



First Unprovoked Seizure in a Child: Recognition and Initial Management

Revision Sheet

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1. Definition

A first unprovoked seizure is a seizure occurring without an acute precipitating cause (e.g., fever, hypoglycemia, electrolyte disturbance, CNS infection, or head trauma) in a child with no previous afebrile seizures.

Important: A first unprovoked seizure is not synonymous with epilepsy.

Definitions

Term	Definition
Provoked (acute symptomatic) seizure	Occurs secondary to an acute illness or metabolic disturbance (e.g., fever, meningitis, hypoglycemia)
Unprovoked seizure	Occurs without an identifiable acute cause
Epilepsy	One of the following: (1) ≥ 2 unprovoked seizures >24 hours apart; (2) one unprovoked seizure with an estimated recurrence risk $\geq 60\%$ over the next 10 years; or (3) diagnosis of an epilepsy syndrome

2. Clinical Presentation



A. History

Confirm That It Was a Seizure

Ask witnesses about:

Before the Event

- Aura (older children)
- Sleep deprivation
- Recent illness
- Head trauma
- Medication or toxin exposure
- Previous febrile seizures

During the Event

- Generalized or focal onset?
- Eye deviation
- Limb stiffening (tonic)
- Rhythmic jerking (clonic)
- Loss of consciousness
- Cyanosis
- Tongue biting (especially lateral)
- Urinary incontinence
- Duration of seizure
- Number of seizures

After the Event (Postictal Period)

- Confusion
- Sleepiness
- Weakness (Todd paralysis)
- Headache
- Time to recovery

Important Past History

- Birth history
- Developmental milestones
- Previous neurological disease
- Family history of epilepsy
- Learning difficulties
- Neurocutaneous disorders

B. Physical Examination

Assess:

ABCs

If seizure is ongoing:

- Airway
- Breathing
- Circulation

Neurological Examination

- Mental status
- Cranial nerves
- Motor examination
- Reflexes
- Focal neurological deficits
- Signs of meningitis
- Signs of raised intracranial pressure

General Examination

- Temperature
- Blood pressure
- Head circumference (young children)
- Skin examination:
 - Café-au-lait spots
 - Hypopigmented macules
 - Port-wine stains
- Trauma
- Dysmorphic features



3. Diagnostic Approach

Step 1

Was it truly a seizure?

Differentiate from:

- Syncope
- Breath-holding spells
- Psychogenic nonepileptic events
- Migraine
- Sleep disorders
- Movement disorders

Step 2

Look for an acute symptomatic cause

Check for:

- Fever
- Hypoglycemia
- Electrolyte abnormalities
- CNS infection
- Head trauma
- Toxic ingestion

If present → Provoked seizure

If absent → First unprovoked seizure

Step 3

Assess recurrence risk

Higher risk if:

Focal seizure	Abnormal neurological examination	Developmental delay	Structural brain lesion
Epileptiform EEG	Family history of epilepsy		

Diagnostic Flowchart



Management

Provoked: treat cause; Unprovoked: EEG $\pm$ MRI

Evaluate

History & exam; look for triggers

Ongoing?

If yes, treat status epilepticus

Initial

Child with seizure; stabilize ABCs

4. Differential Diagnosis

Condition

Syncope

Breath-holding spell

Febrile seizure

Hypoglycemia

CNS infection

Migraine

Psychogenic nonepileptic seizure

Cardiac arrhythmia

Movement disorders

Clinical Clues

Brief loss of consciousness after standing, rapid recovery

Age 6–24 months, emotional trigger

Fever ($\geq 38^{\circ}\text{C}$) in child 6–60 months

Diaphoresis, altered consciousness, low glucose

Fever, neck stiffness, altered mental status

Aura followed by headache

Prolonged, asynchronous movements, eyes tightly closed

Exercise-related collapse, family history of sudden death

Consciousness preserved

5. Investigations

Essential First-Line Tests

Not every child requires laboratory tests.

Investigations should be guided by the clinical presentation.

Investigation	Indication
Blood glucose	All children with an acute seizure
Serum electrolytes (Na, Ca, Mg)	If metabolic cause suspected
CBC	If infection suspected
Toxicology screen	Suspected ingestion
Pregnancy test (adolescents)	When appropriate

Electroencephalography (EEG)

EEG is recommended for all children after a first unprovoked seizure, ideally within 24–72 hours when feasible, as it helps classify seizure type and estimate recurrence risk.



Neuroimaging

MRI (Preferred)

Indications:

- Focal seizure
- Focal neurological deficits
- Developmental delay
- Abnormal neurological examination
- Neurocutaneous syndrome
- Persistent altered consciousness
- Suspicion of structural brain abnormality

CT Scan

Reserved for emergencies:

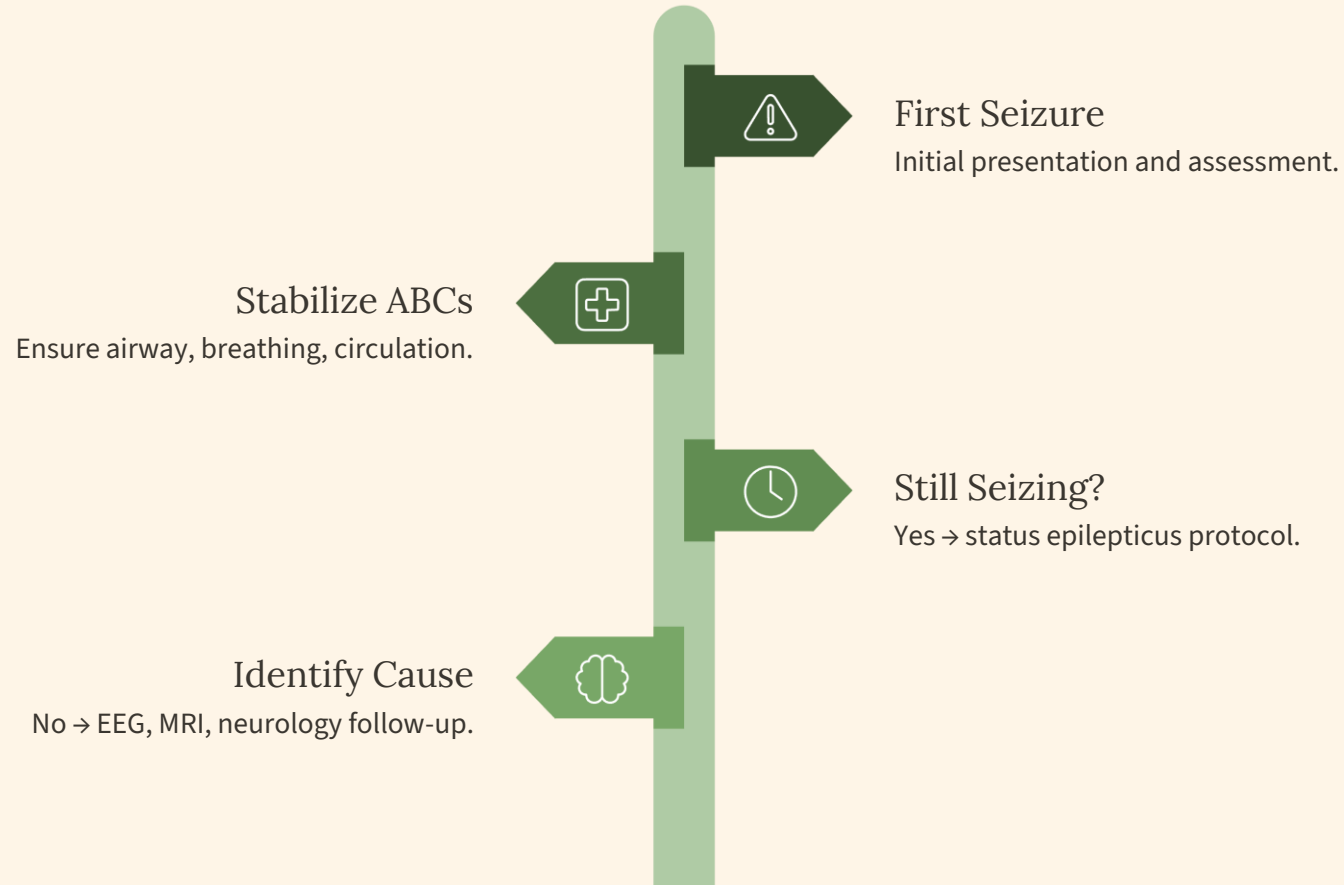
- Acute trauma
- Suspected intracranial hemorrhage
- Signs of raised intracranial pressure
- When MRI is unavailable and urgent imaging is required

Lumbar Puncture

Only if:

- Suspected meningitis or encephalitis
- Infant with unexplained prolonged altered consciousness after excluding raised intracranial pressure

6. Management Algorithm



Emergency Management (If Seizure is Ongoing)

- ABC stabilization
- Place child in lateral recovery position when appropriate
- High-flow oxygen if hypoxemic
- Check blood glucose immediately
- IV or IO access



If seizure lasts >5 minutes: Treat as convulsive status epilepticus.

After the Seizure Stops

- Observe until neurological baseline returns.
- Identify possible provoking factors.
- Educate parents on seizure first aid.
- Arrange EEG and appropriate follow-up.

Should Antiseizure Medication Be Started?

Routine long-term antiseizure medication is **NOT** recommended after most first unprovoked seizures.

Consider treatment only when recurrence risk is high, such as:

- Epilepsy syndrome diagnosed
- Structural brain lesion
- Epileptiform EEG with high recurrence risk
- Significant neurological abnormalities

Decision should be made with pediatric neurology.

7. Drug Summary Table

Emergency Medications (Ongoing Seizure)

Medication	Dose
Lorazepam IV	0.1 mg/kg (maximum 4 mg)
Diazepam IV	0.15–0.2 mg/kg (maximum 10 mg)
Midazolam IM/Buccal/Intranasal	0.2 mg/kg
Diazepam Rectal	0.5 mg/kg (maximum 20 mg)

Second-Line Therapy (Status Epilepticus)

Medication	Dose
Levetiracetam	40–60 mg/kg IV (maximum 4.5 g)
Fosphenytoin	20 mg PE/kg IV
Valproate	20–40 mg/kg IV (avoid in suspected mitochondrial disease or significant liver disease)

Daily antiseizure medication is generally not indicated after a single uncomplicated unprovoked seizure.

8. Admission Criteria

Hospital admission is indicated for:

Persistent altered consciousness	Status epilepticus	Recurrent seizures within 24 hours	Focal neurological deficits
Suspected CNS infection	Significant head trauma	Metabolic abnormalities requiring treatment	Need for urgent MRI or EEG
Inadequate home observation	Diagnostic uncertainty		

9. Referral Criteria

Pediatric Neurology

Refer all children with:

- First unprovoked seizure
- Abnormal EEG
- Focal seizures
- Developmental delay
- Abnormal neurological examination
- Suspected epilepsy syndrome
- Recurrent seizures

Urgent Referral

Immediate referral for:

- Status epilepticus
- Persistent focal deficits
- Suspected brain tumor
- Suspected encephalitis or meningitis
- Progressive neurological deterioration

10. Follow-Up

Situation	Follow-up
First unprovoked seizure	Pediatric neurology review within weeks
EEG performed	Review results and recurrence risk
MRI indicated	Arrange promptly
Recurrence	Reassess diagnosis and consider epilepsy

Parents should receive counseling regarding:

- Seizure first aid
- Water safety (constant supervision while swimming or bathing)
- Avoiding heights and other hazardous activities until evaluated
- When to seek emergency care (e.g., seizure >5 minutes, repeated seizures, injury, or failure to recover)

11. Clinical Pearls

✓ Approximately 40–50% of children with a first unprovoked seizure do not experience another seizure.

✓ An epileptiform EEG is one of the strongest predictors of recurrence.

✓ MRI is preferred over CT for evaluating structural causes because it has higher diagnostic yield and avoids radiation.

✓ Most children do not require long-term antiseizure medication after a first unprovoked seizure.

✓ Every child with a seizure should have an immediate blood glucose measurement.

✓ Always distinguish provoked from unprovoked seizures before making management decisions.

12. Common Mistakes in Exams and Clinical Practice

✗ Diagnosing epilepsy after a single uncomplicated unprovoked seizure.

✗ Forgetting to check blood glucose during the initial assessment.

✗ Ordering an emergency CT scan for every child with a first seizure despite a normal examination.

✗ Missing cardiac syncope as a seizure mimic.

✗ Starting long-term antiseizure medication routinely after the first seizure.

✗ Failing to educate caregivers about seizure first aid and safety precautions.

✗ Overlooking subtle focal neurological deficits after recovery.

13. Key Take-Home Messages

01

A first unprovoked seizure is not equivalent to epilepsy.

03

Differentiate provoked from unprovoked seizures by identifying acute metabolic, infectious, toxic, or traumatic causes.

05

EEG is recommended after a first unprovoked seizure to help classify seizure type and estimate recurrence risk.

07

Routine laboratory testing is not required unless suggested by the history or examination.

09

Provide caregivers with seizure first-aid instructions and counseling about safety precautions.

02

Stabilize the child using the ABC approach and treat any seizure lasting >5 minutes as convulsive status epilepticus.

04

Blood glucose should be checked in every child presenting with a seizure.

06

MRI is the preferred neuroimaging modality when focal findings, developmental delay, or structural brain disease is suspected.

08

Long-term antiseizure medication is usually not started after a single uncomplicated unprovoked seizure.

10

Early pediatric neurology follow-up is recommended for all children after a first unprovoked seizure.

High-Yield Examination Tips

Clinical Finding	Most Likely Diagnosis / Management
Generalized tonic-clonic seizure, normal examination, normal glucose	First unprovoked seizure → EEG, outpatient neurology follow-up
Seizure lasting >5 minutes	Convulsive status epilepticus → Benzodiazepine immediately
Fever + seizure in a 2-year-old	Consider febrile seizure rather than unprovoked seizure
Focal seizure + persistent unilateral weakness	MRI and urgent pediatric neurology evaluation
Epileptiform EEG after first seizure	Increased recurrence risk; discuss treatment with pediatric neurology
Collapse during exercise with rapid recovery	Consider cardiac syncope rather than epilepsy