

The Impact of Emergency First-aid Care on the Rescue Success Rate and Complication Rate of Patients Poisoned by Organophosphorus Pesticides

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Abstract: *Objective:* To analyze the effect of emergency first-aid care for patients poisoned by organophosphorus pesticides, focusing on the impact of its application on the success rate of patient rescue and the incidence of complications. *Methods:* From April 2024 to March 2025, 92 patients with organophosphorus pesticide poisoning were selected for data analysis in the hospital. They were divided into groups using the random number table method, with 46 patients in each group. The experimental group applied emergency first aid care + routine care, and the control group applied routine care. The data differences between the groups were compared. *Results:* Compared with the control group, the incidence rate of complications in the experimental group was significantly lower, the rescue success rate was significantly higher, the HAMD and HAMA scores after nursing were significantly lower, and the rescue time, gastric lavage time, symptom relief time, and cholinesterase recovery time were all significantly shorter, $P < 0.05$; Comparing the HAMD and HAMA scores of the two groups before nursing, $P > 0.05$. *Conclusion:* The effect of emergency first-aid nursing is ideal for patients with organophosphorus pesticide poisoning. The patient's rescue success rate is high, the incidence of complications is low, the patient's negative emotions are relieved, cholinesterase is effectively restored, and the rescue time, gastric lavage time, and symptom relief time are short. It is worthy of clinical promotion and use.

Keywords: Organophosphorus pesticide poisoning; Emergency first aid care; Rescue success rate; Complication rate

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1. Introduction

There is a high incidence of organophosphorus pesticide poisoning in emergency departments. Organophosphorus pesticides can invade the human body due to accidental ingestion, self-administration, or skin contact, causing functional disorders of the nervous system, respiratory system, and circulatory system.

The onset is acute, and the condition progresses rapidly. Patients will develop serious complications such as pulmonary edema, respiratory failure, and cerebral edema in a short period of time, with high disability and mortality rates ^[1]. In the clinical treatment of patients, timely and effective first aid intervention must be carried out and coordinated with refined care, which can block the progress of the patient's condition and improve the patient's rescue effect. The routine nursing process for patients poisoned by organophosphorus pesticides is single, which is prone to problems such as incomplete gastric lavage, untimely medication, and inadequate disease monitoring ^[2]. There is a high risk of complications, and the success rate of patient rescue is affected. Therefore, clinical practice proposes the use of a targeted emergency care model when treating patients' conditions, optimizing the patient's first aid process, rapid gastric lavage, detoxification and medication, monitoring the patient's signs, preventing patient complications, and using comprehensive intervention to improve patient treatment efficiency ^[3]. This study selected 92 patients to analyze the effect of emergency first-aid care for patients poisoned by organophosphorus pesticides, focusing on the impact of its application on the success rate of patient rescue and the incidence of complications.

2. Materials and methods

2.1. Information

From April 2024 to March 2025, 92 patients with organophosphorus pesticide poisoning were selected for data analysis in the hospital. They were divided into groups using the random number table method, with 46 patients in each group. The experimental group was 26/20 male and female, aged 21–78 (50.65 ± 8.59) years old, and the control group was 25/21 male and female, aged 22–77 (50.61 ± 8.54) years old. Comparing the two sets of data, $P > 0.05$ was obtained.

Inclusion criteria: consistent with the disease diagnostic criteria, and the diagnostic methods are medical history, clinical manifestations, and cholinesterase test; acute poisoning, admission to hospital for emergency treatment within 6 hours after poisoning; complete clinical data; informed consent, voluntary cooperation.

Exclusion criteria: combined with serious functional organic diseases of the heart, liver, kidney, and other important organs; combined with other drug poisoning, food poisoning, and craniocerebral injury; already in a state of brain death, respiratory and cardiac arrest when admitted; previous mental illness, cognitive dysfunction; abandonment of treatment midway, transfer to another hospital, and lack of clinical data.

2.2. Method

The control group applied routine care, quickly assessed the patient's basic condition after admission, implemented routine cleaning of oral and nasal secretions for the patient, ensured that the patient could breathe smoothly, and provided oxygen support for the patient. The nurse followed the doctor's instructions to perform basic gastric lavage for the patient, establish venous access, and standardize the infusion of detoxification and symptomatic treatment drugs for the patient. Continuously monitor the patient's blood pressure, heart rate, respiration, blood oxygen saturation, and other physical signs and record the data. Provide patients with basic ward cleaning and disinfection services, inform patients and their families of relevant precautions, complete basic nursing records, and cooperate with doctors to provide routine clinical treatment for patients.

The experimental group applied emergency emergency care + routine care, and added the following operations to the care of the control group: (1) Rapid emergency triage assessment: Complete patient rapid triage within 1 minute after admission, and quickly classify the patient's condition level based on the patient's poisoning method, poisoning dose, admission time, state of consciousness, skin and mucosal manifestations, etc., and prioritize the opening of emergency green channels for patients with severe poisoning, shortening preoperative and treatment preparation time. (2) Thorough gastric lavage care: Determine the gastric lavage position based on the patient's poisoning situation. Select the left lateral decubitus position for oral poisoning, which can effectively prevent patients from aspiration of vomitus. The gastric lavage solution is warm water, and the temperature is controlled within the range of 35 to 38°C. After the gastric lavage machine is connected, the operation is standardized. The gastric lavage is repeated until the washout is clear and has no pesticide smell. After the gastric lavage is completed, the gastric tube is properly fixed for the patient, and the tube labeling and fixation care are implemented. (3) Precision medication care: Use atropine, pralidoxime, and other detoxifying drugs for patients according to the doctor's instructions. The principle is to use them early, in sufficient amounts, and repeatedly. The patient's dosage, administration time, and administration method should be accurately controlled. The speed of intravenous injection of drugs should be controlled. The patient's immediate reaction after medication should be carefully observed. The medication time and dosage should be accurately recorded to prevent patients from missing or mistakenly taking the wrong medication. (4) Strengthen condition monitoring: Continue to carry out ECG monitoring for patients, complete recording of vital signs, consciousness, and pupil changes every 15 minutes, and shorten the monitoring interval for patients with severe poisoning. Check whether the patient has symptoms such as sweating, fasciculations, dyspnea, and pulmonary edema.

2.3. Observation indicators

Compare the complication rate, rescue success rate, HAMD and HAMA scores (evaluated by Hamilton Depression Rating Scale and Hamilton Anxiety Rating Scale, the former has 17 items, 50 points, a high score indicates severe depression, and the latter has 14 items, 56 points, a high score indicates severe anxiety), rescue time, gastric lavage time, symptom relief time, and cholinesterase recovery time between the two groups.

2.4. Statistical analysis

Data calculation was completed with statistical SPSS 28.0 software. Measurement data were described with Mean $\pm$ SD; t-test; count data were described with %, χ^2 test, with $P < 0.05$ indicating it is statistically significant.

3. Results

Compared with the control group, the incidence rate of complications in the experimental group was significantly lower, the rescue success rate was significantly higher, the HAMD and HAMA scores after nursing were significantly lower, and the rescue time, gastric lavage time, symptom relief time, and cholinesterase recovery time were all significantly shorter, $P < 0.05$ (Tables 1–3); Comparing the HAMD and HAMA scores of the two groups before nursing, $P > 0.05$.

Table 1. Comparison of complication rates and rescue success rates (%) between the two groups

Group	Rebound	Pulmonary edema	Total	Rescue success rate
Experimental group (<i>n</i> = 46)	0	1(2.17)	1(2.17)	45(97.83)
Control group (<i>n</i> = 46)	2(4.35)	4(8.70)	8(17.39)	36(78.26)
χ^2	-	-	6.0348	8.3636
<i>P</i>	-	-	< 0.05	< 0.05

Table 2. Comparison of HAMD and HAMA scores (points) between the two groups

Group	HAMD		HAMA	
	Before care	After care	Before care	After care
Experimental group (<i>n</i> = 46)	30.11 ± 3.22	9.11 ± 2.71	29.44 ± 3.06	8.41 ± 2.67
Control group (<i>n</i> = 46)	29.89 ± 3.15	11.47 ± 2.85	29.15 ± 3.12	10.12 ± 2.77
<i>t</i>	0.3312	4.0700	0.4501	3.0145
<i>P</i>	> 0.05	< 0.05	> 0.05	< 0.05

Table 3. Comparison of rescue time, gastric lavage time, symptom relief time, and cholinesterase recovery time between the two groups

Group	Rescue time (min)	Gastric lavage time (min)	Symptom relief time (min)	Cholinesterase recovery time (s)
Experimental group (<i>n</i> = 46)	36.81 ± 4.23	11.32 ± 4.25	19.33 ± 3.33	3.90 ± 1.57
Control group (<i>n</i> = 46)	40.38 ± 4.17	15.25 ± 4.22	22.25 ± 3.28	5.45 ± 1.52
<i>t</i>	4.0764	4.4504	4.2370	4.8107
<i>P</i>	< 0.05	< 0.05	< 0.05	< 0.05

4. Discussion

Patients with organophosphorus pesticide poisoning are very common in emergency departments. The causes are accidental ingestion, self-administration, and skin contact in daily life. After the toxin quickly inhibits cholinesterase activity, multiple system functions of the patient's body will be damaged in a short period of time. Failure to receive adequate treatment will lead to critical complications such as pulmonary edema, intermediate syndrome, and rebound disease, and the patient's risk of death will increase ^[4]. Passive care for patients poisoned by organophosphorus pesticides is carried out according to the doctor's instructions. It is routine care. The various first aid steps are loosely connected, which leads to problems such as delayed triage, incomplete gastric lavage, and lax medication control. The demand for efficient emergency treatment is difficult to meet ^[5]. Therefore, this study proposes the application of emergency first aid care and observes its practical application value in the care of patients poisoned by organophosphorus pesticides.

From the analysis of the data of this study, it can be found that the complication rate of the experimental group with additional emergency care was 2.17%, and the rescue success rate was 97.83%. In the specific practice of patients, first of all, rapid grading and triage after admission and opening of a green channel for severe cases can save unnecessary waiting time, standardize the gastric lavage position and temperature of the gastric lavage liquid for the patient, the residual pesticides in the stomach can be washed away to the greatest extent, and the continuous absorption of toxins into the blood is reduced ^[6]. The probability of patients suffering from poisoning rebound and pulmonary edema will be effectively reduced. Atropine

and pralidoxime are key drugs for detoxification. In emergency care, medication control is refined, and the dosage and infusion speed are accurately controlled to ensure the detoxification effect and avoid additional damage caused by unreasonable use of drugs. In addition, preventive care measures such as regular monitoring of vital signs, strengthening airway care, and regular turning and tapping on the back can be carried out for patients to detect abnormal signs as early as possible and deal with them in time, and the incidence of complications is significantly reduced ^[7].

Patients poisoned by self-administered organophosphorus pesticides have obvious psychological problems, and negative emotions will conflict with various first aid operations, which is not conducive to the smooth development of clinical treatment. After care, the HAMD and HAMA scores of the experimental group dropped more significantly, confirming that psychological counseling can soothe the patient's emotions, and the patient's treatment compliance is high, effectively ensuring the smooth progress of the patient's first aid work. The time required for resuscitation, gastric lavage, symptom relief, and cholinesterase recovery in the experimental group was shorter than that in the control group. This is because emergency care integrates oxygen therapy, establishment of intravenous access, and condition monitoring. The treatment process is streamlined, the recovery of cholinesterase activity is accelerated, and the patient's disease course is shortened ^[8]. However, when applying routine care to patients, there is no overall coordination. Each operation is done step by step and takes longer. Toxins will cause continuous damage to the patient's body, the recovery progress is slow, and the incidence of complications is high. Looking through relevant clinical studies in recent years, we can find that most literature has confirmed that emergency care can significantly improve the treatment effect of patients with organophosphorus poisoning, which is consistent with the results of this study.

In summary, the effect of emergency first-aid care for patients with organophosphorus pesticide poisoning is ideal. The patient's rescue success rate is high, the incidence of complications is low, the patient's negative emotions are alleviated, cholinesterase is effectively restored, and the rescue time, gastric lavage time, and symptom relief time are short. Hence, this treatment is worthy of clinical promotion and use.

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Disclosure statement

The author declares no conflict of interest.

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