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Use and abuses of Electroencephalogram- Strategies to maximize service utilization

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INTRODUCTION

- There has been unrestricted access to electroencephalogram (EEG) in most hospitals throughout Hong Kong.
- Most requests for EEG came from non-specialists. Therefore, there is considerable potential for unnecessary requests and misinterpretation of the results.
- Literature regarding use of EEG in routine clinical practice is limited. Previous studies have suggested that misconceptions about the diagnostic capability of EEG are common and consequently, its use is suboptimal.
- In this context, to promote optimal use of EEG services, well established guidelines that outlined reasons of EEG requests (NICE, SIGN and ILAE) have been produced.

OBJECTIVES

- To investigate whether EEG requests are being made according to guideline recommendations.
- To evaluate subsequent changes in clinical management according to EEG results and extent to which service meet waiting time targets.

METHODS

- All patients aged less than 18 years that underwent EEG between December 2009 and February 2010 were prospectively identified.
- EEG requests and clinical notes were analyzed and compared to pre-determined standards (NICE, SIGN and ILAE).
- EEG requests were defined as ' appropriate' and 'inappropriate' based on international standards (Table 1).
- EEG results were defined as normal, non-specifically abnormal, epileptiform and specific findings such as encephalopathic.
- The potential contribution of the EEG to management was ascribed to one of four categories (Table 2).

Table 1: 'Appropriate' and 'inappropriate' reasons for EEG requests

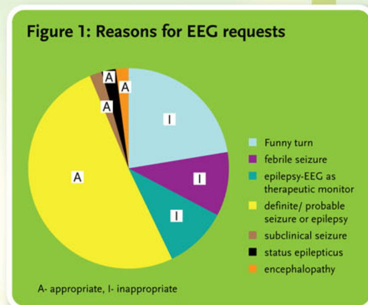
'Appropriate'	'Inappropriate'
Epilepsy	
Definite/ probable epilepsy/ seizure	Funny turn ? epilepsy
Classify new diagnosed epilepsy	Established epilepsy- clinical change in seizures with the exception of absence
Established epilepsy: subclinical EEG changes leading to symptom	
Status epilepticus	
Non- epilepsy	
Encephalopathy	
Neurodegeneration	
Organic brain disturbances	

Table 2: Contribution of EEG on management

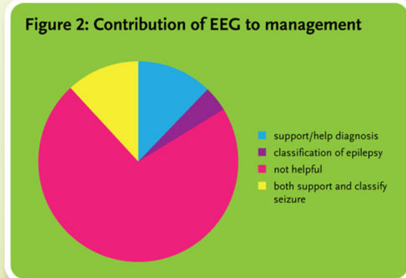
Category	Criteria
Support diagnosis/ help in making diagnosis	EEG supported the clinical history and gave enough evidence to make a diagnosis
Altered management	Clinical management changed as a result of EEG findings- EEG assists in classification of epilepsy and affects subsequent drug choice, investigations or prognosis
Non contributory	EEG had no effect on subsequent management

RESULTS

- One hundred patients were recruited.
- Forty-four percent of EEG requests were considered "inappropriate" with respect to guidelines, of which 50% were for diagnosis of "funny turns" , 22.7% for febrile convulsions and 22.7% in established epilepsy using EEG as therapeutic monitor where there appeared insufficient clinical evidence to justify the request (Figure 1).



- EEG findings were as follows: normal in 60%, epileptiform in 20%, encephalopathic in 12%, both encepahlopathic and epileptiform in 4% and non-specific in 4%.
- EEG contributes to diagnosis or management in only 28% of cases, all of which were appropriately requested (Figure 2).
- Non-specialists made referrals in 86% of cases.
- Purpose of requesting EEG was not provided in 40% and considered "inappropriate" in additional 40%.
- Inadequate information was noted in 66% and the code of requesting doctors was not provided in 32% of EEG requests.
- EEG could be performed < in 85% of in-patients and 95% met guideline target wait of 4 weeks.



CONCLUSION

- An effective EEG services had been provided by electro-medical diagnostic Units, however, its sustainability is questioned if abuses are common.
- We demonstrated that almost half of EEG requests are inappropriate, two-thirds of EEG requests did not contain adequate information and less than one third EEG contributed to diagnosis or affect management.
- Misconception of role and limitations of EEG is reflected.
- EEG is abused if insufficient information about the clinical problem is given on the request form. In order to get the best out of EEG, a clear statement of clinical problem and the question that the EEG is to answer should be provided.
- Through educative, non-confrontational approach, with time to demonstrate to clinicians the guideline recommendations, sustainable change in practice can be achieved that are beneficial to patients, clinicians and service provision.
- Reduction of unnecessary procedures through a change in referral policy can release technical capacity for expansion of other services.

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