

Study on the Effectiveness of Systematic Emergency Intervention Process on the Life-Saving Care of Heat Stroke Patients

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Abstract: Objective to investigate the clinical effects of pre-hospital and in-hospital emergency care on heat-stroke patients. **Methods** 106 heatstroke patients admitted to our hospital from January 2020 to January 2021 were divided into two groups: nursing group (53 cases): conventional nursing + pre-hospital emergency nursing + in-hospital emergency nursing of integrated systematic emergency intervention process for heatstroke nursing intervention; control group (53 cases): conventional nursing for heatstroke nursing intervention; comparison of blood gas analysis index data and satisfaction data between the groups. **Results** The respiratory rate (21.95 ± 3.25)/min, heart rate (74.99 ± 5.65)/min, PaCO₂ (38.75 ± 6.52)mmHg in the nursing group were significantly lower than those in the control group (28.58 ± 3.22)/min, (99.52 ± 2.59)mmHg and (51.25 ± 4.49)mmHg, pH (7.39 ± 0.06) and PaO₂ (79.25 ± 2.49) mmHg were significantly higher than those of the control group (7.31 ± 0.05) and (74.59 ± 1.25) mmHg ($P<0.05$), and the satisfaction of patients with heat stroke in the treatment group (96.23%) was significantly higher than that of the control group (79.25%) ($P<0.05$). **Conclusion** Effective use of pre-hospital emergency care and in-hospital emergency care can significantly improve the blood gas analysis indexes of heatstroke patients, increase patients' satisfaction, and ultimately achieve effective prognosis for heatstroke patients.

Keywords: Heat stroke; Complication; Nursing

1. Introduction

Heat stroke is a type of human dysfunction, mainly caused by long-term work in high temperatures [1]. These patients have a certain degree of decreased thermoregulatory function, mainly focused on dry skin and hyperthermia. If not treated accordingly in the first instance, this can have serious consequences for the patient. It is of significant importance to reduce the body temperature of patients by adopting effective methods. This study will analyze the feasibility of pre-hospital and in-hospital emergency care for patients with heat stroke in order to achieve an effective prognosis for patients with heat stroke.

2. Materials and Methods

2.1. General information

Methods: The 106 cases of heatstroke patients admitted to our hospital from November 2017 to January 2020 were divided into nursing group (53 cases): 22 female and 31 male, age 27-79 years old, average (52.39 ± 6.52) years old; control group (53 cases): 23 female and 30 male, age 28-82 years old, average (52.42 ± 6.53) years old; inclusion criteria. ① abnormal skin temperature; exclusion criteria: ① poor nursing cooperation; ② other

organic diseases; gender and age were significantly balanced between the two groups ($P>0.05$).

2.2. Observation indexes

The main symptoms of patients with aura heatstroke were: body temperature not exceeding 38.5°C , sweating, chest tightness, palpitation, dizziness, inattention, and numbness of limbs; the main symptoms of patients with mild heatstroke were: body temperature 38.5°C - 40°C , wet and cold skin, sweating, red or pale face, body weakness, fast heart rate, weak pulse, decreased blood pressure, and oliguria; the main symptoms of severe heatstroke were: body temperature above 40°C in addition to the above symptoms, but also accompanied by irritability, loss of consciousness and shock.

2.3. Methods

Control group: Heatstroke care intervention was carried out using conventional care methods. After receiving the emergency call, the timeliness of consultation was ensured and the conventional mode of tandem operation was fully integrated. **Nursing group:** conventional nursing + pre-hospital emergency nursing + in-hospital emergency nursing for heatstroke nursing intervention.

2.3.1. Control group

The key to resuscitation of patients with heat stroke hyperthermia is rapid cooling, effective correction of the imbalance of water, electrolytes and acid-base balance, protection of vital organ functions and prevention of complications [2]. First, the patient should be moved away from the hot site to a cool, ventilated place and the room temperature should be adjusted to 20~25°C. Lying down, loosening clothes, and wiping the skin with 35% alcohol to dilate the skin vessels helped to warm the skin. Conscious patients were encouraged to drink more light-saline water. For patients with febrile convulsions, intravenous isotonic saline was administered. In addition to the above measures, patients with high fever should have ice caps placed on the head and ice packs placed on the neck, axillae, groin, and other large blood vessels to enhance heat dissipation. When the axillary temperature drops to 38°C, stop cooling and closely observe the change of body temperature. If the temperature rises again, the above cooling measures should be continued. Follow medical advice to correct the imbalance of water, electrolytes and acid-base balance to prevent shock. For severe heat stroke, with rehydration, if there are still paroxysmal muscle spasms and pain, 10-20 ml of 10% calcium gluconate should be injected slowly intravenously. Monitor the patient's blood pressure and adjust the rate of rehydration according to blood pressure. Keep the airway open and give oxygen flow inhalation at 3-5ml/min. In critically ill patients with respiratory failure, perform tracheal intubation and establish an artificial airway to keep the airway unobstructed and assist breathing [3].

2.3.2. Anticipatory care

Due to the complex condition of heat stroke patients and the high mortality and disability rates of patients with severe heat stroke, doctors should explain the condition and the treatment and prognosis of the disease to family members so that they can correctly understand the disease of heat stroke and actively cooperate with medical personnel to prevent the aggravation of complications. Hospitals should arrange single rooms for patients immediately after they receive treatment and limit their visits. If the patient is severely comatose, the hospital should arrange professional care [4].

2.3.3. Rational life-saving care for non-severe heat stroke

When treating patients with non-severe heat stroke, health care workers should place patients in an air-conditioned room with good ventilation and a temperature maintained at 20-25°C. Patients should be allowed to drink cool water containing appropriate amounts of salt, and they should be told to rest in bed. If necessary, health care personnel should give the patient intravenous infusion of glucose water and saline, and should also pay attention to keeping the patient's airway unobstructed to

prevent the occurrence of vomiting and asphyxiation until the patient's mental state can be kept awake and not agitated [5].

2.3.4. Comprehensive care and treatment of severe heat stroke

A: Hypothermia

① Alcohol cooling: place the patient in an air-conditioned ward with a temperature of 23-25°C, remove the patient's clothes, and wipe the patient's skin with cold water with an alcohol content of 5%-10%. Nursing staff should pay attention to rubbing and massaging the patient's skin to promote blood circulation and accelerate heat dissipation. Put an ice cap on the patient's head and place an ice pack wrapped in a towel on the exposed part of the patient's large blood vessels. At the same time, nursing staff should be careful not to put ice bags on the patient's feet and abdomen to prevent accidents. ② Warm water bath for cooling: scrub the patient's whole body with a towel containing appropriate amount of warm water, leaving water stains on the patient's skin to achieve cooling effect through evaporation of water on the skin. Do not immerse the patient in cold water, as that will only aggravate the condition. ③ Drug cooling: 25-50mg of chlorpromazine is administered intravenously within 2 hours, diluted with 500ml of 5% dextrose saline. During the drug cooling process, medical personnel should always observe the changes in the patient's blood pressure. If the blood pressure drops significantly, the injection should be slowed down or stopped according to the situation.

B: Care of the respiratory system

Medical personnel should pay attention to keeping the respiratory tract of patients with heat stroke open to prevent asphyxia. Help the patient maintain a pillowed, supine position with the head tilted to one side, and use aspirators to quickly remove vomit and secretions from the patient's mouth and respiratory tract; keep observing the patient's respiratory rate for signs of hypoxia, and if the patient has difficulty breathing, the healthcare worker can use respiratory assistance equipment to help him ventilate.

C: Care of the circulatory system

Health care personnel should monitor the patient's heart rate, heart rhythm and blood pressure at all times, focusing on patients with abnormal cardiac electrolysis, shock and arrhythmia to prevent complications such as heart failure. Medical personnel should pay attention to the patient's state of consciousness, strictly observe the changes in pupil light emission, and perform several brain CT examinations on heat stroke patients using EEG

to clarify the intracranial pressure of heat stroke patients and avoid the occurrence of cerebral edema.

① according to the preliminary judgment work of the patient's condition, a series of comprehensive inquiries before the onset of the patient's condition, to understand whether there is a series of urinary incontinence and vomiting coma, etc., through the above situation to be clear, medical personnel should carry out preliminary judgment work, the initial resuscitation measures have been carefully completed; ② reasonable rehydration work to the patient, the aura heat stroke and mild heat stroke patients, to reasonably choose sodium chloride solution (4°C, 0.9%) and patchouli solution for patients to take, and reasonably complete the opening of intravenous channels to give patients reasonable intravenous rehydration intervention; for patients with heat stroke who sweat a lot, reasonably do a good job of water and salt supplementation; ③ ensure that the patient's airway is unobstructed, improve the quality of the patient's body temperature reasonably adjust the ambulance and reduce the ambient temperature. Ice caps should be used to cool the patient's head. In addition, ice packs should be placed in the femoral vein and jugular vein.

D: Reasonable in-hospital emergency rescue care

① To ensure that patients are admitted to the hospital with reasonable use of suction devices, if patients have respiratory distress phenomenon, the symptoms of respiratory obstruction can be completely relieved by tracheal intubation; ② Patients should be reasonably treated with surface cooling surgery, control the room temperature from 20°C to 25°C, and prepare ice bags placed in the cephalic vein position; ③ Postoperative reasonable control of body temperature, complete with ice saline (4°C, 200ml) + aminopyrine (0.5ml) enucleation; ④ for persistent high temperature, give drug therapy for reasonable cooling treatment intervention. The main choice is pethidine 25mg + chlorpromazine 8mg + promethazine 8mg for slow intravenous drip intervention. If the patient shows the phenomenon of blood pressure drop, the amount of medication should be reduced or stopped; ⑤ For a series of auxiliary examinations, they should be actively carried out for the patient to comprehensively correct the water-electrolyte imbalance and check the results of routine blood examination of the subject, so as to provide a strong basis for the subsequent treatment.

2.4. Observation indexes

Observe and compare the data of blood gas analysis index and satisfaction data of the two groups of patients.

2.5. Criteria

A self-made scale sheet was used to evaluate the satisfaction of the two groups of patients with heat stroke. The

evaluation criteria were very satisfied, basic satisfaction and dissatisfaction, and the corresponding scores were 80-100, 60-79 and 0-59, respectively.

2.6. Statistical methods

The results of medication administration in the two groups of heatstroke patients were evaluated by spss19.0 statistical software with t-test for measured data (blood gas analysis index data), expressed as $X \pm s$, and χ^2 -test for count data (satisfaction data), expressed as n (%), with $P < 0.05$ indicating a statistically significant difference.

2.7. Results

100 cases of heat stroke were cured in 95 cases, with a treatment success rate of 95%. 5 cases died of severe heat stroke, including 2 cases of MODS (multiple organ failure) and 3 cases of DIC (diffuse intravascular coagulation).

3. Discussion

Heat stroke often occurs in high temperature and high humidity environments. Generally, elderly people are old and frail, and those with chronic diseases are more prone to this disease. In addition, people who are bedridden for a long time, overworked, bedridden women and infants, and those who stay indoors for a long time with hot and humid air, poor ventilation and high temperatures are also prone to heat stroke. In a hot environment, staff should pay attention to reasonable adjustment of life and heat-resistant exercise, pay attention to prevent direct radiation from heat sources, quit smoking and alcohol drinking, avoid overwork, ensure sufficient sleep and rest, and eat more vitamins and easily digestible food. Prevention of heat stroke is the most important. For pregnant women, infants, the elderly, and patients with chronic diseases, especially cardiovascular diseases, doctors advocate minimizing outdoor activities during the hot season.

Relevant personnel need to increase hot weather warnings on TV and other media to remind the public to prepare for heatstroke; communities need to popularize heatstroke safety education to improve public heatstroke prevention and cooling, and relevant personnel should take effective measures. Once someone has the aura of heatstroke, they should see a doctor as soon as possible.

Heat stroke is one of the common clinical diseases. If such patients do not receive effective treatment in the first instance, their life safety will be seriously threatened. Effective emergency care interventions for such patients are of great significance to safeguard their renal safety. The effective cooperation of pre-hospital emergency care and in-hospital emergency care can fully avoid a series of adverse emotional events, fully protect the safety of the patient's kidneys, effectively clean the patient's airway,

fully prevent the occurrence of renal failure, and fully enhance the patient's self-protection awareness. High priority can be given during saline supplementation, thus alleviating the symptoms of heat stroke and fully avoiding the phenomenon of heat stroke. In addition, in the process of preconception diagnosis and emergency care, medical and nursing staff can fully integrate the specific characteristics of the patient, the implementation of rapid cooling, expansion and comprehensive support of organ function in the early stage, to provide adequate protection for the next effective treatment of patients. It was found that the respiratory rate, heart rate and PaCO₂ of heatstroke patients in the nursing group were significantly lower than those in the control group, and pH and PaO₂ were significantly higher than those in the control group; the satisfaction of heatstroke patients in the nursing group (96.23%) was significantly higher than that in the control group (79.25%), which fully proved the feasibility of pre-hospital emergency care and in-hospital emergency care. In conclusion, the effective use of pre-hospital emergency care and in-hospital emergency care can significantly improve the blood gas analysis index of

heatstroke patients, improve patient satisfaction, and ultimately achieve effective prognosis for heatstroke patients.

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