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Clinical Study on Optimization Strategies for Pre-hospital First Aid and In-hospital Connection in Patients with Severe Trauma

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Abstract: *Objective:* To analyze the clinical effect of optimized strategies for pre-hospital first aid and in-hospital connection in patients with severe trauma. *Methods:* Sample collection time: June 2024 - February 2026, sample size: 82 patients with severe trauma were admitted to our hospital. The included samples were randomly divided into two groups with odd and even numbers. 41 cases in the control group received routine care, and 41 cases in the observation group implemented pre-hospital first aid and in-hospital connection optimization strategies. The first aid time, family satisfaction, nursing quality, and psychological state were compared between the two groups. *Results:* The first aid time of the cases in the observation group was statistically significantly lower than that of the control group, $P < 0.05$. The satisfaction rate of family members of the patients involved in the observation group was 95.12%, which was statistically significantly higher than that of the control group, which accounted for 80.49%, $P < 0.05$. The nursing quality of the cases involved in the observation group was statistically significantly higher than that of the control group, $P < 0.05$. The psychological state of the cases in the observation group was statistically significantly lower than that of the control group, $P < 0.05$. *Conclusion:* Optimizing the connection between pre-hospital first aid and in-hospital care for patients with severe trauma can effectively reduce negative emotions, help shorten first aid time, and has positive significance in improving the quality of care and family satisfaction, and is worth learning from.

Keywords: Severe trauma; Intra-hospital connection optimization strategy; Pre-hospital first aid; Application value

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1. Introduction

With the rapid development of urbanization and industrialization, the incidence of severe trauma is increasing year by year. The condition is critical and progresses rapidly. It is often accompanied by complications such as multiple organ damage and hemorrhagic shock. The death and disability rate remains high, which places extremely high demands on the emergency diagnosis and treatment process [1]. Pre-hospital first aid is the primary link in trauma treatment, and the in-hospital connection is the key support for subsequent treatment. The synergistic efficiency of the two directly determines the patient's prognosis [2]. At present, most medical institutions in my country still have problems such as untimely transmission of pre-hospital and in-hospital information, irregular process connection, and unclear division of labor, which results in prolonged first aid time, waste of treatment resources, and affects the quality of care and patient recovery [3]. Based on the relevant standards for linking pre-

hospital and in-hospital information for severe trauma, combined with clinical treatment practice, this study focuses on the optimization strategy of pre-hospital first aid and in-hospital connection. By standardizing the process and improving the collaboration mechanism, it explores its clinical application value, providing a theoretical basis for improving the treatment effect of severe trauma patients, improving the prognosis, and helping to reduce the death and disability rate of trauma patients.

2. Materials and methods

2.1. General information

Sample collection time: June 2024 to February 2026, sample size: 82 patients with severe trauma were admitted to our hospital. The included samples were divided into two groups using random odd and even numbers. Among the 41 cases in the control group, the gender distribution showed: a total of 21 cases were male (accounting for 51.22%), and a total of 20 cases were female (48.78%). According to statistics on the age range, it ranges from 26 to 74 years old, with an average age of (50.56 ± 3.08) years old. Among the 41 cases in the observation group, the gender distribution showed that there were 22 males (53.66%) and 19 females (46.34%). According to the age range statistics, they ranged from 23 to 77 years old, with an average of (50.89 ± 2.67) years old. There was no difference in the baseline data between the two groups ($P > 0.05$), and the studies were comparable.

2.2. Method

The control group used conventional intervention methods. The observation team's strategy for optimizing the connection between pre-hospital first aid and in-hospital care:

(1) Optimization of pre-hospital first aid: Establish a professional first aid team, train all members on core trauma first aid skills and information transmission standards, quickly assess injuries on site, prioritize control of massive bleeding, and maintain open airways. The electronic information entry method is simultaneously used to record the patient's basic information, injury status and on-site treatment measures in detail, and transmit it to the emergency department of the hospital in real time through the information link system. When electronic conditions are not available, a paper record + telephone handover mode is used to ensure that the information is accurate and complete.

(2) Preparation for in-hospital connection: The in-hospital emergency department sets up a special trauma first aid team. After receiving pre-hospital information, it immediately activates the green channel, prepares rescue equipment, medicines and monitoring instruments in advance, clarifies the division of labor among members, and demarcates exclusive rescue areas. Synchronously connect with the surgery department, laboratory department and other related departments to make preparations for examinations and surgeries in advance to ensure that patients can be treated immediately after arriving at the hospital and reduce waiting time.

(3) Standardize the handover process: Establish a standardized handover list, clarify the handover content, process and responsible personnel. After the patient is transferred to the hospital, the pre-hospital first aid personnel and the hospital nursing staff will check the patient's information, injury assessment results, treatment measures and medication on-site, confirm each item and sign for confirmation, to achieve a seamless connection and avoid information omission or transmission deviation.

(4) Full dynamic monitoring: After the patient is admitted to the hospital, the nursing staff will continue to monitor vital signs, state of consciousness and wound conditions, and promptly detect changes in the condition and deal with them. At the same time, we strengthen communication with family members, promptly inform patients of their condition, treatment progress, and nursing measures, pay attention to the psychological state of patients and family members, and provide timely psychological counseling.

2.3. Observation indicators

(1) Compare first aid time.
(2) Compare family satisfaction, satisfaction = satisfaction ratio + basic satisfaction ratio [4].
(3) Compare the quality of care, involving four dimensions, and the evaluation scores are all 100 points. The higher the score, the higher the quality of care [5].
(4) Compare psychological status and evaluate based on SAS and SDS scales [6].

2.4. Statistical methods

SPSS 26.0 was used for data analysis. The measurement data that conforms to the normal distribution (involving the first aid time value, SAS value, SDS value, and nursing quality value in this study) are expressed as mean ± standard deviation (SD), and intra-group comparisons are performed using the t test; measurement data that do not conform to the normal distribution are described by the median and interquartile range [M (Q25, Q75)], and the difference between groups is analyzed using the Wilcoxon rank sum test. Count data (actual data on family satisfaction in this study) were expressed as frequencies or percentages (n, %), and differences between groups were analyzed using the χ^2 test or Fisher's exact probability method; for hierarchical data, the Wilcoxon rank sum test was used. $P < 0.05$ means the difference is statistically significant.

3. Results

3.1. Comparison of first aid time

The first aid time of the cases in the observation group was statistically significantly lower than that of the control group, $P < 0.05$ (**Table 1**).

Table 1. Comparison of first aid time (mean ± SD)

Group	Clinic response time (s)	On-site first aid time (min)	Auxiliary inspection time (min)	Time for admission and delivery to hospital (h)
Control group (n = 41)	102.52 ± 6.41	11.14 ± 5.71	27.92 ± 3.11	1.91 ± 0.32
Observation group (n = 41)	99.16 ± 7.76	6.14 ± 3.52	18.31 ± 2.64	0.62 ± 0.48
t	2.137	4.772	15.083	14.318
P	0.035	0.000	0.000	0.000

3.2. Compare family members' satisfaction

The satisfaction rate of family members of the patients involved in the observation group was statistically significantly higher than that of the control group, $P < 0.05$ (**Table 2**).

Table 2. Comparative nursing satisfaction [n/(%)]

Group	Satisfied	Basically satisfied	Not satisfied	Satisfaction (%)
Control group (n = 41)	18 (43.90)	15 (36.59)	8 (19.51)	33 (80.49)
Observation group (n = 41)	21 (51.22)	17 (17.07)	2 (4.88)	39 (95.12)
χ^2	-	-	-	4.100
P	-	-	-	0.042

3.3. Compare the quality of care

The nursing quality of the cases involved in the observation group was statistically significantly higher than that of the

control group, $P < 0.05$ (**Table 3**).

Table 3. Comparing quality of life (mean ± SD)

Group	Social relations (points)		Mental state (minutes)		Physical function (minutes)		Physiological functions (points)	
	Before intervention	After intervention	Before intervention	After intervention	Before intervention	After intervention	Before intervention	After intervention
Control group (n = 41)	52.56 ± 3.09	68.25 ± 2.34	56.79 ± 2.83	69.26 ± 2.41	56.36 ± 3.78	62.79 ± 3.83	58.79 ± 3.83	66.56 ± 2.73
Observation group (n = 41)	54.46 ± 2.38	75.21 ± 2.56	59.56 ± 3.73	71.38 ± 2.59	57.54 ± 2.36	78.51 ± 4.36	58.16 ± 4.89	71.42 ± 4.36
t	3.119	12.849	3.788	3.836	1.695	17.344	0.649	6.049
P	0.002	0.000	0.000	0.000	0.093	0.000	0.517	0.000

3.4. Comparing psychological states

The psychological state of the cases in the observation group was statistically significantly lower than that of the control group, $P < 0.05$ (**Table 4**).

Table 4. Comparing psychological states (mean ± SD)

Group	SAS score (points)		SDS score (points)	
	Before intervention	After intervention	Before intervention	After intervention
Control group (n = 41)	62.42 ± 4.61	59.71 ± 5.79	67.82 ± 5.89	58.37 ± 4.41
Observation group (n = 41)	62.36 ± 3.78	54.25 ± 3.35	67.41 ± 4.56	52.67 ± 3.25
t	0.064	5.226	0.352	6.662
P	0.948	0.000	0.725	0.000

4. Discussion

In clinical practice, severe trauma is an acute and severe disease with an increasing prevalence and caused by external forces such as traffic accidents, falls from heights, and violent injuries. Its main characteristics are acute onset, serious condition, and high risk of complications, such as multiple organ failure, hemorrhagic shock, etc. It also has a high disability and mortality rate, and has a great impact on the physical and mental health of patients [7,8]. In the treatment of patients with severe trauma, the implementation of the pre-hospital first aid model can be used as the first line of defense. In the subsequent treatment, intra-hospital connection is the key link. Through the combination of the two, the smoothness and standardization of first aid work can be ensured, the utilization efficiency of patients' golden treatment time can be maximized, and the prognosis can be effectively improved [9]. Nowadays, there are many problems in the first aid work for patients with severe trauma, such as insufficiently standardized procedures, lagging information, etc., which leads to delays in treatment and increases the risk of patient treatment [10]. In actual nursing work, relevant nursing staff standardize the connection model between pre-hospital first aid and in-hospital care based on the actual condition of the patient, giving full play to their synergy and complementary advantages, which is of positive significance to improving their treatment efficiency.

The study found that there was a large difference in first aid time between the two groups, $P < 0.05$. Analysis of reasons: During the actual nursing period, the implementation of the joint nursing model, which transmits hospital information in real time and prepares for rescue at the same time, can significantly shorten the emergency time and lay

a solid foundation for the smooth development of in-hospital emergency work for patients. After optimizing the nursing model based on the patient's actual condition, the rescue time is significantly shortened, avoiding treatment delays due to many factors, and gaining rescue time, thereby significantly reducing the patient's mortality. There is a big difference in the satisfaction of family members of the two groups (80.49%/95.12%), $P < 0.05$. Analysis of the reasons: Implementing joint intervention methods, strengthening communication between family members and medical staff, carefully communicating the condition, formulating targeted treatment plans, and clarifying the prognosis can significantly reduce their negative emotions. At the same time, relevant nursing staff provide patients with active and efficient nursing services through standardized treatment procedures, thereby effectively improving their condition.

In addition, professional and timely nursing services can improve nursing satisfaction while reducing nursing conflicts, further improving the level of nursing care. There was a big difference in the quality of nursing care between the two groups, $P < 0.05$. Analysis of reasons: In nursing work, nursing staff clarify the nursing process, refine nursing responsibilities, and maintain standardized and standard nursing operations, which will help reduce their nursing errors. At the same time, strengthening the training of first aid personnel in relevant knowledge and operational skills and strengthening the cooperation between various departments can effectively improve their professionalism and help improve their emergency response capabilities. In addition, the standardization of information transmission avoids nursing errors caused by information deviation, further improves the overall quality of emergency care, and meets the relevant standards for linking pre-hospital and in-hospital information for severe trauma. The psychological state of the cases in the observation group was statistically significantly lower than that of the control group, $P < 0.05$. The suddenness of severe trauma can easily cause patients to experience negative emotions such as fear, anxiety, and despair, and family members may also become seriously anxious because they are worried about the patient's condition. Full-process psychological care is added to the optimization strategy. Nursing staff use gentle communication and psychological counseling to alleviate the negative emotions of patients and their families, help patients build confidence in overcoming the disease, and guide family members to cooperate with treatment with a positive attitude. At the same time, the efficient treatment results allow patients and their families to see hope of recovery, further improve their mental state, and lay a good psychological foundation for the patient's subsequent recovery.

5. Conclusion

In summary, the optimization strategy of pre-hospital first aid and in-hospital connection for patients with severe trauma has the effect of reducing negative emotions, shortening first aid time, and improving nursing satisfaction and quality, and is worth learning from.

Disclosure statement

The author declares no conflict of interest.

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