Common Pitfalls in EEG Interpretation & How to Write EEG Report

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EEG Report

Why do we need it?

EEG Report

- It assists in communication between the EEG interpreter and the referral physician for appropriate care of patient
- It reflects physician's understanding of EEG

Guidelines for Writing EEG Reports

American Clinical Neurophysiology Society
J Clinical Neurolphysiology 2006;23:118-121

Writing EEG Report

1. Introduction
2. Description
3. Interpretation
   - Impression
   - Clinical correlation

Basic Information for EEG Interpretation

- Name & gender
- Age
- Purpose or indication for EEG recording
- Precaution
- Current medication
- Patient's condition
  - Wakeful, drowsiness, sleep (spontaneous VS sleep induction)
  - Cooperation in recording
  - Skull defect
- Recording duration

Slow BG activity

- Increase amount of theta, decreased sleep spindles
  - phenothiazine, MAO-I, butyrophenone, TCA
  - antiepileptic drug
  - antihistamine
  - opiate

Enhanced beta activities

- Barbiturate
- Benzodiazepines
- Anxiolytics, hypnotics
  - choral hydrate, meprobamate
- Cerebral stimulants

Neuroleptics & EEG

- Phenothiazine, butyrophenone, etc.
- Therapeutic dose:
  - no or little effect
  - slightly slowing of alpha
  - increase voltage of theta
  - Intoxication: diffuse slowing

EEG Report

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I. Introduction

- Description of basic information
- Montage designations including
  - -longitudinal bipolar
  - -transverse bipolar
  - -referential
- Montage with no less than 16,18 and 20 channels
- Electrode placement: full 21electrode placements of the 10-20 System

Introduction (Example of Report)

- This is a 16 channels of simultaneous recording with 21-electrode placements of the 10-20 System consisted of both bipolar and referential montages.

II. Description-1

- Background activity:
  - dominant activity, its frequency (Hz), quantity (persistent , intermittent), location
  - symmetry or asymmetry between both hemispheres
  - regular or irregular
  - amplitude or voltage (μV) “low”, “medium or moderate” and “high”

II. Description-2

- Response to opening and closing eyes – symmetry or asymmetry as well as to purposeful movement of the extremities when appropriate.
- Other non-dominant frequency in the background activity including amplitude, location, symmetry or asymmetry.

II. Description-3

- Abnormal wave forms:
  - Types:
    - Spikes, sharp waves, slow waves + (amplitude)
  - Distribution
    - Diffuse (synchronous or asynchronous)
    - Focal (location)
  - Pattern
    - Synchrony, symmetry
  - Timing
    - Continuous, intermittent, episodic (periodic) or paroxysmal
  - Quantity

II. Description-4

- Activation Procedures
  - Sleep stages (stage 1,2,3,or 4)
  - Hyperventilation 3 minutes & effort (good, fair, poor) and response
  - Photic stimulation 3 to 21/s (stepwise or glissando) and response
- Artifacts

Description (Example of Report)

- Normal background activity:

  The background activity during waking state consists of well (poorly) regulated medium (low or high) amplitude alpha activity at 10 Hz in the posterior head regions (dominant) attenuated with eye opening intermingled with low amplitude beta activity (other rhythm) in the anterior head regions (non-dominant).

Description (Example of Report)

- Abnormal finding:

  The main feature of the record is paroxysmal bursts of high amplitude spike and slow wave activity at 3.5 Hz recorded from both hemispheres more prominent on the anterior head region.

Description (Example of Report)

Activation:

- At times, the patient falls asleep characterized by the occurrence of diffuse theta activity, vertex sharp transient, sleep spindles and K-complexes.
- Hyperventilation enhances paroxysmal bursts of rhythmic high amplitude spike and slow wave activity at 3.5 Hz.
- Intermittent (stepwise) photic stimulation enhances good driving responses at 12 Hz to 18 Hz.

III. Interpretation-1

- **Impression**
  - Interpreter's subjective statement about the normality or abnormality of the record.
  - Short, brief & precise as possible
  - Get to the point
  - Grading of abnormality
    - Abnormal I, II, III

Interpretation-2

- Theta focus → focal disturbance
- Delta focus → structure lesion
- Paroxysmal delta activity → projected deep seated structure
- Diffuse theta → mild disturbance or irregularity or dysfunction
- Diffuse delta → severe disturbance or dysfunction

Interpretation-3

- Sharp wave → irritative process of epileptiform activity
- Spike activity → epileptiform activity
- Spike-wave activity → epileptic activity
- Generalized 3-4 Hz S/W → generalized epileptic activity in the form of 3 to 4 Hz
- Generalized 4 Hz polyspike-wave activity → epileptic activity in the form of polyspike-wave at 4 Hz

Interpretation - Impression

Example of report:

- This EEG is normal. No epileptic activity is recorded in the tracing
- This EEG is mildly abnormal. It indicates diffuse or focal minor irregularities or disturbance in cerebral function or mild cerebral dysfunction.
- This EEG is severely abnormal. It indicates the presence of severe diffuse or focal disturbance of cerebral function or severe cerebral dysfunction.

Interpretation-4

- **Clinical correlation**
  - Should be an attempt to explain how the EEG findings fit (or do not fit) the total clinical picture
  - Explanation should vary, depending on to whom it is addressed
  - Be careful if the recipient is not versed in EEG or neurology

Interpretation-5

- Impression → Clinical Correlation
  - Generalized spike-wave at 3 Hz. → absence seizure
  - Generalized poly spike-wave at 4 Hz → myoclonic seizure
  - Generalized S/W at 1 to 2 Hz → epileptic encephalopathy, Lennox-Gastaut syndrome
  - Hypsarrhythmia → Infantile spasms

Interpretation-6

- Impression → Clinical Correlation
  - FIRDA or OIRDA (frontal intermittent rhythmic delta activity → brain tumor, stroke, epilepsy
  - PLEDs (periodic lateral epileptiform discharges) → stroke, brain tumor, focal encephalitis
  - Burst suppression → drug induced, anoxia, severe insult to CNS
  - Triphasic → Hepatic coma, Creutzfeldt Jakob disease, uremia, metabolic encephalopathy

Interpretation Impression & Correlation

- Normal record: need no interpretation
- Abnormal record
  - What is that abnormality?
  - Is it compatible with a seizure disorder?
  - Any specific diagnosis can be made?
- Recommendation

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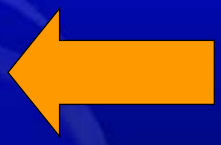

Do not over-read beyond what you see !!!!!!!

Pitfalls in Writing EEG Report

1. Convey the finding, don't over interpret
2. Abnormal findings, specify them
   Not all of them are epileptic potential
3. Guard yourself (from …..) and patient (from having risk of having unnecessary treatment)

Please be reminded

- A normal record does not rule out a convulsive disorder
- If the clinical presentation warrants or if there is any clinical suspicion of an existing epilepsy, a repeated recording may be helpful