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The Collapsed Endurance Athlete: Differential Diagnosis, Red Flags and Immediate Management - A Narrative Review

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Abstract

Introduction and purpose. Collapse during or immediately after endurance exercise is a common presentation at mass-participation events, but the clinical spectrum ranges from transient post-exercise hypotension to cardiac arrest, exertional heat stroke and exercise-associated hyponatremia. This review presents a practical, problem-oriented approach to the collapsed endurance athlete.

Materials and methods. A narrative review was developed from PubMed/MEDLINE-indexed literature, consensus statements and major endurance-event cohorts. Priority was given to evidence addressing triage, exercise-associated collapse, heat illness, hyponatremia, cardiac arrest and on-site emergency care.

Results. Timing of collapse, level of consciousness, breathing pattern, core temperature and focused point-of-care assessment help distinguish uncomplicated post-exercise collapse from time-critical disease. Collapse during exercise, persistent altered mental status, abnormal breathing or circulation, marked hyperthermia, neurologic features and suspected cardiac disease should be treated as red flags. Management should be directed by the most likely physiology while immediately life-threatening conditions are excluded.

Conclusion. The collapsed endurance athlete should initially be approached as an undifferentiated emergency until immediately life-threatening causes have been excluded. A structured event-side pathway may reduce diagnostic anchoring and treatment delay, although prospective validation of such algorithms remains limited.

Keywords: endurance sport, exercise-associated collapse, exertional heat stroke, exercise-associated hyponatremia, sudden cardiac arrest, race medicine

1. Introduction

Few scenes at an endurance event attract attention as quickly as an athlete collapsing on the course or just beyond the finish line. Yet collapse itself is not a diagnosis. At one end of the spectrum is transient post-exercise hypotension; at the other are cardiac arrest, exertional heat stroke, severe electrolyte disturbance and neurologic emergencies. The first task is therefore not to label the episode, but to establish when it happened, what the athlete was doing immediately beforehand and whether there is an immediate threat to life [1].

Exercise-associated collapse (EAC), often discussed as exercise-associated postural hypotension, is particularly common after endurance events. It typically occurs after the athlete stops exercising and is thought to reflect abrupt loss of the skeletal-muscle pump in the setting of persistent peripheral vasodilation and impaired maintenance of venous return [2]. This

pattern matters because collapse during ongoing exercise is less typical of uncomplicated EAC and should increase concern for another cause [3].

Event-level data show that collapse is uncommon relative to the number of starters but frequent enough to influence medical planning. In a five-year cohort of 230,501 starters at the Gothenburg Half Marathon, severe exercise-associated collapse occurred at an incidence of 1.53 per 1000 starters [4]. International consensus work on mass-participation endurance events has therefore emphasized standardized definitions and reporting of medical encounters, both for clinical planning and for comparison between events [5].

This narrative review takes a deliberately practical approach. Rather than discussing each diagnosis in isolation, it follows the decisions faced by clinicians during the first minutes of care. Particular attention is paid to the timing of collapse, findings that should trigger escalation, and the bedside distinction between EAC, exertional heat stroke (EHS), exercise-associated hyponatremia (EAH) and cardiac disease.

2. Epidemiology and Event Context

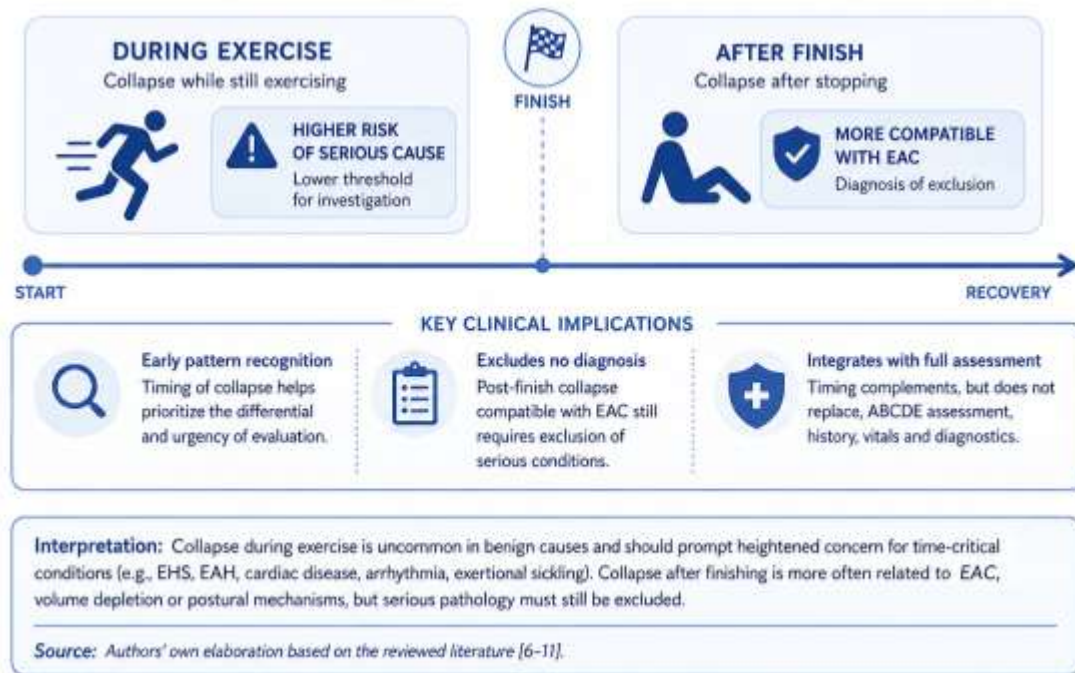
The frequency and nature of medical encounters vary with race distance, participant characteristics and environmental conditions. A three-year study of 94,033 starters in a 16.1-km road race reported an overall medical-encounter incidence of 2.75 per 1000 starters; 44% of encounters were classified as serious or life-threatening, with heat illness and central nervous system complaints prominent among presentations [6]. Environmental conditions also influence medical workload: both warm/humid and cold/wet conditions can alter the pattern and frequency of race-related illness, while long-term marathon surveillance demonstrates that finish-line EAC is a major component of medical-tent activity [7, 8].

Recent trail-running surveillance reinforces the need to think beyond musculoskeletal injury. Across 17 Brazilian trail races involving 18,314 athletes, systemic illnesses—including collapse, heat stroke and hyponatremia—accounted for the majority of recorded medical encounters [9]. These data are not directly transferable to every race, but they illustrate how event medicine differs from routine outpatient sports medicine: clinicians must manage a large number of athletes in a compressed time window, often with incomplete histories and limited diagnostics.

Event organization is therefore part of clinical safety. World Athletics educational guidance identifies EAC, sudden cardiac arrest, EHS and EAH as conditions for which endurance-event medical staff should be specifically prepared [10]. Operational reviews similarly emphasize pre-event risk assessment, communication, appropriately distributed medical resources and

predefined escalation pathways [11]. The diagnostic algorithm is only useful if AED access, cooling capability, core-temperature measurement, point-of-care testing and transport pathways have been considered before the start.

Figure 1. Timing of collapse as an early clinical discriminator in endurance athletes



Source: Authors' own elaboration based on the reviewed literature

3. Exercise-Associated Collapse and Postural Hypotension

EAC is best understood as a clinical syndrome occurring in a conscious athlete who cannot stand or walk unaided after strenuous exercise because of light-headedness, faintness or transient syncope. The modern physiological model places less emphasis on dehydration or hyperthermia as universal explanations and more on transient postural hypotension after abrupt cessation of exercise [12]. Lower-limb venous pooling, persistent vasodilation and loss of the muscle pump reduce venous return at precisely the moment when the athlete stops moving.

In practice, EAC is a diagnosis made after the initial danger has been excluded. A familiar presentation is the runner who reaches the finish, becomes light-headed or unable to remain upright, but is awake, coherent and improves quickly when placed supine with the legs elevated. That pattern is reassuring. Persistent confusion, collapse before exercise has stopped, marked hyperthermia, chest pain, sustained palpitations, focal neurologic signs or failure to recover promptly is not.

Management is usually supportive once serious pathology has been excluded. Positioning the athlete supine with the legs elevated can improve venous return; oral fluids are reasonable when

the athlete is alert and able to drink. Routine aggressive intravenous fluids are not required for uncomplicated EAC and may be harmful if the true diagnosis is dilutional hyponatremia [2, 12].

The haemodynamic transition from running to standing still deserves particular emphasis. During sustained endurance exercise, rhythmic muscle contraction assists venous return while sympathetic activation supports arterial pressure. Abrupt cessation removes the lower-limb muscle pump while cutaneous and muscular vascular beds may remain dilated. In susceptible athletes, the resulting fall in central blood volume can transiently reduce cerebral perfusion and produce light-headedness or collapse. This mechanism explains why an athlete may appear well while moving yet become symptomatic within seconds of stopping [2, 12].

This physiology also explains why dehydration should not be used as a synonym for EAC. Fluid deficit can coexist with post-exercise hypotension, but the severity of body-mass loss does not reliably identify the cause of collapse, and many endurance athletes complete events with measurable dehydration without requiring intravenous treatment. The practical consequence is that volume replacement should be individualized rather than automatic. Once dangerous diagnoses have been excluded, restoration of venous return by positioning and gradual remobilization often addresses the dominant mechanism more directly than empiric intravenous fluid administration [2, 13, 14].

A short period of observation is useful because the trajectory of recovery provides additional diagnostic information. Rapid normalization of symptoms and cognition after lying supine supports EAC, whereas persistent confusion, recurrent syncope, progressive headache, vomiting, chest symptoms or inability to ambulate should trigger reassessment. The clinician should resist converting a working diagnosis into a final diagnosis simply because the athlete crossed the finish line before collapsing [1, 2].

4. Exertional Heat Stroke

Among the differential diagnoses, EHS is especially time-sensitive. It is characterized by marked exercise-induced hyperthermia accompanied by central nervous system dysfunction, and prognosis worsens as severe hyperthermia persists [15]. When the diagnosis is suspected, rectal temperature is the preferred field measurement because oral, tympanic and other peripheral measurements may underestimate core temperature during and immediately after strenuous exercise [16].

For confirmed or strongly suspected EHS, the practical priority is rapid on-site cooling before transport when this can be performed safely. International prehospital guidance recommends

beginning effective cooling at the venue rather than delaying treatment for transfer [17]. Cold-water immersion has the strongest evidence for rapid cooling: a systematic review and meta-analysis found water immersion to reduce core temperature faster than passive cooling [18], while a separate systematic review linked adequate cooling rates with better clinical outcomes [19].

Cold-water immersion remains the preferred high-capacity cooling method when it can be delivered safely and without delaying basic resuscitation [20]. IOC guidance for sports competitions further recommends a dedicated heat-management pathway with rapid rectal temperature assessment, on-site cooling and coordinated transfer after initial treatment [21]. These principles are consistent with earlier American College of Sports Medicine and National Athletic Trainers' Association guidance, both of which emphasize accurate core-temperature measurement and immediate aggressive cooling in suspected EHS [22, 23].

Observational race data are consistent with this approach. At the Falmouth Road Race, 454 documented EHS cases managed within an established cold-water-immersion protocol survived [24]. The series cannot establish comparative efficacy on its own, but it shows what is achievable when recognition, temperature measurement and cooling are integrated into event medical care. Hot weather alone is not diagnostic; altered cognition in a collapsed athlete is the finding that should lower the threshold for obtaining an accurate core temperature.

Table 1. Features that help distinguish common causes of endurance-event collapse.

Feature	EAC/EAPH	Exertional heat stroke	Exercise-associated hyponatremia	Cardiac cause
Typical timing	Usually after stopping	During or after exercise	During or after prolonged exercise	Often during exercise; may occur immediately after
Mental status	Usually preserved or rapidly normalizes	CNS dysfunction is central	May progress from headache/confusion to seizure/coma	Syncope or cardiac arrest; cognition depends on perfusion
Core temperature	Not diagnostic	Markedly elevated; rectal measurement preferred	May be normal or elevated	Variable
Key test	Clinical reassessment	Rectal temperature	Serum/POC sodium	AED/ECG; further cardiac evaluation
Immediate priority	Supine/leg elevation after exclusion of danger	Rapid cooling	Neurologic severity + sodium-directed treatment	CPR/AED if arrest; urgent cardiac pathway

5. Exercise-Associated Hyponatremia

EAH is defined by a serum sodium concentration below 135 mmol/L occurring during or up to 24 hours after prolonged physical activity. Its clinical importance lies in the overlap between early symptoms and other causes of collapse. Headache, nausea, dizziness and fatigue are nonspecific; progressive cerebral edema can produce confusion, seizure, respiratory compromise and coma [25].

The 2015 international consensus identified excessive hypotonic fluid intake as the principal modifiable risk factor, with non-osmotic arginine vasopressin activity contributing to impaired water excretion [25]. Subsequent reviews have reinforced overdrinking beyond thirst as the dominant preventable mechanism while recognizing that EAH can occur across a spectrum of volume states [26]. Weight gain during an event, prolonged exercise duration and a history of drinking beyond thirst increase suspicion. A particularly important bedside error is to assume that every collapsed endurance athlete is dehydrated and to administer large volumes of isotonic fluid before considering EAH.

When neurologic symptoms are present and sodium can be measured promptly, point-of-care testing can materially change management. Severe symptomatic EAH requires hypertonic saline rather than reflex volume expansion with hypotonic or unnecessary isotonic fluids. Because EHS and EAH can coexist in the differential of an encephalopathic athlete, temperature assessment and sodium-directed reasoning should proceed in parallel rather than sequentially [27].

Fluid history is therefore part of the acute examination rather than a secondary nutritional detail. Useful questions include the duration of exercise, approximate fluid intake, whether the athlete drank according to thirst or according to a fixed schedule, use of sodium-containing products, pre-race and post-race body mass when known, and the presence of bloating or repeated vomiting. None of these features is diagnostic in isolation, but together they alter the pre-test probability of EAH and determine how cautiously fluids should be administered [25]. Mild EAH and severe encephalopathic EAH should also be separated conceptually. An athlete with a modestly reduced sodium concentration but normal cognition may require observation and restriction of unnecessary hypotonic intake rather than aggressive correction. Neurologic deterioration, by contrast, reflects cerebral edema until proved otherwise and requires urgent hypertonic therapy. This distinction is important in race medicine because the numerical sodium value and the clinical syndrome must be interpreted together [25, 27].

Prevention is closely linked to this diagnostic framework. Consensus recommendations have moved away from prescriptive overdrinking and toward drinking according to thirst, particularly during prolonged events. Educational messages should also address the misconception that sodium supplementation can compensate for excessive water consumption. Event organizers and medical teams can reduce treatment errors by ensuring that EAH is explicitly included in pre-event protocols and by making point-of-care sodium measurement available when feasible [25].

6. Cardiac Causes and Sudden Cardiac Arrest

Cardiac arrest is far less common than benign finish-line collapse, but no other diagnosis in this differential demands faster action. The Race Associated Cardiac Arrest Event Registry identified 59 arrests among 10.9 million marathon and half-marathon participants (0.54 per 100,000), and 71% were fatal [28]. In an unresponsive athlete with absent or abnormal breathing, the low incidence is irrelevant to the immediate decision: CPR and defibrillation take priority.

Any collapsed athlete who is unresponsive and not breathing normally should enter the cardiac-arrest pathway without delay. Pulse checks should not postpone CPR or AED application. If spontaneous circulation is present, exertional syncope still warrants careful evaluation when it occurs during exercise, particularly when accompanied by chest pain, palpitations, a family history of premature sudden death or an abnormal ECG.

ECG interpretation in athletes requires awareness of physiological training adaptations. International criteria distinguish expected athletic remodeling from abnormalities that should trigger evaluation for structural or electrical disease [29]. These criteria are primarily designed for ECG interpretation rather than acute collapse triage, but they are relevant once an athlete with exertional syncope or suspected arrhythmia reaches a setting where a 12-lead ECG is available.

7. Other Causes: Metabolic, Neurologic, Respiratory and Environmental

Hypoglycemia is less characteristic of recreational road-race collapse than EAC or heat illness, but capillary glucose is rapid, inexpensive and actionable. It is most useful in athletes with diabetes, prolonged exercise, reduced intake or unexplained altered mental status. A low value should be corrected promptly while the clinician continues to search for coexisting pathology. Seizure, intracranial pathology and stroke are uncommon but important when altered consciousness is prolonged or focal neurologic findings are present. Exercise can also precipitate anaphylaxis, severe asthma, pneumothorax or other respiratory emergencies. In cold and wet races, hypothermia becomes a more plausible explanation for exhaustion and impaired cognition, whereas hot conditions increase the burden of heat illness [7].

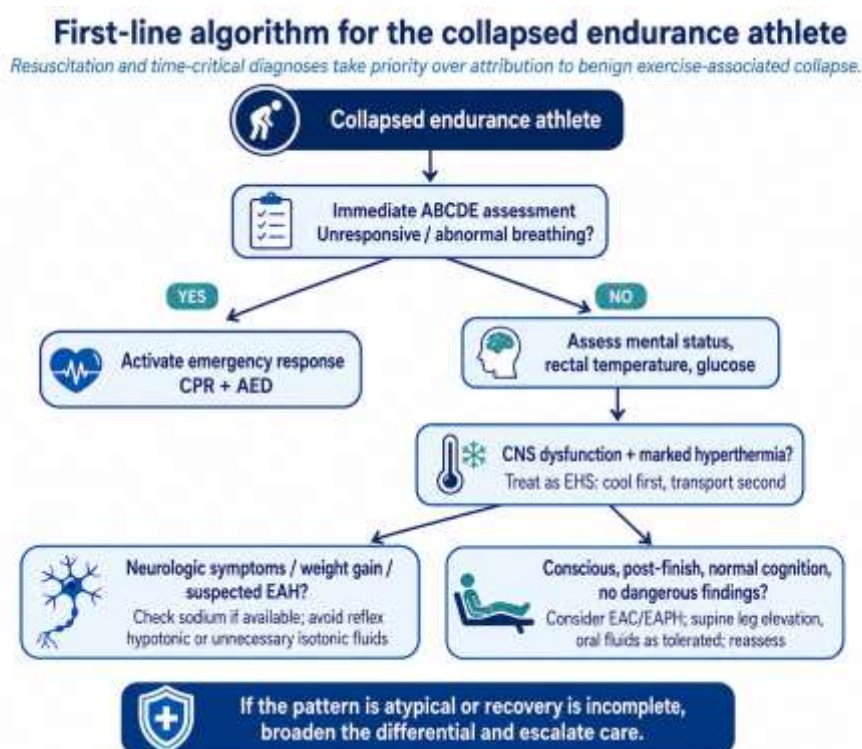
The surrounding circumstances can be misleading. A hot day makes dehydration an easy assumption; crossing the finish line makes EAC an easy label. Neither should replace examination. The differential can narrow quickly, but only after the initial assessment produces a coherent clinical picture.

8. Immediate Assessment in the Medical Tent

At the medical tent, the first assessment remains conventional: airway, breathing, circulation, disability and exposure. Once immediate instability has been addressed, a short event-specific history often provides more information than a long checklist. Did the athlete collapse while still exercising or only after stopping? Was consciousness actually lost? Is the athlete now fully oriented? Fluid intake, environmental conditions, chest symptoms, palpitations, witnessed seizure activity and diabetes history can then be obtained in parallel with examination.

Vital signs help define severity, but isolated values can mislead. A single low blood pressure does not establish EAC, and a normal peripheral temperature does not exclude EHS. Rectal temperature should be obtained promptly when EHS is plausible. Capillary glucose is a reasonable early test in otherwise unexplained altered mental status, while sodium becomes particularly informative when the history or neurologic picture raises suspicion of EAH. Available diagnostics differ markedly between events. A large city marathon may have 12-lead ECG and point-of-care electrolyte analysis a few metres from the finish; a remote trail race may have neither. The assessment pathway must work in both settings. AED access and a workable cooling strategy are basic safety requirements, whereas additional tests should refine—rather than delay—the initial clinical decision.

Figure 2. Proposed first-line algorithm for the assessment of the collapsed endurance athlete.



Source: Authors' own elaboration based on the reviewed literature.

9. Diagnosis-Directed Immediate Management

Treatment should follow the physiology suggested by the assessment rather than the visual impression of an 'exhausted runner'. Once a serious cause has been reasonably excluded, uncomplicated EAC can usually be managed with a supine position, leg elevation and observation; oral fluid is appropriate when the athlete is alert and able to drink. Persistent

hypotension, recurrent syncope or an atypical course should prompt reassessment rather than repeated treatment for presumed EAC.

In suspected EHS, cooling should begin immediately once the diagnosis is supported by CNS dysfunction and severe hyperthermia. Cold-water immersion is preferred when feasible, with continuous monitoring and an organized plan for removal and transfer. Cooling should not be postponed simply to complete a more extensive diagnostic work-up [15–19, 24].

In severe symptomatic EAH, hypertonic saline is the treatment priority. In cardiac arrest, high-quality CPR and early defibrillation dominate every other concern. Hypoglycemia requires glucose replacement. Anaphylaxis requires intramuscular epinephrine. These examples illustrate why a generic 'collapsed runner' fluid protocol is unsafe: the same empiric intervention can be unnecessary in EAC and actively inappropriate in another diagnosis.

10. Event-Side Disposition and Hospital Transfer

Hospital transfer is not necessary after every episode of collapse. Conversely, pressure to clear a busy medical tent is a poor reason to discharge an athlete whose diagnosis remains uncertain. A convincing uncomplicated EAC episode should improve promptly, with normal cognition, stable observations and no recurrence when the athlete progresses from sitting to standing and walking.

Transfer is appropriate when the athlete has persistent altered mental status, significant hyperthermia after initial treatment, suspected EAH with neurologic symptoms, cardiac symptoms or ECG abnormalities, recurrent syncope, persistent hypotension, respiratory compromise, focal neurologic findings, significant laboratory abnormalities or an uncertain diagnosis. EHS patients require further medical evaluation after appropriate on-site cooling because delayed organ injury can occur even after temperature normalizes [15, 17].

Clear documentation is particularly important at mass events. Consensus recommendations for endurance-event surveillance emphasize standardized recording of diagnosis, severity, timing and disposition [5]. Better documentation is not only administrative; it creates the datasets needed to refine staffing models, identify environmental risk and improve future event protocols.

11. Common Diagnostic and Management Errors

Perhaps the most persistent error is to equate collapse with dehydration. Dehydration may contribute to fatigue and circulatory strain, but it is not a satisfactory default explanation for every athlete who cannot stand after a race. More importantly, automatic intravenous fluid

administration can distract from EHS and is potentially harmful when water excess and EAH are the real problem.

Environmental temperature is also an imperfect shortcut. EHS is more likely in adverse heat, but severe exertional hyperthermia is not confined to exceptionally hot days. Metabolic heat production, acclimatization, recent illness, pacing and clothing all matter. The converse is equally important: warm weather does not turn every finish-line collapse into heat stroke.

A third error is premature closure after the athlete improves. Rapid improvement with supine positioning supports EAC, but clinicians should still ask whether the episode occurred during exertion, whether there was genuine loss of consciousness and whether cardiac or neurologic red flags were present. Improvement is evidence, not proof.

Table 2. Frequent pitfalls and safer alternatives.

Pitfall	Why it is unsafe	Safer approach
Assuming dehydration	Collapse has multiple causes; EAH may involve water excess.	Use history, cognition, temperature and targeted POC testing.
Using non-rectal temperature to exclude EHS	Peripheral measurements may underestimate core temperature.	Use rectal temperature when EHS is suspected.
Transporting before cooling confirmed EHS	Prolongs severe hyperthermia.	Begin effective on-site cooling when feasible.
Calling every post-finish collapse EAC	Dangerous causes can also present near the finish.	Exclude red flags before assigning a benign diagnosis.
Delaying AED for diagnostic testing	Cardiac arrest is immediately time critical.	CPR/AED first.
Giving routine IV fluids to all collapsed runners	May be unnecessary or inappropriate.	Treat the identified physiology, not the visual impression.

12. Prevention, Medical Preparedness and Event Design

The quality of care delivered after collapse depends heavily on decisions made before the race begins. Mass-participation endurance events create predictable clusters of illness over a short period, often around the finish area and during the warmest part of the day. Medical planning should therefore be based on expected participant numbers, race distance, environmental conditions, course access, previous encounter rates and transport time to definitive care. Consensus recommendations encourage standardized definitions and prospective recording

because historical event data are among the most useful tools for estimating future medical demand [5].

Equipment should reflect the diagnoses in which minutes materially change outcome. AEDs must be rapidly accessible on the course and at the finish. When heat illness is plausible, the medical system should have a reliable method of rectal temperature measurement and an effective cooling strategy rather than relying on improvised transfer to hospital. Cold-water immersion remains the preferred high-capacity method for EHS when logistics permit; alternative rapid cooling techniques require staff training and a predefined workflow [15, 17, 30]. Point-of-care glucose is inexpensive and broadly useful, while sodium analysis has particular value at long-duration events where EAH is plausible [25].

Human factors are equally important. A protocol that exists only on paper is unlikely to perform well when several athletes arrive simultaneously. Pre-event briefings should define who performs triage, who measures rectal temperature, who initiates cooling, who controls the AED, who documents treatment and who communicates with emergency medical services. Simulation of an unresponsive runner, an encephalopathic hyperthermic athlete and a suspected EAH case can expose delays that are difficult to identify during routine planning [10, 17].

Environmental monitoring should modify preparedness rather than serve as a binary permission to race. Heat and humidity can increase the burden of heat illness, but individual risk also depends on acclimatization, pace, recent illness, medications, clothing and metabolic heat production. Organizers should therefore combine environmental information with operational measures such as additional cooling capacity, water availability, staff deployment and participant communication [7, 30]. Cold and wet conditions require a different resource profile, including protection from exposure and the ability to identify hypothermia among athletes who present with fatigue or impaired cognition.

Participant education is another preventive layer. Messaging should discourage both forced overdrinking and the assumption that thirst must always be pre-empted. Athletes should understand that confusion, unusual behavior, chest pain, severe headache, persistent vomiting and collapse during exercise are not routine signs of simply having "pushed hard." Encouraging early presentation can be particularly important for EHS, where athletes may display subtle behavioral change before profound collapse [15, 25].

Finally, event medical records should support learning after the race. Recording the location and timing of collapse, environmental conditions, core temperature, sodium or glucose when measured, treatment, disposition and final diagnosis permits meaningful audit. When the same data structure is used across events, organizers can compare medical-encounter rates, identify

recurring bottlenecks and evaluate whether protocol changes reduce delays or unnecessary transfers [5].

13. Discussion

Evidence is uneven across the conditions discussed here. EHS is supported by detailed consensus guidance and substantial observational experience; EAH has an international consensus framework; sudden cardiac arrest has large registry data; and EAC is underpinned mainly by physiological reasoning, clinical series and focused reviews. What is less well studied is the undifferentiated athlete at the moment of collapse—the point at which these separate evidence bases have to be combined.

Timing deserves particular weight because it changes the pre-test probability of several diagnoses. EAC classically follows cessation of exercise, whereas collapse during exertion warrants a lower threshold for cardiac and other serious investigation [2, 3]. The distinction is not absolute: serious disease can become apparent just beyond the finish line, and a benign mechanism may occasionally occur before an athlete formally stops. Timing should therefore inform, rather than determine, the diagnosis.

Mental status carries similar weight. An athlete who is coherent and improving fits uncomplicated EAC far better than one who remains confused. Central nervous system dysfunction is central to EHS and may accompany severe EAH, but it is not specific: syncope, a postictal state and hypoglycemia can produce overlapping appearances. No single bedside sign is decisive. The strength of a structured approach is the way several imperfect observations are interpreted together.

The evidence base also contains important methodological weaknesses. Many race studies are retrospective and event-specific; definitions of collapse and severity differ; environmental conditions and medical resources vary; and treatment data are rarely randomized. Consensus statements necessarily incorporate expert judgment where trials are impractical or unethical. For EHS, for example, randomized withholding of rapid cooling would be unacceptable, so high-quality observational outcomes remain highly influential.

Transferability is another concern. Guidance developed around large road races assumes resources that may be unavailable at a mountain ultramarathon or small community event: staffed medical tents, rectal thermometry, immersion tubs and point-of-care analyzers. Even so, the central priorities travel well—recognize arrest, notice abnormal cognition, obtain an appropriate core temperature when EHS is plausible, avoid indiscriminate fluid treatment and escalate when the presentation does not convincingly fit a benign pattern.

Prospective evaluation of collapsed-athlete pathways would be valuable across road races, triathlons, trail events and different climates. Clinically meaningful outcomes include time to accurate core-temperature measurement, time to cooling, AED deployment, use of point-of-care sodium, transfer to hospital, diagnostic revision and patient outcome. The 2019 consensus definitions for medical encounters provide a useful framework for collecting such data consistently [5].

The tension between frequency and consequence is central to this problem. EAC may account for many finish-line presentations, yet a rare diagnosis such as cardiac arrest or EHS carries a much greater cost if treatment is delayed. Crowded finish areas make this distinction harder, not easier: several symptomatic athletes may arrive at once, histories are brief, and the environment itself encourages quick assumptions. A simple hierarchy of priorities is therefore more useful than attempting an exhaustive differential at the bedside.

The proposed pathway is best regarded as a hierarchy rather than a rigid checklist. Immediate threats to life come first; next are conditions in which minutes matter to treatment; a benign explanation should be assigned only after those possibilities have been addressed. The same hierarchy also limits unnecessary intervention. A conscious athlete who rapidly recovers after a typical post-finish EAC episode does not require the same work-up as an athlete who collapses during exertion and remains confused.

14. Summary and conclusions

Collapse in an endurance athlete should be treated as a clinical problem to solve rather than a diagnosis in itself. Uncomplicated EAC is common and characteristically follows exercise, but cardiac arrest, EHS, EAH and other time-critical disorders have to be considered first. Particular concern is warranted when collapse occurs during exercise or is accompanied by persistent cognitive disturbance, abnormal breathing, marked hyperthermia, cardiac symptoms, focal neurologic findings or delayed recovery.

A practical event-side approach begins with ABCDE and immediate AED use when indicated, followed by focused assessment of cognition, timing, rectal core temperature, glucose and—when clinically appropriate and available—sodium and ECG. Treatment must be diagnosis-directed: rapid cooling for EHS, hypertonic saline for severe symptomatic EAH, CPR/defibrillation for cardiac arrest, and supportive positioning for uncomplicated EAC. Standardized protocols and better prospective surveillance could improve both safety and the quality of evidence in endurance-event medicine.

Declaration of the use of generative AI and AI-assisted technologies in the writing process

During the preparation of this manuscript, the author used ChatGPT (OpenAI) to assist with language refinement, improvement of clarity and readability, and manuscript structuring and formatting. After using this tool, the author critically reviewed and edited the content as needed and takes full responsibility for the final content of the manuscript.

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