Research Article

A Case-Control Study of Continuous Veno-Venous Hemofiltration Combined with Xuebijing Injection in the Treatment of Severe Sepsis

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Received 18 March 2022; Revised 16 April 2022; Accepted 6 May 2022; Published 28 May 2022

Academic Editor: Yuvaraja Teekaraman

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A case-control study was conducted to evaluate the efficacy of continuous veno-venous hemofiltration (CVVH) combined with Xuebijing in the treatment of severe sepsis. In order to verify this claim, this study included 100 patients with severe sepsis treated in our hospital from February 2019 to April 2021. The patients were randomly divided into control group and study group. The control group was treated with CVVH, and the study group was treated with CVVH combined with Xuebijing. The curative effect and mortality, NT-proBNP, PCT, Ca (2+), white blood cell count, neutrophil ratio, blood gas analysis, and APACHE-II score were compared between the two groups. The total effective rate of the study group was better than that of the control group \((P<0.05)\). The fatality rate in the study group was lower than that in the control group \((P<0.05)\). The levels of NT-proBNP and PCT in the study group were lower than those in the control group, while the level of serum calcium in the study group was higher than that in the control group \((P<0.05)\).

After treatment, the white blood cell count (WBC) and neutrophil count in the study group were \((13.76 \pm 1.28) \times 10^9/\text{shock L}\) and \((73.48 \pm 1.23)\%\), respectively, which were significantly lower than those in the control group \((17.45 \pm 1.36) \times 10^9/\text{shock L}\) and \((77.82 \pm 1.44)\%\) \((P<0.05)\).

After treatment, the levels of APTT, PT, and DD in the study group were lower than those in the control group. The level of FIB in the study group was significantly higher than that in the control group after treatment. After treatment, the PaO2 and PaO2/FiO2 of the study group were higher than those of the control group, and the APACHE-II score of the study group was lower than that of the control group. CVVH combined with Xuebijing is of positive significance in the treatment of severe sepsis and is worth popularizing.

1. Introduction

Sepsis is a disease that seriously threatens people’s lives [1]. The incidence of multiple organ dysfunction syndrome induced by sepsis has increased by about 137% in the past decade, and the incidence of secondary acute renal failure (ARF) in patients with sepsis is 48%, the fatality rate is 73%, and once secondary ARF medical costs will significantly increase, so early prevention and treatment of renal failure is a very urgent [2–4]. At present, it is believed that the common pathophysiological feature of critically ill patients caused by sepsis is that a series of inflammatory cells such as monocytes, macrophages, and endothelial cells have been activated and a large number of pro-inflammatory cells have been released. Mediators show a “waterfall effect,” resulting in excessive release of inflammatory factors, such as tumor necrosis factor, interleukin-6, interleukin-8, and so on [5]. It has been reported that when the body is seriously infected, endotoxin binds to the endotoxin binding protein in the blood to form a complex, which transmits the signal from the receptor to the nucleus through the cellular signal transduction mechanism. Finally, it can cause renal microvascular dysfunction, endothelial injury, and increased permeability, resulting in poor renal perfusion, abnormal
renal blood flow distribution, glomerular capillary microthrombosis, and direct or indirect damage to renal tissue cells and promote renal tubule and glomerular dysfunction and structural damage [6]. Traditional Chinese medicine believes that the disease belongs to the category of “febrile disease.” The patient feels evil poison externally, and the body defense qi is not enough to render the evil toxin to invade the viscera from the outside to the inside; the internal toxin of the viscera grows so that the internal and external organs are trapped, the organs are trapped and lose their duty, and the meridian loses its qi and stasis, leading to febrile disease [7]. Xuebijing is a pure traditional Chinese medicine preparation, which is effective in the treatment of all kinds of infectious diseases. Chang Wenxiu and other studies found that Xuebijing can quickly reduce the amount of blood bacteria in patients, and the amount of blood bacteria in patients decreased by 97% after one week of medication, which is related to the fact that the drug contains a variety of antibacterial ingredients. Xuebijing injection is an empirical prescription screened and summarized by Professor Wang Jinda on the basis of Xuefu Zhuyu decoction, which has been proved by modern medical research [7]. Xuebijing has the effects of antagonizing endotoxin, protecting endothelial cells, improving microcirculation, regulating immune response, and correcting the disorder of blood coagulation and can block the occurrence and development of sepsis. Some scholars have found that inflammatory mediators play an important role in the pathogenesis of sepsis. Continuous veno-venous hemofiltration (CVVH) can remove the excessive release of inflammatory mediators in circulation and improve the prognosis of patients [8]. Therefore, the purpose of this study was to analyze the application value of CVVH combined with Xuebijing in the treatment of severe sepsis.

A case-control study was conducted to evaluate efficacy of the continuous veno-venous hemofiltration (CVVH) combined with Xuebijing in the treatment of severe sepsis. To check or verify this claim, a total of 100 patients with severe sepsis treated in our hospital, specifically from February 2019 to April 2021, were enrolled in this study. The patients were randomly divided into control group and study group. The control group was treated with CVVH, and the study group was treated with CVVH combined with Xuebijing. The therapeutic effect and mortality, NT-proBNP, PCT and Ca^{2+}, white blood cell count, neutrophil ratio, blood gas analysis, and APACHE-II score were compared between the two groups. There was no statistical difference in baseline clinical data between the two kinds of patients. In the comparison of the treatment effects between the two groups, there were 27 cases of markedly effective, 22 cases of effective, and 1 case of ineffective in the study group, and the total effective rate was 98%; in the control group, 15 cases were markedly effective, 28 cases were effective, and 13 cases were ineffective, and the total effective rate was 86% ($P < 0.05$).

The rest of the manuscript is arranged as given below.

In the following sections, the proposed method and as much detailed information as possible, such as the selection and rejection criteria of patients willing to participate in this trial setting, will be described in detail. The results of the experimental device verify the proposed scheme requirements and provide sufficient detailed information in Section 3 of this manuscript. A general discussion section was provided, followed by the concluding observations of the last part.

2. Proposed Method

2.1. General Information. A total of 100 patients with severe sepsis were selected from February 2019 to April 2021. The patients were randomly divided into the control group and the study group. In the control group, the age was 43–74 years old, with an average of (65.91 ± 3.63) years, including 28 males and 22 females, while in the study group, the age was 44–76 years old, with an average of (65.96 ± 3.58) years, including 26 males and 24 females. There was no statistical significance in the general data of the two groups. This study was approved by the Medical Ethics Association of our hospital, and all patients signed informed consent.

The inclusion criteria were as follows:

1. Age was ≥18 years old;
2. The patients had good communication skills and no language barrier, so they could actively cooperate with the relevant scores, examinations, and inquiries;
3. The routine laboratory indexes were not abnormal before operation; and
4. They met the diagnostic criteria of severe sepsis.

The exclusion criteria were as follows:

1. Patients with severe heart, liver, renal insufficiency, malignant tumors, and other diseases;
2. Patients with long-term infection or recent infection not cured after treatment, or infection has been cured for less than one year;
3. Patients with coagulation dysfunction.

2.2. Intervention Methods. The control group was treated with CVVH, and the methods were as follows: internal jugular vein or femoral vein double lumen catheter was used as vascular pathway; HP used HA330 blood adsorption irrigator produced by Zhuhai Jianfan Biotechnology, 2 hours before continuous blood purification; CVVH used replacement fluid flow 2–4 L/h, blood flow 200 mL/min, and low molecular weight heparin for anticoagulants. After 2 hours, the perfusion device was removed by air method, and hemofiltration continued for 24 hours. The average treatment time was 3 days, and the treatment time was prolonged appropriately according to the related indexes of renal function such as creatinine, urea nitrogen, and urine volume in patients with chronic renal insufficiency. On this basis, the study group was combined with Xuebijing injection (Tianjin Hongri Pharmaceutical Co., Ltd.) 50 ml intravenous drip, twice a day for 7 days, while LMWH (Sanofi Aventis (China) Investment 0.3–0.6 ml was subcutaneously injected once a day for 7 days.
2.3. Observation Index

2.3.1. Evaluation of Curative Effect and Mortality. The standard of therapeutic effect refers to the “Therapeutic effect Standard of Disease and Syndrome diagnosis of traditional Chinese Medicine” [9]

(1) significant effect: 70% ≤ symptom reduction rate;
(2) effective: 30% ≤ symptom frivility <70% Shi;
(3) ineffective: symptom reduction rate <30%.

2.3.2. Laboratory Examination Method. Ca²⁺ was detected by Kemenkul 400 automatic biochemical analyzer made in Germany (transmission turbidimetry and constant speed 400 percussion h). The levels of N-terminal B-type natriuretic peptide (NT-proBNP) and procalcitonin (PCT) were detected by enzyme-linked immunosorbent assay (SB enzyme labeling instrument of Roche, Switzerland; NT-proBNP ELISA kit: 96T–201423–x PCT ELISA kit: specification 96T–201423). White blood cell count and neutrophils were detected by blood cell analyzer (Shenzhen Kubel Biotechnology Co., Ltd., us = 2200).

2.3.3. Examination Method of Blood Coagulation Function Index. Before treatment and 7 days after treatment, venous blood 5 ml was extracted from empty stock in the morning, and the supernatant was taken after centrifugation and stored at -20°C. Activated partial thromboplastin time (APTT), prothrombin time (PT), and fibrinogen (FIB) were detected by Japanese Sysmex CA-4500 coagulation instrument, and plasma D-dimer (DD) was detected by Norwegian NycoCard READER II gold standard method.

2.3.4. Methods of Blood Gas Examination Such as Partial Pressure of Oxygen (PaO₂) and Oxygenation Index (PaO₂/FiO₂). Arterial blood samples were taken to detect blood gas analysis and record PaO₂ and PaO₂/FiO₂. Oxygenation index is an important index to evaluate the respiratory function of patients. When oxygenation index is lower than 200, patients have acute lung injury. If oxygenation index is lower than 150, patients have acute respiratory distress syndrome.

2.3.5. APACHE-II Scoring. APACHE-II score consists of acute physiology score, age score, and chronic health score. The higher the score, the worse the condition, the worse the prognosis, and the higher the fatality rate; the acute physiological score (APS) includes 12 physiological indexes, and the worst value (the highest or lowest value) within the first 24 hours of ICU is selected to score, and the higher score is chosen; the age score is divided into 5 stages from 44 to 75 years old, which are rated as 02jue, 3jue, 5pm, and 6, respectively. Chronic health score requires patients to meet the diagnosis of chronic organ insufficiency or immunosuppression before admission. Patients with chronic organ insufficiency or immunosuppression should be admitted into ICU after elective operation and 5 points after emergency operation or nonoperation, and the final APACHE-II score is the sum of three scores.

2.4. Statistical Analysis. SPSS 21.0 statistical software was used to collate and analyze the data. Taking n (%) to represent the counting data, χ² test was adopted, and t-test was used for comparison between groups. At P < 0.05, the difference was statistically significant.

3. Experimental Results and Observations

3.1. Comparison of Therapeutic Effects. The therapeutic effects are important observation index in this study, so first of all, we compared the curative effect between the two groups. The therapeutic effects of the two groups were compared. In the study group, 27 cases were markedly effective, 28 cases were effective, and 1 case was ineffective. The total effective rate was 98.00%. In the control group, 15 cases were markedly effective, 28 cases were effective, and 13 cases were ineffective. The total effective rate was 86.00%. The total effective rate of the study group was higher than that of the control group, and the difference was statistically significant (P < 0.05). All the data results are shown in Table 1.

3.2. Comparison of Case Fatality Rate between the Two Groups. The case fatality rate is an important observation index in this study, so we compared the case fatality rate between the two groups. The case fatality rate of the two groups was compared: 1 case of the study group died after treatment, the case fatality rate was 2.00%; 7 cases of the control group died after treatment, the case fatality rate was 14.00%; the case fatality rate of the study group was lower than that of the control group, and there was significant difference between the two groups (χ²=4.891; P < 0.05).

3.3. Comparison of NT-proBNP, PCT, and Ca²⁺ between the Two Groups after Treatment. NT-proBNP, PCT, and Ca²⁺ are important observation indexes in this study, so we compared NT-proBNP, PCT, and Ca²⁺ between the two groups. We compared the levels of NT-proBNP, PCT, and Ca²⁺ between the two groups after treatment. After treatment, the levels of NT-proBNP and PCT in the study group were significantly lower than those in the control group, and the content of serum Ca²⁺ in the study group was significantly higher than that in the control group. All the data results are shown in Table 2.

3.4. Comparison of White Blood Cell Count and Neutrophil Ratio. We compared the white blood cell count and neutrophil ratio, and there was no significant difference between the two groups before treatment (P > 0.05). The white blood cell count and neutrophil ratio in the study group were lower than those in the control group, and the difference was statistically significant (P < 0.05). The white blood cell count and the proportion of neutrophils in the study group were significantly lower than those in the control group (P < 0.05). All the data results are shown in Table 3.
Table 1: Comparison of therapeutic effects between the two groups [n/%].

| Group   | N | Significant effect | Effective | Invalid | Total efficiency |
|---------|---|--------------------|-----------|---------|-----------------|
| C group | 50| 15 (30.00)         | 28 (56.00) | 7 (14.00) | 43 (86.00)      |
| R group | 50| 27 (54.00)         | 22 (44.00) | 1 (2.00)  | 49 (98.00)      |

χ² = 4.891, P = 0.026

Table 2: Comparison of NT-proBNP, PCT, and Ca²⁺ after treatment [x ± s].

| Group   | N   | NT-proBNP (ng/L) | PCT (μg/L) | Serum Ca²⁺ (mmol/L) |
|---------|-----|-----------------|------------|---------------------|
| C group | 50  | 1722.53 ± 198.41| 14.52 ± 3.20| 1.42 ± 0.45         |
| R group | 50  | 1057.47 ± 165.60| 7.38 ± 2.32 | 2.23 ± 0.72         |

3.5. Comparison of Blood Coagulation Function Indexes between the Two Groups before and after Treatment. We compared the indexes of blood coagulation function between the two groups before and after treatment. Before treatment, there was no significant difference in the levels of APTT, PT, FIB, and DD between the two groups. After treatment, the levels of APTT, PT, DD, and FIB in the two groups decreased continuously, while the levels of FIB increased. Compared with the control group, the levels of APTT, PT, and DD in the study group were lower than those in the control group, while the level of FIB in the study group was higher than that in the control group (P < 0.05). All the data are shown in Table 4.

3.6. Comparison of Blood Gas Analysis and APACHE-II Score between the Two Groups before and after Treatment. We compared the blood gas analysis and APACHE-II score between the two groups before and after treatment. There was no significant difference in partial pressure of oxygen (PaO₂), oxygenation index (PaO₂/FiO₂), and APACHE-II score between the two groups before treatment. Compared with those before treatment, PaO₂ and (PaO₂/FiO₂) increased and APACHE-II score decreased in both groups after treatment. Compared with the control group, PaO₂ and PaO₂/FiO₂ were significantly higher and APACHE-II scores were lower in the treatment group after treatment. All the data are shown in Table 5.

4. Discussion

Sepsis is an important contributor of septic shock and multiple organ dysfunction syndrome (MODS), which has become one of the important causes of death in critically ill patients due to its ferocious attack, rapid progress, and high mortality [10]. With the environmental pollution induced by the rapid development of society, the aging population, the increase of invasive diagnosis and treatment, and the extensive use of antibiotics bring about the increase of drug-resistant pathogenic microorganisms and patients with immune dysfunction, the incidence of severe sepsis is increasing year by year [9]. The condition of severe sepsis is often very critical, which can promote a serious blow to multiple organs of patients, and the mortality rate of patients is high [11]. Western medicine mainly explains the disease from the perspective of inflammation, a variety of reasons lead to inflammatory response in patients, excessive inflammation can exert damage to multiple organs of patients [12]. Some study reported that the blood leucocyte content of patients with sepsis can reach several times of the normal value, and all kinds of inflammatory factors increase massively, which can damage vascular endothelial cells, change vascular permeability, and disrupt the internal and external environment of blood vessels [13]. Other studies have suggested that inflammation can lead to local capillary thrombosis, multiple organ microthromboembolism can lead to organ failure, and patients may die of systemic multiple organ failure. CVVH is a commonly used renal replacement therapy in critically ill fields, which helps to stabilize the internal environment, regulate the balance of water and water, improve hemodynamic indexes, and inhibit the further development of inflammatory reactions reduce organ damage [13]. Traditional Chinese medicine believes that the sepsis belongs to the category of “febrile disease.” The patient feels evil poison externally, and the body defense qi is not enough to cause the evil toxin to invade the viscera from the outside to the inside; the internal toxin of the viscera grows so that the internal and external organs are trapped, the organs are trapped and lose their duty, and the meridian loses its qi and stasis, leading to febrile disease [14–16]. Xuebijing is a pure traditional Chinese medicine preparation, which is composed of safflower, Radix Paeoniea Chuanxiong, Angelica sinensis, and Salvia miltiorrhiza. Its active ingredients mainly include danshensu, paenoniflorin, and ferulic acid, which can activate blood circulation and remove blood stasis, dredge channels and collaterals, and disperse toxin [7]. Among them, Danshensu and paenoniflorin can improve tissue ischemia/reperfusion injury and scavenge oxygen free radicals, and ferulic acid has a strong promoting effect on nonspecific immunity, humoral immunity, and cellular immunity [17]. Its possible mechanism is to effectively antagonize endotoxin [18], downregulate the level of pro-inflammatory mediators, prevent the toxic damage of platelets and leukocytes, protect vascular endothelium from releasing prostacyclin normally, and reduce the damage of cell ultrastructure, preventing the occurrence of disorder of blood coagulation mechanism and disturbance of microcirculation [18].

In this study, CVVH was performed in the control group, and Xuebijing was combined with Xuebijing in the study group. The results showed that the total effective rate of the study group was higher than that of the control group, and the difference was statistically significant (P < 0.05). Compare the case fatality rate between the two groups: 1 case died after treatment in the study group, the case fatality rate was 2.00%; 7 cases died in the control group after treatment, the case fatality rate was 14.00%; the case fatality rate in the study group was lower than that in...
the control group, and the difference between the two groups was statistically significant (P<0.05). The analysis shows that CVVH combined with Xuebijing can not only improve the therapeutic effect of severe sepsis, but also reduce the mortality of patients. Some study found that Xuebijing can quickly reduce the amount of blood bacteria in patients, and the amount of blood bacteria in patients decreased by 97% after one week of medication, which is related to the fact that the drug contains a variety of antibacterial ingredients [19]. Some scholars have found that Xuebijing can inhibit the contents of IL-4, IL-6, and other cytokines in patients, degrade the inflammatory reaction, and alleviate the degree of electrolyte disorder in patients with sepsis, stabilize the hemodynamics of patients, and avoid sharp fluctuations of electrolytes. In addition, in this study, medicine mainly explains the disease from the perspective of inflammation, a variety of reasons lead to inflammatory waterfall reaction in patients, and excessive inflammatory response can cause damage to multiple organs of patients. The study found that the content of white blood cells in patients with sepsis can reach several times of the normal value, and all kinds of inflammatory factors increase massively, which can damage vascular endothelial cells, change vascular permeability, and disrupt the internal and external environment of blood vessels. Other studies have suggested that inflammation can lead to local capillary thrombosis, multi-organ microthromboembolism can lead to organ failure, and patients can die due to systemic multiple organ failure. Combined with the results of this study, the NT-proBNP and PCT of the study group were lower than those of the control group, and the serum Ca²⁺ of the study group was higher than that of the control group. The analysis shows that the lower the value of N-terminal B-type natriuretic peptide is, the more serious the disease is, which indicates that Xuebijing can reduce the intensity of inflammatory reaction, and the control of abnormal inflammatory response is beneficial to the protection of patients’ organs and reduce the occurrence of organ failure caused by inflammation. Xuebijing can relieve the degree of electrolyte disorder in patients with sepsis, stabilize the hemodynamics of patients, and avoid sharp fluctuations of electrolytes. In addition, in this study,
there was no significant difference in white blood cell count and neutrophil ratio between the two groups before treatment ($P > 0.05$), but after treatment, white blood cell count and neutrophil ratio decreased in both groups. The white blood cell count and neutrophil count in the study group were lower than those in the control group ($P < 0.05$).

The related research results show that the dysfunction of coagulation system plays an important role in the pathogenesis of sepsis [21]. When the pathological process of sepsis is normal, the coagulation, anticoagulation, and fibrinolysis systems are in a state of dynamic balance, while platelets and vascular endothelial cells are also involved to keep the blood unobstructed. During sepsis, the body releases a large number of inflammatory mediators, inhibiting fibrinolytic system and physiological anticoagulation system; on the contrary, coagulation system is activated, and coagulation activation promotes the further development of inflammatory response, which promotes each other and forms a vicious circle, leading to severe sepsis, septic shock, and multiple organ dysfunction syndrome [22]. Combined with the results of this study, there was no significant difference in the levels of APTT, PT, FIB, and DD between the two groups before treatment, but the levels of APTT, PT, and DD in the two groups decreased continuously after treatment, while FIB increased, and the levels of APTT, PT, and DD in the study group were lower than those in the control group, while the level of FIB in the study group was higher than that in the control group. The analysis shows that CVVH combined with Xuebijing can prevent platelet agglutination and destruction, hinder the formation of prothrombin kinase, prevent prothrombin from turning into thrombin, and inhibit thrombin, thus preventing FIB from becoming fibrin. CVVH mainly removes solutes with small and medium molecular weights by convection, while some middle and large molecular solutes can be adsorbed through the filter membrane, but it is greatly limited because the amount of removal depends on the adsorption capacity of the membrane. In addition, studies can also show that the changes of blood coagulation and inflammation are closely related to the severity and mortality of sepsis. Platelets can regulate vascular tension and stabilize the function of endothelial cells, which plays an important role in the occurrence and development of coagulation disorder in sepsis.

Studies have shown that the lung is the first organ to fail in multiple organ dysfunction caused by sepsis, and sepsis is closely related to acute lung injury or acute respiratory distress syndrome [23–26]. The study found that early arterial blood gas analysis plays an important role in judging the prognosis of patients with sepsis. Combined with the results of this study, there was no significant difference in partial pressure of oxygen ($\text{PaO}_2$), oxygenation index ($\text{PaO}_2/\text{FiO}_2$), and APACHE-II score between the two groups before treatment. Compared with those before treatment, $\text{PaO}_2$ and ($\text{PaO}_2/\text{FiO}_2$) increased and APACHE-II score decreased in both groups after treatment [27–31]. Compared with the control group, $\text{PaO}_2$ and $\text{PaO}_2/\text{FiO}_2$ in the treatment group after treatment were higher than those in the control group, while the APACHE-II score in the study group was lower than that in the control group after treatment. The analysis shows that the main mechanism of hypoxemia is lung injury caused by sepsis. The core of its pathogenesis is the recruitment and activation of inflammatory cells in lung tissue, resulting in damage to pulmonary capillary endothelial cells and alveolar epithelial cells, increased permeability of alveolar capillary membrane to water and protein, disturbance of fluid exchange between pulmonary vessels and stroma, and osmotic pulmonary edema in severe patients.

5. Conclusion

A case-control study was conducted to evaluate efficacy of the continuous veno-venous hemofiltration (CVVH) combined with Xuebijing in the treatment of severe sepsis. To check or verify this claim, a total of 100 patients with severe sepsis treated in our hospital, specifically from February 2019 to April 2021, were enrolled in this study. The patients were randomly divided into the control group and the study group. The control group was treated with CVVH, and the study group was treated with CVVH combined with Xuebijing. The therapeutic effect and mortality, NT-proBNP, PCT and Ca$^{2+}$, white blood cell count, neutrophil ratio, blood gas analysis, and APACHE-II score were compared between the two groups. There was no statistical difference in baseline clinical data between the two kinds of patients. In the comparison of the treatment effects between the two groups, there were 27 cases of markedly effective, 22 cases of effective, and 1 case of ineffective in the study group, while the total effective rate was 98%; in the control group, 15 cases were markedly effective, 28 cases were effective, and 13 cases were ineffective, and the total effective rate was 86% ($P < 0.05$). CVVH combined with Xuebijing has positive significance in the treatment of patients with severe sepsis. After treatment, the coagulation function and blood gas indexes of the patients were significantly improved, the APACHE-II score decreased more significantly, and the white blood cell count and the proportion of neutrophils decreased. CVVH combined with Xuebijing has great clinical potential in the treatment of severe septic infection.

Data Availability

The datasets used and analyzed during the current study are available from the corresponding author upon reasonable request.

Conflicts of Interest

The authors declared that they have no conflicts of interest.

Authors’ Contributions

Yan Liu and Bing Wang contributed to this work equally.

Acknowledgments

This work was supported by the Youth Talent Fund of Lianyungang Hospital (QN1913).
References

[1] L. Ni, P. Xue, C. An et al., “Establishment of normal range for thromboelastography in healthy middle-aged and elderly people of Weihai in China,” Journal of Healthcare Engineering, vol. 2021, Article ID 7119779, 5 pages, 2021.

[2] L. Zheng, H. Feng, L. Yin et al., “Study on the correlation factors of tumour prognosis after intravascular interventional therapy,” Journal of Healthcare Engineering, vol. 2021, pp. 1–11, Article ID 6940056, 2021.

[3] J.-L. Vincent, R. Moreno, J. Takala et al., “The SOFA (Sepsis-related Organ Failure Assessment) score to describe organ dysfunction/failure,” Intensive Care Medicine, vol. 22, no. 7, pp. 707–710, 1996.

[4] J. Liu and C. S. Lin, “PP-158 Effect of Xuebijing injection in patients of liver cirrhosis with spontaneous bacterial peritonitis,” International Journal of Infectious Diseases, vol. 14, no. 1, pp. 173–S74, 2010.

[5] M. A. Shitang, L. Peixun, and L. Wei, “Effects of the multi-target capability of Xuebijing and its inflammatory pharmacodynamic material basis,” Acta Physico-Chimica Sinica, vol. 25, no. 10, pp. 255–260, 2009.

[6] M. Jiang, M. Zhou, Y. Han et al., “Identification of NF-κB Inhibitors in Xuebijing injection for sepsis treatment based on bioactivity-integrated UPLC-Q/TOF,” Journal of Ethnopharmacology, vol. 147, no. 2, pp. 426–433, 2013.

[7] M.-W. Liu, Y.-H. Wang, C.-Y. Qian, and H. Li, “Xuebijing exerts protective effects on lung permeability leakage and lung injury by upregulating Toll-interacting protein expression in rats with sepsis,” International Journal of Molecular Medicine, vol. 34, no. 6, pp. 1492–1504, 2014.

[8] F. Qi, Z.-X. Liang, D.-Y. She, G.-T. Yan, and L.-A. Chen, “A clinical study on the effects and mechanism of Xuebijing injection () in severe pneumonia patients,” Journal of Traditional Chinese Medicine, vol. 31, no. 1, pp. 46–49, 2011.

[9] Z. Pan, Y. Shao, W. Dong et al., “Xuebijing attenuates hypotension through the upregulation of angiostatin II type 1 receptor-associated protein 1 in rats suffering from heat stroke,” International Journal of Molecular Medicine, vol. 34, no. 6, pp. 1699–1705, 2014.

[10] L. Wang, Z. Liu, Z. Dong, J. Pan, and X. Ma, “Effects of Xuebijing injection on microcirculation in septic shock,” Journal of Surgical Research, vol. 202, no. 1, pp. 147–154, 2016.

[11] R. P. Dellinger, J. M. Carlet, H. Masur et al., “Surviving Sepsis Campaign guidelines for management of severe sepsis and septic shock,” Critical Care Medicine, vol. 32, no. 3, pp. 858–873, 2004.

[12] S. Li, H. Wang, Q. Sun, B. Liu, and X. Chang, “Therapeutic effect of Xuebijing, a traditional Chinese medicine injection, on rheumatoid arthritis,” Evidence-based Complementary and Alternative Medicine, vol. 2020, Article ID 2710782, 9 pages, 2020.

[13] K. Németh, A. Leelahavanichkul, P. S. T. Yuen et al., “Bone marrow stromal cells attenuate sepsis via prostaglandin E2-dependent reprogramming of host macrophages to increase their interleukin-10 production,” Nature Medicine, vol. 15, no. 1, pp. 42–49, 2009.

[14] H. Wang, H. Liao, M. Ochani et al., “Cholinergic agonists inhibit HMGB1 release and improve survival in experimental sepsis,” Nature Medicine, vol. 10, no. 11, pp. 1216–1221, 2004.

[15] H. Wang, Y. Liu, and F. Fei, “Nursing care of patients with severe acute pancreatitis treated by continuous veno-venous hemofiltration,” Chinese Journal of Nursing, vol. 37, no. 10, pp. 130–136, 2002.

[16] M. Xiong, H. Fan, and L. Guo, “Clinical study on serum procalcitonin monitoring and prognosis evaluation in 80 patients with sepsis,” Chongqing medicine, vol. 40, no. 30, pp. 224–231, 2011.

[17] F. Wu, D. Xu, and W. Jizheng, “Significance of procalcitonin and C-reactive protein in predicting the prognosis of post-operative patients with severe sepsis,” Guangdong medicine, vol. 34, no. 9, pp. 1369–1371, 2013.

[18] T. Jing, Ji Daxi, and D. Gong. “Experience of continuous veno-venous hemofiltration in the treatment of multiple organ failure in patients over 80 years old,” Journal of Kidney Disease and Dialysis Kidney Transplantation, vol. 14, no. 3, pp. 235–242, 2005.

[19] L. Dou, Y. Wang, and S. Cao, “Application of continuous veno-venous hemofiltration in the treatment of capillary leakage syndrome,” Shandong medicine, vol. 49, no. 3, pp. 84–85, 2009.

[20] H. Wang and G. Zhang, “Detoxification and removing blood stasis represents the Meta analysis of clinical efficacy of Xuebijing injection in the treatment of severe pneumonia,” Chinese Journal of first Aid of Integrated traditional Chinese and Western Medicine, vol. 28, no. 1, pp. 24–30, 2011.

[21] D. Li, L. Lu, J. Zhang et al., “Mitigating the effects of Xuebijing injection on hematopoietic cell injury induced by total body irradiation with γ rays by decreasing reactive oxygen species levels,” International Journal of Molecular Sciences, vol. 15, no. 6, pp. 10541–10553, 2014.

[22] H. I Huang, X. J. Xie, H. W. Fei et al., “Real-time three-dimensional transesophageal echocardiography to predict artificial chordae length for mitral valve repair,” Journal of Cardiothoracic Surgery, vol. 8, no. 1, pp. 137–142, 2013.

[23] Y. Chen, Y. Li, X. Chen et al., “Development and validation of a HPLC method for the determination of five bioactive compounds in the “Xuebijing” injection,” Analytical Letters, vol. 43, no. 15, pp. 2456–2464, 2010.

[24] X. Q. Wang, Y. Hu, and K. Hong, “A case-control study of photodynamic therapy combined with thymosin in the treatment of condyloma acuminatum in anal canal,” Journal of Healthcare Engineering, vol. 2022, Article ID 3019379, 8 pages, 2022.

[25] J. Wen, H. Chen, and Y. Shi, “Effect of Xuebijing injection on platelet activating factor CD62P and CD63 in patients with sepsis,” Chinese Journal of Modern Medicine, vol. 31, no. 19, pp. 88–93, 2021.

[26] M. Ren, J. Liu, Y. Zhang, and L. Fan, “Effects of different ovulation induction regimens on sex hormone levels and serum CTRP3 and CTRP15 levels in patients with polycystic ovary syndrome (PCOS),” BioMed Research International, vol. 2022, Article ID 6027878, 8 pages, 2022.

[27] P. Jia, S. Wang, X. Meng et al., “Effects of ionic liquid and nanogold particles on high-performance liquid chromatography-electrochemical detection and their application in highly efficient separation and sensitive analysis of five phenolic acids in Xuebijing injection,” Talanta, vol. 107, pp. 103–110, 2013.

[28] R. C. Bone, R. A. Balk, F. B. Cerra et al., “Definitions for sepsis and organ failure and guidelines for the use of innovative therapies in sepsis,” Chest, vol. 101, no. 6, pp. 1644–1655, 1992.

[29] A. Waage, P. Brandtzæg, A. Halstensen, P. Kierulf, and T. Espevik, “The complex pattern of cytokines in serum from patients with meningococcal septic shock. Association
between interleukin 6, interleukin 1, and fatal outcome,” *Journal of Experimental Medicine*, vol. 169, no. 1, pp. 333–338, 1989.

[30] F. Wu, D. Xu, and W. Jizheng, “Study on the relationship between diagnosis and prognosis of procalcitonin and C-reactive protein in sepsis,” *Modern Preventive Medicine*, vol. 40, no. 23, pp. 561–567, 2013.

[31] K. Ding, D. Su, and Z. Lu, “Clinical observation of continuous veno-venous hemofiltration combined with hemoperfusion in the treatment of hypertriglyceridemic pancreatitis,” *Chinese Journal of first Aid of Integrated traditional Chinese and Western Medicine*, vol. 25, no. 1, pp. 420–429, 2018.