

Reprinted from *Pediatrics*, Vol. 25, No. 1  
January, 1960

## ABDOMINAL EPILEPSY IN CHILDHOOD

George H. Schade, M.D., and Helen Gofman, M.D.

*Department of Pediatrics and Mental Health Unit, University of California Medical Center*

**A**BDOMINAL pain is a very common symptom to the physician who deals with infants, children and adolescents. Intra-abdominal conditions such as appendicitis, intussusception, Meckel's diverticulum, mesenteric adenitis, and kidney disease must be considered as organic causes of pain. The onset of acute infectious disease, such as rheumatic fever, pneumonia, hepatitis, and pancreatitis, also must be considered. The site of origin of the pain, the associated symptoms described by the patient, as well as a definitive history, may eliminate some disease processes; and a meticulous physical examination with necessary laboratory tests may well exclude other disease entities.

Chronic recurrent bouts of abdominal pain present the clinician with a difficult diagnostic problem. He must consider the possibility of food allergy, the periodic syndrome, constipation, intestinal parasites, peptic ulcer, hydronephrosis, psychogenic pain and the possibility of "abdominal epilepsy." Paroxysmal abdominal pain with associated symptoms is now a well established clinical entity, known as abdominal epilepsy.

Several groups of investigators have reported their observations on children who had experienced this syndrome.<sup>1-4</sup> The pain was described as characteristically periumbilical or epigastric, of short duration—of a minute or two—or lasting several hours. Associated gastrointestinal symptoms such as nausea, vomiting, and diarrhea were found to be quite common, as well as paleness, dizziness and slight to marked disorientation. Following such an episode many of the patients were apathetic and lethargic for about an hour; others seemed completely exhausted and sank into a deep sleep. Livingston<sup>5</sup> likened this to a "post-convulsive exhaustion." Hoefer *et al.*<sup>6</sup> reported that 16 of the 31 children in their study experienced paroxysmal abdominal pain followed by post-ictal sleep. Other observers<sup>1-8</sup> noted that electroencephalograms of these patients were not always abnormal.

### ANALYSIS OF CASES

Our experience during the past 18 years with 46 patients with the complaint of paroxysmal bouts of abdominal pain with characteristics of the described clinical entity, is shown in Table I. The average pe-

---

Presented at the Spring Meeting of the American Academy of Pediatrics, San Francisco, April 15, 1959.  
ADDRESS: (G.H.S.) San Francisco 22, California.

PEDIATRICS, January 1960

TABLE I

EIGHTEEN-YEAR EXPERIENCE AT UNIVERSITY  
OF CALIFORNIA HOSPITAL (1940-1958)

|                             | Male            | Female          |
|-----------------------------|-----------------|-----------------|
| Characteristic findings     |                 |                 |
| Average age of onset (yr)   | 8 $\frac{2}{3}$ | 7 $\frac{2}{3}$ |
| Family history of seizures  | 11              | 8               |
| Febrile seizures in infancy | 15              | 10              |
| Family history of migraine  | 1               | —               |
| Total number of patients    | 26              | 20              |

riod of time for which these cases have been followed is 4 years.

These patients experienced paroxysmal bouts of periumbilical or epigastric pain with the associated characteristics of the described clinical entity. A definitive family history in regard to the occurrence of the seizure state or similar episodes was found to be helpful in the management of each case.

#### Procedures and Studies (Table II)

Each parent of the five males and the five females on whom appendectomies were performed stated that surgical intervention was carried out because of the pain and associated symptoms. In all 10 children, the subsequent recurrence of abdominal pain led the family to seek further explanation and therapy.

Stools were examined for ova and parasites in 39 of these children; all were reported to be negative. Five males and five females were evaluated with complete

TABLE II

PROCEDURES AND STUDIES

|                                                    | Male | Female |
|----------------------------------------------------|------|--------|
| Appendectomy                                       | 5    | 5      |
| Examination of stool for parasites and ova         | 19   | 20     |
| Roentgenographic studies of gastrointestinal tract | 5    | 5      |
| Studies of genitourinary tract                     | 1    | 1      |
| Pneumoencephalograms                               | 2    | 1      |
| Tests for allergy: food eliminations, etc.         | 9    | 3      |

TABLE III

RESULTS OF ELECTROENCEPHALOGRAPHIC STUDIES

|                                        | Males | Females |
|----------------------------------------|-------|---------|
| Temporal lobe focus                    | 14    | 8       |
| Generalized dysrhythmia, no focus      | 9     | 7       |
| Higher potentials over left hemisphere | 1     | 0       |
| Normal                                 | 2     | 5       |

roentgenographic studies of the gastrointestinal system and all were reported as normal. Complete studies of the genitourinary tract in one male and one female were interpreted as normal.

Pneumoencephalographic studies in two males were normal, and such a study of one female was interpreted as displaying findings which were compatible with the diagnosis of cerebral atrophy. The pneumoencephalographic studies were made after these patients had experienced seizures following control of their abdominal symptoms.

Allergy tests were performed and food elimination procedures were carried out in 12 children. Two boys were found to be sensitive to egg on scratch tests, one was sensitive to dust, and the others did not react to scratch tests or food elimination tests. Three girls were given scratch tests; one of these was found to be sensitive to egg. Food elimination tests were not carried out on these girls.

The electroencephalograms (Table III) displayed a temporal focus in association with the bouts of abdominal pain in 22 of the cases. A similar observation was made by Pritchard<sup>4</sup> who thought such electroencephalographic findings, in conjunction with paroxysmal bouts of abdominal pain with associated symptoms, were true examples of abdominal epilepsy. Mulder *et al.*<sup>7</sup> concluded from their studies that: "visceral epilepsy is a form of focal epilepsy that can be recognized by the paroxysmal occurrence of the symptoms." Livingston<sup>5</sup> stated that the electroencephalogram may or may not be abnormal as with other types of epileptic seizures.

Intelligence tests were given to 42 children out of the 46 studied—24 boys and 18 girls—with the use of Stanford-Binet and Wechsler Intelligence Scales (Table IV).

#### Treatment and Course

Diphenylhydantoin (Dilantin®), mephobarbital (Mebarol®), phenobarbital, and primidone (Mysoline®) were the anticonvulsive medications which were used with success in controlling the symptom of paroxysmal abdominal pain. The best results were obtained by utilizing an individual combination of diphenylhydantoin with one of the barbiturates. Eleven of the children have developed seizures of various types since being given a regimen to control the symptom of paroxysmal abdominal pain (Table V).

As mentioned, three children received pneumoencephalographic study after the development of seizures (Table II). It is interesting to note that others<sup>1, 2, 5-7</sup> have observed the development of seizures in patients who had displayed paroxysmal bouts of abdominal pain initially. Five of the six females in our group who developed seizures during their period of freedom from bouts of recurrent abdominal pain had experienced febrile seizures during infancy and had a history of seizures in their families; the family and past history of one female was essentially negative prior to the onset of the seizures. Four of the five males experienced febrile seizures during infancy, although all five had a positive family history for seizure state.

Five children failed to follow the anticonvulsive regimen after freedom from abdominal pain for 9 to 12 months, which resulted in recurrence of the abdominal pain and associated symptoms. Medication was discontinued in four children without recurrence of symptoms. With gradual discontinuance of drugs, three had normal electroencephalographic patterns, while one continued to display a right posterior lobe focus with slight secondary generalized dysrhythmia. All four children have been free from symptoms for the past year.

TABLE IV  
INTELLIGENCE QUOTIENTS

|         | Male | Female |
|---------|------|--------|
| Average | 98   | 105    |
| Highest | 126  | 127    |
| Lowest  | 64   | 75     |

Forty-one children (including 11 who experienced seizures) have remained free from paroxysmal abdominal pain and seizures while on their individualized medications. One boy continues to experience seizures of abdominal character with associated paleness, dizziness, and apathy in spite of manipulation of his regimen.

A report<sup>9</sup> in the British literature infers a close relationship of the described abdominal pain to "migraine." In our 46 cases we found one parent who described symptoms compatible with "migraine" episodes. In 2 of the 46 patients, headache was found to be associated with abdominal pain, nausea and vomiting; one of these patients, a girl, was completely relieved of her symptoms with 100 mg of diphenylhydantoin twice daily; the other patient, a boy, has been relieved of paroxysmal bouts of abdominal pain but periodic headaches continue unabated in spite of a variety of anticonvulsive medication.

The management of these 46 cases involved much more than the prescription of medications. We certainly agree with Lambert<sup>10</sup> that the approach is pluralistic and should be adapted to the individual needs of the patient and his family. The physician must meet and deal with the attitudes and

TABLE V  
PROGRESS OF 46 PATIENTS

|                                                     | Male | Female |
|-----------------------------------------------------|------|--------|
| Developed seizures of various types                 | 5    | 6      |
| Failure to follow regimen with resulting recurrence | 3    | 2      |
| Off regimen without recurrence                      | 2    | 2      |
| Free from symptoms while on regimen                 | 23   | 18     |
| Failure to control symptom                          | 1    | —      |

feelings of the patient and his family if success is to be attained in the control of this clinical entity.

### CONCLUSIONS AND SUMMARY

A complete family history as to the past seizures experienced by the patient or by members of his family may be revealing and helpful in establishing a diagnosis of abdominal epilepsy. In our study 19 of the 46 children revealed a past history of seizure state and 25 had experienced febrile seizures in infancy.

Detailed consideration of the type of pain, its site, and allied symptoms should be evaluated carefully. Disorientation during an episode of pain followed by exhaustion and sleep is suggestive of abdominal epilepsy.

Electroencephalography is usually helpful in supporting the clinical diagnosis of abdominal epilepsy.

Discussion with the child and his parents, when practical and possible, in regard to the diagnosis and therapy, is recommended. Clarification and definition of the regimen and of the condition are essential, as the term "epilepsy" still carries a stigma to the lay person. Consideration of the patient and parental feelings and attitudes leads to understanding, co-operation, and ultimate success in the control of symptoms.

### REFERENCES

1. Klingman, W. O., Langford, W. S., Greeley, D. M., and Hoefer, P. F. A.: Paroxysmal attacks of abdominal pain, epileptic equivalent in children. *Tr. Am. Neurol. A.*, **67**:228, 1941.
2. Livingston, S.: Abdominal pain as a manifestation of epilepsy (abdominal epilepsy) in children. *J. Pediat.*, **38**:687, 1951.
3. O'Brien, J. L., and Goldensohn, E. S.: Paroxysmal abdominal pain as a manifestation of epilepsy. *Neurology*, **7**:546, 1957.
4. Prichard, J. S.: Abdominal pain of cerebral origin in children. *Canadian M.A.J.*, **78**:665, 1958.
5. Livingston, S.: Convulsive disorders in infants and children. *Advances Pediat.*, **10**:113, 1958.
6. Hoefer, P. F., Cohen, S. M., and Greeley, D. M.: Paroxysmal abdominal pain: a form of epilepsy in children. *J.A.M.A.*, **147**:1, 1951.
7. Mulder, D. W., Daly, D., and Bailey, A. A.: Visceral epilepsy. *Arch. Int. Med.*, **93**:481, 1954.
8. Glaser, G. H.: Visceral manifestations of epilepsy. *Yale J. Biol. & Med.*, **30**:176, 1957.
9. Farquhar, H. G.: Abdominal migraine in children. *Brit. M. J.*, **1**:1082, 1956.
10. Lambert, J. P.: Psychiatric observations on children with abdominal pain. *Am. J. Psychiat.*, **98**:451, 1941.