·论 著·

头上斜肌/头后大直肌枕骨附着点在乙状窦后入路开颅手术中的作用

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【摘要】**目的** 探讨头上斜肌/头后大直肌枕骨附着点在乙状窦后入路开颅手术中作为骨窗下界标志的意义。**方法** 2018年1月至2021年11月前瞻性收集桥小脑角区病变81例，术前头颅MRI定位横窦、头上斜肌/头后大直肌在枕骨的附着点、椎动脉或周围静脉丛，测量相应距离，以头上斜肌/头后大直肌在枕骨的附着点作为骨窗下界参考。术中解剖暴露头上斜肌/头后大直肌在枕骨的附着点作为乙状窦后入路骨窗下界的参考点。**结果** 术前MRI测量显示，横窦下界与头上斜肌/头后大直肌在枕骨的附着点的距离26.1~40.7 mm，平均(33.4±3.5)mm；头上斜肌/头后大直肌在枕骨的附着点与椎动脉或周围静脉丛的距离11.3~27.2 mm，平均为(18.6±3.6)mm。81例术中骨窗上下界距离(36.8±5.2)mm(上界为横窦下缘)，病变均暴露满意，术中无椎动脉/周围静脉丛暴露及损伤。46例听神经瘤、13例脑膜瘤、7例海绵状血管瘤均全切除；15例听神经瘤因肿瘤与面神经关系密切行近全切除。所有病人骨瓣均完整复位，术后1周~1年CT/MRI复查显示无颅骨缺损，无皮下积液。**结论** 以头上斜肌/头后大直肌在枕骨的附着点作为乙状窦后入路骨窗下界的标记点，有利于安全地显露术野，对手术过程有重要的指导意义。

【关键词】桥小脑角区病变；乙状窦后入路；显微手术；头上斜肌；头后大直肌；椎动脉；下项线

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Role of occipital attachment point of obliquus capitis superior/rectus capitis posterior major in microsurgery through retrosigmoid approach for patients with cerebellopontine angle lesons

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【**Abstract**】**Objective** To investigate the clinical significance of the occipital attachment point of the obliquus capitis superior (OCS)/rectus capitis posterior major (RCPM) as a marker of the lower boundary of the bone window in micorsurgery through retrosigmoid approach for patients with cerebellopontine angle (CPA) lesions. **Methods** From January 2018 to November 2021, 81 patients with CPA lesions were prospectively collected. The transverse sinus, the attachment point of OCS/RCPM at occipital bone, vertebral artery or peripheral venous plexus were located and the corresponding distances were measured according to preoperative MRI. The attachment point of OCS/RCPM at occipital bone was used as the reference for the lower boundary of bone window. During the surgery, the attachment point of the OCS/RCPM to the occipital bone as a reference for the lower boundary of the bone window. **Results** Preoperative MRI showed that the distance between the lower boundary of the transverse sinus and the attachment point of the OCS/RCPM at the occipital bone was 26.1~40.7 mm, with an average of (33.4±3.5) mm; the distance between the attachment point of the OCS/RCPM at the occipital bone and the vertebral artery or peripheral venous plexus was 11.3~27.2 mm, with an average of (18.6±3.6) mm. During the operation, the distance between the upper and lower boundaries of the bone window was (36.8±5.2) mm (the upper boundary was the lower margin of the transverse sinus), and the lesions were all exposed satisfactorily, and no vertebral artery/peripheral venous plexus was exposed or injured. Total tumor resection was achieved in 46 patients with acoustic neuromas, 13 patients with meningiomas, and 7 patients with cavernous hemangiomas. Nearly total tumor resection was performed in 15 patients with acoustic neuromas due to the close relationship between the tumor and the facial nerve. CT/MRI reexamination 1 week to 1 year after surgery showed no skull defect and no subcutaneous fluid. **Conclusions** During the surgery through retrosigmoid approach for patients with CPA lesions, using the attachment point of the OCS/RCPM at the occipital bone as the marker of the lower boundary of the bone window is beneficial to the safe exposure of the operative field and has important guiding significance for the surgical process.

【**Key words**】Cerebellopontine angle lesions; Microsurgery; Retrosigmoid approach; Obliquus capitis superior; Rectus capitis posterior major; Inferior nuchal line; Vertebral artery

因为部位特殊以及术区有横窦、乙状窦、导静脉、椎动脉/周围静脉丛，乙状窦后入路手术处理桥小脑角区病变的过程中可能发生大量出血，以及静脉窦、椎动脉损伤而造成灾难性后果。乙状窦后入

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路开颅的基本要求是上界至横窦，外侧界至乙状窦，而对于骨窗的具体大小、下界无统一要求，实际操作中常把骨窗下界尽量向枕大孔、寰椎方向靠拢[1~5]，因此，附近的椎动脉成为了开颅过程中易损伤的血管[3,6~8]。临床上，多数医生常反复手指触摸术野[7,9]，或者B超探测[10]，评估是否存在椎动脉，这增加了手术时间，同时增加术区感染的几率。本研究以头上斜肌/头后大直肌在枕骨的附着点作为乙状窦后入路骨窗下界的参考点，通过术前头颅MRI测量骨窗下界需暴露的位置，指导经乙状窦后入路开颅手术81例，效果良好，现总结如下。

1 资料与方法

1.1 一般资料 2018年1月至2021年11月前瞻性收集桥小脑角区病变81例，其中男37例，女44例；年龄21~70岁，平均(47.3±12.9)岁。听神经瘤61例[直径9.0~52.0 mm，平均(31.4±9.4)mm]，脑膜瘤13例[直径19.6~48.0 mm，平均(32.0±9.7)mm]，海绵状血管瘤7例[直径9.0~31.0 mm，平均(21.1±7.5)mm]。

1.2 术前头颅MRI测量 术前行头颅MRI平扫+增强扫描，并以岩骨颅后窝面为基线行T_1增强扫描(模拟乙状窦为基线，乙状窦为骨窗外侧界)，在影像工作站窗口下进行以下操作：①截取病变最大截面，旋转30°~45°，使其成术中所需头位为公园侧卧椅位；②标记横窦下界、头上斜肌/头后大直肌在枕骨的附着点、椎动脉或邻近的周围静脉丛，并测量相互之间的距离；③以头上斜肌/头后大直肌在枕骨的附着点为参考点，用显微镜手术的视角观察骨窗下界是否足够，以及测量需向枕大孔方向扩展的距离(图1)。

1.3 手术方法 取公园椅侧卧位，标记横窦、乙状窦体表走形，取发迹内侧约1 cm直切口，长6~9 cm，上界为横窦上1.5~2.0 cm，下界距横窦下缘4.0~7.0 cm。切开皮肤、浅筋膜，乳突牵开器撑开，单极电刀切开项上线及邻近骨质上附着的头夹肌、头半棘肌、胸锁乳突肌，予骨膜剥离器拨开后撑开，注意处理乳突附近的导静脉。电刀分次切开头夹肌、头半棘肌等，并辅以骨膜剥离器钝性剥离、暴露。完好暴露头上斜肌/头后大直肌在枕骨的附着点，视病变情况及术前MRI测量数据，决定是否需继续向枕大孔方向钝性剥离肌肉以增大骨窗下界范围0.5~1.0 cm。定位星点外1 cm，顶乳缝上钻孔，椎板咬骨钳适当扩大骨孔以暴露横窦乙状窦拐角；定位拟行骨窗下界区的乳突后沟点，在其内侧约5 mm处磨钻钻孔，椎板咬骨钳适当扩大骨孔以暴露乙状窦内侧边缘。铣刀铣下骨瓣，确认已暴露出骨窗上界(横窦下缘)、外侧界(乙状窦内侧缘)，不足则用磨钻适当磨除多余骨质。开放气房用碘伏骨蜡封闭。剪开硬脑膜后在显微镜下操作，在枕大池或小脑延髓池释放脑脊液，待脑压下降，适当牵开小脑外侧显露病变并予相应处理，在保护神经解剖及功能的前提下尽可能全切除病变。缝合硬脑膜，复位骨瓣固定，逐层缝合肌肉、皮下组织和头皮(图1)。

2 结 果

2.1 MRI测量结果 横窦下界与头上斜肌/头后大直肌在枕骨的附着点的距离26.1~40.7 mm，平均(33.4±3.5)mm。头上斜肌/头后大直肌在枕骨的附着点与椎动脉或周围静脉丛的距离11.3~27.2 mm，平均为(18.6±3.6)mm。

2.2 手术结果 81例术中骨窗上下界距离(36.8±5.2)mm(上界为横窦下缘)，病变均暴露满意，术中无椎动脉/周围静脉丛暴露及损伤。46例听神经瘤、13例脑膜瘤、7例海绵状血管瘤均全切除；15例听神经瘤因肿瘤与面神经关系密切行近全切除。所有病人骨瓣均完整复位，术后1周~1年CT/MRI复查显示无颅骨缺损，无皮下积液。

3 讨 论

Tayebi等[11]通过尸头研究分析下项线与椎动脉的解剖关系，提出下项线可以作为乙状窦后入路中分离、保护椎动脉的解剖学标志，解剖发现下项线内侧与椎动脉的距离在12.6~34.5 mm，下项线外侧与椎动脉的距离在3.5~15.0 mm。但是，在实际手术过程中，需要分离开覆盖的头上斜肌、头后大直肌才能暴露及识别下项线，部分病例分离的肌肉可能较多，而且在分离的过程中也容易损伤椎动脉；还有部分病例的下项线可能不明显，难以准确辨认。椎动脉V3段位于枕下三角内，头上斜肌、头后大直肌组成枕下三角的上内外侧，止点附着在下项线。我们术中安全、完整地暴露头上斜肌、头后大直肌在枕骨的附着点，也就是下项线位置，以其作为参考点，术前模拟术中显微镜下视角基线行MRI扫描，并成正常手术头部体位，测量参考点至椎动脉/周围静脉丛的距离，以及在显微镜视角下测量，是否需继续向下方暴露骨窗，本文大部分病例骨窗下界只需暴露至头上斜肌、头后大直肌在枕骨的附着点，部分也只需向下剥离头上斜肌/头后大直肌0.5~1.0 cm，均能完全满足深部术野的暴露，可避免椎动脉及周围静脉丛

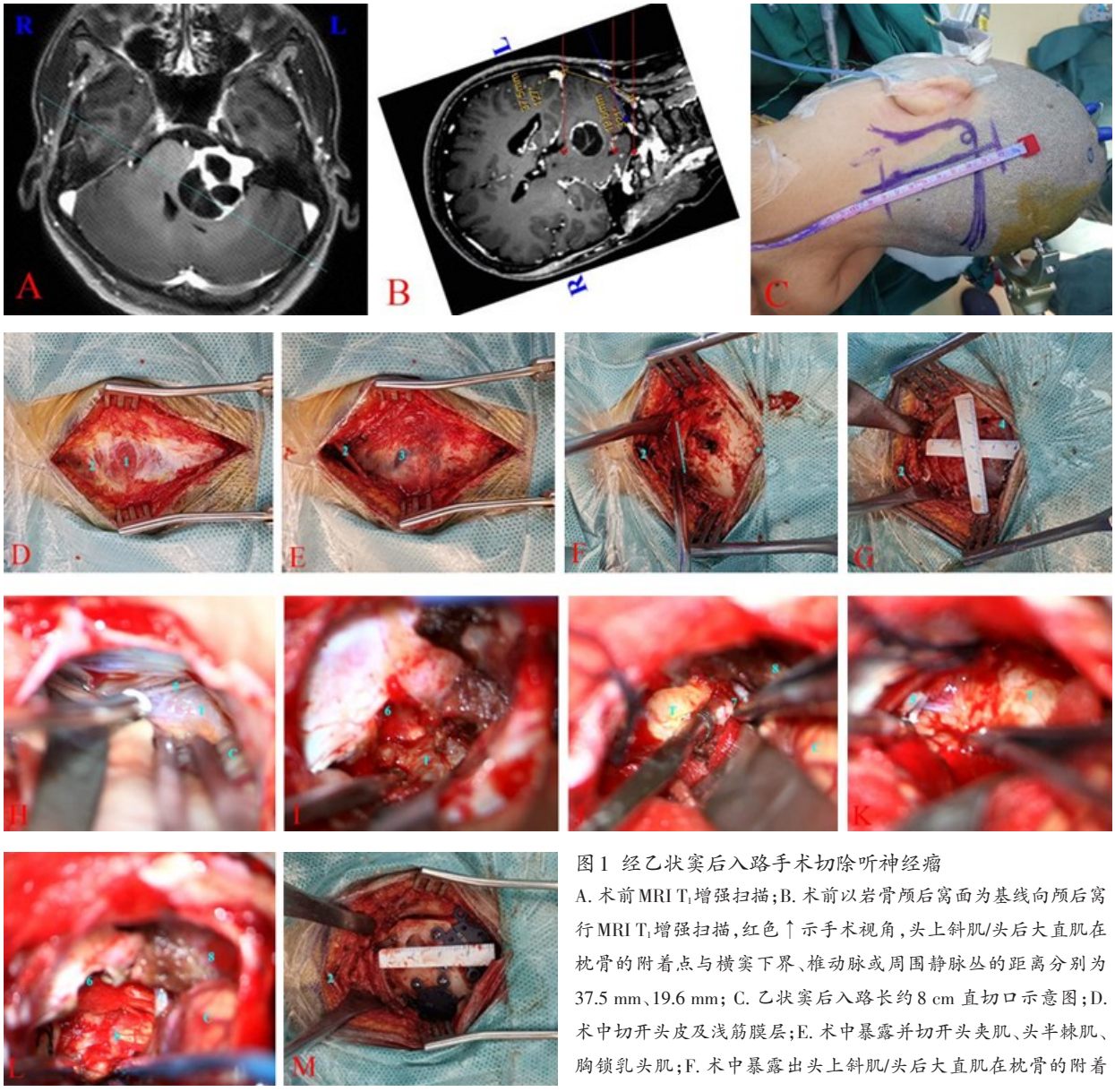

图1 经乙状窦后入路手术切除听神经瘤

A. 术前MRI T_1增强扫描；B. 术前以岩骨颅后窝面为基线向颅后窝行MRI T_1增强扫描，红色↑示手术视角，头上斜肌/头后大直肌在枕骨的附着点与横窦下界、椎动脉或周围静脉丛的距离分别为37.5 mm、19.6 mm；C. 乙状窦后入路长约8 cm直切口示意图；D. 术中切开头皮及浅筋膜层；E. 术中暴露并切开头夹肌、头半棘肌、胸锁乳头肌；F. 术中暴露出头上斜肌/头后大直肌在枕骨的附着点；G. 骨窗；H. 术中枕大孔方向手术视角(C. 小脑；T. 肿瘤)；I. 甚至切除内听道肿瘤(T. 肿瘤)；J. 术中切除肿瘤上极(C. 小脑；T. 肿瘤)；K. 术中切除肿瘤下极(T. 肿瘤)；L. 术中显微镜下观察显示肿瘤全切除(C. 小脑；b. 脑干)；M. 术中回植骨瓣；1. 头夹肌；2. 颈丛分支；3. 导静脉；4. 横窦乙状窦转角；5. 后组颅神经；6. 内听道；7. 岩静脉；8. 天幕；*. 星点

的损伤，以及最大程度地减少深部短肌的损伤。

枕下三角的暴露和椎动脉V3段的保护只在远外侧入路文献中有描述。在远外侧入路手术过程中，Youssef等[12]提出了对颈部肌肉逐层解剖来暴露枕下三角，再利用膜性结构可安全暴露出椎动脉V3。Elhammady等[3]在暴露椎动脉V3段时，也采用肌肉分层解剖，认为枕下区域的肌肉是可靠的解剖标志，在实际操作中，有助于安全地识别每个后续需暴露的解剖结构。在乙状窦后入路中，Chen等[4]提出无血快速开颅，也采用对肌肉逐层解剖暴露，向下暴露至下项线下方，但具体操作过程未描述。Campero等[13]认为逐层解剖暴露对皮瓣血运影响较大，因此，提出以上项线、下项线为标记，枕后肌肉分为四层，第一层的斜方肌、胸锁乳突肌，第二层的头夹肌，第三层头半棘肌、头最长肌，第四层的头后小直肌、枕下三角组成肌肉；前三层肌肉相互交织，主要附着点在上项线，第四层附着点在下项线；前三层可一起分离，最深层的第四层仍然附着在颅底，可安全暴露出枕下三角。Tayebi Meybodi等[11]认为，头后大/小直肌和头上斜肌与上方的肌肉之间，存在疏松结缔组织层，在乙状窦入路手术中不需要解剖每块肌肉，就可以很容易找到这个平面，安全地暴露出枕

下三角。在耳后直切口乙状窦后入路中，切开头皮皮下组织暴露肌肉层后，利用电切时肌肉向两侧收缩，同时辅以钝性剥离，可完好第暴露头上斜肌/头后大直肌在枕骨的附着点，也说明此层肌肉与表面三层肌肉之间有疏松结缔组织层。

总之，以上斜肌/头后大直肌在枕骨的附着点作为乙状窦后入路骨窗下界的标记点，有利于安全地显露术野，避免过多地分离肌肉，对手术过程有重要的指导意义。

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