

## Case Report

# Nursing Care of a Patient with Cervical Spinal Cord Injury Without Fracture and Dislocation: A Case Report

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**Abstract:** Cervical spinal cord injury without fracture and dislocation (CSCIWFD) is a severe disabling injury with acute illness, slow recovery, and many complications that significantly increase patients' pain and the difficulty of disease management. We introduce the nursing care of a 52-year-old man with multiple complications of CSCIWFD caused by a car accident. Nursing mainly focused on posture and safety, nutritional support, respiratory management, limb function training, medication, psychological nursing, and actively preventing and managing complications such as central fever, obstinate hyponatremia, klebsiella pneumoniae infection, venous thrombosis, and pressure ulcers, among others. The nurses closely observed the patient's condition, strictly managed his 24-hour access volume, and regularly evaluated his treatment and nursing effects. In addition to superior treatment and nursing, we should invite multidisciplinary cooperation for diagnosis and treatment and encourage family members to participate in disease management, which improves patient's later functional recovery and his quality of life. After 53 days of hospitalization, the patient's condition gradually stabilized, he and his family members were satisfied with the treatment and nursing results, and he was transferred to another hospital for rehabilitation. The prognosis of patients with CSCIWFD is closely related to the quality of nursing. Personalized comprehensive care is of great significance to reduce and timely control complications and promote patients' recovery.

**Keywords:** Without Fracture and Dislocation, Cervical Spinal Cord Injury, Nursing, Complications

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## 1. Introduction

Cervical spinal cord injury without fracture and dislocation (CSCIWFD) refers to patients with symptoms and signs of cervical spinal cord injury after trauma, but there is no cervical spine fracture or dislocation on imaging examination. The international concept is equivalent to cervical spinal cord injury without radiographic abnormality (CSCIWORA), which is a special type of cervical spinal cord injury. It accounts for 9%~14% of adult spinal cord injuries [1], but the actual incidence is underestimated [2, 3]. Degenerative disc

herniation, vertebral bone hyperplasia, hypertrophy of the yellow ligament, or ossification of the posterior longitudinal ligament cause cervical spinal stenosis and spinal cord compression [4]. Some scholars posit that when the cervical spine is subjected to external forces and internode displacement occurs, the spinal cord hits the spinal canal's opposite bone surface, which is based on spinal cord injury caused by the external spinal stenosis force [2]. Traffic accidents are a common cause of CSCIWFD [5]. With rapid economic development and frequent traffic accidents, the incidence of CSCIWFD has had an upward trend, and this

disease has attracted increased attention [6].

Based on the pathogenic mechanism, the most important treatment for CSCIWFD is to relieve spinal cord compression and improve spinal blood circulation through decompression and stabilization, thereby preventing or reducing spinal cord injury [2]. The management and treatment of these patients demonstrate considerable heterogeneity, which largely depends on the underlying pathophysiology and the patient's clinical characteristics [7]. Therefore, according to the patient's situation, personalized treatment and care, close observation of the condition, prevention and management of complications, and improving treatment compliance are crucial to the patient's condition and later functional rehabilitation. We presented the case of a 52-year-old man diagnosed with CSCIWFD. During hospitalization, the patient experienced a series of changes and complications. Prompt treatment and nursing were provided, the patient's condition was stable and his family members were satisfied with the effect, and he was transferred to another hospital for rehabilitation after 53 days.

## 2. Case Description

On October 19, 2019, a 52-year-old male of Han nationality presented to Helan County People's Hospital with neck pain, numbness, and weakness in his limbs for 4 hours after braking sharply while driving his truck, causing his body to hit the steering wheel. During a 120-minute waiting period, the patient temporarily lost consciousness for approximately 40 minutes. A CT examination of cervical spine showed calcification of the 2-5 posterior longitudinal ligaments of the neck and compression of the spinal cord corresponding to a decrease in the spinal canal volume. For further treatment, the patient was immediately transported by ambulance to the People's Hospital of Ningxia Hui Autonomous Region. The patient was admitted to the emergency department and told that he was seriously ill. After relevant examinations, he was admitted to the orthopedics department with CSCIWFD. On medical examination, the patient had a body temperature (T) of 36.6 °C, pulse rate (PR) of 86 beats/min, respiratory rate (RR) of 17 beats/min, blood pressure (BP) of 112/66 mmHg, blood oxygen saturation (SPO<sub>2</sub>) of 92%, and weight (WT) of 90 kg. The patient could answer questions correctly and had physiological cervical spine curvature and neck tenderness. The sensation disappeared from his shoulder to his trunk and limbs. His left upper limb muscle strength was level 2, right upper limb muscle strength was level 1, and both lower limbs' muscle strength was level 0. His bilateral biceps tendon reflex, triceps tendon reflex, and radius mode reflex were not drawn out. Both lower extremity tendon and Achilles tendon reflexes were normally drawn out. His bilateral patella clonus, ankle clonus and Babinski sign test results were negative. The skin feeling of the perineum and perianal area disappears, and the anal sphincter is relaxed. He hadn't bilateral patellar convulsions, negative ankle clonus. Chest CT showed mild bronchiectasis and inflammation in the upper lobe of the right lung.

On the third day after admission, vascular ultrasonography showed deep venous thrombosis in the left lower extremity, so an inferior vena cava filter was inserted in an emergency operation. On the fourth day after admission, the patient underwent a posterior cervical posterior cervical C3-C6 single open-door laminectomy plus spinal canal decompression and lateral plate internal fixation under general anesthesia.

After the operation, the patient was transferred to the ICU for one day and then transferred to the orthopedic ward after his condition was stable. Postoperatively, the patient developed multiple complications including central fever, obstinate hyponatremia, klebsiella pneumoniae infection, inferior vena cava and bilateral iliac vein thrombosis, and pressure ulcers. At this time, individualized treatment and nursing were provided by doctors and nurses, and the patient was in stable condition and had a good mental state. After being hospitalized for 53 days, the patient was transferred to another hospital with a urinary tube for further rehabilitation.

## 3. Nursing Management

### 3.1. General Nursing

#### 3.1.1. Basic Care

Nurses regularly evaluated the patient's vital signs (including T, PR, RR, and BP), SPO<sub>2</sub>, consciousness, muscle movements of the limbs, and sensations and reflexes. Preoperative care included the following: changes in the patient's condition were closely observed, he was continuously monitored by ECG, he was administered 2 L/min of inhaled oxygen via a nasal catheter, a suction device and tracheotomy package were prepared beside his bed, his sputum was aspirated as needed, his oral cavity was regularly cleaned, his urinary tube was properly fixed, and he was prepared for surgery. In the operating room, his doctors and nurses transferred the patient to the operating table using a four-person transport method. Gaskets were placed on the areas that were easily compressed to prevent compression injuries of the bone process, blood vessels, and nerves. The patient was given medication on time following the doctor's advice after the operation. Nurses prepared the suction device to keep the patient's airway clear, prevented and managed his complications, and guided his rehabilitation training.

#### 3.1.2. Posture and Safety

Prevention of secondary spinal cord injury is the main goal of spinal cord injury nursing [8]. The patient had a high paraplegia cervical spinal cord injury. To prevent secondary injury caused by excessive neck activity, we used an externally fixed cervical collar to maintain the stability of his cervical spine and cervical brake. We inserted an index finger and middle finger vertically into the neck brace to measure its tightness. The patient remained bedridden for a long time. To prevent the formation of pressure ulcers, we maintained the bed unit flat, clean, and dry, and an air cushion bed was used continuously and effectively. Depending on the patient's condition, he was repositioned every two hours to prevent bedsores. The nurses assessed his skin integrity to reduce the

risk of pressure ulcers. During repositioning, his family members and nurses cooperated to avoid excessive flexion and rotation of his cervical spine. When the patient had to be moved, we used sufficient manpower to ensure that his neck remained neutral and his head, neck, shoulders, and torso were on the same plane.

After surgery, based on the patient's neck collar fixation, a 1 cm thick gauze block was placed on the wound at the back of his neck, which allowed air to permeate the wound and reduced pressure on the incision. The patient alternately used the lateral or supine position, and his nurses maintained his functional limb position to avoid over-extension or over-rotation of the joints. Family members put neutral shoes on the patient's feet to prevent sagging. The patient had an indwelling right internal jugular venous tube, wound drainage tube, and urinary tube. Each tube was marked conspicuously, properly fixed, and maintained unobstructed to prevent distortion, compression, or falling out. His nurses told the patient and his family about the risk of the catheter falling out and preventive measures.

### 3.1.3. Nutritional Support

After his spinal cord injury, the patient had repeated fevers, increased metabolism, and consumed a large amount of energy and water. His nurses monitored the dynamic changes in the patient's 24-hour access, electrolytes, albumin, and routine blood, helped him transition from a liquid and semi-liquid diet to a general diet after surgery, and encouraged him to eat more crude fiber, high protein, high-calorie, high-vitamin, and high-sodium foods. We also asked the nutrition department to formulate nutritious meals for him.

Because the patient was bedridden for a long time, his gastrointestinal motility weakened, and excessive water absorption left prone to constipation. We taught the patient's family members to perform abdominal massage on him 1 hour after each meal, centering on the umbilicus from the right lower abdomen, right upper abdomen, and left upper abdomen to the left lower abdomen in a clockwise sequence of 15 to 20 minutes to stimulate bowel movements and promote defecation. When necessary, bifidobacterial triple viable bacteria were prescribed to regulate his intestinal flora, and the patient was instructed to take warm water (water temperature < 40 °C). When the patient had unresolved stools for more than 3 days, he was administered oral lactulose or a glycerin enema was used to relieve his constipation.

## 3.2. Specialized Nursing

### 3.2.1. Central Fever Nursing

The spinal cord plays an important role in body temperature control and maintenance [9]. After the patient's spinal cord injury, his central conduction temperature regulation was damaged, his heat dissipation was affected, and his sweat glands lost sympathetic innervation; these abnormalities caused fevers.

Appropriate measures were used to cool the patient to relieve hyperthermia. We explained the reasons for his fever to the patient and his family and maintained the room

temperature at 25-26°C. We avoided the wind blowing directly on him, regularly opened the window for ventilation, and used ultraviolet lamps to disinfect the ward. When the patient had a fever, ice packs were intermittently placed on both sides of his neck, armpits, groin, popliteal fossa, and other large blood vessels to physically cool him within 20 minutes each time. His family members were instructed to give him a warm water sponge bath and encourage him to drink more water. At the same time, we closely observed the changes in the patient's T, PR, RR, BP, consciousness, pupils, and made records, and reported any abnormalities to the doctor in time and cooperated with the rescue.

### 3.2.2. Obstinate Hyponatremia Nursing

Intractable hyponatremia is a common serious complication after acute cervical spinal cord injury, with an incidence rate is as high as 45%-77.8% [10, 11]. Improper treatment and care can aggravate this condition, impede the recovery of lost nerve function, or even be life-threatening [12].

Obstinate hyponatremia occurred in this patient, and his lowest blood sodium value was 121 mmol/L on the 11th day after injury. His nurses immediately adjusted the patient's dietary sodium content and gave him an appropriate amount of pickled vegetables, oral salt capsules, or 1 g of concentrated oral sodium chloride solution per day. His doctors adjusted his intravenous sodium salt solution according to the patient's blood sodium level and the total amount of fluid according to his 24-hour access. Continuous intravenous pumping of 10% sodium chloride at 10 ml/h while the deep veins maintained sequential instillation, supplementation with colloids (albumin and plasma), hormones to prevent nerve reperfusion injury, anti-infection, and other treatments were administered. The nurses correctly recorded the patient's 24 h urine volume, rechecked his biochemistry 1-2 times/day, and repeatedly monitored his biochemical blood ion indexes to prevent a combination of other ion disorders and acid-base imbalance. We also closely observed the patient for symptoms such as weakness, nausea and vomiting, headache, drowsiness, muscle pain, and neuropsychiatric and sodium supplementation treatment effects.

After symptomatic concentrated sodium infusion treatment, the patient's symptoms improved and his speech was clear. Sodium supplementation treatment was gradually decreased until his serum sodium basically returned to normal.

### 3.2.3. Limb Function Training

Functional exercise is very important for patients with CSCIWFD and should be applied throughout the entire treatment process. Early limb functional exercise can prevent some complications and improve limb function, as well as prevent apraxia muscular atrophy and joint stiffness.

On the first day after surgery, the patient's vital signs were stable and he began functional limb exercises. Under the guidance of medical staff, he exercised step by step, and his family members were taught to exercise his upper limb muscles and joints. He was also subjected to functional exercises such as ankle joint back extension, plantar flexion, toe extension, inversion and abduction of both lower limbs,

and muscle massage 3 times/day for 30-50 repetitions. His family members helped the patient put on elastic stockings to promote blood circulation to his lower extremities and prevent joint stiffness, muscle atrophy, and deep vein thrombosis of the lower extremities. These can establish a good foundation for functional rehabilitation. We also encouraged the patient to actively try to move his own limbs.

On the 29th day after admission, the patient was in good spirits, with level 2 muscle strength and numbness in both upper limbs, without movement or sensation in both lower limbs. ECG monitoring was stopped according to the doctor's instructions. The patient was instructed to make a fist, pinch a ball, and move his upper and lower limbs to improve joint mobility and increase muscle strength. His nurses assisted the patient with wheelchair training and explained the purpose and importance of functional exercise to him and his family. His doctors asked the rehabilitation department to teach the patient how to conduct rehabilitation exercises. The patient underwent general acupuncture once a day, infrared treatment twice a day, and low-frequency pulse electrical treatment twice a day to promote neuromuscular function recovery. We closely monitored the patient's feeling, activity, and limb muscle strength and regularly evaluated his rehabilitation.

### 3.2.4. Medication Nursing

After admission, methylprednisolone sodium succinate was administered to alleviate the patient's secondary nerve and spinal cord injuries. The indwelling needle was supplemented with mannitol infusion to prevent drug extravasation. In the early stage of spinal cord injury, mannitol not only promotes dehydration and reduces spinal cord edema, but also has anti-free radical effects. The patient was given three-dimensional compound B and compound troxerutin and poreine cerebroside injection to nourish his nerves. We monitored whether he had adverse reactions such as chills, dizziness, and allergy. Oral eperisone hydrochloride tablets were administered to regulate muscle blood supply, improve skeletal muscle tension, and produce analgesic and anti-vertigo effects. However, shock may occur with this medicine, so we carefully monitored the patient. When complications occurred, the medicine was immediately ceased and appropriate measures were taken. Omeprazole was administered to prevent stress ulcers, and ceftazidime was given to fight infection.

After surgery, the patient underwent drug therapy to promote nerve recovery, anti-infection, anti-thrombus, detumescence, analgesia, water-electrolyte regulation, and other drug treatments. We closely monitored the adverse effects of these drugs and evaluated their treatment effects.

## 3.3. Special Nursing

### 3.3.1. Respiratory Management

According to reports in the literature [13], the respiratory infection rate after cervical spinal cord injury exceeds 50%, so nurses should pay attention to respiratory management.

The patient's lung function was relatively poor because he needed absolute bed rest and had bronchiectasis with

inflammation. His nurses instructed his family members to help reposition the patient and pat his back, use mechanical aids for sputum excretion, and encourage him to train for lung function including balloon blowing, effective coughing, and deep breathing for sputum excretion. An atomized inhaler was used 2-3 times/day and 2 ml of ambroxol was slowly intravenously injected twice a day to humidify the airway, dilute the sputum, dispel phlegm, and relieve cough. To keep his airway open and mouth clean, we not only gave the patient sputum aspiration on demand and promptly removed oral secretions, but also used chlorhexidine for oral care three times a day.

On the 17th day after admission, the patient's sputum culture result showed klebsiella pneumoniae infection. The medical staff immediately implemented contact isolation. A contact isolation sign was hung on the bed head and a bottle of quick-drying hand disinfection gel was prepared, and all of the supplies were for special use. The purpose and precautions of isolation were explained to the patient and his family to ease their tension and anxiety. Based on the consultation opinions of the respiratory medicine and pharmacy departments, the patient was administered anti-infection treatment using imipenem cilastatin, and his sputum culture plus drug sensitivity were reassessed. We closely monitored his blood routine, liver and kidney function, procalcitonin, C-reactive protein, and other indicators.

### 3.3.2. Deep Venous Thrombosis Nursing

Chung [14] reported that the incidence of deep vein thrombosis in patients with spinal cord injury was approximately 43.0%, and is increasing.

On the third day after admission, vascular color Doppler ultrasound showed deep vein thrombosis in the left lower extremity. The attending physician confirmed that the patient's vital signs were stable and arranged for him to have an emergency inferior vena cava filter insertion. The bed nurse prohibited venipuncture in the patient's punctured side limb and told his family members not to knead or apply hot compression to the affected limb. Postoperatively, the puncture site was bandaged for 2 hours, the limb on the puncture side was immobilized, and ECG was used to monitor his vital signs, especially respiration and SPO<sub>2</sub>, to determine whether the patient had chest pain, suffocating asthma, hemoptysis, or other manifestations of pulmonary embolism. The nurses observed the patient's skin temperature, sensory activity, and dorsal foot artery pulsation to monitor whether there was bleeding or hematoma at the puncture site. The patient was encouraged to drink more than 2000 ml/day to dilute his blood viscosity and maintain urine volume to facilitate the excretion of contrast media. The patient's B-mode ultrasound was regularly reviewed to observe the filter's shape and location to monitor for secondary venous thrombosis.

On the 33rd day after surgery, the patient underwent reexamination of his lower extremity vein color, inferior vena cava color, and iliac vein color via Doppler ultrasound, which showed inferior vena cava and bilateral iliac vein thrombosis.

At this time, he had stable vital signs, swollen lower extremities, normal skin tone, and no unusual complaints.

Doctors urgently consulted with the interventional and vascular surgery departments to assist in the diagnosis and treatment and gave the patient 15 mg of rivaroxaban twice a day to prevent further thrombosis. The doctors emphasized to the patient and his family the precautions for using rivaroxaban as follows: First, rivaroxaban should be taken with food to promote drug absorption. Second, if medication is skipped during the twice-daily administration on the first to 21st days, the patient should immediately take the regular dose to ensure that 30 mg is taken daily, and the next day should continue to his regular daily medication as prescribed. Third, in the absence of adequate replacement anti-coagulation therapy, the sudden discontinuation of this drug will increase the risk of thromboembolic events. Finally, the most common adverse reaction when using rivaroxaban is bleeding, so we closely observed the patient's consciousness and bleeding in various parts of his body.

### 3.3.3. Pressure Ulcer Nursing

The risk factors for pressure ulcers in hospitalized patients are rated on a scale of 11 points (high risk). The main risk factors include long-term bed rest, fever, obesity, and incontinence. Although careful postural care was administered to the patient, which effectively reduced the risk of pressure ulcers, he had a second-stage pressure injury at the gluteal fissure on the morning of the 34 day after admission. The pressure ulcer's area was  $6.0 \times 7.0$  cm, and the pressure did not fade. There were two blisters on the surface, which were intact without rupture, with areas of  $3.0 \times 3.0$  cm and  $1.0 \times 0.5$  cm.

We used saline solution to clean the pressure ulcer, kept the wound surface clean and dry, increased the frequency of repositioning the patient, and promptly notified the nursing department. Later that day, the blisters partially ruptured, producing a small amount of exudate. After using saline to clean the wound, the exudate was absorbed with cotton swabs, mupirocin ointment was applied locally on the surface, and the wound was covered with sterile gauze to keep it clean and dry. The patient presented persistent central fever and hypoproteinemia after surgery, which increased the difficulty of healing the pressure ulcer. On the 51th day after admission, the pressure ulcer was healed, scabs had been shed, and the ulcer's surface was dry with a normal color.

### 3.3.4. Psychological Nursing

CSCIWFD causes patients to suddenly lose their ability to live independently, which has a serious impact on individuals, families, and society [15]. After the injury, the patient was in poor spirits, had trouble sleeping, and developed anxiety, fear, irritability, and pessimism. His family members were also extremely nervous. The nurses monitored the patient according to his condition, understanding and meeting his needs as much as possible and helping him and his family understand and effectively treat CSCIWFD. Medical staff explained the surgical procedures and prognosis to the patient and his family before surgery. The purpose of the operation was to create conditions for spinal cord recovery, reduce the

patient's psychological burden, and provide the best possible outcome.

We answered questions from the patient and his family and urged his family members to communicate with him more to improve his mindset. The nurses encouraged the patient's family to actively perform functional exercises to increase their confidence and assist his recovery. Patients generally trust their family members most, so the family's emotional support is vital throughout the recovery period.

### 3.3.5. Discharge and Follow-up

Patient recovery is a slow and arduous process, so it is important to provide accurate discharge and follow-up guidance.

Medications should be taken on time and as prescribed, and rehabilitation should be continued. Patients should mainly rest at home, complications must be actively prevented, a cervical collar should be worn to protect the cervical spine before moving, strenuous exercise must be avoided, and falls should be prevented. The patient and his family were advised on functional training methods and respiratory system and limb precautions. It was recommended that the patient avoid any physical activity that may increase the risk of re-injury for 6 months [16]. The patient was instructed to regularly review and monitor his bone mineral density, blood routine, liver and kidney function, coagulation function, electrolytes, and related infection indicators. We also advised the patient to actively undergo autonomous bladder retraining, visit the urology clinic regularly to replace the urinary canal, and go to the interventional clinic for follow-up diagnosis of lower limb venous thrombosis. The patient was instructed to return to the respiratory department for a lung disease and pulmonary CT follow-up examination one month after discharge. To understand the patient's rehabilitation process, we created the most suitable rehabilitation program for him and asked him to return to the orthopedic clinic for follow-up exams 1, 3, 6, and 12 months after discharge.

## 4. Discussion

CSCIWFD is often undiagnosed or misdiagnosed if it presents no fracture or dislocation during imaging. In 1948, Talor reported the first case of spinal cord injury after cervical spine hyperextension. Studies have reported that CSCIWFD is related to cervical spine degeneration and other factors, leading to a reduction in the effective cervical canal volume. However, the specific pathogenesis and treatment of this disease remain topics of debate [17, 18]. Most researchers support surgical treatment and believe that surgery can reduce spinal cord edema, spinal canal decompression, improve spinal cord blood circulation, restore cervical spine stability, avoid and reduce secondary spinal cord injury, and facilitate spinal cord function recovery [19]. However, the operation is risky and difficult, and CSCIWFD has the characteristics of mutation, variability, and changeability, which increases the difficulty of managing such patients. Our patient's challenges and complications during his hospitalization reported in this

article increased the difficulty of treatment and nursing, requiring joint diagnoses and coordination between the emergency, respiratory, vascular intervention, critical care, pharmacy, nutrition, and rehabilitation departments.

Due to the patient's complex condition, through careful treatment and nursing, his condition gradually stabilized, but multiple complications still inevitably occurred. Although the patient received continuous lung function exercise, expectoration, and cough treatment, the high level of spinal cord injury caused the loss of diaphragm function. After the injury, he had low immunity and was bedridden for a long time. *Klebsiella pneumoniae* infection occurred on the 17th day of hospitalization. When the patient developed a lung infection, he was immediately subjected to contact isolation and drug treatment, and respiratory management was strengthened. After 16 days of treatment, pulmonary CT reexamination showed that the pleural effusion was absorbed and the sputum culture result was negative the third consecutive time, which indicated that the patient's lung infection was controlled. Due to posture management, there was no secondary injury to the patient's cervical spinal cord, and the small pressure ulcer area that occurred on the 34th day of hospitalization recovered in a relatively short period of time. In this case, due to high paraplegia, the lower extremity vascular pressure was reduced and blood flow was stagnant, leading to lower extremity venous thrombosis on the third day after admission. We cooperated with other departments to promptly implant a venous filter and carry out corresponding care, so no serious consequences occurred.

The patient developed central fever and obstinate hyponatremia, both complications of spinal cord injury. We encouraged the patient to drink more water during fevers, but when hyponatremia occurred, water intake should be controlled to reduce dilutional hyponatremia. It is currently believed that hyponatremia after acute spinal cord injury is central hyponatremia that may be caused by excessive water load and decreased renal drainage and sodium retention capacity. Critical cases can cause severe complications such as convulsions, coma, cerebral edema, epilepsy, and even death, but if managed in time, can improve the survival rate of patients with acute spinal cord injury [9]. Mild hyponatremia can be corrected by providing a high-sodium diet and restricting water intake, and sodium supplementation is required for moderate and severe hyponatremia [20]. It has been reported that hyponatremia has a high correlation with infection and fever, and when spinal cord injury is complicated by pneumonia, hyponatremia will show the characteristics of a longer course, aggravation of disease, more challenging treatment, and the potential for repeated attacks [21].

The patient's obstinate hyponatremia was difficult to correct promptly, and long-term sodium supplementation was required, but the dose was gradually decreased after his symptoms improved. This required a timely review of the patient's electrolyte levels. The nurses closely observed the patient's vital signs, neuropsychiatric symptoms, and sodium supplementation treatment effects to avoid serious consequences caused by abnormal sodium ions.

The patient's car accident resulted in an accidental injury to his spinal cord, abruptly disabling him, which was very devastating for him and his family. Such patients have a long disease course and poor prognosis. Functional exercise, observation, psychological nursing, and patient management should continue throughout the course of treatment. This study highlights the need for medical staff to strengthen effective communication with patients and their families, clarify the significance of family members in nursing, encourage family members to participate in disease management, and support patients emotionally and socially to improve their quality of life.

## 5. Conclusion

The disease characteristics, surgical risks, and complications of cervical spinal cord injury without fracture and dislocation lead to increased complexity of treatment and care, requiring special and individual care. In this article, we demonstrated the treatment and nursing of a CSCIWFD patient. Based on good posture and safety, condition observation, nutritional support, respiratory management, limb function training, medication, and psychological and other care, medical staff effectively prevented and managed his complications including central fever, obstinate hyponatremia, venous thrombosis, and pressure ulcers. Treating CSCIWFD requires multi-departmental joint consultation and cooperation, and family members should be encouraged to participate in the treatment and nursing process to enhance their self-confidence and improve patients' quality of life.

## Conflicts of Interest

All the authors do not have any possible conflicts of interest.

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