

CASE REPORT

Benign afebrile convulsion with gastroenteritis – A differential to consider for afebrile seizure in children

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SUMMARY

A 5-year-old girl presented with three brief episodes of afebrile seizure within 24 hours. There was no significant past medical history but she had symptoms of acute gastroenteritis for the past 2 days. She was mildly dehydrated with no neurological signs. Serum electrolytes and blood sugar were normal and cerebrospinal fluid examination was negative for meningoen­cephalitis. Contrast-enhanced CT Brain showed no evidence of intracranial lesion, haemorrhage or meningeal enhancement. Only stool investigation was positive for Rotavirus. The conclusion of Benign Afebrile Convulsion with gastroenteritis (CwG) was established after excluding other serious causes of afebrile seizure in children.

INTRODUCTION

It is uncommon for healthy children to have unprovoked afebrile seizure. Detailed history is vital to distinguish a seizure from a paroxysmal non-epileptic episode, e.g. breath-holding spell, syncopal attack, gastroesophageal reflux with Sandifer Syndrome. If the history favours afebrile seizure, clinical examination and supplementary tests are often needed to arrive at a diagnosis. The likelihood of recurrence after the first unprovoked afebrile seizure is about 30% and anti-epileptic treatment is rarely required. However, if seizures persist, the patient may need further investigations and some may even require anticonvulsant medications.

Mooroka¹ was the first to describe this condition in year 1982. CwG is defined as convulsion accompanying symptoms of diarrhea without overt dehydration, electrolyte imbalance, and fever ($\geq 38^{\circ}\text{C}$) before and after the seizures in previously healthy infants and children with no evidence of meningitis, encephalitis, or encephalopathy.¹ Patients who are diagnosed with CwG generally have excellent prognosis and rarely require anti-epileptic medications for seizure control. I hope to use this case illustration to highlight that CwG can be a diagnosis to consider when the patient presents with afebrile seizure and symptoms of gastroenteritis.

CASE ILLUSTRATION

A 5-year-old girl presented to the emergency department with a first episode of afebrile seizure which occurred when she was awake. There was no family history of epilepsy or febrile seizure, she had a normal birth history and developmental milestones. The seizure was described as up-rolling of eyes

and tonic-clonic contractions of 4 limbs which lasted for one minute. She was drowsy but rousable with normal vital signs and neurological examination. She had multiple episodes of vomiting and diarrhoea past 2 days but did not have altered behavior.

At the emergency department, she had her second episode of seizure with similar semiology and it was aborted after 3 minutes with suppository diazepam. Maintenance drip was commenced and she was admitted to the general ward for observation. The third episode of seizure occurred 2 hours later with the similar pattern and it lasted for 3 minutes. She was awake during all three episodes of seizure and there was no documented fever ($\geq 38^{\circ}\text{C}$). An intravenous loading dose of phenytoin was given and antibiotics were escalated to treat for meningoen­cephalitis. Blood investigations were normal and an urgent contrast-enhanced CT brain showed no intracranial lesion nor any enhancing lesion. Lumbar puncture was performed and cerebrospinal fluid investigations (biochemistry, culture and viral Herpes PCR) were negative. Electroencephalogram was not performed for this child.

In the next few days, there were no more seizures and she recovered well with no neurological deficit. She was followed-up for 1 year and had no recurrence. There was no change in her behavior or any regression in her developmental milestones.

DISCUSSION

CwG as a clinical condition where mild gastroenteritis in young children may trigger afebrile seizure in the absence of electrolyte imbalance, hypoglycemia or history of epilepsy.¹ Numerous studies and reports from East Asian countries and recently from Western countries attempted to characterize patients with CwG. Many of the published literatures¹⁻⁵ agreed that patients with CwG had several supporting features as listed in Table I.

Although most of these patients had generalized seizure type, some may have focal or focal with secondary generalization type of seizure.^{2,3,4} The majority of the patients had more than one seizure during the illness and most of them occurred within 24 hours.^{2,3,4} Studies had also shown that 75% of the patients diagnosed as CwG developed seizure more than 24 hours after the onset of gastrointestinal symptoms.³ These characteristics were observed in this patient who had 3

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Table 1: Features suggestive of Benign Afebrile Convulsion with Gastroenteritis¹⁻⁵

Children aged between 6 months and 3 years old
Associated symptoms of gastroenteritis with mild or no dehydration
Recurrent, brief duration of afebrile seizure occurred within 24 hours
Seizure can be generalized, focal or combination of both
No neurological deficit pre and post seizure
Normal serum electrolytes, blood glucose, cerebrospinal fluid examination, electroencephalogram and brain imaging
Stool examination may be positive for Rotavirus or other viruses
Rarely require anti-epileptic medication for seizure control

episodes of generalized seizure that occurred within 24 hours. She had gastrointestinal symptoms 2 days prior to the onset of seizure.

Rotavirus is frequently detected in the stool of patients with CwG.^{2,4} In countries with high coverage of Rotavirus vaccination, Norovirus is reported as the main causative agent in their cohort.^{2,3,5} Cerebrospinal fluid analysis and brain imaging if performed are usually normal.^{2,3,4,5} Patients with CwG may have some transient electrical abnormalities but majority will have normal EEG.^{2,3,4} Unless patients have signs of meningeal irritation, raised intracranial pressure or altered consciousness, further radio-imaging or invasive procedures shouldn't be performed. Retrospectively, investigations such as contrast-enhanced CT Brain, EEG and lumbar puncture may be unnecessary if treating clinicians were able to recognise the presence of features suggestive of CwG in this patient.

The pathogenesis for CwG is not well understood but it could be due to immaturity of brain as the condition affects mostly young children. Some hypothesized that the seizure may be due to direct invasion of the virus to the cerebrospinal fluid but the findings were not consistent in all patients.² Higuchi et al³ reported negative association between the number of seizures and serum sodium level which suggested hyponatremia may lower the threshold of seizure. However, further prospective and large-scale studies may be needed to verify these hypotheses.

Patient with CwG usually do not require long term anti-epileptic medications as most seizures occurred between 12 - 48 hours after the onset.^{2,3,4} Although some patients with CwG responded to Carbamazepine³, intensive and prolonged usage of anti-epileptic medications is not recommended.^{2,4} Patients with CwG who were followed-up for a mean of 9.8 years have shown excellent prognosis with low risk for psychomotor abnormalities and subsequent development of epilepsy.⁴

CONCLUSION

CwG is a clinical diagnosis describing association of afebrile seizure in young children or infant with mild gastroenteritis in the absence of meningoencephalitis or encephalopathy. The seizure can be generalized or focal and onset usually occurs in not more than 48 hours. Rotavirus is commonly associated with CwG but Norovirus is more prevalent in countries with high coverage of Rotavirus vaccination. The prognosis for CwG is favourable with patients not requiring long term anti-epileptic medication and with no psychomotor or neurological deficit. It is essential for clinicians to recognise this clinical condition in order to avoid subjecting patients to unnecessary investigations.

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