

Benign Familial Neonatal Convulsions

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SUMMARY: *Benign familial neonatal convulsions are a rare genetic seizure disorder inherited as an autosomal dominant trait. They consist of brief episodes of seizures, recurring during the first few days or weeks of life in otherwise normal babies; their prognosis is good. We report a family in which at least 12 members in three generations presented with this condition; they all had an excellent outcome.*

RÉSUMÉ: *Les convulsions néonatales bénignes constituent un rare syndrome héréditaire de nature dominante. Ces convulsions récurrentes et brèves apparaissent dans les premiers jours de vie chez des bébés par ailleurs normaux. Leur pronostic est bon. Nous décrivons une famille dans laquelle au moins 12 membres appartenant à 3 générations ont présenté un tel syndrome; tous eurent une excellente évolution.*

INTRODUCTION

The incidence of convulsions in the neonatal period varies from 0.2 to 1.4 per 100 live births, according to series studied by different neonatal care units (McInerny, et al., 1969; Keen and Lee, 1973). Their causes are multiple and their overall long term prognosis is relatively severe. Among neonatal seizure disorders, the benign familial convulsions constitute a separate entity which has been very rarely reported in the literature (Rett and Teubel, 1964; Bjerre and Corelius, 1968; Rose et al., 1970; Carton, 1978; Quattlebaum, 1979; Tibbles, 1980). This condition is defined by the following criteria:

- 1) Hereditary nature following an autosomal dominant pattern with full penetrance.
- 2) Short and frequent seizures starting on or after the 2nd day of life, which disappear spontaneously within a few weeks.
- 3) Normal neurological examination and psychomotor development.
- 4) Inconsistent epileptic activity on EEG.
- 5) Lack of clear-cut response to a specific anticonvulsant therapy.

This report describes a family in which at least 12 members, in three generations had benign convulsions in the neonatal period or in early infancy, followed by an excellent outcome. The propositus was studied by the authors. The data on the other cases were provided by history and study of their medical charts.

CASE REPORT

This baby was the product of a full-term, uneventful first pregnancy, with a birth weight of 3840 g. The Apgar score was 10-10. The examination of the newborn was normal except for a mild lower facial asymmetry due to congenital hypoplasia of the depressor anguli oris muscle. On the 6th day, the baby started having brief generalized motor seizures recurring every $\frac{1}{2}$ to 2 hours. During the interictal periods he

remained vigorous, alert and free of any symptoms. On the next day he had several other identical episodes and was admitted to Hôpital Sainte-Justine. The general physical and neurological examination was entirely normal. Soon after admission a few brief generalized seizures were noted.

The following laboratory investigations were normal: blood cell count, urinalysis, serum electrolytes, calcium, magnesium and blood sugar; CSF cell count, protein and sugar; blood gases and acid-base status; urinary amino acid chromatogram. The electrocardiogram and skull and chest X-rays were normal. The electroencephalogram (EEG) showed epileptic activity originating independently from the temporal region of both hemispheres, more evident over the right hemisphere.

The baby was started on phenobarbital and since that time he has been free of seizure. On follow-up examination at 3 months of age, the infant remained normal; an EEG done at that time was normal and the medication was stopped. When last seen at age 12 months, his neurological examination was entirely normal.

FAMILY HISTORY

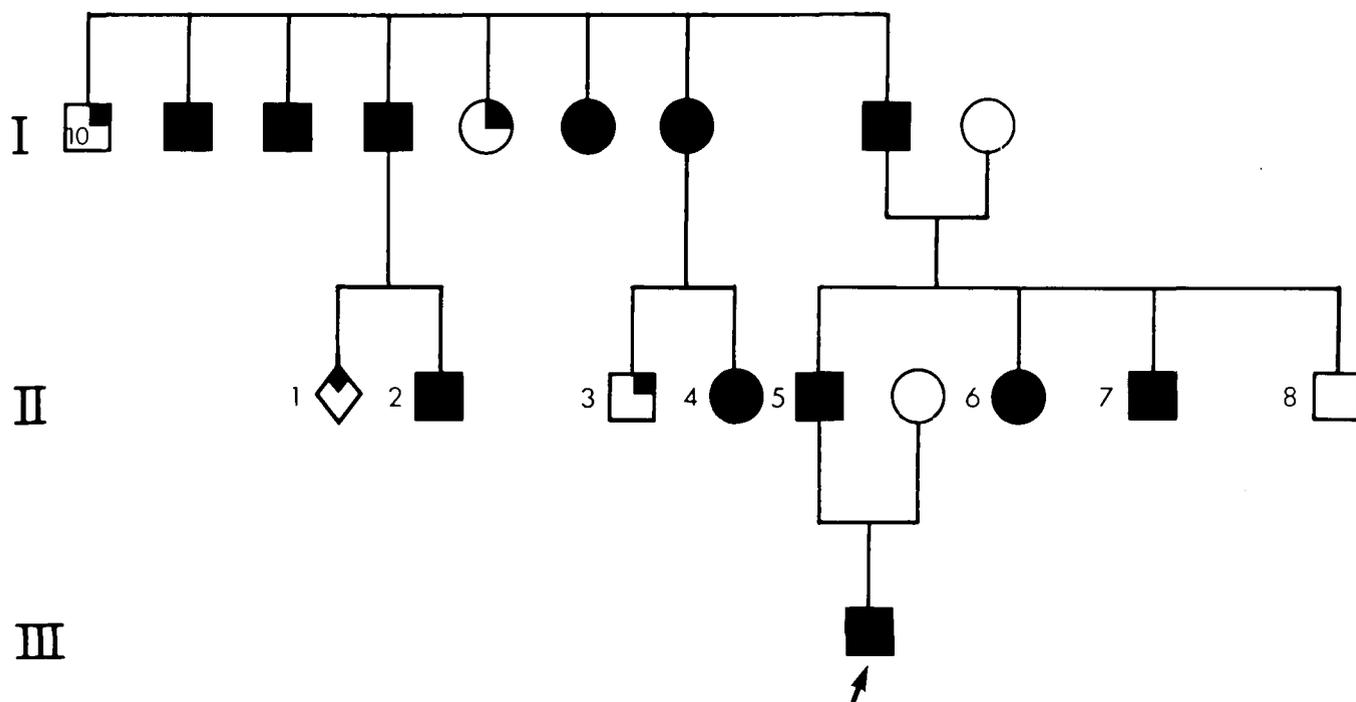
The family history revealed that at least 11 relatives on the paternal side, had convulsions in the neonatal period (Fig. 1). On the 2nd day of life they developed generalized and/or focal motor seizures lasting 1 to 3 minutes. These occurred up to 6 times a day but in all cases they subsided by the end of the first week of life and there was no later recurrence of the seizures. These individuals all function normally as adults.

DISCUSSION

Convulsions in the neonatal period are due to various etiologies (Rose and Lombroso, 1970; Brown, 1973; Keen and Lee, 1973; Rossier et al., 1973; Baudon et al., 1975; Combes et al., 1975). However about 80% of all

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Key:

- Convulsions in neonatal period or in early infancy.
- ◻ Probable convulsions in neonatal period or in early infancy.

Figure 1 — Family pedigree.

TABLE 1:
CASES OF BENIGN FAMILIAL NEONATAL CONVULSIONS REPORTED IN THE LITERATURE

No.	Authors	Country	Year	Number of families	Number of cases	Number of generations
1	Rett & Teubel	Austria	1964	1	8	3
2	Bjerre & Corelius	Sweden	1968	1	14	5
3	Rose & Lombroso	U.S.A.	1970	1	3	3
4	Carton	Belgium	1978	1	9	4
5	Quattlebaum	U.S.A.	1979	1	15	4
6	Tibbles	Canada	1980	3	11	2
7	Present study	Canada	1982	1	12	3

neonatal seizures are due to two main causes, anoxic-ischemic encephalopathy and transient metabolic disorders. Other rarer causes include: infections, central nervous system malformations and inborn errors of metabolism. In 4 to 33% of cases, the etiology remains obscure (Keen and Lee, 1973; Rossier et al., 1973). The long term prognosis of all neonatal convulsions is relatively severe with about 23% incidence of mortality and 29% incidence of long term sequelae.

Few well documented studies have been published on the dominantly inherited neonatal convulsions (Rett and Teubel, 1964; Bjerre and Corelius, 1968; Rose and Lombroso, 1970; Carton, 1978; Quattlebaum, 1979; Tibbles, 1980) (Table 1). From the study of those 8 families which have

been reported in the literature, we present the conclusions regarding this peculiar entity. Most of the patients were born full term and their perinatal course was uneventful. Prematurity was found in only 3%. The birth weight was always within normal limits except for 1 family in which a birth weight between 3,900 g to 5,600 g was recorded in 6 cases (Bjerre and Corelius, 1968). The onset of seizures was generally on the 2nd or 3rd day of life (82%). In a few cases however, it was noticed on the first day (1 case), at 1 month of age (2 cases), at 3 months (3 cases) and between 1 and 2 years (3 cases). Either focal or generalized seizures, or cyanotic spells were observed in the same patient. They always tended to be of short duration from 30 seconds to 3 minutes, often accompanied by cyanosis. Their frequency varied from 1 to 20 per day, with a maximum of 40 per day in 3 cases. The whole period of convulsions lasted from 1 day to 14 months; for most of the cases it lasted between 1 and 6 weeks (70%) and only rarely, between 6 and 8 months (20%). It is noteworthy that in one case (Carton, 1978) the seizures started on the 1st day of life and recurred frequently and regularly every day until the 2nd month. Thereafter the seizures appeared irregularly until the age of 14 months. In the same case strong, paroxysmal fetal movements were perceived during the last two months of pregnancy, probably indicating intrauterine convulsions. EEG was performed in about one third of the cases;

in half of them it was normal, and in the others it showed either epileptic activity or nonspecific disturbances. It seems that specific anticonvulsant therapy has no effect on the natural course of this condition.

The outcome was excellent in the majority of the cases, with normal motor and mental development. Mental retardation was reported in only one case (Carton, 1978), whose seizures started at 1 month of age and were particularly severe, exceeding 20 attacks a day, every day for 2 weeks. Two patients (Bjerre and Corelius, 1968) were said to have died during their seizure. Of the total of 72 cases reported in the literature and in this series, eight (11%) developed epilepsy (Rett and Teubel, 1964; Bjerre and Corelius, 1968; Quattlebaum, 1979; Tibbles, 1980), a much higher incidence than in the general population (0.5 to 1%).

Recognition of this disorder is essential in order to avoid extensive investigation and overtreatment, and also to provide an appropriate genetic counselling. However, because of the rarity of this condition and the potential seriousness of other causes of neonatal and infantile seizures, the diagnosis should not be made without the evidence of a strong family history and until other common causes have been ruled out.

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