盐水冲洗1次，用尖刀依次于颧下（A点）、左第一前磨牙（B点）、右第一前磨牙（C点）分别作一切口，各0.5 cm，经颧下横行切口置入5 mm Trocar内芯向胸骨方向钝性拓展空间，后再以甲状软骨为起点分别向两侧胸锁关节方向钝性拓展，可于颈浅筋膜与颈深筋膜浅层形成第一操作空间，并可见3条导引隧道，B点、C点进5 mm Trocar，A点接CO<sub>2</sub>气压力最高设为3 mmHg（1 mmHg=0.133 kPa），于A点5 mm Trocar处置入5 mm 30°镜头，在镜头引导下用5 mm带芯Trocar钝性分离操作孔通道至第一操作空间（图1B-C）。左侧Trocar置入吸引器帮助显露，右侧Trocar置入电钩，于颈阔肌深面沿导引隧道分离皮瓣下至胸骨上窝，两侧显露胸锁乳突肌，用电凝切开颈白线，打开假被膜，显露甲状腺。沿左侧腋窝皮纹方向用尖刀切开10 mm切口（D点），并沿皮下间隙建立从腋窝至颈部的皮下隧道（图1D），建腔完成（图1E），进入内镜拉钩牵开或顶开带状肌（图1F）。于甲状腺腺体内缓慢注射0.1 mL纳米炭后，甲状腺的淋巴网显影，甲状旁腺负显影<sup>[14-15]</sup>。术中使用喉返神经监测仪监测喉返神经功能。先于颈动脉鞘区域用神经探针检测到V1信号并记录，结合术前辅助检查结果行单侧甲状腺腺叶切除术，如为甲状腺乳头状癌，则并行同侧中央区淋巴结清扫术，贴近真被膜分离、凝闭、切断甲状腺上极血管，保护喉上神经及血供；将上极腺体向下外侧翻牵，在环甲关节水平喉返神经入喉点附近用分离钳仔细探查解剖出喉返神经，保护好神经外膜上的营养血管，并注意保护好喉返神经的多个分支，打开神经隧道，顺着神经隧道解剖保护喉返神经，探查解剖喉返神经过程中注意避免神经的离断伤、牵拉伤和热损伤等，并全程监测并记录R1信号，离断Berry韧带<sup>[16]</sup>。紧贴甲状腺被膜向下分离，超声刀凝闭甲状腺中静脉，向内侧翻转腺体，超声刀依次间断凝闭甲状腺周围血管，近甲状腺下极离断腺体。经10 mm腋窝孔置入组织标本袋取出腺体。甲状旁腺予以原位保留，并保护好旁腺的血供，保留甲状腺下动脉主干、

甲状腺上动脉后支及进入旁腺的细小血管分支,如果不能原位保留甲状旁腺则用剪刀剪下自体移植。再行中央区淋巴结清扫术,清扫范围与开放手术一致,先游离暴露喉返神经,外界为颈总动脉,内界为气管对侧结缔组织,沿喉返神经平面分离神经前方的脂肪结缔组织,清扫喉返神经前方淋巴结。如肿瘤位于右侧还须继续清扫喉返神经后方淋巴结<sup>[17]</sup>。经腋窝孔置入标本袋,取出标本。然后监测并记录R2信号及V2信号<sup>[18-19]</sup>。大量蒸馏水冲洗术野干净,仔细检查有无出血点;检

查喉返神经、甲状旁腺及血供;清点纱布器械无误;可不缝合颈白线,于术腔放置负压引流管,从D点附近沿皮纹另戳孔引出并于皮肤层固定(图1G)。口腔内以5-0可吸收缝合线作B、C点的间断缝合,A、D点切口均用组织胶水直接粘合,然后再次用0.25%碘伏消毒口腔。颈下、腋下敷贴包扎。术后6 h流质饮食,继续预防性使用头孢及甲硝唑类抗菌药物24 h,术后24~48 h拔除引流管。

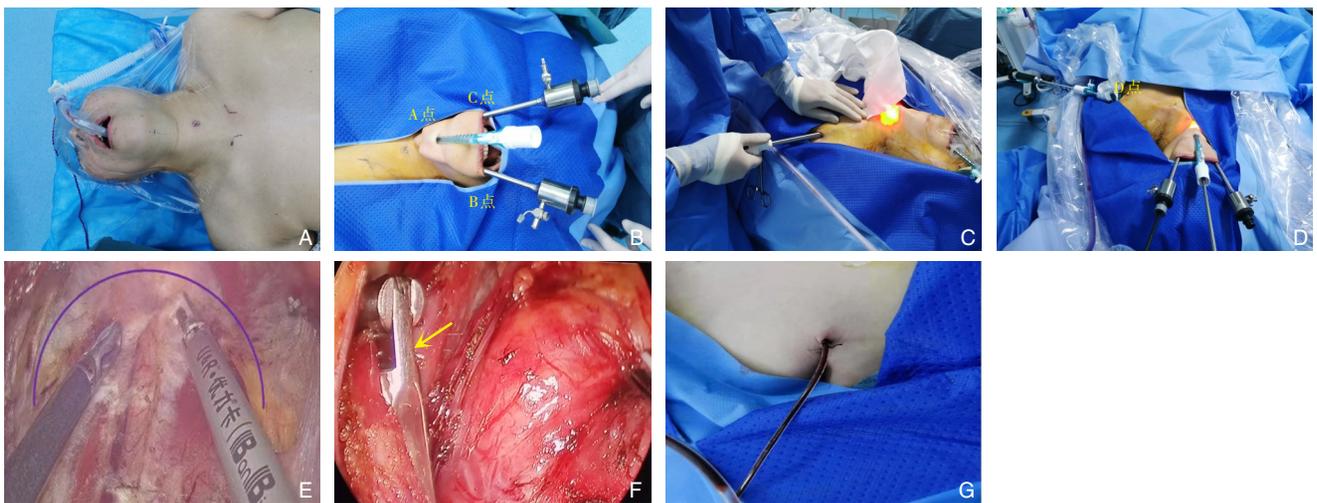


图1 SaAcaTOETVA手术 A: 患者体位准备; B: 建立颈下与口腔前庭腔道; C: 建立颈前皮下空间; D: 建立腋窝腔道; E: 建腔完成后腔道入路情况; F: 经腋窝腔道置入可折叠拉钩拉开带状肌; G: 经腋窝腔道留置引流管

Figure 1 SaAcaTOETVA procedure A: Patient position preparation; B: Establishment of submental and oral vestibular tunnels; C: Creation of subcutaneous space in the anterior neck; D: Establishment of the axillary tunnel; E: Post-creation view of the tunnel routes; F: Insertion of a foldable retractor through the axillary tunnel to retract strap muscles; G: Placement of a drainage tube through the axillary tunnel

## 2 结果

### 2.1 手术与术后情况

6例患者均顺利完成手术,其中3例行甲状腺左侧腺叶切除术+左侧中央区淋巴结清扫,1例行甲状腺右侧腺叶切除术+右侧中央区淋巴结清扫,1例行甲状腺右侧腺叶近切除术,1例行甲状腺双侧叶近全切除术,无中转开放手术患者。手术时间为100~155 min,术中出血量为10~20 mL,术后住院时间为3 d。术后病理学检查结果示结节性甲状腺肿2例,甲状腺微小乳头状癌3例,1例乳头

状癌直径1.4 cm。患者无喉返神经损伤,无皮下血肿、颈神经损伤、颈部及嘴唇麻木、颈部肿胀、低钙血症、吞咽困难、CO<sub>2</sub>气体栓塞、切口感染延迟愈合等并发症发生,1例患者出现颈部小范围瘀青,为操作孔穿刺所致,于1周内恢复。

### 2.2 随访情况

术后1个月随访,患者颈下切口愈合良好,正常站立位时,切口隐藏于颈下及腋窝(图2);术后复查未发现肿瘤种植、复发或转移。



图2 术后切口外观 A: 颏下切口; B: 腋窝切口

Figure 2 Postoperative incision appearance A: Submental incision; B: Axillary incision

### 3 讨论

2008年, Witzel等首次基于人类尸体及动物试验提出了经口入路甲状腺手术(transoral endoscopic thyroidectomy, TOET), 2011年左右我国各大医疗中心陆续开展了TOETVA手术<sup>[20-21]</sup>, 由于其具有体表无痕, 且方便处理低位中央区淋巴结的特点<sup>[22-23]</sup>, TOETVA手术迅速成为临床研究热点。

笔者团队于2019年8月份前成功开展40余例TOETVA手术, 在术后与患者的随访中发现, 部分患者术后有不同程度的颈部麻木感、下唇运动功能减退、水肿变形、颈部瘢痕增生变硬等不适<sup>[12,24-26]</sup>, 而下唇及颈部又是面部表情和功能构成中重要组成部分, 因此笔者于2019年9月后开展了AcaTOETVA手术<sup>[10]</sup>, 意在利用5 mm内镜代替10 mm内镜尽量缩小口腔黏膜及周围肌肉的创伤, 同时利用腋窝腔道辅助手术简化手术操作。然而, 当遇到患者颏骨宽大突出的患者时, “钻孔”法建立观察孔通道比较困难。因此, 当患者颏骨较为宽大突出时采用SaAcaTOETVA手术, 术后患者颈部仅在颏下留下一长约5 mm的手术切口瘢痕及腋窝沿皮纹的一长约10 mm手术切口, 而颏下及腋窝切口相对隐蔽, 能较好满足患者颈部美容需求, 同时避免了颈部及嘴唇麻木、水肿等不适, 加速了患者康复速度, 患者满意度较高。

Ma等<sup>[27]</sup>表明, 甲状腺手术的瘢痕增生程度主要与术中过度牵拉皮肤有关, 与切口长度无关。SaAcaTOETVA利用腋窝切口取出标本, 避免了因颏下切口取标本时对颈部切口的牵拉, 从而影响

颏下切口的愈合。颏下切口对男性更适合, 李武等<sup>[28]</sup>认为, 男性由于其颏下往往有胡须遮挡, 术后颏下切口愈合后对美观影响会更少。

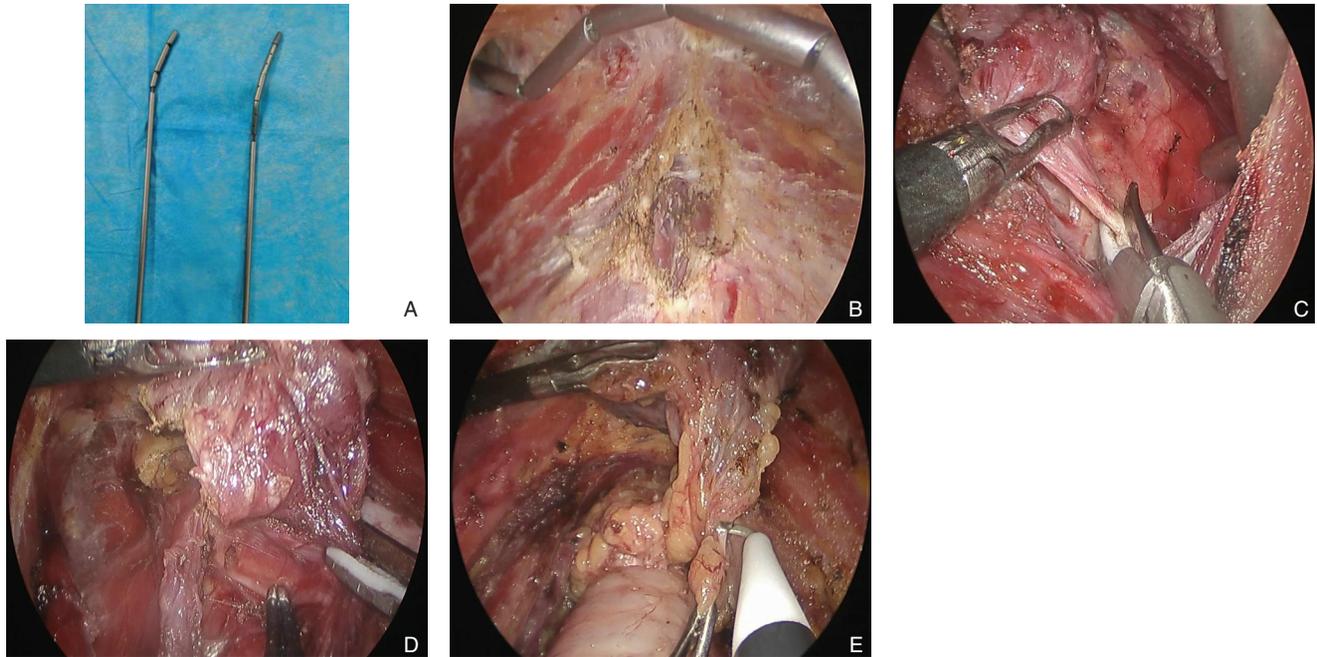
SaAcaTOETVA是颏下前庭入路和口腔前庭联合腋窝入路两种术式的糅合, 相比于颏下前庭入路, 该术式的颏下切口更小更隐蔽, 术后颏下瘢痕更小, 同时在面临更大的甲状腺肿瘤时选择从腋窝取出标本无需延长颏下切口, 避免了颏下瘢痕的延长和牵拉, 即使稍稍延长腋窝切口也不会影响患者美观。该术式有4个腔道, 术中可以同时进入4个器械, 术中可以同时经腋窝孔道辅助吸烟雾吸渗出液体、放置可弯曲拉钩、辅助牵拉甲状腺等, 还可以通过腋窝孔道来作为观察孔, 检查甲状腺上级血管处理情况。本团队发明的“金手指”<sup>[29]</sup>可以通过腋窝通道来辅助手术, 可以进行肌肉、甲状腺、气管、血管在必要时的推拉, 可以时刻进行烟雾的吸引, 可以及时按压出血点等操作。增加器械辅助手术大大方便了手术操作, 缩短了手术时间(图3)。在方静等<sup>[30-31]</sup>的免充气内镜甲状腺手术中强调吸引器的快速参与对于术中处理比较迅速出血的重要性, 本团队的SaAcaTOETVA, 在必要时助手可从左侧腋窝切口通道提拉腺体, 主刀左手可以全程使用吸引器。在甲亢和部分甲状腺腺瘤切除手术这类容易意外出血的手术中, 主刀始终使用吸引器辅助将会大大降低手术难度和减少手术时间。因此, 4个器械同时参与手术对于较复杂内镜甲状腺手术至关重要。

颏下入路观察孔镜头活动灵活, 不受下颌骨外形影响, 甚至不受下颌整形术后所致的影响, 尤其在处理甲状腺上级时, 镜头操作杆可以上翘得更高, 更有利于甲状腺上极的暴露, 从而可以更方便地观察及处理上级血管和喉上神经。此外采用5 mm内镜进行手术, 手术器械之间的拥挤情况会有所好转, 但是这仅仅是笔者的手术体验, 想要进一步量化二者之间的对比比较困难。

马小鹏等<sup>[32]</sup>利用颏下切口进行抽脂, 减少颏下脂肪后患者的颈部外观会更好。现代外科手术越来越强调快速康复, 在避免传统术后并发症(出血、感染、声音嘶哑等)的同时, 减轻术后水肿无疑是快速康复中重要的一环。本团队认为, 虽然口腔黏膜切口可以快速愈合, 但是口腔周围肌肉拉伤和水肿仍是影响患者术后短期内生活质量的主要原因。对于部分口腔前庭较小的患者,

减少口腔前庭内置通道可以避免术中拉伤口唇肌肉的风险,减轻术后口唇水肿,有助于患者尽早恢复口唇运动,从而达到快速康复的目的。李武

等<sup>[26]</sup>认为,中间观察孔 Trocar 无需穿过下唇,可以减少颈部感觉迟钝、肿胀的发生,消除颈下水肿,提升患者术后体验。



**图3 “金手指”拉钩及其应用** A: 左侧和右侧甲状腺手术对应的“金手指”拉钩; B: “金手指”拉钩顶住皮瓣稳定空间; C: 右侧“金手指”拉钩顶住带状肌可以充分显露甲状腺上级; D: 助手经腋窝腔道进抓钳提拉甲状腺,主刀左手使用神经监测保护神经的同时离断甲状腺; E: 助手经腋窝腔道进抓钳提拉甲状腺,主刀左手夹住旁腺分离保护旁腺

**Figure 3 "Golden finger" hooks and their application** A: "Golden finger" hooks corresponding to left and right thyroid surgeries; B: "Golden finger" hook stabilizing the space by holding the skin flap; C: "Golden finger" on the right side holding the strap muscles to fully expose the superior thyroid; D: Assistant using grasping forceps through the axillary tunnel to lift the thyroid while the primary surgeon using left hand to monitor and protect the nerve during thyroid dissection; E: Assistant using grasping forceps through the axillary tunnel to lift the thyroid while the primary surgeon using left hand to hold and protect the parathyroid during separation

手术安全性方面,孙晓伟等<sup>[33]</sup>认为,颈下前庭入路可有效避免颈神经损伤,本团队目前为止已开展 AcaTOETVA 手术 1 000 余例,此术式已在本团队较为成熟, SaAcaTOETVA 为该术式特殊情况下的补充,二者手术安全性相近。

但笔者认为 SaAcaTOETVA 仍存在以下不足:首先,5 mm 内镜的清晰度较 10 mm 内镜差。其次,5 mm 内镜的手术空间狭小,对操作者的技术要求高,对于初学者难度较大<sup>[9]</sup>,延长了学习曲线,另外,此术式不适用于严重疤痕体质的患者。

综上所述, SaAcaTOETVA 手术安全可行,是 AcaTOETVA 手术的特殊情况的重要补充,具有切口隐蔽、美观的特点,但 5 mm 内镜的清晰度问题以及初始建腔空间较小的问题,制约着该术式的推广应用。

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