

2025 Korean Guidelines for Cardiopulmonary Resuscitation: Part 11. First aid

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The 2025 Korean Guidelines for Cardiopulmonary Resuscitation include a first aid section developed through a systematic review and evidence appraisal. The revision aimed to strengthen pre-hospital first aid response capacity while reflecting the Korean healthcare system, field feasibility, and relevant legal and institutional contexts. The guidelines provide evidence-based recommendations for seven priority emergencies: adult chest pain suggestive of myocardial infarction, suspected acute ischemic stroke, asthma-related dyspnea, anaphylaxis, seizures, shock, and syncope. Core principles emphasize early recognition, prompt activation of emergency medical services, minimizing delays to definitive care, and safe condition-specific interventions. Key recommendations include assisting with patient-prescribed medications when appropriate (e.g., nitroglycerin, inhaled bronchodilators, and epinephrine autoinjectors), using structured stroke screening tools, preventing aspiration through proper positioning and withholding oral intake in patients at risk of dysphagia, administering oxygen only for hypoxemia, and initiating cardiopulmonary resuscitation in patients who are unconscious and not breathing normally. Seizure management focuses on safety and emergency medical services activation criteria, while care for shock and syncope emphasizes patient positioning and post-event assessment. These recommendations provide practical, evidence-based guidance for improving patient safety and outcomes in prehospital settings.

Keywords First aid; Emergencies; Guidelines

OVERVIEW

During the revision of the 2025 Korean Guidelines for Cardiopulmonary Resuscitation, the First Aid Task Force identified the most current scientific evidence through a systematic literature review and evidence appraisal. Based on this process, first aid was newly incorporated into the 2025 Korean guidelines. The revision aimed to strengthen the initial response capacity of first aid providers in prehospital settings. To develop these recommendations, the characteristics of the Korean healthcare system, real-world clinical and field applicability, and relevant legal and institutional considerations were comprehensively evaluated.

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FIRST AID FOR ADULTS WITH CHEST PAIN

Chest pain is a common symptom with diverse causes, ranging from minor chest wall contusions to pneumonia or myocardial infarction (heart attack) [1]. Because the causes of chest pain are diverse, distinguishing cardiac from noncardiac origins is often clinically challenging. Among patients presenting to the emergency department with nontraumatic chest pain, the proportion diagnosed with myocardial infarction varies by age, ranging from approximately 1% in individuals aged 18–44 years to about 4% in those aged 80 years or older [2]. Cardiac chest pain can lead to worse outcomes if diagnosis and treatment are delayed; therefore, early recognition and prompt management are critical [3,4]. Typical clinical manifestations of myocardial infarction include chest pain or pressure, dyspnea, nausea, diaphoresis, and pain radiating to the jaw, arm, or back. However, women, older adults, and patients with diabetes often present with atypical symptoms, such as jaw or abdominal pain, epigastric discomfort, shortness of breath, palpitations, or dizziness, thereby complicating the differential diagnosis [1,5–7].

When chest pain or similar symptoms suggestive of myocardial infarction occur, immediate activation of emergency medical services (EMS) is recommended as the highest-priority action (strong recommendation, low certainty of evidence) [8,9]. Transport by ambulance can significantly reduce ischemic time and treatment delays compared with private vehicle transport; Becker et al. [10] reported that 1 in 300 patients with chest pain transported by private vehicle experienced cardiac arrest before arriving at the hospital. For patients with cardiac chest pain diagnosed as angina who routinely carry nitroglycerin tablets or sublingual spray, administration at symptom onset is recommended (strong recommendation, high certainty of evidence) [11]. Nitroglycerin promotes venous dilation, reduces cardiac preload, decreases myocardial oxygen demand, and relieves chest pain. In Korea, level 1 emergency medical technicians may administer sublingual nitroglycerin under direct medical supervision during prehospital transport of patients with suspected cardiac chest pain, provided no contraindications are present, in accordance with the Enforcement Decree of the Emergency Medical Service Act [12].

FIRST AID FOR ADULTS WITH SUSPECTED ACUTE STROKE

Acute ischemic stroke is a time-sensitive neurological emergency in which patient prognosis is greatly influenced by the timing of treatment, and delays in early intervention adversely affect both

patient survival and neurological functional recovery. Reperfusion therapies, including intravenous thrombolysis and mechanical thrombectomy, have demonstrated significant clinical benefits, particularly when treatment is initiated promptly. Therefore, immediate activation of EMS and rapid transport of patients to a specialized medical facility capable of providing appropriate treatment are essential for improving patient outcomes [13,14].

For patients suspected of having an acute stroke, first aid providers are advised to place the patient in a safe and comfortable position and immediately call 119 (Korean EMS contact number) to activate EMS (strong recommendation, low certainty of evidence) [11]. Minimizing unnecessary stimulation, maintaining a stable environment, and continuously monitoring the patient's breathing and level of consciousness until EMS personnel arrive are essential, even if the patient is alert [11]. Food, water, and medications should not be administered orally, as patients with acute stroke have a high risk of dysphagia.

First aid providers are also recommended to use validated stroke screening tools for the early identification of suspected stroke, including the FAST (face, arm, speech, and time) assessment, BE-FAST (balance, eyes, and FAST) assessment, and Cincinnati Prehospital Stroke Scale (weak recommendation, low certainty of evidence) (Fig. 1, Table 1) [11–18].

The FAST assessment is widely recommended by both the American Heart Association and the European Resuscitation Council and was designed for rapid and easy use by laypersons. Specifically, this assessment emphasizes that the presence of facial paralysis or asymmetry (face), weakness in one arm (arm), or slurred or abnormal speech (speech) should prompt immediate contact with EMS (time) [11]. When used by EMS personnel, the FAST tool has been associated with reduced prehospital triage time, shorter time to thrombolysis, and improved diagnostic accuracy for stroke [15,16].

Some patients may present with atypical symptoms, such as dizziness, sudden gait disturbance, blurred vision, or severe headache, in addition to classic FAST symptoms. These atypical presentations are reported more frequently in women, older adults, and patients with diabetes [17,18]. Careful screening, rapid response, education, and awareness regarding the diverse clinical manifestations of stroke are essential in these high-risk populations.

For patients with acute stroke who exhibit hypoxemia, oxygen administration is recommended (strong recommendation, low certainty of evidence) [11,18]. Routine oxygen supplementation is not recommended for patients with an oxygen saturation of 94% or higher, as this does not provide clinically significant improvement or survival benefits and may increase the risk of tissue inju-



Fig. 1. FAST (face, arm, speech, and time) assessment for stroke identification. The 119 indicates the Korean emergency medical services contact number.

Table 1. Cincinnati Prehospital Stroke Scale (CPSS)

Sign of stroke	Description
Facial droop	Ask the patient to smile or show teeth and observe for asymmetry or drooping on one side of the face. Presence of facial asymmetry or unilateral weakness indicates an abnormal finding.
Arm drift	Ask the patient to close their eyes and extend both arms straight forward, palms up, and hold for 10 seconds. If one arm drifts downward or cannot be maintained, it is considered abnormal and suggests motor weakness.
Abnormal speech	Ask the patient to repeat a simple sentence and assess for clarity and coherence. Slurred speech, incorrect words, or inability to speak is considered abnormal.

The presence of one or more abnormal findings among the three components suggests a positive screen for possible stroke.

ry due to hyperoxia [11,19].

When first aid providers use more detailed screening tools that include blood glucose measurement, such as the Los Angeles Pre-hospital Stroke Screen or the Melbourne Ambulance Stroke Screen, significant improvements in the accuracy of acute stroke recognition have been reported [15,20]. However, because these tools require glucometers, professional training, and equipment accessibility, they present practical limitations for use by the general public. Therefore, for adults with suspected acute stroke, capillary blood glucose measurement is recommended only when a glucometer is immediately available on-site and its use does not delay EMS activation (weak recommendation, low certainty of evidence) [11].

USE OF BRONCHODILATORS FOR DYSPNEA CAUSED BY ASTHMA

Asthma is a chronic inflammatory disease of the airways that causes dyspnea, wheezing, cough, and chest tightness (discomfort), owing to reversible airway obstruction and airway hyperresponsiveness. Most patients with asthma carry prescribed inhaled bronchodilators (e.g., albuterol/salbutamol) for use during attacks. In emergencies, patients may have difficulty using these inhalers independently and may require assistance. In such cases, trained first aid providers are strongly recommended to assist patients with the proper use of their inhaled bronchodilators (strong recommendation, moderate certainty of evidence) [11,18,21].

When assisting a patient with an inhaled bronchodilator, using an inhaler with a spacer or a nebulizer is recommended rather than using the inhaler alone (weak recommendation, moderate certainty of evidence) (Fig. 2) [21]. If a commercially available spacer is unavailable, the conditional use of an improvised spacer is recommended to enable the patient to use the inhaled bronchodilator independently (weak recommendation, low certainty of evidence) (Fig. 3) [21].

First aid providers should receive education on the various methods of bronchodilator administration (good practice statement) [11]. Additionally, if a patient recognizes the onset of an asthma attack and has their inhaler available, assistance should be provided to enable proper use [11]. If the patient's condition does not improve or worsens, 119 should be activated immediately (good practice statement) [11]. As a precaution, bronchodilators should be administered only if prescribed to the patient,

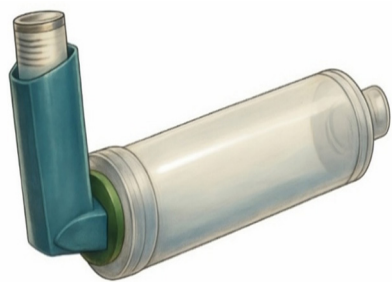


Fig. 2. Metered-dose inhaler (albuterol/salbutamol) with spacer.

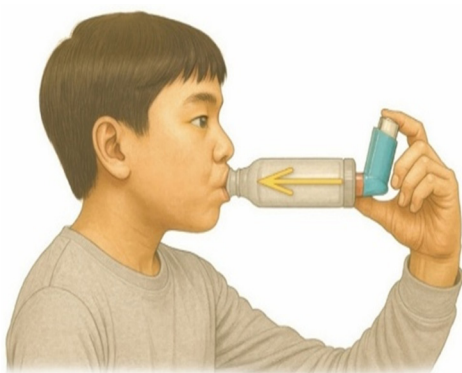


Fig. 3. Use of an improvised spacer with a metered-dose inhaler.

and inhalers belonging to others should not be used (strong recommendation, low certainty of evidence) [11,21].

ANAPHYLAXIS

Anaphylaxis is a life-threatening systemic allergic reaction that can be triggered by various factors, including food, medications, and insect venom. Its signs and symptoms include swelling of the lips and face, a sensation of throat obstruction, difficulty breathing, rash, vomiting, diarrhea, and hypotensive manifestations such as altered level of consciousness, pallor, and dizziness (Fig. 4).

The primary immediate treatment for anaphylaxis is intramuscular epinephrine injection, and administration using an epinephrine autoinjector in the first aid setting is strongly recommended (strong recommendation, high certainty of evidence) [22–24]. Epinephrine autoinjectors are primarily prescribed to individuals with a history of anaphylaxis for self-administration at the first sign of an anaphylactic reaction. Patients experiencing anaphylaxis may request assistance from first aid providers, such as emergency medical technicians or school nurses, to self-administer this medication. The International Liaison Committee on Resuscitation conducted scoping reviews on anaphylaxis in 2019

and 2022 [22,25]. Based on observational studies, an authoritative international consensus strongly recommended early intramuscular epinephrine administration into the lateral thigh as the first-line treatment for anaphylaxis, regardless of the triggering agent (strong recommendation, high certainty of evidence) [23,24,26–32].

Patients with anaphylaxis may be unable to use or operate an autoinjector because of dyspnea, hypotension, or altered mental status. In such cases, first aid providers, including level 1 emergency medical technicians (Enforcement Rule of the Emergency Medical Service Act, Article 33–3) and school nurses (School Health Act, Article 15–2), may assist the patient (expert consensus recommendation) [23,24,26–33]. An analysis of data from 147 emergency departments in Korea's National Emergency Department Information System (NEDIS) between 2007 and 2013 reported 23,313 visits for anaphylaxis during the study period, with incidence increasing from 3.0 per 100,000 population in 2007 to 11.6 in 2013, and the mortality rate rising 1.35-fold annually [34].

First aid providers should receive education on anaphylaxis and the proper use of epinephrine autoinjectors (good practice statement) [22,26]. If a patient with a history of anaphylaxis is able to use an epinephrine autoinjector, self-administration should be performed. First aid providers should assist individuals at risk of anaphylaxis in using the autoinjector when help is requested (Fig. 5). When symptoms of anaphylaxis develop, 119 should be activated immediately (good practice statement) [22,27]. If a patient does not respond to the initial dose of epinephrine and the arrival of first aid providers is delayed by 5 to 10 minutes, repeated administration may be performed (weak recommendation, low certainty of evidence) [35,36].

SEIZURES

A seizure is a transient clinical event caused by abnormally excessive or synchronous neuronal activity in the brain [37]. Seizures can present in various forms, including focal seizures with motor abnormalities confined to a specific body region, or generalized tonic-clonic seizures characterized by widespread muscle stiffening and repeated contractions [38]. When encountering a patient experiencing a generalized convulsive seizure, witnesses may feel startled and panicked; however, remaining calm and following structured guidance is recommended.

- (1) Remain beside the patient and calmly observe the entire course of the seizure (weak recommendation, low certainty

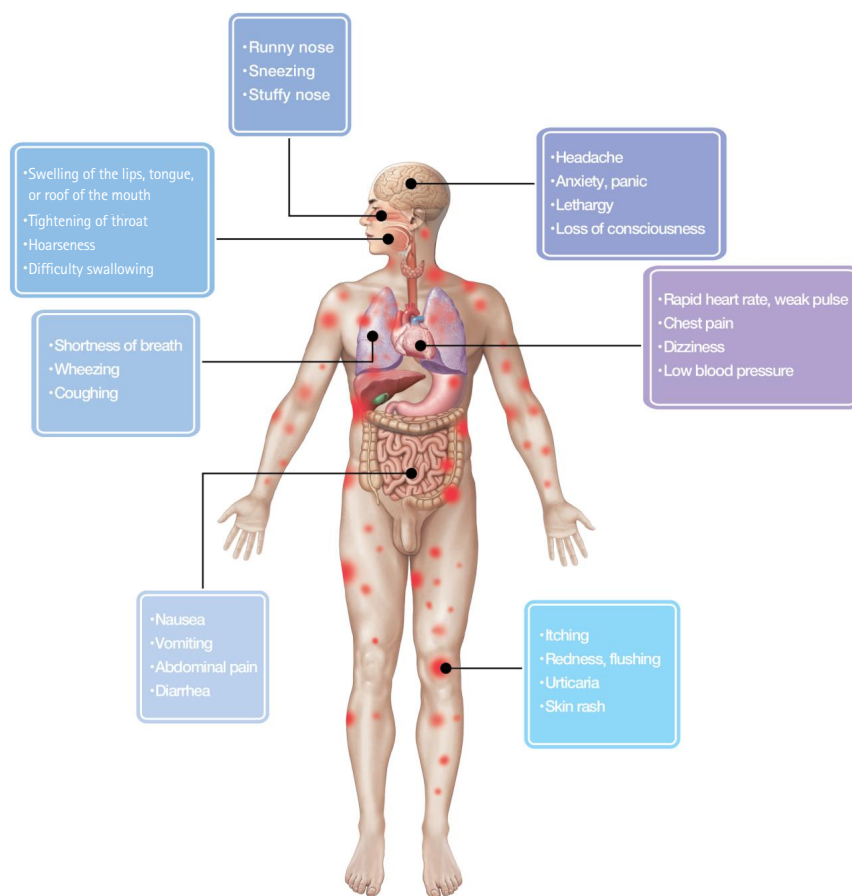


Fig. 4. Signs and symptoms of anaphylaxis.

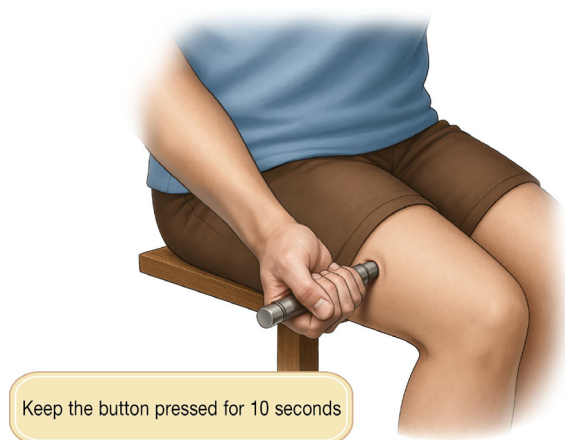


Fig. 5. Administration of epinephrine autoinjectors (e.g., Jext).

of evidence) [21,39–42].

- (2) Move the patient away from hazardous environments and remove nearby dangerous objects to prevent injury (good practice statement) [21,39–42].
- (3) Carefully turn the patient onto their side to prevent airway

obstruction or aspiration (weak recommendation, low certainty of evidence) [21,39–42].

- (4) Place a soft object under the patient's head (weak recommendation, low certainty of evidence) [39,40,42].
- (5) Loosen the patient's clothing and remove dentures, objects that may obstruct the airway, or glasses (weak recommendation, low certainty of evidence) [39,40,41].
- (6) Avoid physically restraining the patient, as this may cause injury (weak recommendation, low certainty of evidence) [21,39–42].
- (7) Do not place objects in the patient's mouth to prevent tongue biting, as this is unnecessary and may cause choking (weak recommendation, low certainty of evidence) [21,39–42].
- (8) Avoid inserting hands deeply into the mouth to remove oral secretions or vomitus because of the risk of being bitten by the patient (weak recommendation, low certainty of evidence) [41].
- (9) Do not administer anticonvulsants or antipyretics during the seizure (weak recommendation, moderate certainty of

evidence) [41–43].

- (10) When possible, witnesses should record detailed information about the seizure, including symptoms, onset time, and duration, to assist in diagnosis and subsequent treatment decisions (weak recommendation, low certainty of evidence) [40–42].
- (11) Activate 119 in the following situations (weak recommendation, low certainty of evidence) [21]:
- First seizure with no prior history of seizures
 - Seizure lasting longer than 5 minutes
 - Another seizure occurring before recovery of consciousness from the previous seizure
 - Breathing difficulty, choking, or seizure occurring in water
 - Presence of trauma
 - Pregnancy or age younger than 6 months
 - Failure to regain consciousness within 5 to 10 minutes after the seizure stops

If the patient is unconscious and not breathing normally, cardiac arrest may be present; therefore, cardiopulmonary resuscitation (CPR) should be initiated immediately. Furthermore, call 119 and follow the instructions of emergency personnel (good practice statement) [44,45].

SHOCK

Shock is a state of circulatory failure in which oxygen and nutrients are inadequately delivered to tissues. Shock may result from decreased intravascular volume due to internal or external fluid loss, reduced cardiac pumping capacity, obstruction of the circulatory pathway, or decreased peripheral vascular resistance. Patients experiencing shock may present with dizziness, dyspnea, chest discomfort, cold and clammy skin, pallor or cyanosis, and, in severe cases, altered consciousness that may become life-threatening. First aid providers should maintain an appropriate position to prevent further deterioration of the patient's condition and ensure stable blood flow to vital organs, particularly the brain [21,46]. To maintain stable perfusion of major organs, the following positions are recommended.

Supine position

For patients with shock, unnecessary movement should be minimized, and maintaining a supine position whenever possible is recommended (weak recommendation, low certainty of evidence; Fig. 6) [47]. An observational study reported that the supine posi-

tion was associated with improvements in cardiac index and stabilization of heart rate compared with the upright position [47].

Recovery position

For nontraumatic patients with shock who are at risk of airway obstruction (e.g., due to vomiting or aspiration) or who have decreased levels of consciousness, the recovery position is recommended. Positioning patients with spontaneous breathing but reduced responsiveness in the recovery position is effective for airway protection and may reduce the risk of aspiration (weak recommendation, low certainty of evidence) [21,48].

Passive leg raising

Passive leg raising may be considered in patients with shock who do not have trauma or spinal injury (Fig. 7). When performed, passive leg raising has been shown to produce transient increases in cardiac output and mean arterial pressure, typically lasting ≤ 7 minutes. Although this maneuver may provide short-term hemodynamic improvement, evidence supporting the persistence of its effect and its clinical significance is limited. Consequently, passive leg raising is not recommended as a routine standard procedure (very weak recommendation, low certainty of evidence) [49–51]. However, in patients without trauma and at low risk of spinal injury, it may be used as a temporary measure to support perfusion of the brain and other vital organs. If the patient experiences discomfort or dyspnea, or if clinical deterioration occurs, the patient should be returned to the supine position (very weak recommendation, very low certainty of evidence) [21,51].



Fig. 6. Supine position.



Fig. 7. Passive leg raising.

SYNCOPE

Syncope results from a transient reduction in cerebral blood flow, with consciousness typically recovering rapidly once perfusion is restored [52]. Common etiologies include reflex syncope, orthostatic hypotensive syncope, and cardiac syncope. Reflex syncope is the most prevalent form and encompasses vasovagal syncope, which may be triggered by intense emotional stress (e.g., fear or severe pain), as well as situational syncope associated with activities such as defecation or coughing. Orthostatic syncope occurs when systolic blood pressure drops significantly upon rapid transition to an upright posture. Cardiac syncope is associated with cardiac arrhythmias or ischemic heart disease and may be life-threatening [52–54]. Because syncope involves transient loss of consciousness and postural tone, it must be differentiated from other conditions such as epilepsy, psychiatric disorders, cerebrovascular disease, and hypoglycemia [53]. Although syncope itself warrants further evaluation, secondary injuries such as head trauma or fractures may occur due to loss of consciousness; therefore, caution is advised (good practice statement) [21,55].

In many cases, syncope is preceded by several seconds of prodromal symptoms, collectively referred to as presyncope. These symptoms may include dizziness, weakness, visual dimming, nausea, diaphoresis, and pallor, and they are particularly common in reflex syncope, such as vasovagal syncope. In such cases, it is suggested that the individual immediately assume a safe position, such as sitting or lying down (weak recommendation, low certainty of evidence) [21].

When witnessing an episode of syncope, the individual's level of consciousness and breathing should be promptly assessed. If the patient is unconscious and not breathing normally, 119 should be activated, and CPR initiated (strong recommendation, low certainty of evidence) [21]. If CPR is not required but the patient remains unconscious or is vomiting, placement in the recovery position is suggested to reduce the risk of airway obstruction (weak recommendation, low certainty of evidence) [48].

After recovery, the patient should avoid sudden standing up and rest for several minutes. When appropriate, further evaluation, such as detailed cardiac examination, neurological assessment, or psychological evaluation, should be recommended based on the suspected etiology (good practice statement) [52–54].

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Conflicts of interest

Sung Phil Chung, Chun Song Youn, Mi Jin Lee, Jisook Lee, and Sung Oh Hwang are editorial board members of this journal, but were not involved in the peer reviewer selection, evaluation, or decision process of this article. The authors have no other conflicts of interest to declare.

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Data availability

Data sharing is not applicable as no new data were created or analyzed in this study.

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