

Guideline

Heatstroke management during the COVID-19 epidemic: recommendations from the experts in Japan

Working group on heatstroke medical care during the COVID-19 epidemic (Japanese Association for Acute Medicine, Japanese Society for Emergency Medicine, Japanese Association for Infectious Diseases, Japanese Respiratory Society)

Fever and hyperthermia are the main symptoms of coronavirus disease (COVID-19) and heatstroke, and it is difficult to distinguish them. There is a need to discuss safe prevention and medical treatment for heatstroke. In view of the above issues, the Japanese Association for Acute Medicine “Committee on heatstroke and hypothermia” established a “Working group on heatstroke medical care given the COVID-19 epidemic” jointly with the Japanese Society for Emergency Medicine that focuses on emergency medical personnel, including paramedics and nurses, the Japanese Association for Infectious Diseases, an academic society of infectious disease, and the Japanese Respiratory Society, an academic organization on respiratory diseases. The precautions for prevention of heatstroke this summer during the coronavirus epidemic was summarized in “Proposals on heatstroke prevention based on the COVID-19 epidemic” as follows and was issued on 1 June, 2020. Based on the above, we have determined that guidance in clinical practice is necessary not only from the viewpoint of heatstroke prevention, but also medical treatment. As such, we have created this guidance in the form of supplementary recommendations.

Key words: COVID-19, diagnosis, heatstroke, prevention, treatment

INTRODUCTION

THE “new lifestyle” needed to prevent the spread of coronavirus disease (COVID-19) was presented by the New Coronavirus Infectious Diseases Experts’ Meeting. Its practice is required while COVID-19 continues to spread.

In the new lifestyle, there are also important things to consider from the viewpoint of heatstroke measures, such as adequate room ventilation, wearing masks, and ensuring physical distancing (to physically keep the distance between people). It is feared that this could cause difficulty and confusion in preventing both the spread of COVID-19 as well as heatstroke.

However, as fever and hyperthermia are the main symptoms of COVID-19 and heatstroke, it is difficult to distinguish them. There is a need to discuss safe prevention and medical treatment for heatstroke.

In view of the above issues, the Japanese Association for Acute Medicine’s Committee on Heatstroke and Hypothermia established a working group on heatstroke medical care given the COVID-19 epidemic, jointly with the Japanese Society for Emergency Medicine, which focuses on emergency medical personnel including paramedics and nurses, the Japanese Association for Infectious Diseases, an academic society of infectious disease, and the Japanese Respiratory Society, an academic organization on respiratory diseases. The precautions for prevention of heatstroke this summer during the coronavirus epidemic was summarized in “Proposals on heatstroke prevention based on the COVID-19 epidemic” as follows and was issued on 1 June, 2020.

RECOMMENDATIONS

1. When indoors, frequently check the room temperature by carefully adjusting the temperature of the air conditioner while giving due consideration to indoor ventilation.
2. Wearing a mask puts a strain on the body when outdoors. Therefore, it is important to take off the mask and take a break. However, mask use is important for infection control. When removing it, consider physical distancing from others and pay sufficient attention to the

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surrounding environment. Also, drink water frequently regardless of your level of thirst.

3. It is dangerous when the body is not accustomed to the heat. While keeping in mind physical distancing, we must become accustomed to the heat slowly by exercising indoors and outdoors.
4. Pay particular attention to people vulnerable to heatstroke (elderly people living alone and people with disabilities in activities of daily living) and stay connected with them frequently to prevent social isolation.
5. Manage your everyday health and keep observation records. If you think something is wrong, contact or consult the local "Returnee/Contact Person Consultation Center" or the nearest medical institution.

BASED ON THE above, we have determined that guidance in clinical practice is necessary not only from the viewpoint of heatstroke prevention, but also from the viewpoint of medical treatment. As such, we have created this guidance in the form of supplementary recommendations.

As we have not experienced COVID-19 during the summer, there are no published reports that directly examine the relationship between heatstroke and COVID-19. Scientific evidence in creating this guidance remains limited and this limitation cannot be denied. Therefore, we would like to add that this guide is for the present moment and could be updated in the future.

We would like to express our gratitude to the Task Force for putting this together in detail by extracting information from 2,736 published reports from Japan and overseas, despite limited information, while maintaining their daily medical care obligations.

This working group, centered on the Japanese Association for Acute Medicine, the Japanese Society for Emergency Medicine, the Japanese Association for Infectious Diseases, and the Japanese Respiratory Society, will continue to collect information for improving heatstroke prevention and treatment this summer. We ask for your continued understanding and cooperation so that everyone can have a safe and secure summer season.

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CLINICAL QUESTIONS AND ANSWERS

Prevention (masks and air conditioners)

CLINICAL QUESTION (Q): What are the precautions for wearing a mask to prevent heatstroke?

Answer (A): When wearing a mask, it is desirable to avoid long-term exercise of 1 h or more.

Q: How should an air conditioner be used to prevent heatstroke while avoiding a "closed" space for COVID-19 prevention?

A: Indoor temperature rises due to ventilation. As such, it is desirable to make adjustments such as lowering the temperature setting of the air conditioner so that both heatstroke measures and COVID-19 measures are compatible.

Diagnosis (clinical symptoms, blood test, computed tomography)

Q: Can heatstroke and COVID-19 be distinguished from clinical symptoms?

A: Respiratory symptoms and olfactory/taste disorders are suspected to be symptoms of COVID-19, but it is difficult to distinguish COVID-19 from heatstroke only from clinical symptoms.

Q: Is a blood test useful for distinguishing between heatstroke and COVID-19?

A: There are no useful blood tests for distinguishing between the two.

Q: Is a computed tomography (CT) examination of patients suspected of heatstroke due to hyperthermia and consciousness disorder useful for differential diagnosis of COVID-19?

A: Although it is not useful for definitive diagnosis, it could play a certain role in excluding the diagnosis. Therefore, it is desirable to undertake CT examination as a screening test, especially in patients suspected of having COVID-19.

Treatment (cooling method)

Q: Can the patient be cooled using evaporative plus convective cooling, as in the past?

A: In principle, the evaporative plus convective cooling method should not be used. It is desirable to select a cooling method that is an alternative to the evaporative plus convective cooling method, depending on the

experience of use and preparation conditions at each facility.

SELECTION OF DOCUMENTS

AS COVID-19 had not occurred last summer, we could not search for published reports that directly examined the influence of COVID-19 on heatstroke prevention and treatments. Therefore, we selected and created a basic set of articles for each of them.

According to the clinical study issues raised by the Task Force, we further selected and extracted documents from each basic set. Regarding issues that could not be retrieved by basic set extraction, necessary documents were collected based on the guidance of government agencies and related academic societies and expert advice.

Heatstroke basic set

Screening was carried out according to the following selection criteria to create a basic set.

(i) Primary selection

From the Japan Medical Abstracts Society's Ichushi Web, Medline, and Cochrane, 2,591 cases were extracted by the search formula of heatstroke (HEAT STRESS DISORDERS, HEATSTROKE, HEAT ILLNESS, HEAT ATTACK, HEAT CRAMP, HEAT EXHAUSTION, SUN STROKE) × human (excluding animals).

(ii) Secondary selection

Of the 2,591 primary selections, 811 were selected, excluding those without abstracts, those classified as Q&A/special features, explanations, explanations/special features on the Japan Medical Abstracts Society's Ichushi-Web, and documents prior to the year 1999.

(iii) Tertiary selection

This was managed by nine members of the Japanese Association for Acute Medicine and committee on heatstroke and hypothermia. Two members independently screened abstracts of the secondary selections to select reports for the next step. When they disagreed on the judgement, the Editor-in-Chief made a decision. Of the 811 secondary selections, 411 were selected based on the abstract that was adopted by at least two of the three members, including the Editor-in-Chief.

(iv) Quaternary selection

Eleven members of the Japanese Association for Acute Medicine and the committee for heatstroke and hypothermia were in charge. Full-text papers were obtained for the 411 tertiary selections, with the cooperation of the Teikyo University Library and the Central Asahi General Hospital Library, and the actual documents were ordered. After full-text screening by two members (the Editor-in-Chief resolved their disagreements), 356 papers were selected.

Reference selection criteria

In the tertiary and quaternary selections, the committee members examined whether the abstracts and full-text documents met the selection criteria below. Documents published in languages other than Japanese and English were not accepted because they could not be sufficiently understood.

Meta-analyses and systematic reviews

Only meta-analyses and systematic reviews were accepted, and narrative reviews were excluded.

Controlled trials

Studies in which a control group was set up and compared were included, even if they were not randomly assigned.

Observational studies targeting more than 50 actual patients

In case series, we accepted those with 50 or more subjects, regardless of the genre of research such as biomarkers (prognostic factors), treatment methods, and prevention methods. For observational studies comparing patients and healthy controls, we accepted those with a total of 50 participants, including both patients and healthy controls. Furthermore, epidemiological studies that indicated the number of patients and the number of deaths were judged to have more than 50 subjects and accepted. We also accepted questionnaire surveys with more than 50 respondents. Studies involving only meteorological conditions such as WetBulb Globe Temperature were not included because they did not cover actual patients.

Experimental research

Experimental research (regardless of the number of subjects) targeting healthy people (including volunteers) was accepted regardless of the number of subjects.

COVID-19 basic set

In the selection process below, screening was carried out, and a basic set was created.

Primary selection

One hundred and forty-five cases were extracted from PubMed using the search formula of COVID-19 × systematic review.

Secondary selection

Of the 145 primary selections, 119 were selected excluding duplicates without abstracts.

Selection of published works on clinical questions

Primary selection

This was managed by 19 people in the Editorial Committee. Two committee members independently screened the abstracts and judged whether they were selected for the next step. The Editor-in-Chief resolved any disagreements.

Secondary selection

This was managed by 19 people in the Editorial Committee. Two members screened the obtained full-text papers to judge whether they were accepted. The Editor-in-Chief resolved any disagreements.

PREVENTION (MASK)

Q: WHAT ARE the precautions for wearing a mask to prevent heatstroke?

A: When wearing a mask, it is desirable to avoid long-term exercise of 1 h or more.

Explanation

Although there were no relevant heatstroke-related papers, we examined surgical masks that are similar to commonly used masks.

In a study of resting volunteers wearing 62 surgical masks and 31 N95 masks, N95 masks showed a statistically significant increase in oral and eardrum temperatures 30 min after wearing the mask, but not with a surgical mask.¹ However, regarding exertion, in a study comparing the presence or absence of a mask in 20 people who exercised on a treadmill at 5.6 km/h for 1 h, in a group wearing a mask, heart rate,

respiratory rate, and percutaneous carbon dioxide partial pressure and exposed face temperature were significantly increased. In particular, the fact that the facial temperature inside the mask had risen by 1.76°C should be noted.² A study of 87 medical workers wearing surgical masks and N95 masks for 3 h also showed increased discomfort with both masks. An increased nasal resistance did not recover for at least 90 min after mask removal.³

From the above research reports, it is not possible to say that wearing a surgical mask at rest for a short time (less than 30 min) does not raise the central temperature, and that wearing a mask causes heatstroke. However, it cannot be denied that wearing a surgical mask during prolonged exercise (more than 1 h) could indirectly cause heatstroke due to its effects on cardiopulmonary function. Therefore, when wearing a mask, it is desirable to avoid prolonged use (1 h or more) during exercise.

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PREVENTION (AIR CONDITIONERS)

Q: HOW SHOULD an air conditioner be used to prevent heatstroke while avoiding a “closed” space in COVID-19 prevention?

A: Indoor temperature rises due to ventilation. As such, it is desirable to make adjustments such as lowering the temperature setting of the air conditioner so that both heatstroke measures and COVID-19 measures are compatible.

Explanation

Twelve papers related to heatstroke were considered.

The usefulness of air conditioners was reported in nine of the 12 papers considered in this analysis.^{1–9} Only three papers mentioned the actual air conditioner settings, and the temperature settings were 22.2°C ± 0.6°C,¹ 24.0°C ± 1.4°C,² and 28.6°C ± 1.6°C,³ respectively.

Although it was not possible to identify a room temperature setting that is effective in preventing heatstroke occurrence, it can be said from these reports that air conditioners are effective in preventing heatstroke.

“COOL BIZ” is a campaign that the Ministry of the Environment has been promoting since 2015. It proposes a lifestyle that encourages light clothing and efforts that allow you to spend time comfortably even at a room temperature of 28°C while using an air conditioner. This indicates that the guideline for room temperature control that does not overcool in a reasonable range is 28°C. It does not show the standard of the room temperature setting of an air conditioner.

For infection control against COVID-19 (preventing the three Cs: closed spaces, crowded spaces, and close-contact settings), frequent ventilation is necessary to prevent a “closed” space. However, there was no clear evidence on how much ventilation is appropriate, and in that case, how much the room temperature would increase by ventilation.

The Ministry of Health, Labor and Welfare issued the following guidelines: “Points to note regarding heatstroke prevention behavior in 2020”, “Heatstroke prevention in ‘a new lifestyle’ with COVID-19”, and “Ventilation method for improving ‘closed space with poor ventilation’ with attention to heatstroke prevention.” In these, the recommended ventilation method is as follows: to keep the room temperature and relative humidity below 28°C and 70%, respectively, always open two-way windows as much as possible and continuously let air pass through the room. However, it is not possible to uniformly predict how much the room temperature will rise when ventilation is provided in the living room. Therefore, it is desirable to make temperature adjustments frequently, such as by lowering the temperature setting.

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DIAGNOSIS (CLINICAL SYMPTOMS)

Q: CAN HEATSTROKE and COVID-19 be distinguished from clinical symptoms?

A: COVID-19 is suspected when olfactory disorder and taste disorder are observed, but it is difficult to distinguish COVID-19 from heatstroke only from clinical symptoms.

Explanation

Through primary and secondary extraction, 35 papers on clinical symptoms of heatstroke and 14 papers on clinical symptoms of COVID-19 were extracted.

In heatstroke, symptoms such as sweating, thirst, lethargy and malaise, dizziness, headache, nausea/vomiting, muscle aches and muscle cramps, and disturbance of consciousness are seen.^{1,2} In COVID-19, fever, respiratory symptoms (cough, sore throat, nasal discharge, and nasal congestion), headache, malaise, and olfactory and taste disorders are seen.³

Heatstroke often accompanies hyperthermia, but COVID-19 symptoms also include fever with a high probability of 83.3–91.3%.^{4,5} It has also been reported that 9% of COVID-19 patients suffered from disturbance of consciousness, common in third-degree heatstroke.⁶ In addition, fatigue, headache, and muscle pain, often seen in first- and second-degree heatstroke, were reported in 35.5–51.0%,^{5,7} 6.5–34.0%,^{8,9} and 11.0–35.5%^{6,7} of COVID-19 cases, respectively. Gastrointestinal disorders and nausea and vomiting were seen in 15.0–17.6%^{10,11} and 5.2–7.8% of cases, respectively.^{12,13}

However, the main symptom of COVID-19 is respiratory. It has been reported that, even in severe heatstroke, tachypnea was seen in 38.4–40.0%,^{1,14} dyspnea in 71.4%,¹⁵ and SpO₂ decrease in 21.0% of cases.¹⁶ COVID-19 is known to have olfactory and taste disorders as characteristic early symptoms. A systematic review of 10 papers reported that olfactory disorder was observed in 52.7% and taste disorder in 43.9% of COVID-19 cases.¹⁷ There was no report on olfactory or taste disorders as specific symptoms of heatstroke.

From the above, COVID-19 is suspected when olfactory disorder and taste disorder are recognized, but it is difficult to distinguish COVID-19 from heatstroke only from clinical symptoms.

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DIAGNOSIS (BLOOD TEST)

Q: IS A blood test useful for distinguishing between heatstroke and COVID-19?

A: There are no useful blood test items for distinguishing between the two.

Explanation

We examined 14 papers related to heatstroke and four papers related to COVID-19. At the time of the search of published reports, there were no studies on blood collection items for the purpose of differentiating COVID-19 from heatstroke.

In heatstroke, liver damage, renal damage, and coagulopathy are observed as the severity progresses. These are included in the definition of heatstroke severity classification

III (most severe). In contrast, according to the Guideline for New Coronavirus Infectious Diseases Treatment 2020, 2nd Edition, a decrease in lymphocyte count, an increase in C-reactive protein (CRP), an increase in ferritin, D-dimer, and lactate dehydrogenase (LDH) are identified as aggravating or poor prognostic factors in patients with moderate disease. Abnormal values of these test items, except for “decreased lymphocyte count” and “increased CRP,” were reported at a certain rate in the heatstroke studies examined at this time.

Elevated ferritin has been reported to occur in 26.4% of exertional heatstroke.¹ However, none of the studies on COVID-19 had targeted ferritin.

Elevated D-dimer in heatstroke was reported as disseminated intravascular coagulation (DIC) and was observed in each observational study at a rate of 2.8–21.7%.^{2–4} In the meta-analysis of COVID-19 that was the subject of this study, it was reported that the D-dimer increase was 29.3% (95% confidence interval [CI], 4.8–61.6; $I^2 = 0.95$).⁵

Elevated blood LDH was reported in observation studies in heatstroke within the range of 4.5–16.2%.^{1,6,7} In the meta-analysis for COVID-19, the heterogeneity of the target studies was high, but 51.6% (95% CI, 31.4–71.6; $I^2 = 0.93$)⁵ to 57.0% (95% CI, 38.0–76.0; $P < 0.001$; $I^2 = 0.93$)⁸ was associated with elevated blood LDH. The decrease in the number of lymphocytes in COVID-19 was reported as 43.1% (95% CI, 18.9–67.3; $I^2 = 0.979$),⁹ 57.4% (95% CI, 44.8–69.5; $I^2 = 0.94$),⁵ and 59%.¹⁰ Although it is possible that COVID-19 could be used as a cause of the severity of LDH and the number of lymphocytes, all studies have problems, such as high heterogeneity and targeting the perinatal period. In addition, at present, no comparative studies have been undertaken with heatstroke, and these items alone cannot lead to recommendation as a differential test.

Regarding the increase in CRP, the study that examined both heatstroke and COVID-19 did not mention the percentage of outliers.

In addition, an increase in creatine kinase (CK) was noted as a characteristic item in observational studies of heatstroke.^{1,2,6,7,11–13} However, the rate of increase in CK due to heatstroke is in a wide range, from 7.9% to 92%. In addition, the study target has a wide age range, and there are studies that include soldiers during military training as well as the general public. Therefore, they could not be interpreted as the same subject, and the ratio with abnormal CK value could not be generalized. For COVID-19, a study that examined CK elevation observed a rate of 10.8% (95% CI, 3.1–21.5; $I^2 = 0.92$)⁵ and 21.3% (95% CI, 3.2–39.4; $P = 0.021$; $I^2 = 81.4$).⁹ However, it is difficult to evaluate the findings as the target studies are highly heterogeneous.

Regarding electrolyte abnormalities presumed to occur in heatstroke, neither hyper/hyponatremia nor hyper/hypokalemia have shown the characteristic results of exertional and non-exertional heatstroke. In addition, no studies have examined electrolyte abnormalities for COVID-19.

From the above, although there are test items, diagnostic scores, and prognostic scores that could be identified for differentiation of heatstroke and COVID-19 in the future, at present, biomarkers leading to the differentiation of heatstroke and COVID-19 are not clear. In addition, the biomarker considered to be specific to COVID-19 could not be identified by this analysis.

Regarding heatstroke itself, we could not identify a biomarker that was considered to be specific, because there was a problem in this study in that exertional and non-exertional cases were mixed.

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DIAGNOSIS (CT EXAMINATION)

Q: IS CT examination of patients suspected of heatstroke due to hyperthermia and consciousness disorder useful for differential diagnosis of COVID-19?

A: Although it is less useful for definitive diagnosis, it is desirable to undertake CT examination as a screening test because it can play a certain role in exclusion diagnosis.

Explanation

Heatstroke is a “general term for conditions caused by impaired physical adaptation in hot environments,” and is diagnosed by excluding other diseases that present with fever.¹ During the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) epidemic, COVID-19 will be included in the diseases to be differentiated. This could lead to an excessive burden on the emergency medical field and delay in the start of treatment. Therefore, we studied how useful CT examination is for differential diagnosis of COVID-19 in patients with hyperthermia and consciousness disorder who were suspected of heatstroke.

We examined six papers^{2–7} related to COVID-19. There was no report on the sensitivity and specificity of chest CT limited to COVID-19 patients with hyperthermia and consciousness disorder that becomes problematic in the differentiation from heatstroke.

The diagnostic sensitivity of chest CT for COVID-19 overall (including mild and asymptomatic persons) was approximately 90%, but the specificity was low at 30%. The positive odds of COVID-19 in the presence of chest CT findings were 1.28 (0.9/0.7) times that of pre-test levels, and its usefulness for definitive diagnosis is low. However, CT examination shows relatively characteristic imaging findings such as peripheral dominance, bilateral lesion distribution, ground-glass opacities, and interlobular thickening.^{2–4} In

some cases, it could help the diagnosis in hyperthermic patients suspected of COVID-19. However, in the absence of findings on chest CT, the positive odds of COVID-19 decreased by 0.33 (0.1/0.3) times before the test and could play a certain role in the exclusion diagnosis. It is therefore recommended to carry out chest CT as a screening test.⁵ However, even if there is no particular finding on chest CT, the odds after the test do not become zero. To remove the suspicion of COVID-19, the prevalence of COVID-19 (pre-test odds), clinical symptoms, gene amplification tests such as polymerase chain reaction test, and antigen test results must be comprehensively and carefully considered on implementation.^{6,7}

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TREATMENT (COOLING METHOD)

Q: CAN THE patient be cooled using evaporative plus convective cooling as in the past?

A: As a general rule, the evaporative plus convective cooling should not be used. It is desirable to select a cooling method that is an alternative to the evaporative plus convective cooling method, depending on the experience of use and preparation conditions at each facility.

Explanation

Twelve papers related to heatstroke were considered.

COVID-19 cannot be ruled out in patients with hyperthermia and impaired consciousness by clinical symptoms or CT findings alone. Therefore, while suspecting COVID-19, active whole body cooling must be carried out as an initial medical treatment for heatstroke. The causative virus of COVID-19, SARS-CoV-2, is abundant in sputum, nasopharynx, and saliva. COVID-19 is diagnosed by detecting SARS-CoV-2 by polymerase chain reaction at the same site. However, SARS-CoV-2 is also found in stool, urine, and blood, and it was also reported that it was detected in feces for 22 days, upper respiratory tract for 18 days, and blood for approximately 16 days.¹ Severe heatstroke patients are often contaminated with urine/fecal incontinence, and when suspecting COVID-19, it should be assumed that SARS-CoV-2 is present on the body surface or exhaled breath. It was also reported that SARS-CoV-2 survived for several hours in airborne aerosols, suggesting that COVID-19 could be spread by infection with microparticles or vectors.²

Cooling methods for heatstroke patients include evaporative plus convective cooling, cold water immersion, cold water shower, local cooling, intravascular cooling, and cooling methods using devices such as cooling mats. However, it should be noted that, in all cases, health-care workers are at risk of contact infection, and standard precautions, such as wearing personal protective equipment, should be strictly followed.

For non-exertional heatstroke patients whose condition developed in daily life, evaporative cooling could be used to rapidly cool the whole body. The evaporative plus convective cooling is a method in which the surface of the whole body is moistened with lukewarm water by sprays or misters, and then the moisture is evaporated with an electric fan or a fan to remove the heat of vaporization from the body surface and cool the body from the outside. This has been widely used in Japan. However, when the evaporative cooling method with a fan is carried out, SARS-CoV-2 existing on the body surface and exhaled breath is taken into the aerosol generated by the evaporation of water from the body surface. Using the air flow generated by the fan, there is no denying the risk of spreading to a wide range of emergency departments and hospitals. For normal contact infection prevention, it is important for medical personnel who are in direct medical care to take appropriate infection control measures. However, considering the potentially wide area of infection by aerosols, the risk of infection also spreads to medical staff not directly involved in care, as well as other patients. In the present situation where there are no

published reports that examine the safety of evaporative plus convective cooling, the evaporative plus convective cooling method should not be used in principle and alternative cooling methods should be considered.

From the comparison of cooling rates, recommended alternative cooling methods that do not use evaporative plus convective cooling include cold water immersion,^{3–6} cold water shower,⁷ local cooling,⁸ intravascular cooling,⁹ and devices such as a cooling mat.^{6,10} There were many reports that cold water immersion was effective in cooling the whole body or a part of the body. However, there were many studies on exertional heatstroke in athletes and healthy adult volunteers, and the use of cooling in hospitals requires elaboration.^{3,11–13} Regarding cooling devices such as intravascular cooling and cooling mats, the performance varies depending on the manufacturer and product, and not all products can be recommended. It is desirable to select a cooling method that is an alternative to the evaporative plus convective cooling method, depending on the experience of use and preparation conditions at each facility.

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APPENDIX 1

Working group on heatstroke medical care during the COVID-19 epidemic.

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DISCLOSURE

Approval of the research protocol: N/A.

Informed consent: N/A.

Registry and registration no. of the study/trial: N/A.

Animal studies: N/A.

Conflict of interest: None.

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