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视频脑电图和影像学检查对继发性癫痫患儿的诊断价值研究

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摘要 目的:研究视频脑电图(V-EEG)和影像学检查对继发性癫痫患儿的诊断价值。**方法:**选取从2014年3月到2017年4月在我院接受诊治的癫痫患儿168例纳入本次研究。分别对所有患儿实施V-EEG和核磁共振成像(MRI)诊断,比较两种方式的诊断价值。**结果:**168例患儿中,V-EEG监测到154例有异常的脑电信号,其中120例有痫样放电,V-EEG显示痫样放电分布在左侧和右侧导联的比例较双侧导联明显更高($P<0.05$),MRI检测结果显示,140例患儿有颅内有关结构的病变亦或是发育异常,28例未发现异常。168例患儿中,发作类型为单纯部分型者72例,占比最高,为42.86%;主要病因中,颅内感染的发作类型以全身型为主,占11.31%。脑梗塞的发作类型以单纯部分型为主,占8.33%。颅内软化灶的发作类型以复杂部分型为主,占6.55%。颅内肿瘤的发作类型以单纯部分型为主,占6.55%。MRI定位主要在单侧,其中左侧占38.10%,右侧占29.76%;而经V-EEG监测显示异常放电154例,占91.67%,其中颅内感染和脑梗塞以及颅内肿瘤和颅内软化灶的阳性检出比例最高,分别为24.40%,13.10%,11.90%和10.71%。V-EEG诊断灵敏度和特异度均明显高于MRI($P<0.05$)。**结论:**V-EEG较MRI对继发性癫痫患儿的诊断价值更高,能够更加准确地提供诊断结果数据,值得在临床诊治过程中给予推广和应用。

关键词:视频脑电图;影像学检查;继发性癫痫;患儿;诊断价值

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Diagnostic Value of Video EEG and Imaging Examination for Children with Secondary Epilepsy

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ABSTRACT Objective: To study the diagnostic value of video EEG (V-EEG) and imaging examination for children with secondary epilepsy. **Methods:** A total of 168 children with epilepsy, who were treated in First Hospital of Qinhuangdao from March 2014 to April 2017, were selected in this study. V-EEG and magnetic resonance imaging (MRI) diagnosis were performed in all children respectively, and the diagnostic value of the two methods was compared. **Results:** Among the 168 patients, abnormal EEG signals were detected in 154 patients (120 patients had epileptiform discharges), V-EEG showed that the distribution of epileptiform discharges in the left and right leads were significantly higher than that in bilateral leads, and the differences were significant ($P<0.05$). MRI test showed that 140 patients had intracranial structural lesions or abnormal development, and 28 patients were not found abnormal. Among the 168 cases, 72 cases were pure partial type, the highest proportion was 42.86%; Among the main causes, the type of intracranial infection was mainly systemic, accounting for 11.31%. The type of cerebral infarction was mainly partial type, accounting for 8.33%. The main types of intracranial softening lesions were complex part, accounting for 6.55%. The type of intracranial tumor was mainly partial type, accounting for 6.55%. The location of MRI was mainly unilateral, in which the left side was 38.10% and the right side was 29.76%. V-EEG monitoring showed abnormal discharge was found in 154 cases, accounting for 91.67%, of which intracranial infection and cerebral infarction, as well as intracranial tumors and intracranial softening of the positive detection rate were the highest, respectively 24.40%, 13.10%, 11.90% and 10.71%. The sensitivity and specificity of V-EEG diagnosis were significantly higher than those of MRI ($P<0.05$). **Conclusion:** V-EEG is more valuable than MRI in the diagnosis of secondary epilepsy. It can provide more accurate diagnostic data and is worthy of promotion and application in the clinical diagnosis and treatment.

Key words: Video EEG; Imaging examination; Secondary epilepsy; Children; Diagnostic value

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前言

癫痫为神经科十分常见的疾病类型,其具有长期性反复发作的特点,且部分患者病情难以控制,对患者日常工作以及生活质量等均造成严重影响^[1,2]。因此,癫痫疾病诊断以及治疗是目前神经科研究工作的重点。癫痫发病机制十分复杂,并且发病形式多样,如何对病灶作出精准解剖以及功能定位为癫痫病学当前研究方向^[3]。研究证实,继发性癫痫发病和颅内致痫灶二者之间具有十分密切联系,可借助各种检查手段来确认致痫灶^[4]。视频脑电图(Vedio-electroencephalogram, V-EEG)为新型脑电图检查技术,自开展以来被不断应用于临床颅脑检查,特别是用于癫痫类疾病临床诊断、疾病分型以及疗效观察和病灶定位诊断等工作^[5]。核磁共振成像(magnetic resonance imaging, MRI)检查可为癫痫病因的诊断提供可靠信息^[6,7]。本文通过研究分析 V-EEG 和 MRI 检查对继发性癫痫患儿的诊断价值,以期临床的诊治过程提供相应的科学数据支持,现报道如下。

1 资料和方法

1.1 临床资料

选取从 2014 年 3 月到 2017 年 4 月在我院接受诊治的癫痫患儿 168 例纳入本次研究,纳入标准:(1)所有患儿均符合国际抗癫痫联盟关于癫痫的相关诊断标准^[8];(2)经影像学诊断后证实;(3)年龄 ≥ 2 岁;(4)患儿家属对此次研究知情同意,且签署同意书。排除标准:(1)其他类型的脑部疾病者;(2)患儿的病历资料数据不全;(3)合并其他严重的器质型疾病者。所有患儿中,男 101 例,女 67 例;年龄 2~15 岁,平均 (7.83 ± 1.03) 岁;病程 5 d~11 年,平均 (5.31 ± 0.35) 年。发作次数 1~8 次/d,平均 (3.42 ± 0.31) 次/d。病因:颅内感染 43 例,颅内出血 14 例,脑梗塞 24 例,脑血管畸形 13 例,颅内软化灶 21 例,颅内肿瘤 21 例,产伤 4 例,脑萎缩 13 例,海马硬化 9 例,皮层发育不良 3 例,灰质异位 3 例。发作类型:单纯部分型 72 例,复杂部分型 57 例,全身型 25 例,部分继发全身型 14 例。此次研究获得了医院伦理委员会的评审通过。

1.2 研究方法

分别对所有患儿实施 V-EEG 和 MRI 诊断,其中 V-EEG 检查的主要步骤为:选择产自日本光电株式会社的视频脑电图仪 EEG-1200C,常规安放好双极头皮盘状导联,而后为患儿监测记录 24 h 的脑电图,在监测时若出现临床发作,则记录好发作开始和结束的时间,以及发作情况。在完成监测后对脑电图和临床的录像资料进行回放,记录患儿在正常活动中的状况和发作情况,主要记录以下信息:(1)发作开始的时间;(2)发作时的表现;(3)发作结束的时间;(4)发作后的有关情况;(5)脑电图在发作前和发作后的变化。MRI 诊断的主要步骤为:选择 3.0T Sigma HDx MRI 对患儿实施头颅 MRI 诊断,分别扫描其横断位和矢状位,以及冠状位的 T1WI 和 T2WI,设置 T1WI TR 为 400 ms,TE 为 10 ms,而 T2WI TR 为 4000 ms,TE 为 108 ms。患儿中有 53 例接受头颅磁共振血管造影的检查,所得影像结果均由 2 位专业的诊断医师进行双盲阅片,遇到结果不一致时讨论出一致的诊断结论。

1.3 统计学方法

选用 SPSS20.0 软件实施统计分析,其中计数资料以 $n(\%)$ 表示,比较选择 χ^2 检验,灵敏度 = 真阳性 / (真阳性 + 假阴性) $\times 100\%$;特异度 = 真阴性 / (真阴性 + 假阳性) $\times 100\%$;准确度 = (真阳性 + 真阴性) / (真阳性 + 假阳性 + 真阴性 + 假阴性) $\times 100\%$, $P < 0.05$ 是差异有统计学意义。

2 结果

2.1 患儿 V-EEG 监测显示的痫样放电情况及 MRI 检测结果

168 例患儿中,监测到 154 例有异常的脑电信号,其中 120 例有痫样放电,V-EEG 显示痫样放电在左侧额叶 17 例(14.17%),左侧颞叶 21 例(17.50%),左侧顶叶 10 例(8.33%),左侧枕叶 0 例(0.00%),痫样放电分布在左侧导联共 48 例(40.00%)。右侧额叶 18 例(15.00%),右侧颞叶 18 例(15.00%),右侧顶叶 12 例(10.00%),右侧枕叶 0 例(0.00%),痫样放电分布在右侧导联共 48 例(40.00%)。双侧额叶 8 例(6.67%),双侧颞叶 11 例(9.17%),双侧顶叶 3 例(2.50%),双侧枕叶 2 例(1.67%),痫样放电分布在双侧导联共 24 例(20.00%)。痫样放电分布在左侧和右侧导联的比例较双侧导联明显更高,差异有统计学意义($\chi^2=5.983$, $P=0.000$; $\chi^2=5.983$, $P=0.000$)。168 例患儿的 MRI 检测结果显示,140 例患儿有颅内有关结构的病变亦或是发育异常,28 例未发现异常。

2.2 患儿病因及发作类型的关系分析

168 例患儿中,发作类型为单纯部分型者 72 例,占比最高,为 42.86%,复杂部分型者 57 例,占 33.93%,全身型者 25 例,占 14.88%,部分继发全身型者 14 例,占 8.33%。主要病因中,颅内感染的发作类型以全身型为主,占 11.31%。脑梗塞的发作类型以单纯部分型为主,占 8.33%。颅内软化灶的发作类型以复杂部分型为主,占 6.55%。颅内肿瘤的发作类型以单纯部分型为主,占 6.55%,见表 1。

2.3 患儿 MRI 定位与发作类型的关系

168 例患儿中,有 28 例接受 MRI 检查后未发现异常,占 16.67%。MRI 定位主要在单侧,其中左侧占 38.10%,右侧占 29.76%,见表 2。

2.4 患儿病因及 V-EEG 监测结果的关系

168 例患者中经 V-EEG 监测显示异常放电 154 例,占 91.67%,其中颅内感染、脑梗塞、颅内肿瘤和颅内软化灶的阳性检出比例最高,分别为 24.40%、13.10%、11.90%和 10.71%,见表 3。

2.5 两种方式的诊断价值对比

V-EEG 诊断灵敏度和特异度分别为 91.67%(154/168)、98.21%(165/168),分别高于 MRI 诊断灵敏度和特异度的 83.33%(140/168)、81.55%(137/168),差异均有统计学意义($\chi^2=5.333$, $P=0.021$, $P=0.000$)。

3 讨论

继发性癫痫发病和颅内致痫灶具有密切联系,多项神经科相关研究力求通过临床检查确定致痫灶位置。近年来,临床对于继发性癫痫通常以 V-EEG 作为主要检测方法,对于患者致痫灶定位发挥较大作用^[9,10]。伴随影像学检查技术不断提高,CT 以及 MRI 等检查得到广泛应用,对脑部疾病研究贡献较大,并

表 1 患儿病因及发作类型的关系分析[n(%)]

Table 1 Analysis of relationship between etiology and seizure type in children [n(%)]

Etiology	n	Simple partial type	Complex partial type	Systemic type	Partial secondary systemic type
Intracranial infection	43	14(8.33)	7(4.17)	19(11.31)	3(1.79)
Intracranial hemorrhage	14	4(2.38)	6(3.57)	3(1.79)	1(0.60)
Cerebral infarction	24	14(8.33)	7(4.17)	0(0.00)	3(1.79)
Cerebrovascular malformation	13	9(5.36)	2(1.19)	0(0.00)	2(1.19)
Intracranial softening foci	21	7(4.17)	11(6.55)	0(0.00)	2(1.19)
Intracranial tumor	21	11(6.55)	7(4.17)	2(1.19)	1(0.60)
Birth injury	4	1(0.60)	3(1.79)	0(0.00)	0(0.00)
Brain atrophy	13	4(2.38)	7(4.17)	1(0.60)	1(0.60)
Hippocampal sclerosis	9	2(1.19)	7(4.17)	0(0.00)	0(0.00)
Cortical dysplasia	3	3(1.79)	0(0.00)	0(0.00)	0(0.00)
Heterotopic gray matter	3	3(1.79)	0(0.00)	0(0.00)	0(0.00)
Total	168	72(42.86)	57(33.93)	25(14.88)	14(8.33)

表 2 患儿 MRI 定位与发作类型的关系[n(%)]

Table 2 Relationship between MRI location and seizure types in children [n(%)]

Seizure type	n	MRI positioning			
		Left side	Right side	Both side	Normal
Simple partial type	72	34(20.24)	19(11.31)	12(7.14)	7(4.17)
Complex partial type	57	23(13.69)	24(14.29)	4(2.38)	5(2.98)
Systemic type	25	5(2.98)	3(1.79)	4(2.38)	13(7.74)
Partial secondary systemic type	14	2(1.19)	4(2.38)	5(2.98)	3(17.86)
Total	168	64(38.10)	50(29.76)	25(14.88)	28(16.67)

表 3 患儿病因及 V-EEG 监测结果的关系[n(%)]

Table 3 Relationship between etiology and monitoring results of V-EEG in children[n(%)]

Etiology	n	V-EEG(+)	V-EEG(-)
Intracranial infection	43	41(24.40)	2(1.19)
Intracranial hemorrhage	14	13(7.74)	1(0.60)
Cerebral infarction	24	22(13.10)	2(1.19)
Cerebrovascular malformation	13	11(6.55)	2(1.19)
Intracranial softening foci	21	18(10.71)	3(1.79)
Intracranial tumor	21	20(11.90)	1(0.60)
Birth injury	4	4(2.38)	0(0.00)
Brain atrophy	13	11(6.55)	2(1.19)
Hippocampal sclerosis	9	8(4.76)	1(0.60)
Cortical dysplasia	3	3(1.79)	0(0.00)
Heterotopic gray matter	3	3(1.79)	0(0.00)
Total	168	154(91.67)	14(8.33)

且研究显示^[11],MRI 对于人脑某些微小病灶检出率较高,甚至对于 CT 无法识别的疾病早期病灶同样可以借助 MRI 查出。多项报道证实,头部 MRI 检查可对头颅解剖结构进行准确分辨,同时对于可引发癫痫的相关病理性改变能够精准识别,进而为癫痫疾病临床诊断以及病因探讨提供可靠辅助信息^[12,13]。有学者指出^[14,15],V-EEG 检查能够反映出脑功能活动改变状况,MRI 可体现出中枢神经系统整体形态结构等,有利于寻找病因,这两种检查手段对继发性癫痫临床病灶以及致痫灶等定位均十

分关键,发挥着重要诊断价值。

本文研究发现,168 例患儿中 V-EEG 监测到 154 例有异常的脑电信号,其中 120 例有痫样放电,V-EEG 显示痫样放电分布在左侧和右侧导联的比例较双侧导联明显更高,这与康晓萍等人^[16,17]的报道结果类似,提示了 V-EEG 能够较好地诊断出异常脑电信号,尤其是针对痫样放电的诊断,且痫样放电以单侧为主。原因可能与 V-EEG 的诊断机制和痫样病变多为单侧等因素有关。同时,本文发现,168 例患儿中,发作类型为单纯

部分型者 72 例,占比最高,为 42.86%;主要病因中,颅内感染的发作类型以全身型为主,占 11.31%。脑梗塞的发作类型以单纯部分型为主,占 8.33%。颅内软化灶的发作类型以复杂部分型为主,占 6.55%。颅内肿瘤的发作类型以单纯部分型为主,占 6.55%,这符合张邵军等人^[18,19]的报道结果,提示了继发性癫痫患儿的发作类型主要是单纯部分型,而引起发作的主要病因是颅内感染和脑梗塞,以及颅内软化灶和颅内肿瘤。原因主要可能与上述病因所累及区域具有一定的特异性等因素有关。研究证实^[20-22],针对患者实时发作记录,并结合其临床症状以及发作状况,发作起始时间等,将患者脑电图改变以及其行为异常改变等进行综合分析,即可确定患者致痫灶以及病理灶具体位置和范围等信息。本研究中颅内感染和脑梗塞,以及颅内肿瘤和颅内软化灶的阳性检出比例最高,分别为 24.40%,13.10%,11.90%和 10.71%。而 168 例患儿中,有 28 例接受 MRI 检查后未发现异常,占 16.67%。MRI 定位主要在单侧,其中左侧 38.10%,右侧占 29.76%,同时研究结果显示 V-EEG 诊断的灵敏度和特异度均明显高于 MRI($P < 0.05$),这提示了 V-EEG 对于继发性癫痫患儿具有更高的诊断效果,分析原因,主要可能与 V-EEG 对大脑异常放电的捕捉效果更好有关。具体而言,V-EEG 能够记录患者于日常生活中脑活动状态,且其对检测时间范围内大脑所发生的功能瞬间障碍情况也可以进行同步记录^[23,24]。因此,该检查对于继发性癫痫患者所表现出的痫样放电情况能够准确检出,进而防止漏诊以及误诊现象发生。同时,V-EEG 还具有监测时间不受限制的特点,灵活的监测能够顺利捕捉到患者发作期间行为异常,还可以记录下自主活动以及睡眠时脑电变化,进而提升异常脑电发现概率^[25,26]。此外,该监测结果均被存储,方便后期回放分析,医生可根据视频同步回放所反馈的信息,来对复杂信息作出详细梳理,并给出合理诊断。MRI 属于无创性影像学检查方法,其能够检查出颅内结构异常以及病理改变等,并且可以判断病变和相邻组织之间联系。该检查可以体现患者中枢神经结构,适用于寻找发病原因,为继发性癫痫诊断重要手段^[27,28]。研究结果显示,MRI 所检查出来的病理灶不一定为致痫灶,部分病理灶和致痫灶相同,但也有病理灶和致痫灶临近或者无任何关系的情况。因此,外科手术过程中仅对病理灶进行切除不一定会对致痫灶进行同步切除。MRI 精确度较高,但是其漏诊率偏高,同时其有一定局限性,对于颅内钙化情况无法准确显示,具有运动性伪影,且检查持续时间较长,检查费用较高,在临床推广方面受到限制^[29,30]。

综上所述,V-EEG 较 MRI 对继发性癫痫患儿的诊断价值更高,能够更加准确地提供诊断结果数据,值得在临床诊治过程中给予广泛地推广和应用。

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