

PLASMA PROLACTIN IN EPILEPSY AND PSEUDOSEIZURES

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ABSTRACT

Postictal values of plasma prolactin levels were measured in 15 children with generalized seizures, 8 children with pseudoseizures and 6 control subjects. In patients with generalized seizure, the mean plasma prolactin level was 28.6 ± 2.3 ng/ml, whereas in patients with pseudoseizures and in controls, its mean values were 10.4 ± 3.8 ng/ml and 9.8 ± 2.6 ng/ml, respectively. Thus, prolactin levels were significantly ($p < 0.001$) elevated following generalized seizures but were almost normal following pseudoseizures. Plasma prolactin levels may, therefore, be helpful in differentiating between generalized seizures and pseudoseizures.

Key words: Prolactin, Seizure, Pseudoseizure.

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In day to day clinical practice it is difficult to differentiate clinically between an epileptic seizure and pseudoseizure. For their differentiation, an eye witness account is very important, which is lacking in most of the cases. Expensive and time consuming aids, e.g., EEG and CT brain scanning, are useful but not confirmatory in most of the cases. Therefore, a simple biochemical test would be very helpful for the diagnosis.

Several investigators have now reported elevated plasma prolactin levels in patients with epileptic seizures(1-3). The aim of this study was to establish the fact that plasma prolactin level estimation may be of great importance in the differentiation of epileptic seizures from pseudoseizures.

Material and Methods

Plasma prolactin levels were estimated in 15 children with generalized seizures and 8 children with pseudoseizures admitted to the emergency ward of the Upgraded Department of Pediatrics, Patna Medical College Hospital, Patna, Bihar. Six children were taken as controls. The criteria for selection of these children were:

- (i) *Generalized Seizures:* All these patients had generalized tonic-clonic seizures at the time of admission and subsequently in the ward observed by the investigators. The clinical diagnosis was supported by positive EEG.
- (ii) *Pseudoseizure:* All these children had atypical bizarre movements and other suggestive features but not resembling tonic clonic generalized seizures. They also did not have any history of seizures in the past.
- (iii) *Control Subjects:* These age matched children had no apparent illness and

were free from endocrine or metabolic illness.

None of the patients included in the present study were taking any anticonvulsant medication. Plasma prolactin levels were estimated at 15-20 minutes following seizures and in control subjects. All sera were tested with commercially available kits by radioimmunoassay for prolactin levels.

Results

All children with generalized seizures had elevated serum prolactin levels (28.6 ± 2.3 ng/ml) in comparison to controls (9.8 ± 2.6 ng/ml) and children with pseudoseizures (10.4 ± 3.8 ng/ml). This difference was highly significant ($p < 0.001$). There was no significant difference in serum prolactin levels between children with pseudoseizures and controls (*Table I*).

Discussion

The result of this study confirms the previous observation that serum prolactin increases following generalized seizures(3,4).

Our findings confirm that plasma prolactin levels were unchanged following

pseudoseizures. This and other studies(2-4) would therefore, suggest that estimation of plasma prolactin is useful in differentiating between generalized and pseudoseizures. The previous two studies(2,5) had shown that the peak level of plasma prolactin was noted at 15-20 minutes after a seizure. Therefore, in the present study the blood samples were taken within 15-20 minutes of seizure.

It is known that prolactin is increased in situations characterized by stress, arousal and hypoglycemia(6). Certain drugs like chlorpromazine, butyrophenones and methyl dopa increase prolactin secretion. Exercise can lead to small rises(7). However, in the above situations the rise is minimal and well within normal range, whereas in case of generalized seizures there is a significant rise.

The mechanism by which generalized seizures induces a shortlived elevation of plasma prolactin following seizures is not known. Stress causes an elevation of plasma prolactin. However, this is unlikely to be the cause following seizures as it has been shown that while serum cortisol rises following simulated seizures, prolactin is not significantly elevated. This study confirms that whilst the stress of a pseudoseizure results in a slight rise in the prolactin level, this rise is not significant and the maximum prolactin level lies well within normal range.

Prolactin secretion is predominately under inhibitory control from the hypothalamus. Dopamine appears to be the major inhibitory transmitter involved. It is possible that a rise in plasma prolactin will occur only when the abnormal electrical discharge in an epileptic seizure passes through the hypothalamic region.

TABLE I—*Mean (SD) Plasma Prolactin Level in Different Groups of Patients*

Group	Total No.	Age (yrs)	Plasma prolactin (ng/ml)
Generalized seizures	15	5-10	$28.6 \pm 2.3^*$
Pseudoseizures	8	8-12	10.4 ± 3.8
Controls	6	6-10	9.8 ± 2.6

* $p < 0.001$

Therefore, our observations suggest that plasma prolactin level should be measured in the children with seizure especially when there is difficulty in separating the cases of seizure from pseudoseizure clinically. This subject needs further study and may be very useful in children with functional neurological disorders.

REFERENCES

1. Zelnik N, Kahana L, Rafael A, Besner I, Lancu TC. Prolactin and cortisol levels in various paroxysmal disorders in children. *Pediatrics* 1991, 3: 572-575.
2. Collins WCJ, Lanigan O, Callaghan N. Plasma prolactin concentrations following epileptic and pseudoseizure. *J Neurol Neurosurg Psychiatr* 1983, 46: 505-508.
3. Abbott RJ, Browing MCK, Davidson DLW. Serum prolactin and cortisol concentration after grandmal seizures. *J Neurol Neurosurg Psychiatr* 1980, 43: 163-167.
4. Trimble MR. Serum prolactin in epilepsy and hysteria. *Br Med J* 1978, 2:1682.
5. DanaHaeru J, Trimble MR, Oxley J. Prolactin and gonadotrophin changes following generalized and partial seizures. *J Neurol Neurosurg Psychiatr* 1983, 46: 331-335.
6. Noeol GL, Suh HK, Stone JG, Franz AG. Human prolactin and growth hormone release during surgery and other conditions of stress. *J Clin Endocrinol Metab* 1972,35: 840-851.
7. Hoppener RJE, Rentmeester TO, Arnoldussen W, Hulsman J, Meijers CAM. The changes in serum prolactin level following partial and generalized seizures. *Br J Clin Pract* 1982, Suppl 18:193-195.