·论　著·

术中MRI指导下经鼻蝶入路神经内镜手术治疗巨大无功能垂体腺瘤的疗效分析

谢　森　韩轶鹏　毛更生　朱伟杰　孟祥辉

【摘要】**目的** 探讨术中MRI指导下经鼻蝶入路神经内镜手术治疗巨大(最大径>4 cm)无功能垂体腺瘤的疗效。**方法** 回顾性分析2009年2月至2015年6月经鼻蝶入路神经内镜手术治疗的24例巨大无功能垂体腺瘤的临床资料。术中使用MRI指导手术切除肿瘤。**结果** 肿瘤最大直径4~5 cm有18例,>5 cm有6例。术中MRI扫描1次15例,2次6例,3次2例,4次1例;平均(1.5±0.8)次/例。肿瘤全切除18例,次全切除6例。术中发现脑脊液鼻漏2例,术后出现脑脊液鼻漏1例、一过性尿崩6例;未出现颅内感染、颅内血肿。术后随访3~60个月,平均45个月;术后视力及视野改善19例,头痛缓解11例;新发垂体功能低下3例,嗅觉功能障碍4例,肿瘤复发2例。**结论** 术中MRI指导下经鼻蝶入路神经内镜手术是治疗巨大无功能垂体腺瘤安全有效的方式,能获得比较满意的疗效,手术安全性高、并发症少。

【关键词】垂体腺瘤;神经内镜;经鼻蝶入路;术中MRI;疗效

【文章编号】1009-153X(2024)01-0008-04　【文献标志码】A　【中国图书资料分类号】R 739.41; R 651.1+1

Efficacy of neuroendoscopic surgery via transsphenoidal approach under guidance of intraoperative MRI for patients with giant non-functional pituitary adenomas

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【**Abstract**】**Objective** To investigate the clinical efficacy of endoscopic endonasal transsphenoidal surgery (EETS) guided by intraoperative MRI (iMRI) for patients with giant (maximum diameter >4 cm) non-functional pituitary adenomas (NFPA). **Methods** The clinical data of 24 patients with giant NFPA treated by EETS from February 2009 to June 2015 were retrospectively analyzed. The iMRI was used to guide surgical resection of the tumors. **Results** The maximum tumor diameter was 4~5 cm in 18 patients and >5 cm in 6. The iMRI scan was performed in 15 patients for 1 time, 6 patients for 2 times, 2 patients for 3 times, and 1 patient for 4 times; with an average of (1.5±0.8) times/case. Total resection of the tumors was achieved in 18 patients and subtotal in 6. Cerebrospinal fluid (CSF) rhinorrhea occurred in 2 patients during the operation, and CSF rhinorrhea occurred in 1 and transient diabetes insipidus in 6 after the operation. There was no intracranial infection or intracranial hematoma. The postoperative follow-up ranged from 3 months to 60 months,with a mean time of 45 months. Impairments of visual acuity or visual field were improved in 19 of 24 patients, headache was relieved in 11 of 14 patients. Hypopituitarism occurred in 3 patients and olfactory dysfunction in 4, and tumors recurred in 2 patients during the follow-up. **Conclusions** EETS guided by iMRI is a safe and effective method for the treatment of patient with giant NFPA, which can obtain satisfactory efficacy, high surgical safety and few complications.

【**Key words**】Giant non-functional pituitary adenomas; Intraoperative MRI; Endoscopic endonasal transsphenoidal surgery; Efficacy

垂体腺瘤是颅内常见的良性肿瘤,多数为单个、瘤体可大可小。无功能垂体腺瘤占垂体腺瘤的20%~35%,因肿瘤无生物活性激素分泌功能,症状不显著,而且肿瘤生长缓慢,通常因肿瘤增大后压迫垂体组织及视交叉出现头痛、视力障碍及垂体功能低下就诊。经鼻蝶入路手术是目前大多数无功能垂体腺瘤的首选治疗措施[1]。巨大(最大径>4 cm)无功能垂体腺瘤,常呈侵袭性生长,肿瘤与周围血管、神经联系紧密,手术难度较大。术中MRI在垂体腺瘤手术中具有重要作用,可明显提高手术效果[2-5]。本文探讨术中MRI指导下经鼻蝶入路神经内镜手术治疗巨

doi:10.13798/j.issn.1009-153X.2024.01.003

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大无功能垂体腺瘤的疗效。

1 资料与方法

1.1 研究对象 回顾性分析2009年2月至2015年6月手术治疗的24例巨大无功能垂体腺瘤的临床资料，其中男11例，女13例；年龄27~69岁，平均49岁；复发3例（1次手术后复发）。肿瘤最大直径4~5 cm有18例，>5 cm有6例。本研究方案经解放军总医院第三医学中心伦理委员会审查批准（批号为：伦审科研2024023），所纳入病人均签署知情同意书。

1.2 临床表现 视觉功能障碍24例，其中失明3例，单纯视力下降14例，单纯视野缺损2例，视力下降伴视野缺损4例，视力下降伴复视1例；头痛14例；月经紊乱3例；性功能减退1例。

1.3 手术方法 将术前MRI数据上传BrainLAB工作站，制定初步手术计划。全麻后取仰卧位，安装头架并将BrainLAB参考架固定于头架上。神经导航注册成功后，稀释碘伏消毒皮肤、鼻腔粘膜，副肾素首先浸润两侧鼻底粘膜，神经内镜下再次用副肾素浸润右侧鼻底粘膜。导航定位下找到蝶窦前壁，根据蝶窦前壁缺损情况去除部分粘膜，充分暴露。若系再次经鼻蝶入路手术，则直接扩大骨窗进入蝶窦。如果蝶窦前壁完整，则磨除前壁骨质并形成骨窗。定位鞍底，根据术前MRI适当扩大骨窗，切开硬膜，神经内镜下观察肿瘤质地、血供等情况。用刮圈、标本钳、吸引器及刀片切除肿瘤，术中结合肿瘤大小、侵袭性生长方向及形状等决定切除顺序。瘤腔填塞止血纱布或明胶海绵，进行充分止血。术中认为肿瘤已经全切除或进一步切除手术风险大而无法继续切除时，行术中MRI扫描。如达术前预期目标，结束手术，否则根据MRI扫描结果重新制定手术计划，直到术中MRI判断肿瘤全切除或已达术前预期目标。

2 结 果

术中MRI扫描1次15例，2次6例，3次2例，4次1例，平均（1.5±0.8）次/例。肿瘤全切除18例（图1、2），次全切除6例（肿瘤侵袭性生长，全切除难度大、风险高）。术中发现脑脊液鼻漏2例，取自体筋膜修补鞍底，术后未再出现脑脊液鼻漏。术后出现脑脊液鼻漏1例，手术修补后治愈；出现一过性尿崩6例，未出现颅内感染、颅内血肿。术后随访3~60个月，平均45个月，术后视力及视野改善19例，头痛缓解11例。术后新发垂体功能低下3例，嗅觉功能障碍4例，肿瘤复发2例。

3 讨 论

巨大垂体腺瘤占垂体腺瘤的5%~14%[6]。无功能垂体腺瘤在明确诊断时体积往往较大，既往多采用开颅手术治疗。随着医疗器械和设备的发展以及经鼻蝶入路手术的日益成熟和普及，经鼻蝶入路目前已成为治疗巨大无功能垂体腺瘤的最佳路径之一。目前认为，经鼻蝶入路理论上是可行的，虽然肿瘤体积较大，但其生长缓慢，大多数质地较软，有时发生出血、软化、坏死等，容易切除。另一方面，向鞍上发展的肿瘤部分存在包膜，与下丘脑底部及鞍上池之间有蛛网膜相隔，术中肿瘤顶部包膜可塌陷至蝶鞍开口水平或下降到鞍内，有利于全切除肿瘤。尽管如此，巨大无功能垂体腺瘤的手术治疗仍是一大难题，由于肿瘤体积巨大，常累及视交叉、视神经、下丘脑、颈内动脉等重要的神经、血管，手术难度较

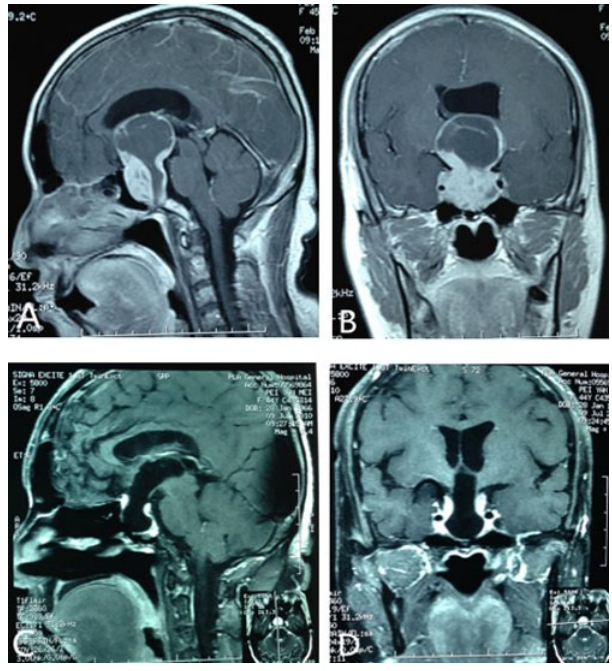

图1 巨大无功能性垂体腺瘤经鼻蝶入路神经内镜手术治疗前后影像

A~B. 术前MRI T_1像增强扫描矢状位、冠状位，肿瘤不均匀强化，部分囊变，向鞍上生长；C~D. 术后3个月MRI T_1像增强扫描矢状位及冠状位，肿瘤全切除

Figure 1 MR images of a giant nonfunctional pituitary adenoma before and after an endoscopic endonasal transsphenoidal surgery

A-B: Sagittal and coronal enhanced T_1WI before the surgery showed that the tumor was unevenly enhanced, partially cystic, and growing towards the saddle. C-D: Sagittal and coronal enhnaced T_1WI at 3 months after the surgery showed that the tumor was completely resected.

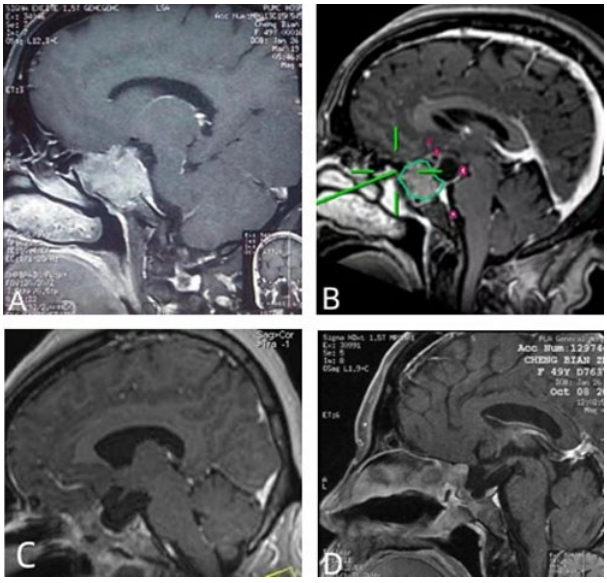

图2 巨大无功能性垂体腺瘤经鼻蝶入路神经内镜手术治疗前后影像

A. 术前MRI T_1像增强扫描矢状位；B. 切除部分肿瘤后，术中第一次MRI T_1增强扫描，显示肿瘤残留较多；C. 继续扩大切除，术中第二次MRI T_1增强扫描显示肿瘤全切除；D. 术后3个月MRI T_1像增强扫描矢状位，肿瘤切除满意

Figure 2 MR images of a giant nonfunctional pituitary adenoma before and after an endoscopic endonasal transsphenoidal surgery

A: Sagittal enhanced T_1WI before the surgery. B: The first intraoperative enhanced T_1WI after partial resection of the tumor showed a large residual tumor. C: The second intraoperative enhanced T_1WI after extended resection of the residual tumor showed complete resection of the tumor. D: Sagittal enhanced T_1WI at 3 months after the surgery showed that the tumor was competely resected.

大、风险较高，全切除率低，术后并发症发生率及肿瘤复发率高。巨大无功能垂体腺瘤有时单纯经鼻蝶入路难以做到全切除，需要分期手术或联合经颅入路，对术前伴有脑积水的病人，手术治疗更加复杂。

单纯经鼻蝶入路神经内镜下手术治疗垂体腺瘤得到迅速发展和普及，解决了显微镜下术野存在盲区的问题，不仅可以提高肿瘤全切除率，而且能明显降低并发症发生率[7-9]。有研究指出，神经内镜可以提供较开阔的视野及视角，但术后仍有可能出现垂体腺瘤的残留[10]。术中MRI的引入，能可靠地评估肿瘤残留，减少影像漂移带来的误差，实时监测手术进程，显著提高了垂体腺瘤的全切除率[11-13]。此外，术中MRI还可及时发现术中出血等并发症，为病人的及时施救提供依据[14]。术中MRI分辨率高，图像清晰，配合神经内镜的使用，可避免损伤重要的血管、神经等结构，提高了手术安全性。我们认为术中MRI指导下神经内镜手术具有以下优点：神经内镜视野开阔，解决了术野盲区问题，最大程度上减少鼻腔生理结构的破坏，创伤小；术中MRI无辐射损伤，术中可多次使用，实现了真正的动态监测，提高了肿瘤全切除率；术中MRI成像清晰，可实时显示肿瘤与周边重要结构的关系及距离，并且可以发现颅内血肿等意外情况，提高了手术安全性，减少了并发症。缺点：神经内镜学习曲线非常陡峭，对术者经验要求较高；术中MRI的使用增加了手术时间、麻醉风险，并且多次使用增加了颅内感染发生概率；术中MRI设备昂贵，限制了中小医院的应用及普及。本研究所有病人未出现与使用术中MRI相关的并发症，术中应重视以下几点：扫描前，应使用无菌敷料严密包裹，并把不兼容的设备及器械移动至5G线外；扫描期间，应注意观察病人生命体征，如有异常及时停止扫描并做相应处理；扫描后，若计划继续切除肿瘤，需重新确定导航计划。

术后垂体功能低下多由正常垂体组织遭到破坏引起，治疗措施：定期检测激素水平，如发现垂体-靶腺功能不足，给予激素替代治疗。本文病例术后新发垂体功能低下3例，均采取激素替代疗法，定期进行内分泌检查，根据结果调整用量。尿崩症是垂体腺瘤经鼻蝶入路切除术后常见的并发症[15]，防治措施：术前制定详细地切除计划，术中仔细辨别肿瘤组织与正常脑组织，尽量减少对正常脑组织的损害；术后补液、维持水电解质平衡，并适当应用垂体后叶素或醋酸去氨加压素。本文病例术后发生一过性尿崩6例，均在短期内恢复。本文4例术后出现嗅觉功能障碍。垂体腺瘤经鼻蝶入路术后嗅觉丧失的发生率在9%~10.4%[16,17]，机制尚未完全明确。多数学者认为，术中应用神经内镜产生的鼻腔并发症较显微镜更少。神经内镜的使用降低了创伤，但仍会对鼻黏膜带来一定的损伤，同时术中其它器械的损伤、多次经鼻手术、肿瘤直径大、病人自身因素等都可能是嗅觉消失的原因之一，防治措施：术中尽可能减少对鼻腔正常结构的破坏，对嗅区黏膜加以保护，避免不必要电凝及机械性损伤，术后应用营养神经药物。

总之，术中MRI指导下经鼻蝶入路神经内镜手术是治疗巨大无功能垂体腺瘤安全有效的方式，能获得比较满意的疗效，手术安全性高、并发症少。

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（2023-05-25收稿,2023-09-15修回）