Ochsner Pediatric ED Pathway

FEBRILE SEIZURES

Definition: *Seizure accompanied by fever within 24 hours before or soon after seizure (>38C/100.4F by any method).*
Symptoms: *loss of consciousness, difficulty breathing, pallor/turning blue, foaming at mouth, eyes rolling into back of head, fixed gaze, generalized or focal twitching, jerking of arms/legs. Often followed by irritable, confused, drowsy period.*[1]

Inclusion Criteria

- 6 months-5 years old (first febrile seizure) or history of febrile seizure and up to 6 years old
- Child's is neurotypical
- Seizure and fever (≥38C) within 24 hours before or soon after presentation

Exclusion Criteria

- Known CNS abnormalities
  - CP
  - Epilepsy
  - VP shunt
  - intracranial pathology
- Previous neurologic insults
- Any history of afebrile seizures
- Immunodeficiency

Consider Alternative Diagnoses

- Fever + fine tremulousness without LOC→ rigors
- Fever + acute, transient confusion → febrile delirium
- Breath holding +/- LOC → breath holding spells
- Limpness after painful event/shock→ reflex anoxic seizures
- Febrile syncope
- Ingestion

Actively seizing?

- Yes → See algorithm for Acute Seizure Management on next page → Seizure cessation
- No

- Antipyretic
  Ibuprofen or acetaminophen
- Assess for treatable cause of fever
  AOM, UTI, Influenza

Assess Febrile Seizure (FS) Type

SIMPLE FEBRILE SEIZURE (FS)

- Generalized
- < 15 minutes
- Resolved spontaneously
  - No benzo given
- No more than 1 in 24-hour period

>12 months of age
AND
Fully immunized

- Yes
- No

Signs of meningitis or serious illness, including:
- Irritability or lethargy
- Purpura
- Hypotonia
- Bulging fontanelle
- Unexplained tachycardia or respiratory distress

- No
- Yes → Lumbar Puncture (LP)
  - CBC, CMP, CRP, magnesium
  - Blood cultures, UA/Urine culture
  - Antibiotics

On Reassessment:
Improvement over observation period ≤ 3 hours
AND
At neurologic baseline
AND
Parents comfortable with discharge

- Yes
- No → Admit to Obs

COMPLEX FEBRILE SEIZURE (CFS)

- Longer lasting (≥ 15 min)
- Recur (≥ 2 seizures) within 24 hours of same febrile illness
- Duration ≥ 5 minutes + benzodiazepine
- Focal findings during seizure (including fixed lateral gaze)
- Todd's paresis lasting > 15 minutes during recovery

Consult Pediatric Neurology

- First focal FS[7]
  - CT head or MRI brain

Signs of meningitis or serious illness, including:
- Irritability or lethargy
- Purpura
- Hypotonia
- Bulging fontanelle
- Unexplained tachycardia or respiratory distress

- Yes → Lumbar Puncture (LP)
  - CBC, CMP, CRP, magnesium
  - Blood cultures, UA/Urine culture
  - Antibiotics
- No

<12 months of age
OR
Persistent altered mental status (>3h)

- Consider → Yes → Lumbar Puncture (LP)
  - CBC, CMP, CRP, magnesium
  - Blood cultures, UA/Urine culture
  - Antibiotics
- No

On Reassessment
Normal mental status
AND
No persistent focal neuro findings on exam

- Yes → Admit to Obs
- No → Admit to PICU

FEBRILE STATUS EPILEPTICUS (FSE)

- ≥ 20 minutes[1]
- Shorter serial seizures without recovery of consciousness in between for 1 hour or more

- Consult Pediatric Neurology
- Discuss utility of EEG

- If no history of FS or if head imaging has never been done:
  - CT head or MRI brain
- *Highly consider* lumbar puncture
- *Consider* CBC, CMP, CRP, mag, blood cultures, urine culture

Can *consider* discharge if ALL are true:
- Child has *recurrent* complex febrile seizures
- Child is well-appearing/at baseline
- Neuro agrees with discharge home
- Parents comfortable with discharge
- Child has Rx for home rescue med

Discharge

- PCP follow up

AND/OR

- Neuro follow up in 1-2 weeks
  All complex seizures
  2 febrile seizures in lifetime
- Home rescue medication
  If patient >24 months of age

Rectal Diazepam Dosing

Age	Dosage
<2 years old	Rectal dose not established
2-5 years old	0.5 mg/kg rectal
6-11 years old	0.3 mg/kg rectal
>12 and adolescents	0.2 mg/kg rectal

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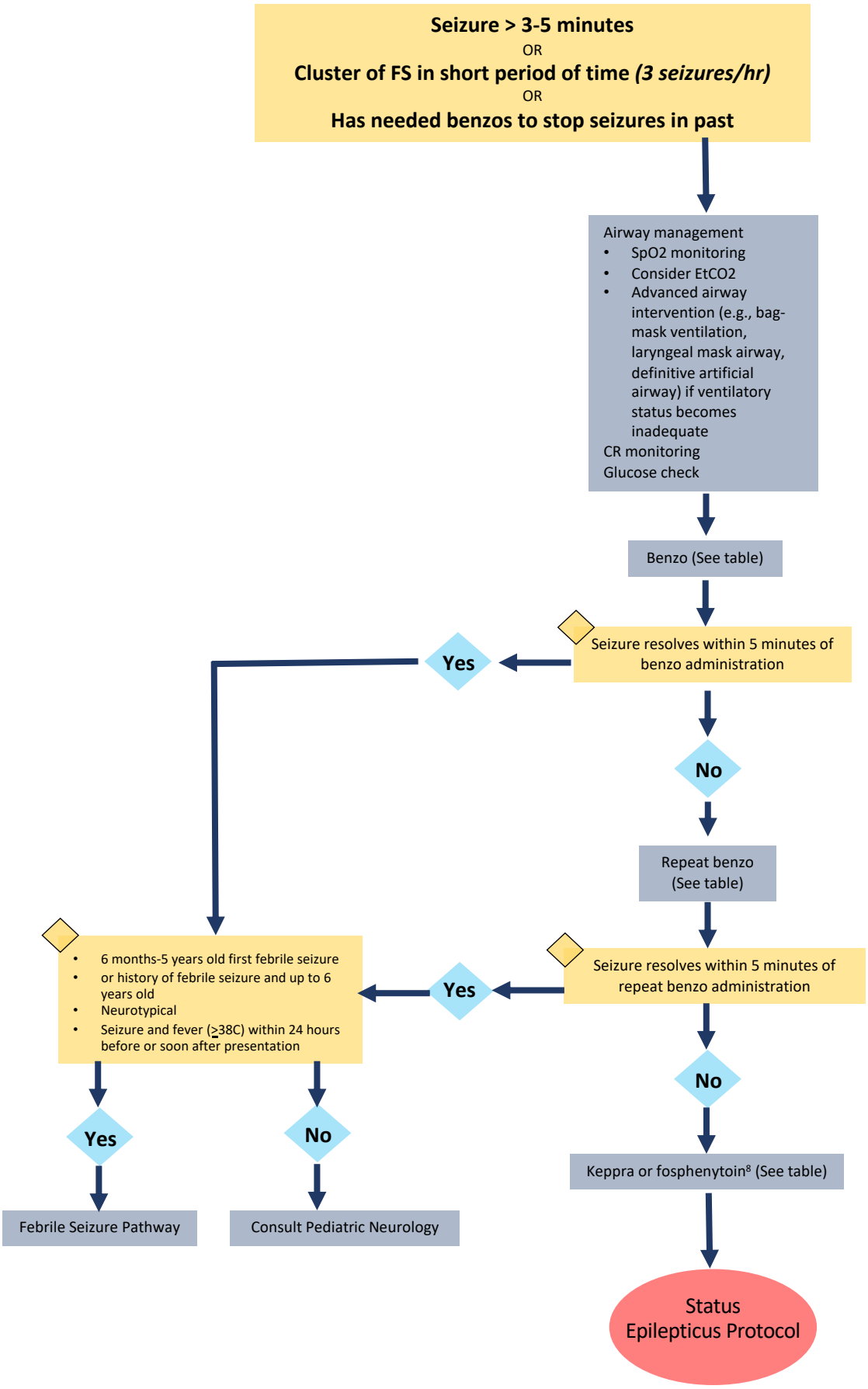
Seizure Management

Seizure Symptoms: *loss of consciousness, difficulty breathing, pallor/turning blue, foaming at mouth, eyes rolling into back of head, fixed gaze, generalized or focal twitching, jerking of arms/legs. Often followed by irritable, confused, drowsy period*[1]



Rescue Medications

Indication	Medication	Dosage	Route	Frequency
Seizure > 3-5 minutes OR Cluster of FS in short period of time *(3 seizures/hr)* OR Has needed benzos to stop seizures in past	Lorazepam OR Midazolam OR Diazepam	0.1 mg/kg (max 4 mg) 0.2 mg/kg (max 10 mg) 0.2 mg/kg (max 10 mg) 0.25 mg/kg (max 10 mg) 0.5 mg/kg	IV IN IV IV or IO Rectal	A second dose may be given 10 minutes after the first; max 2 doses A second dose may be given 10 minutes after the first; max 2 doses A second dose may be given 10 minutes after the first; max 2 doses
Seizure has not resolved despite benzos X 2	Leviteracitam[8] (Keppra) OR Fosphenytoin[8]	60 mg/kg (max 4500 mg) 20 mg PE/kg (max 1500 PE)	IV IV	Once Once

Febrile Seizures

Clinical Guidance

FS Patient Assessment[1]

History of Present Illness

Seizure details:
- Description, including +/- focal features
- Duration
- Number
- Presence and duration of post-ictal phase

Recent illness, fever (including Tmax) and use of antibiotics
Recent trauma
Medications given

Past Medical History

Immunizations
Personal history of FS
Neuro disease and/or developmental delay
Immunosuppression

Family History

Febrile seizures
Epilepsy
Neurological disorder

Physical Exam

Vital signs
General appearance
Examine head/neck/intracranial infection
Detailed neuro exam
***If post-ictal, reassess (and document) complete repeat physical exam

Work-Up and Treatment of Simple FS

- No evidence that EEGs (at presentation or within a month) predict FS recurrence or development of unprovoked seizures/epilepsy within two years
- The risk of radiation exposure (CT) or sedation (MRI) outweighs benefits of imaging and in general, imaging does not change outcome
- Antiepileptics do not decrease risk of developing epilepsy

Family Education

FS Facts

- Exact cause of FS is unknown
  - Thought to be due to high cytokines due to fever alter brain activity, triggering seizure
  - Possible association with environmental and genetic factors[1]
- Most FS are short, self-terminating, and do not require antiepileptics
- Peak age of onset of FS is 18 months[1]
- FS occur in 2-5% of all children[1]
  - 1/3 of children with one FS will present with a second FS during a future febrile illness
- If a child has a simple FS, no evidence of increased mortality or intellectual disability and no known effects on behavior, school performance, or neurocognition
  - The risk of epilepsy is higher in children with complex FSs

Risk of FS Recurrence[5]

Risk Factors for FS Recurrence:
- First FS < 1 hour after start of fever
- FS at body temp <38
- First FS when <18 months old
- History of simple or complex FS
- Family history of FS
- Developmental delay

- FS recur in <20% of children **with no** risk factors
- 30% recurrence if age >12 months at first FS
- 50% recurrence if age <12 months at first FS
- FS recur in >70% of children **with all** risk factors
- Risk of **epilepsy** is 15% if ≥ 3 FSs

Complex features **are not** associated with risk of recurrence

FS Family Education

FS can be extremely frightening for parents, even if they are generally harmless. Parents must be appropriately informed and guided on management of fever and/or recurrent seizures. Emphasize benign nature of short seizures.

- If providing rescue medication, ensure parents know how and when to give it
- Review seizure first aid, including placing child on side, ensuring safe surroundings
- Instruct family to take video of any seizure activity
- Call 911 if lasting > 5 minutes
- Inform family that antipyretics may[6], but are unlikely to decrease risk of seizure recurrence at home[2]; they are given primarily for comfort, not to prevent seizure
- Instruct family that neurology follow up is warranted for complex FS or ≥ 2 FS in lifetime
- Inform families of children who do need EEGs that if a child is not actively seizing, EEG should be done at least 48 hours after FS to avoid confusion of post-ictal electrical activity with abnormal electrical activity

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Pathway published June 2022; Due for revision March 2027

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