

枕下远外侧入路研究进展

杨 虎 潘亚文[△]

(兰州大学第二医院神经外科 甘肃 兰州 730000)

摘要:下斜坡、枕大孔前缘、颈静脉孔区及脑干腹侧的病变,一直以来这些区域的手术难度高,风险极大。由于周围毗邻解剖关系复杂,对于神经外科医生是一个巨大的挑战,枕下远外侧入路是到达上述区域比较理想的入路之一,它包括:1)沿颅颈交界区后外侧面分离肌肉,充分暴露 C1 横突和枕下三角;2)今早在寰椎后弓上方和或寰椎和枢椎动脉;3)行枕下颅骨切除术或枕下开颅术,并切除至少半个寰椎后弓。这一入路提供了以下三个入路的通道:经髁入路的方向经过枕髁或寰枕关节和邻近的髁部,髁上入路的方向经过枕髁上方的区域,髁旁入路的方向经过枕髁外侧区域。它的路径短,适合于颅颈交界区域的多种病变,可以较早期地辨认与保护椎动脉,并可以根据手术的具体要求选择磨除枕髁的多少以及周围的骨性结构,以期达到良好的术野。

关键词: 枕下远外侧入路;临床;应用

中图分类号: R615 **文献标识码:** A **文章编号:** 1673-6273(2012)23-4563-03

Progress in Research on Far Lateral Suboccipital Approach

YANG Hu, PAN Ya-wen[△]

(Department of Neurosurgery, The Second Hospital of Lanzhou University, Lanzhou, Gansu, 730000, China)

ABSTRACT: Lower slope, the leading edge of the foramen magnum, jugular foramen and the ventral brain stem lesions, surgery for diseases in these areas has been difficult and risky. As the complexity of the surrounding adjacent anatomy, it is a huge challenge for neurosurgeons. Suboccipital far lateral approach is one ideal way to reach the above regions. It includes: 1) along the rear facies laterals of cranio-cervical junction, separate the muscles, fully expose the C1 transverse process and the suboccipital triangle; 2) pass the posterior arch of atlas or atlas and atlantoaxial vertebral artery; 3) take suboccipital resection of the skull or suboccipital craniotomy, resect at least half of the posterior arch of the atlas. This approach provides the following three channels: from the condyle direction pass the occipital condyles or atlanto-occipital joints and adjacent condyle; from the condyle into the up direction of the road through the area above the occipital condyles; from the condyle into the road beside the occipital condyle through the lateral direction of the region. This approach has a short path, and is suitable for a variety of cranio-cervical junction area lesions. Neurosurgeons can identify and protect the vertebral artery earlier, and can make a better decision on the number of occipital condyles according to specific requirements of grinding operation and the surrounding bone structure, in order to achieve a good operative field.

Key words: Far lateral suboccipital approach; Clinical; Application

Chinese Library Classification(CLC): R615 **Document code:** A

Article ID: 1673-6273(2012)23-4563-03

引言

枕骨大孔前缘、颈静脉孔区、脑干腹侧部以及下斜坡的病变,由于位置深,毗邻血管神经复杂,手术当中暴露比较困难,其手术难度和风险极大。枕下远外侧入路对下斜坡、脑干腹侧及颅颈交界区病变具有良好的显露,可缩短手术路径,使显露角度在侧方有所增加,减轻或避免对小脑和脑干牵拉。该手术入路还可以较好的在手术早期控制椎动脉,根据手术的要求咬除颅骨、椎骨,也可与其他入路联合应用。现将研究进展综述如下。

1 枕下远外侧入路概述

枕下远外侧入路是一种经枕髁颅颈交界区的外侧入路^[1],其名称在目前的文献当中还不甚统一,主要是术者的观点和术

式改良的不同。Hammon^[2]和 Heros^[3] 分别在 1972 年和 1986 年用枕下外侧入路处理了椎基底动脉瘤和小脑动静脉畸形,Wen^[4]等 1997 年对该入路进行了显微解剖研究,并将该手术入路分为经髁、经髁上和经髁旁三种途径。Salas^[5]等经研究后进一步将此入路分为远外侧经颈静脉孔入路、颈椎关节面入路、经颈静脉结节入路、完全经枕髁入路、枕髁后入路、部分经枕髁入路 6 个亚型。Spektor^[6]等将该入路分为 6 个步骤并称为 " 完全远外侧入路 " 或 " 远外侧经髁经结节入路 "。Kawashima^[7]等对远外侧入路和极外侧入路作了对比研究。Rhoton^[8]将该入路划分为:(1)髁旁途径 (2)髁上途径 (3)经髁途径。髁旁途径主要包括磨除枕髁侧方的静脉突,到达颈静脉孔的后方,并可暴露附近的面神经及乳突,髁上途径主要磨除颈静脉结节增加暴露,经髁途径在磨除枕髁后,能够增加侧方视野,对下斜坡及延髓腹侧具有较好的暴露。

2 手术步骤

2.1 手术体位

作者简介:杨虎(1980-)男,硕士研究生,主要研究方向:颅底肿瘤

[△]通讯作者:潘亚文, E-mail:panyawen666@sohu.com

(收稿日期:2011-11-28 接受日期:2011-12-25)

枕下远外侧入路的手术体位有侧卧位、侧俯卧位和坐位。目前多采用侧俯卧位,优点是乳突能够处于体位的最高点,从而避免了静脉充血和空气栓塞的发生,同时扩大了枕大孔与寰椎的间隙,减少了术后反应也有利于脑脊液向下引流。

2.2 手术切口

主要有3种切口:倒U形切口、S形切口及C形切口。倒U形切口始于中线(在枕外隆突下方约5 cm处),由此向上至枕外隆突上,在项上线上方转向外并到达乳突,在胸锁乳突肌后缘的前方转向下,至乳突尖端下方约5 cm处的颈外侧面,在此可通过皮肤触及寰椎横突。S形切口对肌肉的损伤较小,容易缝合,术后不易并发脑脊液漏及假性脑膜膨出。如术后考虑对患者实行颈枕融合应选择倒U形切口,倒U形切口对颈椎的暴露比较好。

2.3 椎动脉的处理

椎动脉全长可分为4段:第一段为锁骨下动脉第一段--C6横突孔;第二段为C6横突孔--寰椎横突孔;第三段为寰椎横突孔上口--椎动脉进入硬膜处;第四段为椎动脉的硬膜内部分。椎动脉的第三段又可分成三部分:垂直段(C2~C1横突)、水平段(寰椎椎动脉沟内)、斜段(椎动脉沟到硬膜),斜段和水平段交界处被称为椎动脉膝部^[9]。此两端之间椎动脉走行复杂,手术中应特别小心。有的学者认为经髂手术不需要移位椎动脉^[10]。寰椎横突、肩胛提肌、第二颈神经的腹侧支可作为寻找寰椎横突孔间椎动脉的重要标志。第二颈神经的腹侧支大多数都是恒定地跨过椎动脉的后方^[11]。椎动脉自寰椎横突孔穿出后向外侧走行然后转向内侧入寰椎后弓的椎动脉沟。头外侧直肌及椎静脉丛也可作为确认第三段椎动脉的解剖标志。如手术中出现椎静脉丛出血,常覆以绵片或明胶海绵压迫止血或采用双极电凝止血,而Sekhar等^[12]报道的使用纤维蛋白凝胶注射对椎静脉丛止血也具有良好的效果。

2.4 骨质的切除

枕下远外侧入路中骨质的切除主要涉及到是枕骨、颈静脉结节、枕髁、及C1~C2椎板,有时还需要切除一部分乳突。内侧至中线,上缘至横窦,外侧至乙状窦,下界到达寰枕关节后缘。磨除枕髁时应该特别注意对舌下神经管的保护,以防止损伤舌下神经,舌下神经管的颅外段大约位于枕髁前中部1/3上方约5 mm处。目前大多数学者采用硬膜外磨除颈静脉结节,在磨除颈静脉结节时应用脑压板保护硬膜以防损伤副神经,并采用“隧道磨除法”^[10]最后去除临近硬膜的骨皮质。Day^[14]等提出了硬膜下磨除颈静脉结节处理小脑后下动脉瘤的病例,认为颈静脉结节解剖存在很大的变异,所以硬膜外磨除颈静脉结节比较困难。Day认为想要彻底磨除颈静脉结节来增加术野的暴露,就应该在硬膜直视下进行磨除颈静脉结节的操作,从而提高了磨除颈静脉结节安全性。日前大部分学者认为磨除枕髁和颈静脉结节对于暴露中下斜坡、椎基底动脉交界处、桥延腹侧至关重要^[6,15-17]。Moil等^[18]报告了1例已经破裂椎动脉的动脉瘤的处理方式:先采用了硬膜外磨除部分颈静脉结节的办法,然后再用了硬膜内磨除部分颈静脉结节的方法,这样可在手术中充分显露下斜坡中线区。

2.5 骨质切除范围及暴露关系

主要是围绕枕髁为中心进行切除,切除范围依据病变位置、大小、性质等作出决定,包括枕骨、枕髁、颈静脉、乳突、C1~C2椎板等。Salas等^[5]和Wen等^[4]提出的远外侧入路,尽管较为常用,但两者的骨窗切除范围均较大,而张恒柱、兰青提出的远外侧入路骨窗设计的较前两者小的多。对于枕髁的磨除程度看法不一,有学者认为肿瘤增大形成的空间足以满足肿瘤分块切除所需的操作空间,所以不必磨除枕髁。Wanebo等提出将枕髁分别磨除25%和50%可分别增加侧方暴露13%、30%,侧方暴露角度分别增加10.7和15.9度。磨除时常用的钻头为金刚砂钻头,先磨除皮质骨,然后再磨除松质骨,如果碰到皮质骨时预示着到了舌下神经管。多数学者认为磨除枕髁小于50%不会损伤到舌下神经^[13]。有学者提出使用术中导航系统辅助则更加安全^[10]。Spektor等^[6]认为应磨除1/3,如颅骨切除过多则会带来不利影响,即①损伤椎动脉、颈静脉、颈静脉球、乙状窦引起出血及静脉栓塞;②可能损伤颅神经;③增加颈椎的不稳定因素;④延长手术时间。

2.6 颈枕融合

目前大多数学者认为枕髁磨除不超过50%不会影响寰枕关节稳定性,术后带颈托限制活动数月即可,超过50%需行寰枕关节融合术。Bejjani等^[19]磨除枕髁70%以下时可不行外植骨融合,如果超过70%将会影响颅颈稳定,应植骨,也可用不锈钢钉固定。Ghassan报道了17例经极远侧入路磨除枕髁不超过70%未行颈枕融合术的患者未出现颅颈交界不稳定的表现,而8例磨除枕髁超过70%的患者均需行寰枕融合术。Shin等^[20]报道枕髁磨除范围超过50%时或是患者病变性质为转移性肿瘤、脊索瘤时,亦需要作枕颈融合。

3 临床应用

3.1 枕下远外侧入路的适应证

(1)肿瘤性病变:延髓腹侧部、高位颈髓腹侧部硬膜内的肿瘤、斜坡中下段、枕髁与颈静脉孔区硬膜外的肿瘤,常见的有脑膜瘤、神经鞘瘤、脊索瘤等,还有极为罕见的原始上皮样血管内皮瘤和骨软骨瘤;(2)血管性病变:椎动脉、基底动脉及小脑后下动脉的动脉瘤;(3)类风湿性和先天性的颅颈交界处畸形。少见的C1神经鞘瘤也可用此入路。

3.2 枕下远外侧入路常见并发症

(1)损伤后组颅神经的症状,术后可能会出现吞咽困难,呛水以及咳嗽反射消失;(2)椎动脉、乙状窦、颈静脉球等的损伤;(3)术后发生脑积水;(4)脑脊液漏,尤其是在手术后发生率更高,从而影响伤口愈合;(5)枕颈关节出现不稳定,导致四肢瘫痪、脊髓后索功能障碍。

4 总结

总之,枕下远外侧入路是一种颅颈交界区较为理想的手术入路,具有手术路径短、避免牵拉脑干和脊髓、易于早期辨认和控制椎动脉、直视和保护后组颅神经、避免损伤脊髓前动脉、手术便于操作、能够适用于多种病变手术、且病变全切率高等特点。对于沿枕骨大孔前外侧缘生长的某些肿瘤,在不需要磨除枕髁的基础上远外侧入路暴露的范围已经足够。然而在此基础上,还可使用经髂、髂上和髂旁入路以及其他一些改进入路。各

种入路都有自己几种变异,其各种变异都有各自的优缺点,应根据病人的具体情况予以选择。尽管目前仍然尚无标准术式,但术者可根据病变位置、性质、大小对远外侧入路进行改良^[21-22],以期达到最佳手术疗效。

参考文献(References)

- [1] Lanzino G, Paolini S, Spetzler RF. Far-lateral approach to the craniocervical junction[J]. Neurosurgery,2005,57(4 Suppl):367-371
- [2] Hammon WM, Kempe LG. The posterior fessa approach to aneurysms of the vertebral and basilar arteries [J]. J Neurosurg,1972,37 (3): 339-347
- [3] Heros RC. Lateral suboccipital approach for vertebral and vertebral-basilar artery lesions[J]. J Neurosurg,1986,64(4):559-562
- [4] Wen HT, Rhoton AL Jr, Katsuta T, et al. Microsurgical anatomy of the transcondylar, supracondylar and paracondylar extensions of the far lateral approach[J]. J Neurosurg,1997,87(4):555-585
- [5] Salas E, Sekhar LN, Ziyad IM, et al. Variations of the extreme-lateral craniovertebral approach: anatomical study and clinical analysis of 69 patients[J]. J Neurosurg,1999,90(2 Suppl):206-219
- [6] Spektor SE, Anderson GJ, McMenoney SO, et al. Quantitative description of the far-lateral transcondylar transtubercular approach to the foramen magnum and clivus[J]. J Neurosurg,2000,92(5):824-831
- [7] Kawashima M, Tanfiover N, Bhoton AL, et al. Comparison of the far lateral and extreme lateral variants of the atlanto-occipital transarticular approach to anterior extradural lesions of the craniovertebral junction[J]. Neurosurgery,2003,53(3):662-674
- [8] Rhoton AL. The far-lateral approach and its transcondylar supracondylar, and paracondylar extensions[J]. Neurosurgery,2000,47(3):195
- [9] Bruneau M, Cornelius J, George B. Anterior-lateral approach to the V3 segment of the vertebral artery [J]. Neurosurgery,2006,58 (1 suppl): ONS29-35
- [10] Seckin H, Ates O, Bauer AM, et al. Microsurgical anatomy of the posterior spinal artery via a far-lateral transcondylar approach [J]. Neurosurg Spine,2009,10(3):228-233
- [11] Wang J, Ou SW, Wang YJ, et al. Microsurgical management of dumbbell C1 and C2 schwannomas via the far lateral approach [J]. Clin Neurosci,2011,18(2):241-246
- [12] Sekhar LN, Natarajan SK, Manning T, et al. The use of fibrin glue stop venous bleeding in the epidural space, vertebral venous plexus, and anterior cavernous sinus; technical note[J]. Neurosurgery,2007,61 (3 Suppl):E51
- [13] Menezes AH. Surgical approaches: postoperative care and complications "posterolateral-far lateral transcondylar approach to the ventral foramen magnum and upper cervical spinal canal" [J]. Childs Nerv Syst,2008,24(10):1203-1207
- [14] Day JD. Intradural jugular tubercle reduction to enhance exposure via the transcondylar approach: technical note [J]. Neurosurgery,2004,55 (1):247
- [15] Zou Lin-bo, Jia Lu, Zhang Yue-kang, et al. Microsurgery via modified farlateral approach for giant dumbbell-shaped jugular foramen tumors[J]. Chin J Cancer,2010,29(2):207-211
- [16] Wu A, Zabramski JM, Jittapiromsak P, et al. Quantitative analysis of variants of the far-lateral approach: condylar fossa and transcondylar exposures[J]. Neurosurgery,2010, 66(6 Suppl Operative):191-198
- [17] Zhang H, Lan Q, Wang X, et al. Neuronavigation-based quantitative study of the far-lateral keyhole approach following partial removal of the occipital condyle and jugular tubercle [J]. Clin Neurosci,2011,18 (5):678-682
- [18] Mori K, Nakao Y, Yamamoto T, et al. Intradural jugular tuberclectomy in a case of inadequate extradural removal [J]. Surg Neurol, 2005,64(4):347-350
- [19] Bejjani GK, Sekhar LN, Riedel CJ. Occipitocervical fusion following the extreme lateral transcondylar approach [J]. Surg Neurol,2000,54 (2):109-115
- [20] Shin H, Barrenechea U, Lesser J, et al. Occipitocervical fusion after resection of craniovertebral junction tumors [J]. J Neurosurg Spine, 2006,4(2):137-144
- [21] Zou LB, Jia L, Zhang YK, et al. Microsurgery via modified far-lateral approach for giant dumbbell-shaped jugular foramen tumors[J]. Chin J Cancer,2010,29(2):207-211
- [22] Lütjens G, Barlocher CB, Krauss JK. A modified "far-lateral" approach for safe resection of retroodontoid dural cysts [J]. Eur Spine J, 2011,20(Suppl 2):S262-265

(上接第 4562 页)

- [14] Lanier ER, Ptak RG, Lampert BM, et al. Development of hexadecyloxypropyl tenofovir (CMX157) for treatment of infection caused by wild-type and nucleoside/nucleotide-resistant HIV[J]. Antimicrob Agents Chemother,2010,54(7):2901-2909
- [15] Meanwell NA, Kadow JF. Maraviroc, a chemokine CCR5 receptor antagonist for the treatment of HIV infection and AIDS[J]. Curr Opin Investig Drugs,2007,8(8):669-681
- [16] Cahn P, Sued O. Raltegravir: a new antiretroviral class for salvage therapy[J]. Lancet,2007,369(9569):1235-1236
- [17] Jin H, Cai RZ, Schacherer L, et al. Design, synthesis, and SAR studies of novel and highly active tri-cyclic HIV integrase inhibitors[J]. Bioorg Med Chem Lett,2006,16(15):3989-3992
- [18] Sechi M, Derudas M, Dallochio R, et al. Design and synthesis of novel indole beta-diketo acid derivatives as HIV-1 integrase inhibitors [J]. J Med Chem,2004,47(21):5298-5310