

# CONVULSIONS IN THE OLDER INFANT

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From the revised edition of "The First Year of Life," published this week

## Tonic

- Cry
- Loss of consciousness
- Rigidity
- Apnoea

## Clonic

Repetitive limb movements  
(rate can be counted)

## Sleep

## Dangers

- Inhalation of vomit
- Hypoxaemia

In infants between the ages of 1 month and 1 year convulsions are usually associated with fever. If there is no fever, fits secondary to a structural brain abnormality, hypoglycaemia, and hypocalcaemia should be considered. Fits can be divided into generalised or partial seizures. Generalised seizures include tonic-clonic and myoclonic fits. Partial seizures include focal motor and temporal lobe fits. During some episodes partial seizures may be followed by generalised seizures.

Generalised tonic-clonic fits are the most common type. The child may appear irritable or show other unusual behaviour for a few minutes before an attack. Sudden loss of consciousness occurs during the tonic phase, which lasts 20-30 seconds and is accompanied by temporary cessation of respiratory movements and central cyanosis. The clonic phase follows and there are jerky movements of the limbs and face. The movements gradually diminish and the child may sleep for a few minutes before waking confused and irritable.

Although a typical tonic-clonic attack is easily recognised, other forms of fits may be difficult to diagnose from the mother's history. Infantile spasms may begin with momentary episodes of loss of tone, which can occur in bouts and be followed by fits in which the head may suddenly drop forward or the whole infant may move momentarily like a frog. Recurrent episodes with similar features, whether they are changes in the level of consciousness or involuntary movements, should raise the possibility of fits. Parents are very frightened by a fit and may fear that their infant is dying.

## Differential diagnosis

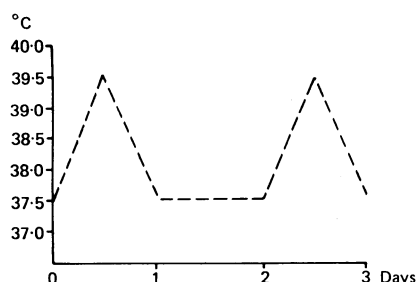
Pain or frustration

? Breath holding attack

Convulsions must be differentiated from blue breath holding attacks, which usually begin at 9 to 18 months. Immediately after a frustrating or painful experience the infant cries vigorously and suddenly holds his breath, becomes cyanosed, and in the most severe cases loses consciousness. Rarely his limbs become rigid, and there may be a few clonic movements lasting a few seconds. Respiratory movements begin again and the infant regains consciousness immediately. The attacks diminish with age with no specific treatment. Mothers may be helped to manage these extremely frightening episodes by being told that the child will not die and that they should handle each attack consistently by putting the child on his side.

Rigors may occur in any acute febrile illness, but there is no loss of consciousness.

## Febrile convulsions

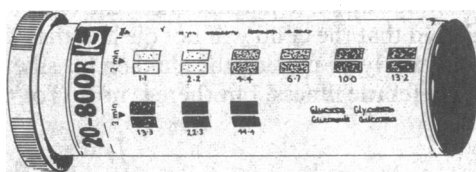
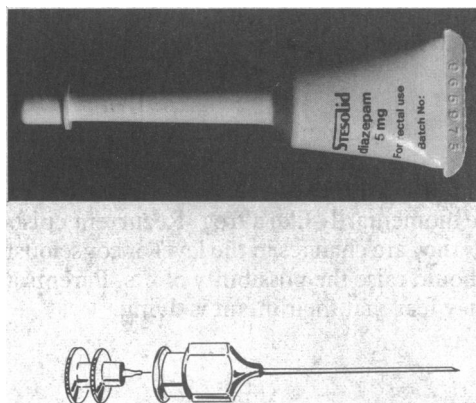
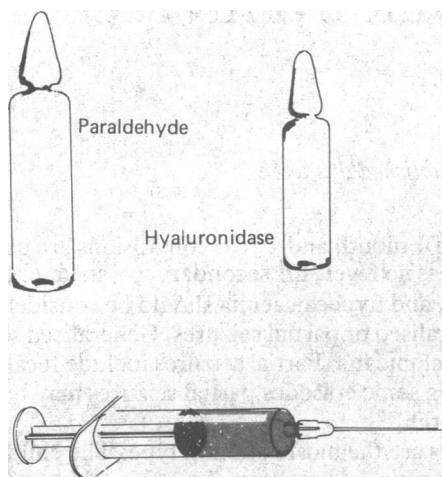


The remainder of this paper is concerned with febrile convulsions.

A febrile convulsion occurs in an infant who has a susceptibility to convulse when he has fever, especially when the temperature is rising rapidly. It is rare below the age of 6 months and above 5 years and the peak incidence is from 9 to 20 months. Often fever is recognised only when a convulsion has already occurred. Febrile convulsions are usually of the tonic-clonic type. The objective of emergency and prophylactic treatment is the prevention of a prolonged fit (lasting over 15 minutes) which may be followed by permanent brain damage, epilepsy, and developmental delay.



## Emergency treatment



If the child has fever all his clothes should be removed and he should be covered with a sheet only. This applies whether the child is at home or in the accident and emergency department. If his temperature does not fall within a few minutes he can be sponged with cool water, a wet sheet can be applied to his trunk and his head, or he can be placed in a *shallow* bath of *cool, not cold*, water. He should be nursed on his side or prone with his head to one side because vomiting with aspiration is a constant hazard. It may be dangerous to take an ill febrile child into his parents' warm bed.

If convulsions are still occurring or start again rectal diazepam (0.5 mg/kg) is given and produces an effective blood concentration within 10 minutes. The most convenient preparation resembles a toothpaste tube (Stesolid). The alternative is to use the standard intravenous preparation with disposable syringes and short pieces of plastic tubing. The closed end of the sheath of a disposable needle can be cut off to provide a substitute for the plastic tubing. If at home the child should then be transferred to hospital.

Intramuscular paraldehyde can be given instead of rectal diazepam. If hyaluronidase is added to the paraldehyde it is effective more quickly. A glass syringe is ideal, but if only a plastic syringe is available the paraldehyde should be injected within two minutes of filling the syringe. The dose of paraldehyde is 0.2 ml/kg. One ml of sterile water is added to an ampoule of hyaluronidase, and 0.1 ml of this solution is aspirated into the syringe containing the measured amount of paraldehyde and shaken well just before injection. If the dose of paraldehyde is over 2 ml it should be divided and given into two sites.

If the convulsions do not stop within 10 minutes of giving rectal diazepam or paraldehyde the duty anaesthetist should be present while another drug is given intravenously. Diazepam (0.3 mg/kg) or a short acting barbiturate must be given slowly over several minutes. Diazepam is an extremely effective anticonvulsant but the standard preparation cannot be diluted and it is difficult to measure accurately the small dose needed in infants. The use of a 1 ml tuberculin syringe allows small doses to be given slowly. If the dose is too large or is given too quickly, particularly if the patient has previously received an anticonvulsant, there is a risk of respiratory arrest. A special preparation of diazepam for intravenous use (Diazemuls) can be diluted with glucose solution and can be measured more accurately. Early transfer to the intensive care unit should be considered if a second dose of anticonvulsant is needed.

All infants who have had a first febrile convulsion should be admitted for lumbar puncture to exclude meningitis and to educate the parents, as many fear that their child is dying during the fit. Physical examination at this stage usually does not show a cause for the fever but a specimen of urine should be examined in the laboratory to exclude infection, and a blood culture and "stix" test should be performed. Most of these children have a generalised viral infection with viraemia. A febrile convulsion may occur in roseola at the onset and three days later the rash appears. Occasionally acute otitis media is present, in which case an antibiotic is indicated, but most children with febrile convulsions do not need an antibiotic.

## Long term management

### Leaflet for parents

- Fever control
- Prophylaxis
  - (a) continuous anticonvulsants
  - (b) diazepam during fever
- Management of a fit

If they think he has fever parents are advised to cool the infant by taking off his clothes and giving him paracetamol. A simple leaflet on the management of convulsions can be given to the parents and they should be shown how to give rectal diazepam. The use of prophylactic drugs after a febrile convulsion is controversial but infants less than 1 year of age have "complex" convulsions by the generally agreed definition and should all receive either continuous prophylactic anticonvulsants or, alternatively, rectal diazepam given 12 hourly while the temperature is above 38.5°C. A maximum of six doses of prophylactic diazepam is given.



## Febrile convulsions

Your baby has had a febrile convulsion. This means that he (or she) had a fit because he had a high temperature. It is very common for this to happen (one child in 30 has one between the ages of 9 months and 5 years). The fit was very frightening for you.

The following is general advice on how to handle him in future.

### TEMPERATURE CONTROL

If he starts to develop a temperature:

- (1) Take off his clothes.
- (2) Give him regular paracetamol in the doses shown:  
Less than 1 year      1×5 ml spoonful every 6 hours  
Over 1 year            2×5 ml spoonfuls every 6 hours
- (3) To bring his temperature down it may be necessary to sponge him with tepid water for five minutes or place him in a *shallow* bath of cool, *not* cold, water.

### REGULAR MEDICINE

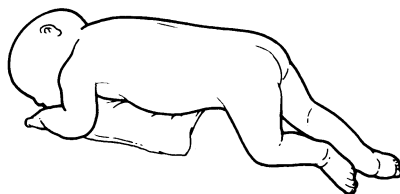
Some infants are more likely to have further fits than others and for them we recommend regular medicine to prevent this. The medicine has to be given every day until the child is about 3½ years, when it can possibly be stopped. Not every child needs regular medicine and a doctor will advise you if your child needs it. Each child on regular medicine has a blood test about three weeks after he starts it to check that the dose is right for him.

### OTHER FITS

If your baby does have another fit, don't worry! Lie him down where he cannot hurt himself, with his head turned to one side so that if he is actually sick it will not go into his lungs and his tongue will drop forward.

### THEN—EITHER

- (a) Give rectal diazepam, OR
- (b) Take him to your doctor, OR
- (c) Call your doctor if he is likely to come quickly, OR
- (d) Go to an accident and emergency department (in an emergency you can call an ambulance).

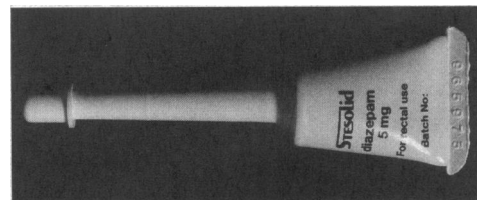
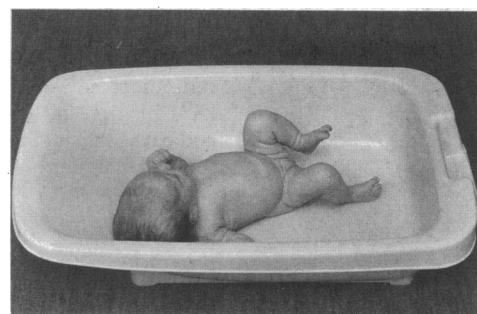


THE POSITION YOUR CHILD SHOULD BE PLACED IN IF HE HAS ANOTHER FIT.

*Remember to keep all medicines out of the reach of children.*

Continuous phenobarbitone at a dosage of 5 mg per kg body weight given only at bedtime is effective in reducing the incidence of recurrence. It should be prescribed as tablets which can be crushed and given in milk or jam. The elixir contains a high concentration of alcohol and is unpalatable. Phenobarbitone produces irritability in some infants and in these cases sodium valproate can be substituted at a dosage of 20 mg per kg body weight in each 24 hours, divided into two doses. Sodium valproate is not the first line drug as it is associated very rarely with hepatitis or pancreatitis. Phenytoin has no value in the prevention of febrile convulsions.

Anticonvulsant blood concentrations should be estimated three weeks after the first dose and then every six months. Treatment should be given for a total of two years and then withdrawn gradually over a few months.



## Prognosis for the infant less than 1 year

### Risk factors

- (1) Developmental or neurological abnormalities before first seizure.
- (2) Epilepsy of genetic origin in a parent or sibling.
- (3) First febrile seizure longer than 15 minutes.
- (4) Focal or followed by transient neurological sequelae or repeated on the same day.

Febrile convulsions occur in about 3% of preschool children. In girls less than 13 months there is more than a 50% risk of a further febrile convulsion and for boys the risk is 30%. In this age group the risk that a subsequent attack will be prolonged is 30%. The prognosis for further fits also depends on the duration of the episode.

In a large American study it was shown that in infants who had no febrile convulsions the risk of later epilepsy was 0.5%. The occurrence of later non-febrile seizures was twice as high among those who had recurrent febrile convulsions compared with those who had one episode. The risk of later epilepsy increased with the number of risk factors:

No risk factor—later epilepsy 2%.

One risk factor—later epilepsy 3%.

Two or more risk factors—later epilepsy 13%.

Most afebrile seizures develop within a few years of the febrile seizure.

I thank Mr R Lamont, MRCOG, for constructive criticism on the article on prenatal diagnosis.

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