

간질의 평가와 진단 - 발작간 뇌파소견을 중심으로 -

박 건 우*†

Interictal EEG in Diagnosis and Assessment of Epilepsy

Kun-Woo Park, M.D., Ph.D.*†

ABSTRACT

The routine interictal electroencephalogram(EEG) continues to play an important role in the diagnosis and treatment of epilepsy. The clinical investigation of brain disease in the last decade has been marked by dramatic advances in functional imaging, magnetic resonance scanning and digitized EEG. Epilepsy is a disorder of electrical hyperirritability of cerebral cortex and the interictal EEG remains the most convenient means available to demonstrate cortical hyperirritability. The sensitivity and specificity of the EEG in the diagnosis of epilepsy have been disputed. In this review, the type of EEG findings in epilepsy are reviewed and the sensitivity and specificity of interictal epileptiform discharge are discussed. And also the role of EEG in various clinical situations are summarized.

KEY WORDS : Interictal EEG · Interictal epileptic discharges · Epilepsy.

뇌파검사의 유용성

21

. 20

PET,

EEG)

가

(functional MRI),

(interictal

가

가

흔히 발견되는 발작간 이상뇌파의 유형

Department of Neurology, Korea University, College of Medicine, Seoul, Korea

†교신저자 : , 136 - 705 5가 126 - 1
) (02) 920 - 5347,) (02) 929 - 9435
E - mail) kunu@korea.ac.kr

5가

(Walczak 1997).

- 1) (interictal epileptiform discharges. IEDs)
 - 2) (periodic lateralized epileptiform discharges PLEDs)
 - 3) (generalized periodic sharp waves)
 - 4) (focal or generalized slow waves)
 - 5) (nonspecific paroxysmal pattern) IEDs PLEDs
- 가

3. 광범위한 주기성 예파(Generalized periodic sharp waves) 가 (synchronous) (hypoxic brain injury) (Treiman 1987). 가
4. 국소성 및 광범성 서파(Focal or generalized slow waves)

1. 발작간 간질형 방전(Interictal epileptiform discharges)

, Pedley(1980)

(1).

4가

- 1)
- 2)
- 3) (70msec) (200msec)
- 4) negative polarity 가 IEDs

2. 주기성 일측성 간질형 방전(Periodic lateralized epileptiform discharges)

1~2 가

23~66% PLEDs 가 (Walsh 1987).

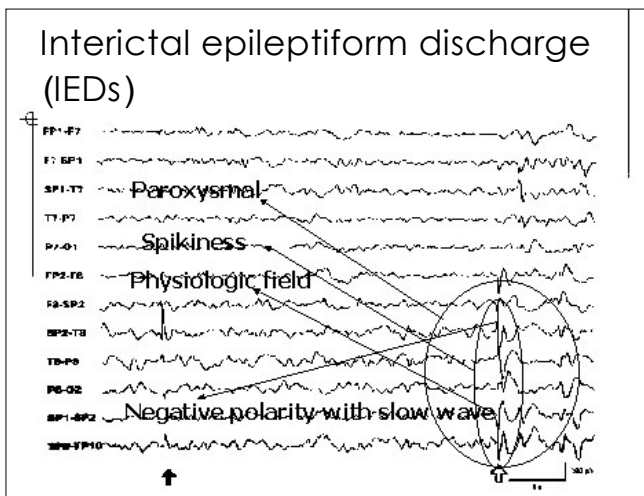


Fig. 1. Criteria of interictal discharges(IEDs).

5. 비특이성 돌발파(Nonspecific paroxysmal pattern) IEDs

Benign epileptiform transients of sleep(BETS), 6 - c/s phantom spike - wave, 14 and 6 - c/s positive bursts, rhythmic midtemporal theta burst of drowsiness, midline theta rhythm

IEDs의 양성 예측치(Positive Predictive Value)

1. 간질환자에서 IEDs는 얼마나 자주 관찰되는가?

2가

1 1

29~55%

(4) 80~90% 가 IEDs (Salinski 1987).

IEDs가 (Walczac

1993).

IEDs가 가 6~45%,

12~50%

43~73%

(Van Donselaar

1992 ; Shinnar 1985).

IEDs

가

IEDs가

가 IEDs

(valproate> benzodiazepine, barbiturate> phenytoin, tegretol), IEDs

IEDs가 가?

가

20% IEDs

(Ellingston 1984).

가

2. 과호흡(Hyperventilation)

(absence seizure)

50~80% 가

build up

2. 간질이 아닌 환자에서 IEDs의 관찰정도는?

IEDs

(0.2~0.5%

IEDs가

10%

(Sato

2.2~3.5%), IEDs

1983).

5.3%가

(Cavazzuti 1980).

3. 광자극(Photic stimuli)

10% IEDs

(childhood absence epile-

psy),

(juvenile absence epilepsy),

(juvenile myoclonic epilepsy) epilepsy

with grand mal on waking (Wolf Gooses 1986).

가

가? Centrottemporal IEDs, generalized IEDs

photoparoxysmal response가

IEDs

IEDs

IEDs

가

IEDs가 75~95% , centrottemporal IEDs

가

40%

IEDs

15%

(Kellaway 1980).

photoparoxysmal response

(posterior dominant)

(generalized epileptiform discharge)

가

sharp transient

3. 요약하면

IEDs

sensitivity

55%,

IEDs가

가 4%

(Goodin

Aminoff 1984).

0.5%

1000

5

3

IEDs

40

IEDs

IEDs

positive predictive value

7%

가

50%

, 1000

4. 검사를 여러번 한다.

IEDs

IEDs

, 4

90%

IEDs

5. 전극을 추가한다.

10~20 International System Array

가

43~58%, nasoparyngeal electrode 가

57~69%, anterior temporal electrode

81~90%, shenoidal electrode 75~

100% IEDs (Ho-

man 1988). nasopharyngeal electrode anterior

temporal electrode , shenoidal electrode

(Sperling

1986).

IEDs를 유발시키는 방법은?

1. 수면 및 수면 박탈(Sleep deprivation)

40% IEDs

. Chloral hydrate가

가

Table 1. International classification of seizures

1.	() [Partial(focal, local) Seizures]
1)	(Simple partial seizures)
(1)	(with motor symptoms)
(2)	(with somatosensory or special sensory symptoms)
(3)	(with autonomic symptoms and signs)
(4)	(with psychic symptoms)
2)	(Complex partial seizures)
(1)	(Simple partial onset followed by impairment of consciousness)
(2)	(with impairment of consciousness at onset)
3)	(Partial seizures evolving to secondarily generalized seizures)[(tonic-clonic, tonic, or clonic)]
(1)	(Simple partial seizures evolving to generalized seizures)
(2)	(Complex partial seizures evolving to generalized seizures)
(3)	(Simple partial seizures evolving to complex partial seizures to generalized seizures)
2.	() [Generalized Seizures(convulsive and non-convulsive)]
1)	(Absence seizures) ; (1) (Typical) (2) (Atypical)
2)	(Myoclonic seizures)
3)	(Clonic seizures)
4)	(Tonic seizures)
5)	(Tonic-clonic seizures)
6)	(Atonic seizures)
3.	(Unclassified epileptic seizures)

Commission on Classification and Terminology of the International League Against Epilepsy. Proposal for revised clinical and electroencephalographic classification of epileptic seizures. *Epilepsia* 1989 ; 30 : 389 - 399

간질증후군의 진단에 있어 발작간 뇌파의 역할

가 . 가 . localization - related epilepsy generalized epilepsy idiopathic symptomatic EEG가 IEDs가 localized - related epilepsy IEDs generalized epilepsy .

Table 2. Classification of epilepsies, epileptic syndromes and related seizure disorders

1.	Localization-related(focal, local, partial) epilepsies and syndromes
1. 1	Idiopathic(with age-related onset) :
	Benign childhood epilepsy with centro-temporal spikes
	Childhood epilepsy with occipital paroxysms
	Primary reading epilepsy
1. 2	Symptomatic :
	Chronic progressive epilepsia partialis continua of childhood(Kojewnikow syndrome)
	Seizures characterized by specific modes of precipitation
1. 3	Cryptogenic
2.	Generalized epilepsies and syndromes
2. 1	Idiopathic(with age-related onset - Listed in order of age) :
	Benign neonatal familial convulsions
	Benign neonatal convulsions
	Benign myoclonic epilepsy in infancy
	Childhood absence epilepsy
	Juvenile absence epilepsy
	Juvenile myoclonic epilepsy
	Epilepsy with generalized tonic-clinic seizures on awakening
	Other generalized idiopathic epilepsies not defined above
	Epilepsies with seizures characterized by specific modes of precipitation(e.g. photosensitive epilepsy)
2. 2	Cryptogenic and/or symptomatic(in order of age) :
	West syndrome(infantile spasms)
	Lennox-Gastaut syndromes
	Epilepsy with myoclonic-astatic seizures
	Epilepsy with myoclonic absences
2. 3	Symptomatic :
2. 3. 1	Non-specific aetiology :
	Early myoclonic encephalopathy
	Early infantile epileptic encephalopathy with suppression-bursts
	Other symptomatic generalized epilepsies not defined above
2. 3. 2	Specific syndromes
3.	Epilepsies and syndromes undetermined whether focal or generalized
3. 1	With both generalized and focal seizures :
	Neonatal seizures
	Severe myoclonic epilepsy in infancy
	Epilepsy with continuous spike-waves during slow wave sleep
	Acquired epileptic aphasia(Landau-Kleffner syndrome)
	Other undetermined epilepsies not defined above
3. 2	Without unequivocal generalized or focal features
4.	Special syndromes
4. 1	Situation-related seizures :
	Febrile convulsions
	Seizures occurring only in the context metabolic or toxic events
4. 2	Isolated seizures or isolated status epilepticus

Commission on Classification and Terminology of the International League Against Epilepsy. Proposal for revised classification of epilepsies and epileptic syndromes. *Epilepsia* 1989 ; 30 : 389 - 399

Table 3. Characteristic EEG findings in specific epileptic syndromes

Differential diagnosis	EEG findings
1) 가	
Childhood absence epilepsy	3Hz spike-wave
Atypical absence of Lennox-Gastaut syndrome	Slow generalized spike-wave activity
Temporal lobe epilepsy	Temporal sike or sharp waves
2)	
Benign childhood epilepsy with centro-temporal spikes	Centrottemporal focus of spikes
Temporal lobe epilepsy	Temporal sike or sharp waves

가
symptomatic epilepsy 가 3

간질환자에서 인지기능의 장애를 보일 때 뇌파검사의 역할

(subclinical ststus epilepticus) 가

가
가
(Walczac 1997).

처음 경련을 보인 환자에서 뇌파검사의 역할

가
1.9,
1.4 (Berg Shinner 1991).
가 가 가
(febrile seizure)

항경련제 중단시 뇌파검사의 역할

IEDs가 가
generalized IEDs
가 가 가
Lennox - Gastaut
(benign Rolandic epilepsy, Benign childhood epilepsy with centro - temporal spikes) Childhood absence epile-psy 가 가
(Walczac 1997).

■ 주전 웹 사이트

<http://inhavision.inha.ac.kr/~neurolee/eeg/eeg.htm>

<http://www.epilepsy.org/ctf-1/>

<http://home.earthlink.net/~mchee1/episynd.html>

중심 단어 : Epilepsy · EEG.

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