

The Child with Pyrexial Convulsions

— Drs Russell Kirkby and AC Crutchley

Dr Russell Kirkby MBChB (Pret), DA (SA), BScHons
(Pharmacol) (Potch) M Prax Med (Medunsa), MFGP
370 Loop Street
Pietermaritzburg 3201

Dr Anthony C Crutchley MBChB (Cape Town),
DCH (SA), FCP (SA) Paed.
Chelmsford Medical Centre
107 Chelmsford Road
Durban 4001

LO is a three year old girl and control of her convulsions is proving to be a problem. Of note in the family history is the fact that the mother is an asthmatic and she also had problems with enuresis till a late age. On the father's side there is apparently some history of Polycystic Disease of the kidneys.

Aged 10 Months

She presented with her first pyrexial convulsion which was a generalised Tonic Clonic seizure lasting about "five minutes" - description by mother. She had an Upper Respiratory Tract infection at the time. She suffered the seizure at home. It was of short duration and subsided spontaneously. She was admitted to hospital and fever controlled with tepid sponging and Paracetamol (Panado). She was treated with Penicillin and a cough syrup/decongestant. No investigations other than Chest X-ray were performed.

One Year Old

At this stage she developed a high swinging fever, Rhinorrhoea and was miserable. She then had three episodes during which she became floppy, cyanosed and non responsive. There were no other significant symptoms.

Clinical Examination and assessment was that of a viral upper respiratory tract infection with probable convulsive episodes. The GP who saw her referred her to a Paediatrician.

Her fever was controlled with Ponstan (Mefenamic acid), tepid sponging and fanning. Over the next 24 hours it returned to normal and she was discharged home.

How do you manage these often problematical patients?

Is your knowledge up to date and would you handle this problem expertly and efficiently if faced with such a crisis tomorrow?

Test yourself by reliving and working through the following problems which are presented exactly as they occurred and in the way they were managed.

Answer the questions only with the information supplied. These were the questions the doctor managing the case asked himself during the course of the illness.

Then compare your answers with the summary and commentary on the treatment provided by the consultant Dr Anthony Crutchley.

The following investigations were performed:

WBC-normal; ECG-normal; EEG-normal. Immunoglobulins which revealed an IgE of 89,6 (Normal 3,2-13); IgG, IgM & IgA were all normal.

The comment was made by the Paediatrician that saw her that "These cyanotic episodes were probably pyrexial convulsions. She has now had four of these episodes and should be placed on an anti-convulsant".

Assessment at this stage was:

- i) Pyrexial convulsions and because of four she required anti-convulsant therapy
- ii) Recurrent infections. She obviously has an

Pyrexial Convulsions

underlying allergic diathesis and this may be the cause of her recurrent upper respiratory tract infections.

Management

1. Pyrexial convulsions - Phenobarbitone 50mg nocte (5mg per Kg per day.)

2. Recurrent infections. URT allergy. Treatment: Tinset (Oxotomide).

A urine test at that time showed E Coli urinary tract infection and she was given a course of Cefachlor and a follow up urine culture showed clearing of the infection.

QUIZ *Note: Some answers to these questions are provided later in the journal*

1.	Was the management at the first occurrence of seizures satisfactory?	Yes	No
2.	Should she have had the following investigations? (a) Full blood count (b) Lumbar Puncture (c) Brain Scan (d) EEG	Yes Yes Yes Yes	No/Not essential No/Not essential No/Not essential No/Not essential
3.	Is a Lumbar Puncture mandatory on the first occurrence of febrile seizure?	Yes	No
4.	What percentage of children suffer 1 or more febrile convulsions?	1% 5% 10%	
5.	What is the peak incidence of febrile convulsions?	1yr 2yrs 4yrs	
6.	What is epilepsy?		
7.	When do we classify someone as an epileptic and no more as suffering from febrile convulsions?		
8.	Is someone who has suffered from febrile convulsions more likely to suffer from epilepsy in later years?	Yes	No
9.	After how many febrile seizures would you institute prophylactic anticonvulsant therapy?	Never 1 2 3 4 Other-specify	
10.	When can you stop prophylactic anticonvulsant medication for febrile seizures?	Never 1 year seizure free 2 years seizure free 3 years seizure free At 5 years of age	Other-specify
11.	What methods are most appropriate to reduce fever rapidly?		
12.	What dose of Aspirin and at what interval would you give it: (a) to a 1 year old (10Kg.) (b) to a 2 year old (12Kg.)		
13.	What dose of Paracetamol and at what interval would you give it? (a) to a 1 year old (10Kg.) (b) to a 2 year old (12Kg.)		
14.	In respect of dangers of Reyes Syndrome and Aspirin usage, should one still use it in viral illness to reduce fever where real danger of febrile convulsions exist?	Yes — Benefit outweighs risk.	No — other methods should be used.
15.	What anticonvulsant drugs are most appropriate for prevention of febrile convulsions?		

Pyrexial Convulsions

13 Months

A month after starting the Phenobarbitone she was re-assessed. She had no further convulsions but the Phenobarb made her very active and she did not sleep. She was therefore changed to Epilim (Sodium Valproate). From July 1985 until the following year in April she was seen on 12 occasions. On eight of these occasions she was significantly pyrexial and difficulty was experienced controlling the fever. She was attending a playschool and had recurrent upper respiratory tract infections with croup and also at other times a wheezy bronchitis. (Has a raised IgE and family history of asthma). Further investigations performed in this period were an IVP and a VCU in view of the previous urinary infection and family history. These were normal.

One Year 10 Months

Review by Paediatrician April 1986. Showed the following:

Assessment: "Her recurrent infections obviously have as their basis underlying allergic diatheses.

1. Allergic Rhinitis — This problem was not marked when I saw her. However, it is obviously causing problems. In future should it require management. I would suggest we use some anti-histamine such as Zaditen and a Rynacrom nasal spray or drops. As an infant she had laryngomalacia and still while crying has very mild stridor. Obviously any infection involving the upper respiratory tract aggravates this and makes the stridor worse.
2. Asthma — From the history especially in view of the recent severe chest infection I'd feel she has underlying Reactive Airways Disease. With regard to the use of Lomudal which we queried, I feel she is too young to use this effectively unless a nebuliser is used. I therefore felt she should be on a long acting Theophyllin and use Ventolin if symptoms develop.

Management

1. Allergic Rhinitis — As suggested above should she develop signs and symptoms.



Pyrexial Convulsions

2. Asthma — I have put her on Somophyllin 100mg bd and Ventolin 5ml qid when necessary.”

Two Years One Month

Her asthma continued to be a problem and in June of 1986 Lomudal nebulisations were instituted. From April to September of that year she required four courses of antibiotics in addition to treatment for her asthma and on each occasion she was significantly pyrexial.

Two Years Four Months

On 15/9/86 at the age of two and a half she once again presented with a fever of 39°C. She had a “croupy cough” and a few creps and rhonci in the left lower zone.

In addition to her preventative medication of Solphyllin, Lomudal and Ventolin, Erythromycin was added.

On the night of 16/9/86 she developed an even higher temperature of about 40° which had not

responded to 7,5ml of Ponstan plus 10ml of Paracetamol syrup. She had also had tepid sponging which had not brought the temperature down.

Further tepid sponging was performed with no result and 1/4 Indocid suppository (25mg) was inserted. At this stage she weighed ± 14Kg and was on the appropriate dose of Theophyllin in the form of Solphyllin, was on Lomudal and Ventolin nebulisations. In addition she had been given adequate doses of Epilim and in addition had had the Ponstan, Panado and Indomethacin.

Approximately 15 minutes later she developed a generalised seizure while we were still attempting to get the temperature down with sponging. Intra rectal administration of Diazepam 5mg was attempted but the convulsions were so violent the dose was returned forthwith. The room was poorly lit and the mother rather distressed. It was only on the arrival of my partner that we were able to finally insert an intravenous line and abort the convulsions that way. The patient was then admitted to hospital.

PENETRATING POWER

S2 R/13.9.2/203 10 mg cream
S2 R/13.9.2/204 10 mg solution



FUNGICIDAL
Bifonazole
Mycospor[®]
ONCE A DAY — ALL DAY

Bayer-Miles



27, Wrench Rd., Isando. Tel: (011) 921-5911 Company Reg. No. 53/00355/07
Mycospor and the Bayer cross are registered trademarks of Bayer Germany.

Pyrexial Convulsions

"Investigations on 16/9/86:

1. FBC, HB 10,7 WBC 8880. Monos 10%.
Otherwise normal diff. count.
2. Urea & Electrolytes Urea 2,5; Chlor 111; Pot 3,5; Sod 136; Bicarb 19,7.
3. Calcium and Magnesium normal
4. EEG pending
5. CSF — clear colourless fluid. No cells.
Chemistry normal.
6. Serum Valproic Level (Epilim) 370 (normal).

Comment

She was admitted, fever controlled in the usual manner and I also gave her IV Phenobarbitone initially and for the next few days. For the croup she received Ampicillin, adrenaline nebulisations PRN, and this slowly improved. However, as could be expected, she went on to develop evidence of

Lower Airways Obstruction, and I therefore added Solphyllin and she received physiotherapy. Slowly over the next 4-5 days she improved, temperature settled and she was discharged home.

I will be reviewing her within the next week/ten days at which juncture I will be arranging a CAT scan of her head. Will keep you informed of further significant developments."

The CAT scan proved to be negative. Since this episode in September she has had another 5-6 bouts of upper and lower respiratory tract infections with significant fever, all of which proved difficult to control.

The latest episode in May 1987 required repeated cool baths and fanning in addition to Mefenamic acid and Paracetamol before being controlled.

QUIZ (continued)

16.	What are the most important possible side effects and adverse reactions of (1) Phenobarbitone (2) Sodium Valproate (Epilim)		
17.	What are the dosages of the following drugs: (1) Phenobarbitone — mg/Kg/day (2) Sodium Valproate — mg/Kg/day		
18.	How frequently should these drugs be administered ie How many times during a 24 hour period? (1) Phenobarbitone (2) Sodium Valproate	1 2 3 4 1 2 3 4	
19.	Referring to the treatment used to control fever in the last instance, was this management satisfactory?	Yes	No
20.	Are any of the medications used "epileptogenic" ie can precipitate a seizure in a susceptible patient? Salbutamol (Ventolin) Aminophyllin (Solphyllin) Indomethacin (Indocid) Mefenamic Acid (Ponstan)	Yes Yes Yes Yes	No No No No
21.	Name other common substances or drugs that should be avoided by epileptics:		
22.	When should one intervene to terminate a grandmal seizure?	(1) Immediately (2) Never (3) 30 seconds (4) 1 minute (5) 5 minutes (6) 10 minutes (7) Other — specify	
23.	What is the method/drug of choice for terminating a seizure?		
24.	What dosage of drug should be used and by what route?		

QUIZ (continued)

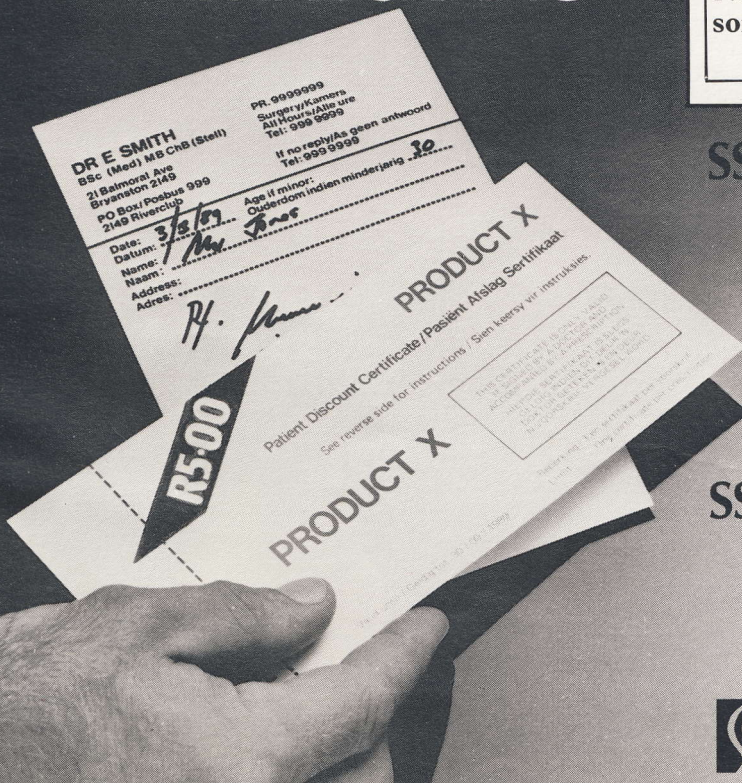
25.	Name alternative drugs that can be used:		
26.	What drugs do you have for terminating convulsions in your emergency bag (right now in your car)?		
27.	What drugs should you have?		
28.	Have you personally administered intrarectal Valium	Yes	No
29.	What is the most effective means of administering intrarectal Valium?		
30.	What dose of intrarectal should be given to a 2 year old — 12Kg child?		
31.	What precautions should be taken when administering IV or IR Valium?		
32.	Should one attempt IV Valium or IR Valium administration at home?	Yes	No

How do you answer the following queries from parents

- 1) Why is she having these attacks?
- 2) What is epilepsy, fits, convulsions, seizures?
- 3) Is my child an epileptic?
- 4) Will it damage her brain?
- 5) Will her intelligence be affected?
- 6) Can she play games normally with other children?
- 7) Can she play sport? What sports are safe? What sports should be avoided?
- 8) What can I do to prevent these attacks?
- 9) What must I do when she gets them?
- 10) What do I do if she gets a fever: and in the future?
- 11) Will her children be affected?
- 12) Should she tell her boyfriend?
- 13) Can she drive a car?

Now turn to page 233 for the summary and some answers

COVER YOUR R_x WITH A PATIENT SAVING



SSS PATIENT DISCOUNT CERTIFICATES

- One signature reduces your patient's medication costs.
- No record keeping required.
- Does not exclude the limited use of samples.
- Only a limited number of products will participate at any one time.

SSS PATIENT DISCOUNT CERTIFICATES Reduces the cost of medicine

For further information contact: Peter de Wet
SSS Marketing and Communications (Pty) Ltd
Reg. No. 88/02602/07. P.O. Box 2338, Randburg,
2125. Tel. No. (011) 789-2908.



The Child with Pyrexial Convulsions

Comments by Dr AC Crutchley

Summary

A two and a half year old girl presented with a persistent fever, croupy cough and creps with wheezing in her left lower lobe. In her past, at ten months of age she had a generalized convulsion lasting 5 minutes following an upper respiratory infection. At twelve months she had 3 further episodes of going floppy, cyanosed and unresponsive associated with febrile illness. EEG and ECG were both normal as was a full blood count. As she had been having recurrent infections an IgE was performed and found to be raised suggesting an allergic diathesis. There was no history of birth problems. Development was normal.

She was commenced on Phenobarbitone 50mg nocte and symptomatic treatment for her URTIs. A UTI was discovered and successfully treated. As she became hyperactive on Phenobarb it was changed to Epilim.

Her recurrent infections continued. Asthma was diagnosed and she was placed on Lomudal nebulizations, Theophyllin and Ventolin as required. Her Epilim was continued.

Now at two and a half years she had croup and chest infections. Medication consisted of Epilim, Lomudal nebulization, Theophyllin and Salbutamol syrups. Erythromycin was added. However, due to inability to control fever she was given Ponstan 7,5mls alternating with Paracetamol 10mls and tepid sponging. Poor fever control resulted in the addition of a $\frac{1}{4}$ Indocid suppository. Fifteen minutes later she had a generalized seizure, rectal Valium was inserted and the seizures only ceased with IV Valium. She was admitted to hospital. Further investigations including lumbar puncture and CT Scan were normal and she recovered.

Some Answers

1. The history is the most important. Febrile seizures occur between 6 months and 6 years only associated with fever. Usually generalized but may be focal. EEG is not usually helpful as even if abnormal this does not indicate epilepsy without the clinical correlation, namely seizures not associated with a fever.
2. Investigations are generally unhelpful. However a lumbar puncture although not mandatory is essential if in any doubt as to the possibility of meningitis especially in children under 1 year of age. A brain scan and EEG are generally not indicated unless the seizure is focal.
3. The prevalence of epilepsy has been shown to be in the order of 8/1000 school children. Approximately 3% of children are likely to have a febrile seizure. Of the latter approximately $\frac{1}{3}$ are likely to have a recurrence and 2 - 3% of the children with febrile seizures are likely to develop epilepsy.
4. Febrile seizures, if severe and prolonged can cause brain damage which may lead to later epilepsy and various chronic brain syndromes. One particular area of the brain that appears susceptible is the temporal horn. There is a relationship between Ammons horn sclerosis, febrile seizures and later temporal lobe epilepsy.
5. The recurrence risk of febrile seizures influenced by the following factors:-
 - a) *Severity* of attack. A prolonged and severe first episode is more likely to result in further episodes.
 - b) *Sex*: Female children are at risk for severe and further episodes.
 - c) *Age*: Children less than 13 months have a 30 - 50% recurrence risk whereas a 3 year old child only 1,4% risk.
 - d) *Family History*: a positive family history for febrile seizures results in a 50% recurrence risk.
6. The risk for epilepsy following a febrile seizure is increased if the following are present:-
 - a) severe and prolonged seizure
 - b) repeated seizures (especially in same illness).
 - c) Focal seizure.
 - d) Antecedent brain injury.
 - e) Family history of epilepsy.
7. The most important aspect is to reduce the temperature as rapidly as possible. Place the infant naked in a tepid bath and sponge down the body including the head. Antipyretics such as Ponstan and Paracetamol are used regularly in the appropriate doses. Disprin should be avoided in young children because of dangers

Pyrexial Convulsions

of overdosage and Reyes syndrome. Indocid suppositories have potentially very serious side effects and should be avoided.

Rectal valium is safe and effective in the dose of 5 to 10mg rectally. Unlike intravenous valium it does not cause apnoea. Parents and staff can be shown how to administer safely.

Thereafter the parents will need careful guidelines on how to manage future febrile episodes and should be informed about the place of prophylactic anticonvulsants.

8. In this particular instance she was a female less than 13 months and had had 4 episodes and also had a predisposition to allergy and recurrent infections. Anticonvulsants would definitely be indicated. First line medication is Phenobarb but in a significant proportion of children restlessness and behaviour alterations will require a change to Valproate. These are the only 2 drugs of proven value in febrile seizures. In view of the difficulty in controlling fever, showing the parents how to use rectal valium would also be appropriate.

9. Prophylactic anticonvulsants should be continued for at least 2 years after the last seizure. However each case needs to be assessed on its own merits. Children can be weaned at 4 years of age very often if they have not had a seizure for 2 years. Anticonvulsants must be given regularly and not at the beginning of an illness as it takes too long to build up therapeutic blood levels.

10. Drug interactions are a serious problem. During the last illness the child was on Lomudal, Salbutamol, Theophyllin syrup, Erythromycin, Ponstan, Paracetamol, Indomethacin suppositories, Epilim syrup and rectal Valium.

Theophyllin syrup is a potent CNS stimulant and Erythromycin is known to potentiate its blood levels. Epilim inhibits hepatic metabolism and can affect drug levels significantly. Indomethacin suppositories have many side effects but can affect renal function sometimes resulting in renal failure.

Recommended further reading

1. Neal V. O'Donohue. Epilepsies of Childhood. Second Edition. Butterworth.

THE SOLUTION IS CRYSTAL CLEAR



STOPS THE URATE PROBLEM BEFORE IT STARTS.