Perioperative Application of ERAS-Based Integrated Traditional Chinese and Western Medicine Nursing Care in a Patient with Amyotrophic Lateral Sclerosis

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Abstract

This article summarizes the surgical treatment and rehabilitation course of a hospitalized patient with amyotrophic lateral sclerosis (ALS) who underwent surgery for ureteral stones and hydrocele. While receiving surgical treatment plus Western medication, the patient was concurrently administered oral traditional Chinese medicine, combined with comprehensive therapies including acupuncture, tuina massage, external application of traditional Chinese medicine compresses, auricular seed acupressure, and rehabilitative functional exercises, along with effective psychological counseling. This integrated approach effectively alleviated the patient's perioperative pain, anxiety, and other discomforts, enabling a smooth and comfortable passage through the perioperative period. Integrated Chinese and Western medicine and nursing care played a significant role in the rehabilitation process of perioperative patients, warranting clinical promotion.

Full Text

Application of Integrated Chinese and Western Medicine Nursing in the Perioperative Period of an ALS Patient Under the ERAS Concept

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Abstract

This paper summarizes the hospitalization, surgical treatment, and rehabilitation process of an ALS patient who underwent surgery for ureteral calculi and hydrocele. Concurrent with surgical and Western medical treatment, the patient received comprehensive integrated therapy including oral Chinese medicine, acupuncture, massage, topical application of Chinese medicine compresses, auricular point seed pressing, and rehabilitative functional exercise, combined with effective psychological counseling. This approach successfully alleviated perioperative pain, anxiety, and other discomforts, enabling the patient to pass through the perioperative period smoothly and comfortably. Integrated Chinese and Western medicine nursing played a significant role in the patient's rehabilitation, warranting clinical promotion.

Keywords: ALS; ERAS concept; Integrated Chinese and Western medicine nursing; Perioperative period

Introduction

Amyotrophic lateral sclerosis (ALS), also known as "gradually freezing disease," is the most common type among the four classifications of motor neuron disease (MND). ALS is a progressive neurodegenerative disease involving upper motor neurons in the cerebral cortex, brainstem, and spinal cord. As the motor neurons that control muscle movement slowly degenerate and die, muscles gradually atrophy. With disease progression, patients develop progressive symptoms including muscle weakness, muscle atrophy, dysphagia, choking while drinking, and slurred speech, eventually losing motor function and self-care abilities until death. ALS is classified by the World Health Organization as one of the world's five incurable diseases, alongside cancer, AIDS, leukemia, and rheumatoid arthritis, due to its high mortality rate and lack of curative treatment.

Epidemiological data indicate that ALS incidence is approximately 2-4 per 100,000 people, with higher rates in males than females. A survey of ALS incidence in Beijing from 2010-2015 reached conclusions consistent with international research findings [2]. The cure rate is zero, and the typical life expectancy is 2-4 years [3]. The etiology remains unclear [4], though experts speculate it may be related to genetic factors, gene defects [5], viral infections, and other factors. Current ALS treatment focuses on prolonging survival and improving quality of life through pharmacological therapy, nutritional management, respiratory support, and comprehensive treatment. Early-stage ALS is difficult to detect and diagnose. Key diagnostic measures include: (1) electromyography, which shows high diagnostic value with typical neurogenic damage patterns; (2) CT and MRI imaging, which may reveal spinal cord thinning (particularly at the lumbar and cervical enlargements) but are otherwise unremarkable; and (3) muscle biopsy, which aids diagnosis but lacks specificity. The interval from symptom onset to diagnosis typically ranges from 9 to 15 months.

As ALS is irreversible, treatment primarily aims to improve quality of life and

extend survival [6]. Pharmacological interventions include riluzole, cerebrolysin, and symptomatic management. Respiratory training addresses breathing difficulties, while massage and tuina therapy target muscle weakness and atrophy [7]. The renowned British scientist Stephen William Hawking, who also suffered from ALS, survived over 20 years due to early detection and treatment, high-quality medical care, and his optimistic mindset. Thus, family nursing and psychological status significantly impact patients' quality of life and survival duration.

Case Report

Present Illness Patient Zhu, male, 25 years old, was admitted with "right scrotal enlargement discovered for 20 years, accompanied by pain for 1 day." Symptoms included severe right scrotal pain radiating to the right lower abdomen, presenting as persistent distending pain; urinary frequency and urgency without dysuria; no gross hematuria; no chills or fever; no nausea or vomiting; limb weakness; muscle atrophy; limited mobility; inability to perform fine motor movements; poor appetite and sleep; occasional nocturnal chest tightness; and occasional choking during eating. Neurological examination revealed muscle atrophy in all four limbs with grade 4- muscle strength.

Past Medical History The patient had a history of "amyotrophic lateral sclerosis (ALS)" for over one year.

Specialist Examination Upon standing, the patient's right scrotal contents were enlarged. No enlarged masses were observed in bilateral inguinal regions, and the spermatic cord showed no swelling. A 10$×$6 cm oval mass was palpable in the right scrotum, firm in texture with a smooth surface, elastic and cystic, without tenderness. No obvious masses or nodules were palpated in the right testicle. The transillumination test was positive. The left testicle and epididymis were not enlarged.

Neurological examination revealed muscle atrophy in all four limbs with increased muscle tone and grade 4- muscle strength.

Auxiliary Examinations

- **November 1, 2023** (Male genital ultrasound): Right testicular hydrocele.
- **October 30, 2023** (Transcranial Doppler): (1) Decreased blood flow velocity in left vertebral artery; (2) Decreased blood flow velocity in left anterior cerebral artery; (3) Decreased blood flow velocity in bilateral middle cerebral arteries.
- **October 30, 2023** (Four-limb electromyography): (1) Neurogenic damage in upper and lower limbs; (2) Multiple NCS injuries in four limbs (involving motor and sensory fibers, with obvious demyelinating damage); (3) Possible right median nerve proximal or nerve root injury.

- **May 1, 2023** (External hospital lower limb EMG): EMG of left biceps femoris long head, biceps femoris short head, gastrocnemius, tibialis anterior, and extensor digitorum brevis showed neurogenic damage (please correlate clinically). No obvious abnormalities in left common peroneal nerve or tibial nerve.
- **Brain MRI**: Bilateral symmetrical patchy abnormal signals in cerebral peduncles-thalamus, suggesting metabolic brain disease? Cystic shadow in posterior horn of right lateral ventricle, choroid plexus cyst?
- **Lumbar MRI**: Lumbar spine hyperostosis; Schmorl's nodes at thoracic 11-lumbar 4 vertebrae; Lumbar 4/5 disc degeneration with protrusion.
- **Cervical MRI**: Cervical spine hyperostosis.
- **Thoracic MRI**: Schmorl's nodes at thoracic 10-lumbar 1 vertebrae.

Preoperative Diagnosis **Traditional Chinese Medicine diagnosis:** Hydrocele with kidney qi deficiency pattern.
Western Medicine diagnosis: (1) Motor neuron disease (amyotrophic lateral sclerosis); (2) Right testicular hydrocele; (3) Right hydronephrosis with ureteral calculi; (4) Coagulation dysfunction; (5) Abnormal myocardial enzyme profile; (6) Emphysema; (7) Bilateral pulmonary nodules; (8) Bilateral chronic pulmonary inflammation.

Communication and Surgical Procedure After completing preoperative examinations, neurology and anesthesiology departments assessed the risks. Following thorough communication with the patient and family members and obtaining informed consent, surgery was performed. On August 8, 2024, the patient underwent transurethral ureteroscopic holmium laser lithotripsy for right ureteral calculi + right ureteral stent placement + right testicular hydrocele repair under general anesthesia. The surgery proceeded smoothly, and the patient was returned to the ward after complete recovery from anesthesia. Postoperatively, based on conventional Western medical treatment, combined Chinese medicine characteristic therapies were administered, including: acupoint plastering (bilateral Sanyinjiao SP-6 and Zusanli ST-36) to regulate gastrointestinal qi and strengthen the spleen and stomach; indirect moxibustion (Guanyuan CV-4 and Qihai CV-6) to warm yang and boost qi; Chinese medicine hot compress (on abdomen) to warm meridians and relieve pain; auricular point pressing (Shenmen and Sympathetic points) to calm the mind, aid sleep, and relieve pain; infrared therapy (on surgical incision) to improve local blood circulation, reduce inflammation, relieve pain, and promote wound healing; and massage with functional exercise for atrophied limb muscles to accelerate postoperative recovery. On August 19, 2024, the patient underwent removal of the right ureteral stent under anesthesia. Postoperative recovery was good, and the patient was discharged on August 21, 2024.

Perioperative Nursing Care

2.1 Preoperative Nursing

Preoperative education constitutes a crucial component of integrated Chinese and Western medicine enhanced recovery nursing. Informing patients about the integrated enhanced recovery protocol builds confidence and compliance. This hospitalization primarily addressed the testicular hydrocele, which does not impose special surgical requirements. However, this case was unique due to the patient's ALS condition and decreased limb muscle strength, requiring prolonged bed rest. Nursing considerations focused on several key aspects:

First, psychological communication: establishing gentle dialogue with the patient to alleviate psychological burden and foster a positive mindset. Second, patient education: introducing surgical methods, significance, and intraoperative experiences to eliminate anxiety from unfamiliarity with procedures, advising adequate preoperative sleep, and administering oral sedatives the night before surgery if necessary. Patients were guided to complete all laboratory tests (blood and urine routine, blood biochemistry, coagulation function, liver and kidney function, etc.), electrocardiogram, cardiac ultrasound, and chest X-ray. Third, health guidance: implementing safety nursing measures including bed rail protection to prevent falls. Key nursing points included maintaining a quiet, clean ward with soft lighting and appropriate temperature/humidity; warm water foot baths and listening to relaxing music to nourish the heart spirit; monitoring climate changes to avoid invasion of exogenous pathogenic factors; maintaining regular daily routines with adequate sleep; and syndrome-based dietary care emphasizing foods that clear heat and resolve dampness, such as coix seed, cucumber, celery, and winter melon. Fourth, medication nursing: informing patients about medication precautions. Fifth, implementing syndrome-based nursing according to the National Administration of Traditional Chinese Medicine's "Hypochondriac Pain TCM Nursing Protocol," with corresponding measures based on assessment scores, completion of admission education, and signing of relevant consent forms. Risk assessments showed: fall risk score 3 (low risk), pressure injury risk score 20 (no risk), self-care ability score 65 (mild dependence), and surgical thrombosis risk score 1 (low risk). Sixth, performing bilateral inguinal and perineal surgical area skin preparation as required.

2.2 Preoperative Preparation

Detailed nursing was applied in operating room care. This patient-centered nursing model builds upon routine perioperative preparation, intraoperative nursing, and postoperative rehabilitation by meticulously executing operating room nursing tasks to avoid and reduce risks from clinical nursing procedures.

An intravenous catheter was established, preferably in the right upper limb, and secured properly to maintain patency throughout surgery and ensure emergency access. Electrocardiogram monitoring leads were connected correctly to avoid interference, along with blood pressure and oxygen saturation monitoring. The

blood pressure cuff was placed on the left upper limb with appropriate tightness. Due to increased sensitivity to anesthetic drugs in ALS patients, right radial artery catheterization was performed for invasive blood pressure monitoring to ensure patient safety and maintain stable blood pressure.

The surgery required lithotomy position with both hands naturally extended at the sides and supported by armrests, and both lower limbs elevated and separated on leg supports. However, given this patient's bilateral lower limb muscle atrophy with increased muscle tone and severe whole-body shaking from anxiety upon entering the operating room, the lithotomy position was established after anesthesia induction. Soft padding protected muscles and joints, avoiding excessive abduction of lower limbs, compression of bony prominences, blood vessels, and nerves, while respecting the degree of joint impairment and limited mobility to maximize functional preservation. For potential limb numbness from prolonged positioning, appropriate movement and massage were provided. Patient privacy was protected by minimizing exposure scope and duration.

2.3 Intraoperative Nursing

Dedicated personnel continuously monitored electrocardiography and dynamic condition changes throughout surgery, closely observing heart rate, rhythm, blood pressure, and oxygen saturation variations. Operating room nurses must possess ECG and blood pressure interpretation skills to promptly inform anesthesiologists or surgeons of abnormalities. Enhanced intraoperative rounds are essential as general anesthesia patients cannot express themselves, requiring close observation of vital signs, blood loss, and urine output by anesthesiologists and circulating nurses for timely detection and management.

Intravenous infusion sets must be bubble-free to prevent air embolism, and fluids should be replaced promptly when depleted. During surgery, the remaining volume in pressurized irrigation bags was monitored and replaced in a timely manner to prevent air entry. At surgery completion, nurses assisted with surgical incision dressing.

2.4 Anesthesia Recovery Nursing

During anesthesia recovery in general anesthesia patients, spontaneous breathing recovery and consciousness status were closely monitored. For this ALS patient, assistance was required during extubation to prevent post-extubation respiratory weakness and choking. Suction equipment was prepared, and thorough suctioning was performed before extubation. Extubation was delayed until spontaneous breathing and muscle strength indicators recovered satisfactorily to avoid re-intubation. After extubation and stabilization of all parameters, the radial artery catheter was removed, and a radial artery compression hemostat was applied with observation of the puncture site and radial pulse. ALS patients must be confirmed free from residual anesthetic effects before leaving the operating room. After returning to the ward, bedside handover was conducted

with ward nurses.

2.5 Postoperative Nursing

Following anesthesia recovery and according to enhanced recovery principles, fasting time was shortened. This patient could drink water and eat appropriately after complete recovery of swallowing function. Treatment included intravenous famotidine for acid suppression and gastric protection, phloroglucinol for antispasmodic analgesia, and cefoperazone-sulbactam for anti-infection. Postoperative integrated Chinese medicine therapies included: acupoint plastering (bilateral Sanyinjiao SP-6 and Zusanli ST-36) to regulate gastrointestinal qi and strengthen the spleen and stomach; indirect moxibustion (Guanyuan CV-4 and Qihai CV-6) to warm yang and boost qi; Chinese medicine hot compress (on abdomen) to warm meridians and relieve pain; auricular point pressing (Shenmen and Sympathetic points) to calm the mind, aid sleep, and relieve pain; infrared therapy (on surgical incision) to improve local blood circulation, reduce inflammation, relieve pain, and promote wound healing; and massage with functional exercise for atrophied limb muscles to accelerate recovery. Patients were encouraged to engage in appropriate physical activity and early ambulation to prevent deep vein thrombosis. Pain was assessed using facial expression or verbal description scales. Multimodal analgesia was provided, including analgesic medications and breathing exercises.

Additionally, the department's self-prepared Chinese medicine hot compress was applied to Yongquan points (KI-1). Located using the body-inch method, Yongquan is found in the depression on the anterior sole, at the anterior one-third of the line connecting the web between the second and third toes to the heel. After heating, the compress was placed on both feet's Yongquan points twice daily, with allergy history confirmed before application. Pain assessment and multimodal analgesia were implemented as described above.

2.6 Nursing Evaluation

The patient's 20-year hydrocele problem was resolved, providing psychological relief and deeper understanding of the medical process. Through psychological counseling, the patient gained confidence for future life. The patient's father expressed satisfaction with the treatment (having been refused surgery by multiple hospitals) and committed to accompanying his son for continued treatment, life, and exercise. After comprehensive integrated nursing care, the surgical wound showed no bleeding, hematoma, or infection, limb muscle strength remained stable, and the patient was discharged smoothly on August 21, 2024.

2.7 Health Education and Discharge Guidance

Post-discharge, patients continue rehabilitation at home. Telephone follow-up assessments monitor physical condition with timely targeted guidance to track dynamic changes. Follow-up instructions emphasized avoiding prolonged bed

rest, encouraging ambulation, and maintaining appropriate muscle activity to delay progression of limb muscle atrophy and weakness.

Discussion

ALS is a rare disease [8]. Physical decline severely impacts patients' self-care ability and quality of life, causing devastating effects on patients and families. Effective nursing measures can improve neuronal function, alleviate suffering, and significantly enhance quality of life and survival time [9]. ALS patients have very poor tolerance for surgery and anesthesia. Given the disease's rarity, few surgical cases have been reported, providing limited reference guidance. Our approach was based on the patient's actual condition combined with our hospital's experience in integrated Chinese and Western medicine nursing to develop a detailed and comprehensive medical-nursing plan.

The perioperative period encompasses the entire process surrounding surgery, from the decision to operate through surgical treatment and basic recovery, typically spanning 5-7 days preoperatively to 7-12 days postoperatively. Enhanced Recovery After Surgery (ERAS) is a series of evidence-based perioperative optimization measures. Since its proposal in 2001, the concept has continuously evolved over more than two decades. As early as 2012, Chen Zhiqiang summarized the important role of Chinese medicine nursing in ERAS [10]. Through integrated Chinese and Western medicine nursing optimization, measures including reducing postoperative stress responses, rational pain management, early diet resumption, and early mobilization decrease postoperative complications, shorten hospital stays, and reduce medical costs to achieve rapid recovery [11]. Kehlet et al. [12] found that single measures to reduce perioperative stress responses were unsatisfactory, proposing multi-modal, multi-pathway, integrated approaches to reduce trauma and stress responses through multidisciplinary collaboration among surgery, anesthesia, and nursing. Perioperative nursing, as a crucial component of multidisciplinary collaboration, plays a significant role in ERAS. With the addition of integrated Chinese and Western medicine nursing [13], indicators including exhaust time, postoperative pain scores, postoperative hospital stay, and hospitalization costs were significantly reduced, as confirmed in nursing practices by Dai Meng [14] and Gu Yechun [15]. A critical component is patient education about the integrated enhanced recovery nursing protocol, encouraging early postoperative feeding and mobilization, explaining the significance of various Chinese medicine nursing interventions, enhancing compliance, and building patient confidence to overcome disease, demonstrating humanistic nursing care.

Standardized application of ERAS combined with Chinese medicine technology benefits postoperative recovery, significantly accelerating rehabilitation after fracture surgery [16]. Through meticulous integrated Chinese and Western medicine nursing, patient satisfaction was markedly improved [17].

Due to ALS's unique characteristics—decreased limb muscle strength and in-

complete self-care ability—patients experience severe physical and psychological trauma, making surgery and anesthesia major challenges. Under the ERAS concept, our hospital's integrated Chinese and Western medicine techniques achieved certain success in perioperative application. In this case, after comprehensive assessment of all indicators, we developed an integrated treatment plan combining surgery and Western medicine with oral Chinese medicine, acupuncture, tuina, topical Chinese medicine compresses, auricular point seed pressing, and rehabilitative functional exercise, plus effective psychological counseling. Throughout the perioperative period, we strengthened life care, condition monitoring, and surgical preparation; performed intraoperative monitoring and surgical cooperation; and implemented postoperative vital sign monitoring, wound care, complication prevention, health education, and discharge guidance. These measures effectively relieved perioperative pain, anxiety, and discomfort, enabling the patient to pass through the perioperative period smoothly and comfortably.

ERAS-based integrated Chinese and Western medicine nursing applies the holistic view and syndrome differentiation concepts of Chinese medicine. Tailoring effective integrated nursing protocols to each patient's unique condition through individualized, syndrome-based treatment significantly reduced postoperative incision pain intensity, shortened pain duration and time to ambulation and anal flatus, improved perioperative comfort, accelerated postoperative recovery, and enhanced patient satisfaction, making it worthy of clinical promotion.

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Patient Consent: Informed consent for publication of this case report was obtained from the patient and family members.

Conflict of Interest Statement: The authors declare no conflicts of interest in this article.

Note: Figure translations are in progress. See original paper for figures.