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神经导航下经胼胝体 - 穹窿间入路切除丘脑胶质瘤的临床应用价值分析 *

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摘要 目的: 探讨神经导航系统辅助下经胼胝体 - 穹窿间入路手术切除丘脑胶质瘤的临床应用价值。**方法:** 选择 2016 年 2 月至 2018 年 9 月我院收治的丘脑胶质瘤患者 60 例为研究对象,以其中采用神经导航系统辅助下的经胼胝体 - 穹隆间入路显微切除丘脑胶质瘤的 30 例患者作为实验组,另外 30 例采用常规手术切除的患者作为对照组。分析和比较两组手术情况、治疗效果及并发症的发生情况。**结果:** 治疗后,实验组手术时间、住院时间均比对照组明显缩短,术中出血量及术中引流量显著少于对照组(均 $P<0.05$);实验组肿瘤全切除率高于对照组,次全切除率及部分切除率均低于对照组($P<0.05$);实验组并发症发生率(20.0%)显著低于对照组(53.3%)($P<0.05$)。**结论:** 与常规手术相比,神经导航系统辅助下经胼胝体 - 穹窿间入路切除丘脑胶质瘤能显著缩短手术时间,减少术中出血量及术后引流量,显著提高丘脑肿瘤全切除率,并降低术后并发症的发生率。

关键词: 胼胝体;神经导航;丘脑胶质瘤;丘脑

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Analysis of the Clinical Value of Neuronavigation-Guided Corpus Callosum-foraminial Approach for the Resection of Thalamus Glioma*

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ABSTRACT Objective: To investigate the clinical value of neuronavigation-guided corpus callosum-foraminial approach for the resection of thalamus glioma. **Methods:** 60 cases of thalamus glioma admitted to our hospital from February 2016 to September 2018 were selected Among them, 30 patients who underwent microsurgical resection of thalamus glioma via the transcallocallose-dome approach assisted by neural navigation system were selected as the experimental group, and the other 30 patients who underwent conventional surgical resection were selected as the control group. The operation condition, treatment effect and incidence of complications were analyzed and compared between two groups. **Results:** After treatment, the operation time and hospitalization time of experimental group were significantly shorter than those of the control group, and the intraoperative blood loss and intraoperative drainage flow were significantly lower than those of the control group (all $P<0.05$). The total tumor resection rate of experimental group was higher than that of the control group, and the subtotal resection rate and partial resection rate were lower than those of the control group ($P<0.05$). The incidence of complications in the experimental group (20.0%) was significantly lower than that in the control group (53.3%)($P<0.05$). **Conclusion:** Compared with the regular surgery, the neuronavigation system can significantly shorten the operation time, reduce the bleeding volume and postoperative drainage, increase the total resection rate of thalamus tumor, and reduce the incidence of postoperative complications.

Key words: Corpus callosum; Neural navigation; Thalamus glioma; Thalamus

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前言

丘脑内含有人体重要的神经核团和传输纤维,功能极为重要,且毗邻第三脑室、下丘脑、内囊等重要解剖结构,解剖关系比较复杂,发生肿瘤后手术的难度较大,术后并发症也较多,尤其是内侧型丘脑胶质瘤,传统手术方法疗效差,致残率较高[1-4]。据相关文献报道,丘脑胶质瘤的发病率约占颅内肿瘤的 1%~5%[5],由于其位置较深,且毗邻颅内重要结构,手术难度较大,术后并发症发生率较高,采用传统的经额部皮质造瘘 - 室间孔入路,疗效差,致残率高。因此,丘脑胶质瘤的治疗一直以来都是神经

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外科领域的技术难题[6]。

随着当前医疗技术的突飞猛进,显微神经外科技术和神经导航技术的发展,越来越多的专家主张全切除或次全切除丘脑胶质瘤。胼胝体 - 穹隆是脑组织在胚胎发育过程中形成的潜在腔隙,经此入路到达第三脑室的路径较短,能较大限度的减少手术损伤[7,8],本研究旨通过比较神经导航(Neuronavigator)辅助下显微外科手术与常规手术治疗丘脑胶质瘤的疗效,探讨神经导航在丘脑胶质瘤显微外科手术治疗中的临床应用价值。

1 资料与方法

1.1 研究对象

选择 2016 年 2 月至 2018 年 9 月在我院接受治疗的丘脑胶质瘤患者 60 例作为研究对象,术前均采用 CT 扫描或 MRI 进行检查,且术后病理检查证实患者均未丘脑胶质瘤。将所有患者平均分为两组,实验组 30 例在神经导航辅助下的经胼胝体 - 穹隆间入路显微切除丘脑胶质瘤,对照组 30 例采用常规手术切除丘脑胶质瘤。两组的基线资料对比差异无统计学意义(P>0.05),见表 1,具有可比性。

表 1 两组基线资料的对比(n=30)

Table 1 Comparison of the baseline data between the two groups(n=30)

Groups	Male /female	Average Age (year)	Average Course (month)	Average Diameter (mm)	Pathological type (n)			
					Glioblastoma multiforme	Astrocytoma	Oligoden-dro-glioma	Rest
Observation group	17/13	36.7± 2.4	0.8± 0.2	4.6± 1.1	9	8	7	6
Control group	16/14	36.8± 2.1	0.8± 0.1	4.3± 1.5	7	10	6	7

1.2 治疗方法

1.2.1 对照组治疗方法 给予常规显微手术治疗,经胼胝体 - 穹隆间入路切除。

1.2.2 实验组治疗方法 术前准备:实验组患者术前均行 MRI,导航 MRI。患者术前 1 d 剃头,在患者头皮贴 5~8 个导航定位标记(Marks),标记围绕病灶分散在不易移动的部位,如顶结节。然后行全头颅无间隙 MRI 水平连续增强扫描,层厚 1 mm;根据肿瘤的位置及与周围纤维束的毗邻关系,选择经胼胝体 - 穹隆间入路手术。

手术过程:将待手术患者的 MRI 数据导入导航系统工作站,扫描并建立三维立体图像,根据肿瘤的位置、形状、大小、毗邻关系建立三维模型,选择最优手术入路。术前患者全身麻醉,取仰卧位或侧卧位,根据术前规划最佳手术路线,以导航探针为指引,标记出肿瘤头皮投影位置,在肿瘤与正常组织的交界处标记病灶界限,行马蹄形手术切口,尽量缩小切口面积,开颅后,按手术计划逐层向肿瘤切入并寻找肿瘤,注意避开功能区,观察肿瘤及周围组织结构的血流分布与解剖关系,尽可能做到全切除肿瘤。

1.3 观察指标

对比两组手术时间与住院的时间;术中出血量与术后引流量;肿瘤切除率及手术后的并发症的发生情况。

1.4 统计学分析

采用 SPSS21.0 软件进行数据处理,组间计量资料比较采用 t 检验,计数资料采用 x^2 检验,以 P<0.05 为差异具有统计学意义。

2 结果

2.1 两组手术时间、术中出血量、术后引流量和住院时间的对比

实验组的手术和住院的时间都显著短于对照组,术中出血量和术后引流量也都明显少于对照组(均 P<0.001),见表 2。

表 2 两组患者手术时间、术中储蓄量、术后引流量及住院时间的比较

Table 2 Comparison of the operation time, intraoperative bleeding volume, postoperative draining volume and hospitalization time between the two groups

Groups	N	Operation time/min	Intraoperative bleeding volume/mL	Postoperative draining volume/mL	Hospitalization time/d
Control group	30	64.4± 9.7	173.7± 10.6	2241± 114.6	11.7± 1.7
Observation group	30	29.7± 9.9	102.6± 10.3	1277± 121.4	6.9± 2.1
t		13.71	26.35	31.63	9.73
P		<0.001	<0.001	<0.001	<0.001

2.2 两组肿瘤切除率的对比

实验组肿瘤全切除率高于对照组(P<0.05),次全切除率及部分切除率均低于对照组(P<0.05),见表 3。

2.3 两组术后并发症发生情况的对比

治疗期间,实验组并发症发生率显著低于对照组(P<0.05),见表 4。

3 讨论

神经导航系统是由德国 Schlondorff 和日本 Watanabe 发明并命名的[9],是将患者术前的影像资料和术中患者肿瘤的实际位置通过计算机系统联系起来,从而在术中准确显示中枢系统的三维解剖结构及肿瘤的毗邻关系,指导术者精确定位并摘除

肿瘤[10-12]。神经导航系统的优点包括:(1)可以在术前设计最佳的手术方案,提高手术的安全性[13,14];(2)实时定位手术位置并显示术野结构,回避重要结构,引导手术的前进方向[15];(3)手术过程中根据需要实时调整手术方案[16]。

表 3 两组患者肿瘤切除率的比较

Table 3 Comparison of the tumor resection rates between the two groups

Groups	N	Total tumor resection	Subtotal removal resection	Partial removal resection
Control group	30	8(26.7%)	14(46.7%)	8(26.7%)
Observation group	30	22(73.3%)	6(20.0%)	2(6.7%)
x^2		13.07	4.8	4.32
P		<0.001	0.028	0.038

胼胝体 - 穹隆是脑组织在胚胎发育过程中形成的潜在腔隙[17],经胼胝体 - 穹隆间入路的优势包括:(1)利用自然间隙进行手术操作能最大限度减少手术的创伤;(2)通过该入路到达第三脑室的路径较短[18-20],通过调整显微镜的角度及患者头部固定方位可以充分显示术野,术中充分暴露丘脑的各部位解剖结构,有利于把黏连肿瘤的大脑大静脉分离;(3)该入路能在直视下探查并打通室间孔,并根据情况造瘘以减少脑积水,改善脑脊液循环[21];(4)该入路的手术过程无须切断穹窿柱、结扎静脉,从而减少了术后偏瘫、昏迷等并发症的发病率[22]。

丘脑周围毗邻重要的解剖结构,关系复杂,加之丘脑胶质瘤位置深,治疗难度大[23-26]。以往的手术只能借助 CT 或 MRI 等检测肿瘤,且如果需要在术中寻找位置较深、体积较小的肿瘤和那些边界不清的恶性肿瘤,医师只能靠自己的经验[27]。神经导航系统能够对颅内的任何位置做出精确的定位,并能动态跟踪,从而能够实现术中精确定位肿瘤;同时,使手术医师能最大限度地规避手术误差;最终能够实时监测手术过程并尽可能地切除肿瘤[28-30]。

本研究选择手术时间、术中出血量、术后引流量、住院时间、肿瘤切除率及术后并发症作为观察指标,能比较客观地反映手术疗效及安全性。本结果表明神经导航系统辅助能提高丘脑胶质瘤手术的效率与安全性。在本次研究过程中,我们也注意到神经导航系统定位的精确度在手术过程中会受多重因素的影响,应当予以高度重视,否则可能会给手术带来极大的不确定性,主要包括以下几个方面:(1)导航标志物应固定在头皮上不易移动的部位,且需适当增加标记物的数量,术中谨防导航标志松动和脱落,可以选择眉弓、鼻尖、岩骨乳突等作为标记点,标记物应围绕靶点散在分布,避免直线排列;(2)准确固定患者的头部、参考架等,如标志物注册完成后头部出现移动需重新注册,否则将误导手术,同时应尽可能降低导航过程中的影像漂移,根据丘脑胶质瘤的部位选择最佳手术方案;(3)术中应对颅内标志性结构进行定位复检,以防止出现较大误差;(4)要特别警惕术前严重脑积水患者,可先行脑室穿刺外引流术或脑室 - 腹腔分流术以进一步降低手术风险;(5)当术中医师无法通过肿瘤质地、颜色等辨别肿瘤与正常丘脑组织时,可借助导航来确认手术准确位置,但术中也存在不可避免的影响如脑脊液流失和肿瘤部分切除。因此,在术中应不断地更新导航系统的数据,以避免对手术操作产生误导。

神经导航技术可以准确的在术前对肿瘤进行追踪,及时的制定手术方案及术中对手术操作的实时引导,有助于神经外科医师准确发现并切除颅内深部肿瘤,避免损伤重要功能区组织,降低医源性损伤发生率。同时,借助导航系统,医师在操作丘脑胶质瘤手术时,选择最安全的的入路,提高切除的准确率,减少不必要的损伤,降低并发症的发生率,在显微神经外科手术中具有更广泛的应用前景。

综上所述,神经导航系统辅助下经胼胝体 - 穹窿间入路切除丘脑胶质瘤能显著缩短手术时间,减少术中出血量及术后引流量,显著提高丘脑肿瘤全切除率,并降低术后并发症的发生率,临床应用价值较高。

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