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Reversible Electroencephalogram Changes Associated with Administration of Baclofen in a Quadriplegic Patient: Case Report

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Summary

We present the case of a spastic quadriplegic who developed mental symptoms which resolved when his Baclofen was discontinued. Of interest was the presence of EEG abnormalities similar to those described in cats receiving this drug. These abnormalities, previously unreported in humans, resolved upon discontinuing Baclofen therapy.

Introduction

Over the last decade many studies have demonstrated the efficacy of Baclofen (Lioresal) in the treatment of spasticity resulting from spinal cord injury or multiple sclerosis (Duncan *et al.*, 1976; Feldman *et al.*, 1978; Jones *et al.*, 1970; Sachais *et al.*, 1977; Shahani *et al.*, 1974). The mode of action, indications, contraindications, and side-effects of this drug were well summarized in Young and Delwaide's (Young & Delwaide, 1981) recent review. One of Baclofen's major advantages has been the comparatively low incidence of mental side effects such as drowsiness, euphoria, or confusion.

While electroencephalographic changes associated with Baclofen administration have been reported in cats, (Koella, 1980) no such changes have been previously documented in humans. We are reporting the case of a traumatic quadriplegic patient who developed EEG changes and mental symptoms, both of which resolved after discontinuing Baclofen therapy.

Case Report

A 32 year old male sustained a C4 fracture-dislocation with quadriplegia in 1977, while wrestling. In 1978 he was started on Baclofen for spasticity, with a maximal dose of 20 mg three times daily. He did well over the next 3 years except for the development of a urethral diverticulum and urethral sphincter spasm, both of which were treated surgically.

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In February, 1982 he had several 'blackout spells', and noted episodic sweating with frontal headache. On admission to a local hospital he was found to be hypothermic. He was given antibiotics for suspected urinary tract infection and discharged after 5 days. However, he continued to have headaches and sweating associated with voiding. He also reported drowsiness, slowed speech, impaired memory and a general feeling of mental dullness.

On admission to our facility he was hypothermic (98° oral), hypertensive (140/80; normal BP in quadriplegics (Ramos *et al.*, 1981) is around 110/70), and sweating. His speech was slow but not slurred, and there was no evidence of dysphasia or thought disorder. Cranial nerves were intact. Residual motor power was trapezius, normal; deltoid and biceps weak bilaterally. Pinprick was absent below T4 bilaterally. Bilateral sustained ankle clonus was present.

Clinical impression on admission was autonomic dysreflexia and possible drug reaction related to Baclofen. Dysreflexic symptoms (including hypothermia) responded to Phenoxybenzamine and surgical repair of his urethral diverticulum; however, his mental symptoms persisted. After an initial EEG study his Baclofen was gradually tapered over a one week period and speech, memory, and overall mentation returned to normal. An EEG was repeated after the patient was off Baclofen and a 24 hour EEG monitor was done as a follow-up 2 months later.

Electroencephalographic Findings

Initial EEG on 3/5/82 (taken while the patient was on Baclofen and exhibiting mental symptoms) showed intermittent rhythmical Delta waves in a generalized distribution maximal in the fronto-central regions, with increased prevalence during drowsiness. The pattern was interpreted as a diffuse cerebral disturbance consistent with a deep midline lesion or metabolic disturbance.

A second EEG on 3/16/82 (after the patient was off Baclofen) showed that the previously noted rhythmical Delta waves had disappeared. However, two spike discharges coming from the right temporal region were noted, and this raised the question of localized seizure discharges. These spikes appeared to be of cerebral origin rather than artifactual. The clinical significance of this finding was unclear.

A 24 hour ambulatory EEG monitor was done for follow-up on 5/20/82; the patient had been stable and free of mental symptoms in the intervening two months. This tracing was entirely within normal limits.

Discussion

Reports about EEG changes related to spinal cord injury first appeared more than 30 years ago (Kaplan & Stearns, 1949; Merlis & Watson, 1949; Perry & SImons, 1951). More recently, EEG abnormalities have been found among quadriplegic but not paraplegic subjects (Adey *et al.*, 1968). These changes included poor development of Alpha rhythms with irregular frequencies and lower voltage, show frequency Theta activity during waking records, and increased amounts of Stage II or 'light' sleep compared to slow wave sleep or rapid eye movement sleep. The transient frontal intermittent rhythmical Delta activity seen in this patient has not previously been associated with spinal cord injury.

Koella (Koella & Baclofen, 1980) has studied the effects of orally administered Baclofen upon EEG activity in cats. Doses of 1 mg. per kg. did produce rhythmical

high amplitude slow waves, while even higher doses of 3 mg. per kg. showed more persistent high amplitude Delta waves predominantly along with a disorganized sleep pattern. The EEG patterns seen while our patient was on Baclofen parallel these EEG findings.

Paroxysmal features seen in the second EEG may represent a seizure focus evolving two years after the initial injury, and may have been responsible for the patient's blackout spells. It is important to distinguish the pattern of frontal intermittent rhythmical Delta activity from paroxysmal features such as the focal sharp waves in our patient. One should also recognize the transient nature of these rhythmical slow waves, their relationship to his medication, and not confuse them with either the effects of trauma or seizures.

Since Baclofen is a widely-used antispastic medication in patients with spinal cord injuries, we feel it is important for the clinician to be aware of this potential side-effect of the drug and to consider it in the differential diagnosis of altered mental status in these patients.

Conclusion

Mental changes have been associated with Baclofen therapy, although these symptoms occur less frequently than with other antispastic drugs. We report the case of a patient whose mental changes while taking Baclofen correlated with reversible EEG changes. Such EEG findings have not been documented in humans, and they are similar to those previously reported in animal studies.

Résumé

Nous présentons un cas avec une quadriplégie spastique qui a developpé des symptômes mentaux qui se sont résolus après que le Baclofen a été discontinié. D'intérêt était la présence des abnormalités de EEG similaires à celles décrites dans les chats recevant ce médicament. Ces abnormalités, non rapportées auparavent dans les humains, se sont résolues après la discontinuation de la thérapie de Baclofen.

Zusammenfassung

Ein Tetraplegiker mit Spastik wurde mit dem Medikament Baclofen behandelt und zeigte daraufhin symptome on die auf geistige Veraenderungen deuten. Abnormalitaeten wurden auch am EEG festigestellt aehnlich wie man sie bei Katzen beobachtet hat die mit dem gleichen Medikament behandelt wurden. Diese on patienten bisher unbekannten Abnormalitaeten behoben sich mit der Einstellung der Behandlung.

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