Don't Forget The Bubbles

FEBRILE CONVULSIONS

Facilitators Guide

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Topic: **Febrile convulsions**
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Duration: **Up to 2 hrs**
Facilitator level: **Senior trainee/ANP equivalent +**
Learner level: **most useful for those experience seeing paediatric patients regularly: FY1+, band 5+ nurses**
Equipment required: **finger bandages, zimmer boards, plaster of paris sets, green sterile needle or cauterisation device**

OUTLINE

- Pre-reading
- The basics
- History taking and examination
- Basic cases
- Advanced cases
- Quiz questions
- Summary

PRE-READING FOR LEARNERS

Expectation is for the learners to have watched or read one of the basic pathophysiology links before the session.

'Febrile seizures' (Korean Journal of Pediatrics)
'Febrile seizures' (Don't Forget the Bubbles)
'Febrile seizures' (NICE CKS)

BASICS: (DFTB + NCBI - FEBRILE SEIZURES)

Febrile convulsions are benign seizures associated with fever of 380 or above and without evidence of intracranial infection or defined cause for the seizures. It occurs in children between 6 months to 6 years of age. The peak age of incidence is around 18 months of age with around 30% risk of recurrence.

Most febrile seizures are generalized tonic clonic seizures, lasting for a few minutes (less than 10 mins) and are conventionally classified as being simple (70%) and complex (30%).

Simple febrile seizures are generalized (i.e. without focal features, short (last under 10minutes) and do not recur within 24hours, or within the same febrile illness. Complex febrile seizures have focal features, last for more than 10 mins or recur within 24 hrs or during the same febrile illness.

Any febrile seizure lasting for > 30 mins is considered febrile status epilepticus.

Febrile seizure is one of the common presentations in the paediatric ED, causing significant parental anxiety (especially following the first episode). Some common misconceptions such as use of antipyretics to prevent febrile convulsions or it leading to epilepsy in future can be prevented by good parental education during ED visit.

There is a 1:3 or 30% risk of recurrence of the febrile convulsions and occur within 2 years of the first episode. The risk factors for recurrence are :-
- onset before 18 months of age
- shorter duration of fever (< 1hr) before onset of seizures
- lower temperature threshold (around 380)
- family history of febrile seizures.

There is a very low risk of developing epilepsy following febrile convulsions (approximately 2% following simple seizures and 5% following complex seizures as compared to 1% in the general population). The risk factors for developing epilepsy / afebrile seizures are :-
- complex febrile seizures
- multiple or prolonged febrile seizures
- family history of epilepsy
- presence of neurodevelopmental abnormality
- shorter duration of fever (<1 hour) before the seizure
- an onset of febrile seizures before the age of 1 year or after the age of 3 years
- epileptiform discharges on EEG.

PATHOPHYSIOLOGY (DFTB-FEBRILE SEIZURES + OSMOSIS.ORG - FEBRILE SEIZURES)

Fever is the main trigger for febrile convulsions. Viral infections are the main cause for fever.

The pathophysiology of febrile convulsions is not very clear. Genetic predisposition (mutations in sodium ion channel genes and neurotransmitter genes) have been identified in children with febrile convulsions

The hypothalamus is the main homeostatic core temperature regulator which is still being developed in children. Increase in the core temperature (fever) which excites the neurons makes seizures more likely.

Hyperventilation (during fever) can cause respiratory alkalosis and cytokines (e.g., IL-1β) activate the NMDA receptors which all result in neuronal excitation, causing seizures.

ASSESSMENT OF THE CHILD: (NICE GUIDELINES + NCBI - MANAGEMENT OF PEDIATRIC FEBRILE SEIZURES)

1. If the child is actively having seizures in the ED:

- Airway assessment and management - confirm and protect the airway. Start the child on high flow oxygen via the non-rebreather mask.
- Monitor the duration of the seizures
- Protect the child from injury during the seizures (cushioning the head, removing any harmful objects etc); however do not restrain the child or insert anything into the mouth to avoid tongue bite
- Prepare to terminate prolonged seizures (longer than 5-10 mins) - check blood glucose, try for IV access, rescue medications (buccal or im midazolam if no IV access), determine the need for airway support and involvement of appropriate clinical teams if necessary (paediatrics, anaesthetics and critical care)
- Note, if in doubt, manage as per the APLS guidelines

2. Post seizures

- Airway assessment – put the child in recovery position
- Observe the child for complete recovery
- Complete careful history - includes details such as : duration and nature (tonic clonic or focal) of the seizures, about fever (was there preceding fever or was the temperature only sought after the seizure), details of the post-ictal phase (duration and recovery), symptoms pertaining to any particular focus of infection, any recent infections/fever and use of antibiotics, any similar episodes in the past, immunisation and developmental history of the child, family history (of febrile convulsions, epilepsy or any neurological conditions) and use of anti-pyretics or any rescue medications
- and head to toe examination looking for the source of the fever (including looking for injuries)
- Do urine dipstick if the source of fever is not obvious
- Routine investigations are not recommended in case of simple febrile seizures

BASIC CASES

CASE 1

A 10 month old child is brought by the parents to ED, 60 mins post generalized clonic tonic seizures lasting for 1-2 mins. The child is back to his normal self, febrile with a temperature of 38.60 and red throat and obvious coryza revealed on examination. After a short period of observation in the ED, he looks well and has been eating and drinking normally and playing.

1. What will be your management plan for the child?

2. When would you discharge him from the ED?

3. What discharge advice is to be given to the parents?

4. Parents are very anxious to know about the recurrence and chances of the baby developing epilepsy in future. What details and advice would you give them?

DISCUSSION POINTS:

What will be your management plan for the child?

Management plan: (DFTB)
The child had a simple febrile seizure with a clear course of infection (viral URTI) and hence routine investigations are not indicated.

When would you discharge him from the ED?

When to discharge the child: After Simple Febrile Seizures, discharge may be considered after a period of observation if:
- the child has a normal level of alertness within an hour of the event
- a clear source of the fever is found
- the child does not appear toxic, distressed or hemodynamically unstable
- the parents have been reassured/counselled

What discharge advice is to be given to the parents?

Discharge advice: **(**NICE guidelines **+** DFTB**)**– preferably as a written leaflet with clear safety netting advice

- Parents/carer reassurance and counselling is the mainstay of therapy - explain that it a very common condition and the risk of recurrence and prognosis
- Advice for any further episodes of febrile convulsions – first aid during the episode and post the seizures (protect the child from injuries, recovery position post seizures), when to seek medical help (if seizures last more than 5 mins, incomplete recovery of the child)
- Explain the signs and symptoms of child being unwell (dehydration, petechial spots etc) - meningitis / encephalitis or other serious sources of fever
- Febrile convulsions are not the same as epilepsy. The overall risk of subsequent epilepsy in simple febrile seizures is only slightly above that of the general population (1-2%).
- Explain that regular use of paracetamol / ibuprofen to prevent recurrence of febrile seizures is not recommended; but can be used for discomfort associated with fever.
- Explain that prophylactic antipyretics/antibiotics/anti-epileptics medications are not recommended and do not prevent recurrence

- Advice for completion of all childhood vaccinations
- The prognosis after a simple febrile seizure is excellent – there are no known effects on IQ, academic performance or behavioural abnormalities.
- The prognosis after a complex febrile seizure depends on the underlying neurological condition

Parents are very anxious to know about the recurrence and chances of the baby developing epilepsy in future. What details and advice would you give them?

Recurrence and chances of developing epilepsy following febrile seizure:
(NICE guidelines + DFTB - Febrile seizures + DFTB - Hot & shaking truths + NCBI-Febrile seizures)

- 1:3 chances or 30% chance of recurrence
- The risk reduces as the child grows and the brain matures. Febrile seizures are very rare beyond 6 yrs of age
- Explain that short lasting seizures are not harmful to the child
- Risk factors for recurrence are: onset before 18 months of age, shorter duration of fever (< 1hr) before onset of seizures, lower temperature threshold (around 380), going to child care, multiple seizures in one illness and family history of febrile seizures.
- All recurrences take place within 2 years.
- Very low risk of developing epilepsy following febrile convulsions (approximately 2% following simple seizures and 5% following complex seizures as compared to 1% in general population)
- Risk factors from developing epilepsy / afebrile seizures – complex febrile seizures, multiple or prolonged febrile seizures, family history of epilepsy, presence of neurodevelopmental abnormality, shorter duration of fever (<1 hour) before the seizure, an onset of febrile seizures before the age of 1 year or after the age of 3 years and epileptiform discharges on EEG.

CASE 2

You are called to the resuscitation bay in your ED following arrival of the expected pediatric alert. It is a 13 month old female child with a history of two episodes of generalised clonic tonic seizures at home lasting for 3-5 mins, around 90 mins before presentation in the ED. Presently the child is found to be febrile with a temperature of 39.2o . Parents also give history of recurrent ear infections since the last 2-3 months, needing antibiotics (last course around 10 days ago).

1. What are the red flags to be considered in a child presenting with febrile seizures?

2. What investigations and treatment options should you consider?

3. How do you know when to admit or have an assessment by the pediatric team?

DISCUSSION POINTS:

This is a case of Complex Febrile Seizures and hence the child should be investigated thoroughly and treated accordingly.

What are the red flags to be considered in a child presenting with febrile seizures?

Red flag signs and symptoms of febrile seizures : (NCBI - Management of pediatric febrile seizures)

- Child presents with complex febrile seizures
- Positive meningeal signs (Kernig's ± Brudzinski sign ± neck stiffness
- Altered level of consciousness for more than 1 hour after interruption of the seizure
- Evolving non-blanching rashes in an unwell child
- Bulging anterior fontanelle
- Tachycardia out of proportion of the temperature or tachycardia that persists after normalisation of the body temperature
- Signs of moderate to severe respiratory distress such as tachypnea, grunting, low oxygen saturation and chest wall recessions

What investigations and treatment options should you consider?

Investigations (DFTB) – if child looks unwell or there is diagnostic uncertainty

- Blood glucose, FBC, CRP, urea and electrolytes
- Chest x-ray
- Urine dip-stick
- Lumbar puncture if meningitis is suspected

Treatment (DFTB - Febrile seizures + SGEM)

- No indication for antipyretic to normalize the temperature or to prevent recurrent febrile convulsions
- Antibiotics if there is evidence of any bacterial infection
- IV antibiotics ± IV acyclovir if meningitis / encephalitis is suspected

How do you know when to admit or have an assessment by the pediatric team?

Admission of the child/assessment by the pediatrician (NICE CKS - Febrile seizures)

- Suspected meningococcal disease/meningitis or encephalitis
- Other suspected serious source of fever – pneumonia etc

- It is the first presentation of febrile seizure (or a subsequent febrile seizure and the child has not had a previous specialist assessment).
- The child is less than 18 months of age (clinical signs of central nervous system infection may be subtle or absent).
- There is diagnostic uncertainty about the cause of the seizure.
- There are any features of a recurrent complex febrile seizure.
- There is any focal neurological deficit.
- There was a decreased level of consciousness prior to the seizure.
- The child has recently taken antibiotics (may mask the signs of central nervous system infection).
- There is parental/carer anxiety and/or difficulty coping.
- Unexplained fever and unclear focus of infection
- The child has neurodevelopmental delay and/or signs of a neurocutaneous syndrome or metabolic disorder

ADVANCED CASE 1

20 month old Lucy presents to the A&E with a 36 hour history of diarrhoea and vomiting associated with a short, 2 minute seizure (started with facial tics and jerky movements of the right upper limb followed by generalised clonic tonic seizures). On examination she is febrile, well perfused with a CRT of less than 2sec, heart rate of 155 and respiratory rate of 35. Her general examination was normal, however she had a GCS of 14, was floppy and in a post-ictal state.

1. What would be your next steps in managing Lucy and recommendations for evaluating complex febrile seizures?

2. Lucy has another prolonged generalised tonic clonic seizure in the ED. How would you manage her?

3. On further enquiry, it is clear that Lucy has an abnormal developmental history. Mum asks you if Lucy has epilepsy. What is your response?

DISCUSSION POINTS: (NCBI - FEBRILE SEIZURES)

What would be your next steps in managing Lucy and recommendations for evaluating complex febrile seizures?

It is confirmed that Lucy has had complex febrile seizures (with concerns of meningitis) since she has had focal symptoms and the symptoms at presentation to ED. Hence a detailed history and examination with investigations is needed for the child.
Incidence of meningitis in children presenting with febrile seizures is around 2-5%
History includes:
- details of the diarrhea and vomiting and any other associated symptoms
- relationship of the fever to the seizures
- seizure semiology (focal followed by generalised)
- duration of the post-ictal drowsiness
- any pre-treatment with antibiotics
- past medical history (any previous similar episodes)
- developmental milestones (abnormal in this case)
- immunisation status, known allergies, any recent travel or exposure (mainly meningitis in this case)
- family history of seizures (paternal aunt has had febrile seizures a s a child)

Examination includes:
- head to toe examination - including vital signs and skin examination for non blanching rashes and presence of any neurocutaneous stigmata (port wine stain, cafe-au-lait spots etc)
- hydration status of the child (consider electrolyte imbalance as a one of the probable cause of the seizures)
- detailed neurological examination - for any signs of meningism and any focal / lateralizing signs

Investigations includes: NICE - Meningitis and meningococcal septicemia in under 16s + NCBI - Febrile seizures + ALIEM - LP after febrile seizures
- Capillary blood gas - check the acid base status, blood glucose and electrolytes
- Full blood count
- CRP
- Renal function tests - including electrolytes (sodium, potassium, chloride, calcium, magnesium and phosphorus)
- Stool cultures - to determine the cause for D&V

- Blood cultures
- Lumbar puncture - It is not indicated for all cases of simple or complex febrile seizures.

Indications for LP in simple febrile seizures are:

- There are signs or symptoms of meningitis after the seizure
- If the child is not fully immunized or immunization status is unknown (H. influenza type b or S. pneumonaie)
- If the patient has been pretreated with antibiotics, because this may mask signs and symptoms of meningitis

LP to be performed in children with complex febrile seizures who appear unwell and show signs and symptoms of meningitis or encephalitis (prolonged post ictal phase, irritability, excessive drowsiness, neck rigidity, positive Kernig's and Brudzinski's sign, focal neurological deficits)

CSF examination should include white blood cell count and examination, total protein and glucose concentrations, Gram stain and microbiological culture

Contraindications for LP are:

- signs suggesting raised intracranial pressure
  - reduced or fluctuating level of consciousness (Glasgow Coma Scale score less than 9 or a drop of 3 or more)
  - relative bradycardia and hypertension
  - focal neurological signs
  - abnormal posture or posturing
  - unequal, dilated or poorly responsive pupils
  - papilloedema
  - abnormal 'doll's eye' movements
- shock
- extensive or spreading purpura
- after convulsions until stabilised
- coagulation abnormalities
  - coagulation results (if obtained) outside the normal range
  - platelet count below 100 x 109/litre
  - receiving anticoagulant therapy
  - local superficial infection at the lumbar puncture site
  - respiratory insufficiency (lumbar puncture is considered to have a high risk of precipitating respiratory failure in the presence of respiratory insufficiency

- Neuroimaging - CT scan to be performed in children with a reduced or fluctuating level of consciousness (GCS < 9 or a drop of 3 or more), with focal neurological

signs to detect alternative intracranial pathology. (cerebral abscess, tubercular meningitis, traumatic injuries), with suspected structural defects of the brain or with abnormally large heads.
Raised intracranial pressure to be determined clinically rather than by CT scan. However, if radiological evidence of raised intracranial pressure is seen, do not perform lumbar puncture.
- EEG - Children with complex febrile seizures (and no other risk factors) have a 5-6 fold increased risk of developing epilepsy. In this case, an EEG may be used as a means of establishing prognosis for development of epilepsy.
If performed should be at least 48 hrs after the complex febrile seizures to avoid confusing post-ictal electrical activities with abnormal electrical activities.

Treatment:
IV hydration - based on percentage of dehydration and the calculated water deficit
Ceftriaxone - IV or IM
IV aciclovir

Lucy has another prolonged generalised tonic clonic seizure in the ED. How would you manage her?

Management of active seizures in the ED:

- Airway assessment and management - confirm and protect the airway.
Start the child on high flow oxygen via the non-rebreather mask.
- Monitor the duration of the seizures
- Protect the child from injury during the seizures
- Termination of prolonged seizures (longer than 5-10 mins) - with appropriate rescue medications (IV / IM / buccal diazepam,midazolam or lorazepam)
- post termination of seizures - assess airway, breathing, circulation and disability
- if still drowsy (after post-ictal period) and GCS is low and – you need to intubate

On further enquiry, it is clear that Lucy has an abnormal developmental history. Mum asks you if Lucy has epilepsy. What is your response?

Recurrence and risks of epilepsy in complex febrile seizures:

There is a 30% chance of recurrence. Risk factors for recurrence are: onset before 18 months of age, shorter duration of fever (< 1hr) before onset of seizures,

lower temperature threshold (around 380), going to child care, multiple seizures in one illness and family history of febrile seizures.

The risk of developing epilepsy is between 5-15% in case of complex febrile seizures, multiple or prolonged febrile seizures, family history of epilepsy, presence of neurodevelopmental abnormality, shorter duration of fever (<1 hour) before the seizure, an onset of febrile seizures before the age of 1 year or after the age of 3 years and epileptiform discharges on EEG. The risk increases upto 50% in presence of more than one risk factor.

ADVANCED CASE 2

16 month old Ron has been brought to the ED by his parents with active ongoing seizures since the last 20-25 mins.The seizures began as right sided focal and progressed to generalised clonic tonic. There is a history of fever, drowsiness and irritability since the last 24 hrs as reported by the parents. Cold sores are observed around the mouth of the child and the mother (since around 3-4 days)

1. What is your management plan for the ongoing seizures?
2. What are the investigations and treatment for the child?
3. Can the seizure and encephalitis recur? What are the treatment options for the recurrence?

DISCUSSION POINTS

What is your management plan for the ongoing seizure?

This is a case of febrile status epilepticus probably secondary to herpes encephalitis.(h/o fever, irritability and presence of cold sores)

Treatment plan for status epilepticus: (NICE - protocol for convulsive status epilepticus)

Step 1: (0 mins)

- assess and maintain airway, breathing and circulation + highflow O2 by non-rebreather mask
- prevent injuries during the seizures
- IV access + blood glucose levels

Step 2: (5 mins)

- administer - midazolam (0.5mg/kg buccally stat) or Lorazepam (0.1mg/kg IV stat)
- Midazolam may be given by parents, carers or ambulance crew in non-hospital setting

Step 3: (15 mins)

- administer lorazepam (0.1 mg/kg IV stat)

Step 4: (25 mins)

- administer phenytoin (20 mg/kg IV infusion over 20 minutes) or paraldehyde (0.8 ml/kg of mixture PR)
- if already on phenytoin, administer phenobarbital (20 mg/kg IV infusion over 5 mins)
- inform the intensive care team and the anesthetic team with the probability of needing to continue to the next step if the seizures do not cease.

Step 5: (45 mins)

- Rapid sequence induction of anaesthesia using thiopental sodium (4 mg/kg IV stat followed by IV infusion)
- the child needs to be transferred to Paediatric intensive unit

What are the investigations and treatment for the child?

Investigations and treatment:

Investigations includes: NICE - Meningitis and meningococcal septicemia in under 16s + NCBI - Febrile seizures + BMJ - Neonatal and childhood herpes encephalitis

- Capillary blood gas - check acid-base status, blood glucose and electrolytes
- Full blood count
- CRP
- Renal function tests - including electrolytes (sodium, potassium, chloride, calcium, magnesium and phosphorus)
- Blood cultures
- Lumbar puncture - indicated in this case.

Children produce around 0.35mL/kg/ hr of CSF. Hence upto 0.2mL/kg CSF can be taken for investigations.

CSF examination includes measuring the opening pressures using a manometer, white blood cell count and examination, total protein and glucose concentrations, bacterial screen (Gram stain and microbiological culture and sensitivity) and viral screen (PCR for herpes simplex virus (HSV-1 and HSV-2), VZV, enterovirus, parechovirus, EBV, HHV6 and mumps)

CSF interpretation: JOI - Management of suspected encephalitis in children

Investigation	Normal	Bacterial	Viral	Tuberculous	Fungal
Opening Pressure	10-20cm	High	Normal/high	High	High/very high
Colour	Clear	Cloudy	"Gin" Clear	Cloudy/yellow	Clear/cloudy
Cells	<5	High/very high 100-50000	Slightly Increased 5-1000	Slightly Increased <500	Normal-high 0-1000
Differential	Lymphocytes	Neutrophils	Lymphocytes	Lymphocytes	Lymphocytes
CFS/ Plasma Glucose	50-66%	Low <40%	Normal	Low-very low (<30%)	Normal-low
Protein	<0.45	High >1	Normal-high 0.5-1	High/very high 1.0-5.0	Normal/ high 0.2-5.0

- Neuroimaging - CT scan with contrast (to look for any space occupying lesions / other causes of raised ICP) + MRI (diagnostic of encephalitis)
- EEG - not indicated in this case unless there is diagnostic uncertainty even after lumbar puncture and MRI

Treatment : BMJ - Neonatal and childhood herpes encephalitis
- IV hydration
- IV aciclovir - for 21 days . Dosages as follows:
- birth to 3 months of age - 20 mg/kg TDS
- 3 months to 12 yrs of age - 500 mg/m2 TDS
- more than 12 yrs of age - 10 mg/kg TDS
- broad spectrum IV antibiotics

Can the seizure and encephalitis recur? What are the treatment options for the recurrence?

Recurrence of the seizures and treatment of recurrence: NCBI- Febrile seizures
There is a 30% chance of recurrence. Risk factors for recurrence are: onset before 18 months of age, shorter duration of fever (< 1hr) before onset of seizures, lower temperature threshold (around 380), going to child care, multiple seizures in one illness and family history of febrile seizures.

Rescue benzodiazepines may be considered for children presenting with multiple or prolonged seizures, those with high risk of recurrence or who have poor access to medical care. Intermittent therapy with oral or rectal diazepam or nasal or buccal midazolam at the onset of a febrile illness may be considered. There is no evidence to show continuous antiepileptic treatment to prevent recurrence.

Recurrence of herpes encephalitis and treatment: BMJ - Neonatal and childhood encephalitis
Reactivation of herpes simplex virus may occur at later stage of life manifesting with dermatological or neurological symptoms.

Prophylaxis with oral aciclovir (for neonates) and oral valaciclovir (for older children) is recommended for upto 3 months (for immunocompetent children) and upto 12 months (for immunocompromised children).

QUIZ (5 MINUTES)

Question 1.

A child with febrile convulsions who needs admission for observation:

A. Who has had simple febrile seizures
B. Complete recovery of child back to normal self
C. Recurrent complex febrile seizures
D. Clear source of non serious source of fever noted

Explanation: criteria for admission are:
- Suspected meningococcal disease / meningitis or encephalitis
- Other suspected serious source of fever – pneumonia etc
- It is the first presentation of febrile seizure (or a subsequent febrile seizure and the child has not had a previous specialist assessment).
- The child is less than 18 months of age (clinical signs of central nervous system infection may be subtle or absent).
- There is diagnostic uncertainty about the cause of the seizure.
- There are any features of a recurrent complex febrile seizure.
- There is any focal neurological deficit.
- There was a decreased level of consciousness prior to the seizure.
- The child has recently taken antibiotics (may mask the signs of central nervous system infection).
- There is parental / carer anxiety and/or difficulty coping.
- Unexplained fever and unclear focus of infection
- The child has neurodevelopmental delay and/or signs of a neurocutaneous syndrome or metabolic disorder

Question 2.

What is the most significant risk factor for development of febrile seizures?

A. presence of family history
B. height of temperature at the onset of seizures
C. prematurity
D. vaccines

Explanation: NCBI - Febrile seizures
The risk factors for febrile seizures are:
- Height of temperature at the onset of seizures rather than the rapidity of the rise in temperature is the most significant risk factor (higher the temperature ; the greater likelihood of febrile seizures)
- Family history - around 1/3rd children with febrile seizures have a family history
- Viral infections - mainly roseola infantum, influenza A and human corona virus
- Following administration of vaccines - mainly combined DPT, combined vaccine of DTaP-IPV-HiB, conjugated pneumococcal vaccine and some inactivated influenza vaccine
- Prematurity
- Postnatal treatment with corticosteroids
- Prenatal exposure to nicotine and/or alcohol
- Prenatal or perinatal stress
- Residential exposure to noise or air pollution
- Iron deficiency anemia
- Zinc, vitamin B12, folic acid, selenium, calcium or magnesium deficiency
- Past history of febrile seizures
- Intrauterine growth retardation
- Staying in neonatal nursery for > 28 days
- Neurodevelopmental delay
- Daycare attendance

Question 3.

One of the complication of febrile seizures is

A. decreased cognitive function in future
B. meningitis
C.epilepsy
D. encephalitis

Explanation: **NCBI - Febrile seizures**
The complications following febrile seizures are:
- epilepsy - increased risk of around 2% following simple febrile seizures and around 5% following complex febrile seizures as compared to 1% of the general population developing epilepsy in future.
- encephalopathy
- increased risk for development of the following conditions in comparison of general population - developmental coordination disorder, autism spectrum disorder, intellectual disability, Tourette syndrome, sudden cardiac death in young, atopic diseases (allergic rhinitis and asthma) and stress hyperglycemia

Take home points

1. Differentiating between simple vs complex febrile seizures is critically important
2. Complex febrile seizures include a heterogenous array of conditions and no standardized guideline can be recommended. Be directed by your clinical assessment.
3. Routine investigations or admission is not indicated in simple febrile convulsions
4. Mainstay of treatment for febrile seizures is parental education on future episodes and recognition of signs that the child needs urgent attention.
5. Children with simple febrile seizures have a 30% incidence of recurrence; subsequent use of antipyretics at fever onset does not lower the recurrence rate.
6. A slight higher risk of progressing to epilepsy seen in simple febrile seizures (2%) and complex febrile seizures (5%) as compared to the general population (1%)

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