

PEDIATRIC COMPLEX FEBRILE SEIZURE

Facilitator Guide | Ontario Paramedic CME

Scenario purpose (for facilitator only): assess a postictal febrile child, recognize a recurrent seizure with focal onset, terminate an ongoing generalized seizure promptly when within scope, support ventilation, and recognize TWO complex features: focal onset and two seizures within 24 hours.

If time permits, run this as an ACP scenario and then as a double PCP scenario and discuss the key differences.

Facilitator Overview

Item	Details
Participants	6-15 paramedics (mixed PCP & ACP groups)
Active roles	2 paramedics + 1 parent actor; remaining participants observe
Resources	No fire, police, additional ambulance crew or ACP intercept/backup
Scenario time	Approximately 15 minutes; may end earlier for a PCP-only crew
Debrief time	30-40 minutes; separate page
Patient	3-year-old male, approximately 15 kg
Clinical focus	Postictal on arrival -> recurrent focal seizure -> generalized seizure -> scope-specific management

Specific Learning Objectives

- Perform a rapid PAT and pediatric ABC assessment of a postictal child.
- Recognize recurrent seizure activity early, including focal onset before generalized convulsions.
- Recognize complex febrile seizure features: focality and recurrence within 24 hours.
- For an ACP crew, apply the current Ontario ALS PCS Seizure Medical Directive promptly once the child is actively seizing, including pediatric midazolam dose/route selection and medication cross-checks.
- For a PCP-only crew, remain within scope while prioritizing airway/ventilation, monitoring, glucose, rapid transport and reassessment.
- Reassess ventilation after seizure termination and benzodiazepine administration using clinical assessment, SpO2 and ETCO2.
- Avoid anchoring on fever/recent URTI and broaden the differential when complex features or abnormal recovery are present.
- Communicate effectively with the parent and provide an organized seizure history/treatment response during receiving hospital patch.

Participant Organization

- Attending Paramedic: leads assessment, clinical decision-making, treatment, transport planning and communication with the parent.
- Partner Paramedic: assists with assessment, airway/ventilation, monitoring, equipment, history and medication preparation when applicable.

- Parent actor: on scene with the patient and provides history when appropriately questioned (provide script and 2-3 minutes for them to review ahead of time).
- Observers: all remaining participants. They do not coach the crew during the scenario and will be expected to contribute observations during the debrief.

Run this as a realistic two-paramedic call. No additional resources or ACP intercept are available for PCP crews. If the active crew is PCP-only, the scenario should test recognition, assessment, supportive care and transport decisions.

Equipment / Simulation Setup

- Pediatric manikin.
- iSIM monitor with SpO2 and ETCO2 capability.
- BVM, pediatric NRB mask, nasal cannula, suction, oxygen and airway adjuncts.
- Simulated midazolam with IN/IM/IV supplies for ACP crews; no IV established initially.
- IV fluid setup if desired for discussion, but fluids are not used simply to lower fever.
- Glucometer, thermometer, pediatric dosing aid and current ALS PCS 5.4 app.
- Parent actor script.

Pre-Brief (5 mins)

- *Introduce simulation: **15-20-minute in-class scenario (respect this time and set a timer as to not go over or you will lose the learners)** + 30-40-minute learner-led debrief where everyone will have a chance to participate and ask questions.*
- *State what the learning objectives are for the scenario to the class:*
 - *Perform a structured pediatric assessment.*
 - *Recognize deterioration and changing clinical status.*
 - *Prioritize appropriate treatment and patient management.*
 - *Reassess frequently and evaluate response to interventions.*
 - *Use clinical reasoning to guide decision-making and avoid premature conclusions.*
 - *Communicate effectively with caregivers, partners, and the receiving team.*
- *Orient the class to the equipment (see list below and ensure you have everything) and where things are located, ask if there are any questions.*
- *State that this is for formative ongoing learning purposes only and that there is no evaluation component.*
- *Discuss psychological safety being important and let them know the scenario is confidential, all discussions and actions that occur here today, stay within these four walls – ask and ensure everyone agrees with this.*
- *Provide them with a case summary: A 3-year-old seizing child with a known recent illness who is not acting himself as per caregiver on scene.*
- *Delegate roles: ask for any volunteers to be attending paramedic, partner paramedic, and one parent actor on scene (provide them with the necessary script and allow for review for a couple of minutes). If no one wants to be the parent, then you as the facilitator can use the script. Inform the remainder of the class that their role is observers and that they will be called upon during the debrief (hint: pay attention!).*
- *Let them know you will be taking notes to remind yourself of things to discuss in the debrief and that you are present but NOT part of the scenario (no evaluation). Ask if anyone has any questions before we get started.*

Scenario Stem - Information Given When Asked

Note: Ensure the timer is set for maximum 20 minutes and respect this time for the scenario, do not let it go over or drag on. Take notes for yourself for the debrief on what went well and what can be improved so you remember to discuss it later on and close any knowledge gaps.

To start scenario - Dispatch: “Code red, 3-year-old, seizure. Child is no longer shaking. Unknown further details.”

Additional info when asked:

- Three days of runny nose, cough and decreased appetite consistent with a recent URTI.
- Fever began overnight. No known epilepsy or prior unprovoked seizure.
- FIRST SEIZURE TODAY: approximately 10 minutes before paramedic arrival, the child had a brief generalized seizure lasting about 2 minutes that stopped spontaneously. He has not returned to baseline.
- One previous febrile seizure approximately 8 months ago that stopped spontaneously.
- No known medication allergies, ingestion, significant trauma or metabolic disorder. Immunizations reported current.
- The parent gave acetaminophen earlier for comfort and is worried the fever “spiked too fast.”

Phase 1 - Arrival: Postictal Child (0-5 min)

Finding	Initial presentation
Appearance / GCS	Postictal, drowsy; GCS 10 (E3 V2 M5)
Airway	Patent; occasional secretions
Breathing	RR 24/min, spontaneous; adequate chest rise
SpO2	95% on room air
ETCO2	38 mmHg with waveform if applied
HR	148/min
BP	98/60 mmHg
Skin	Hot, flushed, dry; cap refill about 2 sec
Temperature	39.4 C
BGL	5.2 mmol/L

Parent opening: “He stopped shaking just before you got here, but he still isn’t himself. He’s so sleepy.”

Expected actions

- Perform PAT and rapid ABC assessment; recognize postictal altered LOC.
- Obtain BGL and temp as seizure has stopped and patient is postictal.
- Obtain a clear seizure history: onset, duration, description, return to baseline, previous seizures and illness history.
- Position airway, suction as needed, apply monitoring and prepare equipment in case seizure activity recurs.
- Assess ventilation clinically; apply SpO2 and ETCO2 when appropriate.
- Begin planning transport; do not become fixated on the fever number.
- Recognize that the child has already had one seizure during this febrile illness and has not yet returned fully to baseline.
- Unable to obtain IV access if attempts made.

Phase 2 - Recurrent Focal Seizure -> Generalized (5-10 min)

At approximately simulation minute 5, while the crew is assessing the postictal child, the RIGHT ARM begins rhythmic jerking. Within 20-30 seconds, the activity progresses to the right face and then to generalized tonic-

clonic seizure activity.

- Parent becomes distressed: “He’s doing it again! His arm is shaking—this is what happened before!”
- This is the SECOND seizure within the same febrile illness/24-hour period.
- The focal onset is a second independent complex feature.
- Expected priorities: ensure patient still has circulation, time the seizure, protect from injury, manage airway/secretions, assess/support ventilation, continue monitoring and prepare for seizure termination based on crew scope.

ACP pathway - terminate the ongoing seizure promptly

- Once the child is actively generalized motor seizing and the ALS PCS directive applies (not focal seizing), the ACP should move promptly to midazolam while the partner manages airway/ventilation and monitoring in parallel.,
- No IV is established. If the team delays treatment solely to obtain IV access, the seizure continues.
- Complete appropriate medication cross-checks and use the quickest appropriate authorized route; do not delay solely to establish IV access (not obtained).
- For this 15-kg patient, use the current ALS PCS 5.4 pediatric dose/route and carried concentration applicable to your service (10 mg / 2 mL used for this scenario).
- After appropriate simulated midazolam administration, allow generalized convulsions to stop after approximately 3 minutes for IN/IM routes.
- Prioritize airway positioning, suction, oxygen as indicated, BVM as ventilation is inadequate, SpO2/ETCO2 when feasible, rapid packaging and transport, and ongoing reassessment.

Route	Dose	15-kg patient
IV / IO*	0.1 mg/kg; max 5 mg	1.5 mg (0.3 mL)
IM / IN / Buccal	0.2 mg/kg; max 10 mg	3 mg (0.6 mL)

PCP-only pathway - supportive care + rapid transport

- Recognize the recurrent generalized seizure.
- No ACP intercept/backup is available. Do not delay transport waiting for a resource that does not exist in the scenario.
- Prioritize airway positioning, suction, oxygen as indicated, BVM as ventilation is inadequate, SpO2/ETCO2 when feasible, rapid packaging and transport, and ongoing reassessment.
- Allow the seizure to terminate spontaneously once the PCP crew has demonstrated appropriate supportive management and committed to rapid transport or at the 3-minute mark. The PCP version may end sooner.

Phase 3 - Seizure Stops / Postictal Ventilation Problem (10-13 min)

Finding	After seizure termination
GCS	6 (E1 V1 M4), postictal
HR	150/min
BP	96/58 mmHg
RR	10/min, shallow
SpO2	90% despite supplemental oxygen
ETCO2	52 mmHg with waveform
Chest rise	Reduced
Skin	Hot, flushed; centrally pink
Temperature	39.4 C - obtain once seizure has stopped
BGL	5.2 mmol/L - obtain once seizure has stopped

Expected response

- Recognize inadequate ventilation despite seizure termination.
- Reposition airway, suction as needed and assist ventilation with BVM when indicated.
- Continue SpO2 and trend ETCO2; reassess respiratory rate, effort and chest rise.
- Repeat neurologic assessment and full vital signs; prepare for another seizure. Check BGL and temperature if not done already or potentially for a second time.
- Continue expedited transport.
- Able to obtain IV access en route if attempted again.

With effective BVM ventilation: SpO2 improves toward 97%, ETCO2 trends from 52 toward 45 mmHg, chest rise improves and the child gradually becomes more responsive.

Phase 4 – Time Warp: Transport / Handover / Scenario End (13-16 min)

- The child gradually localizes to the parent but remains drowsy. No further seizure activity occurs.
- Continue respiratory and neurologic reassessment and prepare for recurrence.
- Give the crew 60 seconds to prepare a concise hospital handover.
- Listen for: age/weight, recent URTI/fever, FIRST seizure and duration, incomplete recovery, SECOND seizure, focal right-sided onset, generalized progression, medication/dose/route/time if ACP-treated, ventilation support, glucose, temperature and recovery trajectory.

Example handover: "This is a 3-year-old male, approximately 15 kg. He has a 3-day history of URTI symptoms and fever. Prior to our arrival, he experienced a brief generalized seizure and remained postictal. During our assessment, he developed a second seizure with focal onset involving the right arm and face, which progressed to generalized tonic-clonic activity. Midazolam was administered by ACP [dose/route], with successful seizure termination. Following the seizure, he developed postictal hypoventilation requiring BVM-assisted ventilations. His BGL was 5.2 mmol/L and temperature was 39.4°C. He is currently postictal but gradually improving, with improving respiratory effort and level of consciousness. No allergies, medications, or significant medical history are known at this time. Given the focal onset and recurrence of seizures within 24 hours, this presentation has features of a complex febrile seizure."

IMIST-AMBO

A structured paramedic handover format commonly used in EMS and emergency care: This may be new to some participants and will not be formally evaluated during this CME. It is included as a facilitator reference to support a more structured handover process during the SIM, as this approach is expected to become increasingly common in future practice.

I – Identification (patient age, sex, name if known)

M – Mechanism/Medical complaint

I – Injuries/Information relevant to complaint

S – Signs (vital signs, assessment findings)

T – Treatment and trends

A – Allergies

M – Medications

B – Background (medical history)

O – Other information (PO intake, events, social considerations)

Scenario Vital Signs Progression

Facilitator reference: Provide full sets approximately every 2 minutes. Temperature and BGL are obtained once during the initial postictal assessment before the second seizure. Values are simulation cues and may be adjusted slightly based on participant interventions.

Time / phase	GCS	Temp	HR	BP	RR	BGL	SpO2	ETCO2	Skin
2 min Arrival - postictal	9 E2 V2 M5	39.4 C	148	98/60	22	5.2 mmol/L	94% RA	38	Hot, flushed, dry; CRT ~2 sec
4 min Postictal assessment	10 E3 V2 M5	-	142	100/62	22	-	96% RA	37	Hot, flushed; well perfused
6 min Focal seizure begins	7 E2 V1 M4	-	156	102/64	20 irregular	-	93% RA	42	Hot/flushed; centrally pink
8 min Generalized seizure	3 E1 V1 M1	-	170	104/66	16 irregular / shallow	-	89%	50	Hot, flushed; lips may become dusky
10 min Seizure terminated*	5 E1 V1 M3	-	150	100/62	10 shallow	-	91% on O2	52	Warm, flushed; centrally pink
12 min BVM support	6 E1 V1 M4	39.4 C	142	100/64	10 assisted	5.2 mmol/L	97%	45	Warm, pink; perfusion maintained
14 min Early recovery	9 E2 V2 M5	-	132	102/64	18	-	98%	41	Warm, pink, dry
16 min Transport / improving	12 E3 V4 M5	-	124	104/66	22	-	98%	39	Warm, pink; well perfused

* ACP pathway: seizure terminates after approximately 3-minutes of appropriately administered midazolam. PCP-only pathway: continue ABC support and rapid transport; facilitator may allow spontaneous termination after approximately 3-minutes of appropriate management is demonstrated.

30-40-MINUTE FACILITATED DEBRIEF

The debrief should be approximately twice the length of the scenario, though it is perfectly acceptable if the discussion concludes earlier. This is where learners typically gain the greatest insight, as it provides an opportunity to reflect on their decisions, clinical reasoning, communication, and performance. The debrief should be learner-led whenever possible. As a facilitator, aim to do less talking and more guiding, allowing participants to identify strengths, challenges, and key takeaways themselves. Debrief notes are included to help facilitate discussion and can be used as prompts for quieter groups when needed.

Debrief goal: connect recognition of a changing neurologic presentation to scope-appropriate action. Use observers heavily and compare PCP vs ACP priorities without framing lack of medication scope as a performance failure.

Debrief Structure

Note: include everyone including the observers and the actor parent. Everyone has a chance to speak.

- Ask individuals about initial reactions. Ask: How did that feel? Ensure learners focus on reactions. If they start talking about what occurred in the scenario, bring them back to feelings and let them know you'll come back to that thought.
- Ask someone to provide a brief summary of what occurred in the simulation (volunteer?) and ask if everyone agrees.
- Review the specific learning objectives on the very first page with the learners.
- Get into the plus/delta – “what went well” (plus) first and stay in this column – avoid only using umbrella terms like, “good communication” – if you receive a response like this then dig deeper and ask, “what about it, be more specific.” See if everyone agrees with what went well and then move into the, “what can be improved upon column.” (Delta). See if everyone once again agrees and get specific. This is learner led and you are there just to facilitate the discussions and ensure they remain respectful for psychological safety. Let them try to close the knowledge gaps on their own if there are any. You will have the opportunity to close any gaps/correct anything in the next step.
- Facilitator feedback: close any knowledge gaps, give direct feedback if you saw anything that was incorrect so the learner doesn't leave thinking they did the right thing. Use words like, “I noticed when you did this, next time you should do...” or “I noticed...I am concerned because of this...I am curious what you were thinking or what made you do it that way.” No judgment and come from a curiosity perspective.
- Lastly, go around the room and ask each learner 1-2 take away points and ask how they will incorporate that into their practice.
- Thank everyone for participating and ask if there are any questions.

See below for prompts if needed. There is also an FAQ provided.

1. Reactions & Psychological Safety

- Start with: “What went well?” before discussing gaps.
- Ask the active crew first, then observers.
- Keep feedback focused on decisions, communication and systems rather than individuals.
- If there is an error or a gap, this needs to be addressed and closed with the group during facilitator feedback after going through plus/delta.

2. Postictal Child on Arrival

- What are the priorities in a child who is no longer convulsing but has not returned to baseline? Did this change your level of concern?
- How did PAT, ABCs, GCS, ventilation and seizure history shape your initial plan?
- What equipment or medications should be anticipated/prepared in a child at risk of recurrent seizure?

3. Recurrent Seizure & Scope-Specific Management

- The right arm began shaking before generalized activity. Who recognized this as focal onset? What does that mean/change? Were you anticipating the child to seize again?
- This was the second seizure within 24 hours. What does recurrence add to the classification?
- For ACPs: once generalized motor seizure activity is present and the directive applies, seizure termination should be prompt; airway/ventilation care occurs in parallel.
- For PCPs: what can you change immediately despite not having midazolam within scope? Emphasize airway/ventilation, monitoring, rapid transport and reassessment. Can emphasize that most seizures terminate spontaneously without specific treatment and that airway patency and oxygenation are the priorities for all level of provider.

4. Airway, Ventilation & Post-Benzodiazepine/Postictal Reassessment

- What changed after the seizure stopped?
- SpO2 assesses oxygenation; it does not prove adequate ventilation. Discuss RR, chest rise, effort and ETCO2 waveform/trend.
- Why did the patient require BVM support despite oxygen?
- For ACP crews, both postictal physiology and benzodiazepine may contribute to hypoventilation; support the physiology rather than focusing a single cause. Intubation in the post-ictal period is rarely if ever indicated and often complicates things unnecessarily.

5. Why This Is a Complex Febrile Seizure

- Complex feature #1: focal onset (right arm/right face).
- Complex feature #2: recurrence within 24 hours.
- Duration ≥ 15 minutes is another complex feature, but it is NOT required when focality or recurrence is already present.
- How should these features change the differential and handoff?
- Avoid premature closure: fever + URTI does not automatically equal a simple benign febrile seizure.

6. Fever Myths, Parent Education & Handover

- The rate of temperature rise is not considered the cause of febrile seizures; there is no single temperature threshold at which they occur.
- Higher temperatures are generally associated with increased likelihood, but individual susceptibility matters.
- Acetaminophen/ibuprofen improve comfort but do not reliably prevent febrile seizures.
- Do not routinely treat a comfortable, well-appearing child simply to normalize temperature.
- “Does having two febrile seizures today mean this child has epilepsy?” Reinforce that febrile seizures themselves do not equal epilepsy, while complex features warrant careful assessment.

- Strong handover: 2x febrile seizures within a 24-hour period, lack of complete recovery between two seizures (did not fully return to baseline which meets the definition of status epilepticus) began with focal onset, generalized progression, treatment, ventilation, BGL, temperature and neurologic recovery.

Key debrief line: “The child looked postictal when you arrived, but the call was not over. The recurrent focal-to-generalized seizure changed both the urgency and the classification.”

Key Debrief Takeaways

- A postictal child requires ongoing ABC and neurologic reassessment because seizure activity may recur.
- Assess circulation during seizure activity, as seizures can occasionally be the first sign of cardiac arrest (rare in children). Early pulse checks help prevent delayed recognition.
- Following a prolonged seizure, multiple seizures, status epilepticus, or administration of benzodiazepines such as midazolam, the postictal period may last several hours.
- Time and characterize every seizure; ask specifically how it started.
- Focal onset and recurrence within 24 hours each independently make a febrile seizure complex.
- Not returning to normal baseline between two seizures = status epilepticus.
- For ACPs, terminate an ongoing generalized motor seizure promptly when the seizure directive applies.
- For PCPs, supportive care and rapid transport remain high-value treatment when seizure medication is outside scope.
- After seizure termination, actively reassess ventilation and ETCO₂; SpO₂ alone is insufficient.
- Recent URTI and fever can create anchoring bias; try to avoid this.
- Treat the child and physiology, not the fever number.