

Nursing care of a patient with acute severe fatty pancreatitis complicated with severe pneumonia

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Abstract Through the nursing care of a patient with severe acute lipogenic pancreatitis complicated with severe pneumonia, the author comprehensively mastered the nursing points and precautions of the disease, and also had a profound understanding of the monitoring and management of this patient. It has also accumulated valuable experience in bed protection and unplanned extubation. In the observation of the effect of sedation and analgesia in patients, new reflections have been triggered through learning and literature search.

Key words acute severe fatty pancreatitis; severe pneumonia

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I. Background

Acute pancreatitis (AP), a disease characterized by acute inflammation of the pancreas and destruction of histologically upper acinar cells, is one of the common digestive system emergencies in the emergency department and often becomes severe acute pancreatitis (SAP) by local development involving systemic organs and systems (1). SAP accounts for 5% to 10% of acute pancreatitis, with persistent (> 48 h) organ dysfunction and a high mortality rate (2). The occurrence of hyperlipidemic pancreatitis (HLP) is closely related to a significant increase in serum triacylglycerol (TG) levels (3), so it is also known as hypertriglyceridemic pancreatitis (HTGP). In recent years, the incidence of HTGP has increased, and the mortality rate of severe HTPG is significantly higher than that of severe biliary pancreatitis (4). A large sample study in developed regions of China showed that the proportion of hyperlipidemia in the etiology of AP has jumped to 25.6% In addition, HTGP occurs mostly in young men, especially those with obesity, alcoholism and diabetes (5).

The diagnosis of HTGP was first in accordance with the diagnostic criteria for AP in [6 of the New Classification and Classification System for Acute Pancreatitis, Atlanta, USA, 2012]: ① acute, sudden, persistent, and severe upper abdominal pain, which can radiate to the back; ② serum amylase and/or lipase levels ≥ 3 times the upper limit of the reference range; ③ typical imaging changes of AP (pancreatic edema or peripancreatic exudative effusion) on contrast-enhanced CT or magnetic

resonance imaging. AP can be diagnosed if two of the above three criteria are met. Second, serum TG levels ≥ 1000 mg/dl (11.30 mmol/L), or serum TG levels of 500 ~ 1000 mg/dl (5.65 ~ 11.30 mmol/L) but chylous serum; other etiologies of AP are again excluded (7).

II. Case Introduction

Patient Name: Zheng Jin Gender: Male Age: 39 years EICU 7 Bed Hospital Status

1. chief complaint: epigastric pain with nausea and vomiting for 10 days.

2. History of present illness: 10 days ago, the patient developed epigastric pain after drinking a lot of alcohol (about 3300 ml beer), which was persistent pain, with abdominal distension, progressive aggravation of abdominal pain and abdominal distension, accompanied by nausea and vomiting, and the vomitus was gastric contents. The patient was admitted to the EICU of Huizhou Central Hospital for 9 days, and was transferred to our hospital at 8-31-13:36.

3. Past medical history: previously healthy, smoking for more than 20 years, 40 cigarettes/day; drinking for more than 20 years, about 10 bottles of beer/day.

4. allergic history: denied any history of drug allergy.

5. Admission: T 38.5°C, P 111 beats/min, R 28 breaths/min, BP 167/94 mmHg. Young male, height 170 cm, weight 80 kg, BMI 27.7; sedated, RASS score + 2. The pupils were equal and round, $d \approx 3$ mm, and sensitive to light reflexes. Orotracheal intubation was connected to ventilator-assisted breathing with mode SIMV + PS, pressure support of 15 cmH₂O, oxygen concentration of 100%, and PEEP of 5 cmH₂O. Indwelling gastric tube, unobstructed fixation, visible yellow-green gastric contents elicited, connected to negative pressure drainage bottle for gastrointestinal decompression; indwelling right subclavian venous catheter, well fixed; indwelling right femoral venous dialysis catheter, well fixed, unobstructed indwelling catheter, visible yellow urine elicited. Yellow staining was observed on the skin and sclera of the whole body. On auscultation, the breath was coarse, and scattered crackles and wheezing could be heard in the lungs. The abdomen was distended, the right abdominal puncture site was covered with gauze dressing, a large amount of yellow exudate was observed, and the abdominal muscles were tense. Abdominal tenderness, rebound tenderness, Murphy's sign, percussion in the renal area, and shifting dullness were uncooperative. Bowel sounds were not heard. Muscular tension was normal in all four limbs.

6. auxiliary examination:

Laboratory tests		DATE	8-21	8-31	9-13
Blood routine	White blood cell (WBC) x10 ⁹ /L		20.7	23.92	14.98
	Neutrophil percentage (NE)		90.4	95.3	87.8
	Hemoglobin (HB) g/L		187	78	67
	CRP mg/L		11.39	327.76	77.48

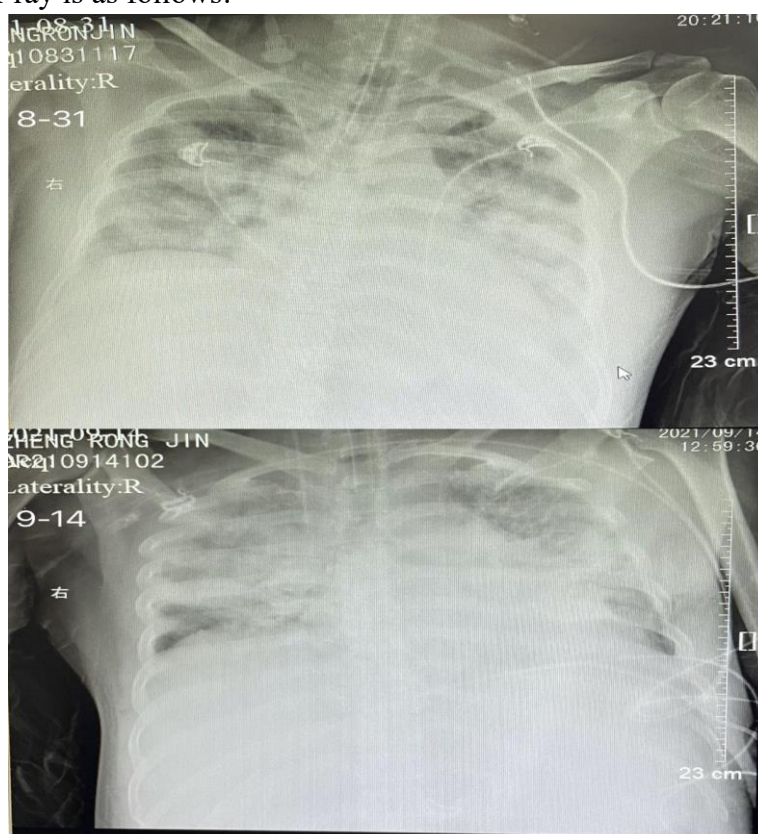
	PCT ng/L	0.202	0.466	0.164
Blood Biochemistry	Blood amylase (AMY) u/L	670	54	40
	Lipase u/L	※ Strict specimens Hyperlipemia	70	63
	Albumin (ALB) g/L	39.6	27.8	38.6
	Total bilirubin (TBTL) umol/L	32.6	315.9	32.3
	Total cholesterol (CHO) mmol/L	18.41	3.17	3.65
	Triglyceride (TG) mmol/L	46.45	5.31	3.17
	Lactic acid (Lac) mmol/L	6.53	1.1	1.2
Blood gas	PO2 kpa	13.3	15.9	11.3
	PH	7.494	7.378	7.48

Imaging examination:

On August 21 (outside hospital), chest and abdominal CT revealed: 1. acute pancreatitis with surrounding exudation; 2. emphysema at both lung apices; 3. pancreatitis liver injury? Fatty liver? ;

On September 12 (our hospital), chest and abdominal CT revealed: 1. multiple lesions with partial consolidation; 2. pleural effusion; 3. pericardial effusion; 4. full pancreas with a large amount of surrounding exudation, considering acute necrotizing pancreatitis; 5. peritonitis; a large amount of abdominal effusion;

Chest X-ray is as follows:



7. admission diagnosis: 1. severe acute pancreatitis (lipogenic) 2. severe pneumonia 3. Abdominal infection 4. Pleural effusion 5. Abdominal effusion 6. Cause of jaundice 7. Hyperlipidemia 8. Fatty liver 9. Moderate anemia 10. Hypoproteinemia 11. Hypocalcemia.

8. Diagnosis and treatment process:

Time	Diagnosis and treatment process
8-21 (Outside hospital)	The patient was given fasting, gastrointestinal decompression, cleaning enema, acid suppression, lipid-lowering and anti-infection treatment;
8-23	Peritoneal puncture drainage was performed;
8-25	Considering ARDS, the patient was given tracheal intubation and ventilator-assisted respiration;
8-25	CRRT was performed;
8-31 (Our hospital)	The patient was continuously given sedation and analgesia, inhibition of enzyme, lipid-lowering, anti-infection, anticoagulation, improvement of anemia, albumin supplement, nasogastric feeding of total liquid diet, strengthening of nutrition and fluid infusion, combined with traditional Chinese medicine and other symptomatic and supportive treatment. Monitor vital signs, blood gas analysis, blood routine, blood biochemistry, infection and other indicators; observe the condition, pay attention to maintain a negative balance of intake and output;
9-1	Fiberoptic bronchoscopy and lavage were performed;
9-2	Transfusion of RhD positive leucocyte-depleted suspended red blood cells 2 U;
9-6	The right subclavian deep venous catheter was removed from the outside hospital, and right internal jugular vein catheterization was performed;
9-8	Tracheotomy and tracheal tube fixation were performed, and orotracheal intubation was removed;
9-9	Fiberoptic bronchoscopy and lavage were performed;
9-12	Fiberoptic bronchoscopy and lavage were performed;
9-13	Ultrasound-guided puncture drainage of pleural effusion and abdominal effusion;

III. Nursing Plan and Implementation

1. nursing assessment

- ❖ Nervous system: drug sedation state, RASS score: + 3 ~ -5;
- ❖ Respiratory system: tracheotomy with ventilator SIMV + PS assisted ventilation, pressure support 14 cmH₂O, oxygen concentration: 40%, PEEP: 8 cmH₂O, coarse breath sounds, scattered wet rales and wheezing rales heard in the lungs;
- ❖ Circulatory system: regular heart rate, mild systemic edema, dull complexion, pale nail bed and conjunctiva, yellow and white skin and mucosa;
- ❖ Digestive system: The patient had fasted for more than 10 days after onset, indwelled gastrointestinal decompression tube, and drained yellow-green gastric contents. The abdomen was distended and the abdominal muscles were tense. On

September 6, the patient had spontaneous exhaust and defecation after enema, with audible borborygmus. The patient was continuously pumped with Bepril 83ml/h via nasogastric tube;

- ❖ Urinary system: indwelling catheter, urine color changed from admission strong tea color to yellowish;

Assessment Scale	8-21	8-31	9-12
Sequential Organ Failure Score SOFA	8	8	6
APACHE II	14	19	19
Acute Pancreatitis Severity Bedside Index BISAP	3	4	3
Modified Marshall Score	1	3	2
Sedation Score RASS	/	+ 2	- 2
Analgesic score CPOT	/	5	2
Risks score Braden	23	11	12
Deep Venous Thrombosis Padua	/	6	6

2. Nursing diagnosis, planning, implementation and evaluation

Care Problem	Related Factors Etiology
❖ Compromised gas exchange:	It is associated with ARDS, changes in spontaneous respiratory morphology
❖ Body temperature:	Associated with pancreatitis and pulmonary infection
❖ Fluid overload:	Associated with pancreatitis leading to hypoproteinemia
❖ Risk of falling into bed or taking out the tube:	Associated with pain and poor sedation

2.1 Nursing diagnosis: impaired gas exchange: associated with ARDS and changes in spontaneous respiratory morphology

2.1.1 Plan of Care:

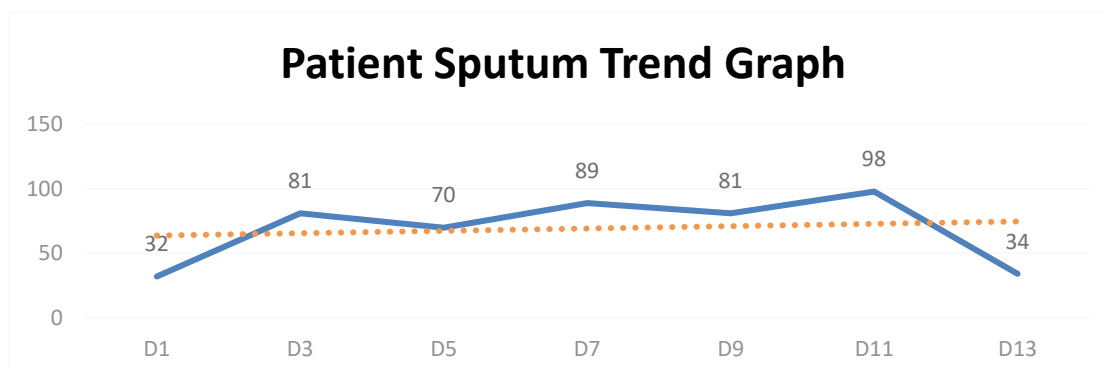
- Improve respiratory morphology;
- Blood gas parameters returned to normal, and oxygen partial pressure and oxygenation index reached normal levels.

2.1.2 Nursing measures:

- Keep the airway unobstructed, detect the balloon pressure of respiratory cannula and the abnormality of each pipeline connection in each shift, keep the ventilator in normal operation, and accurately record the parameters of ventilator. Timely handle the alarm of low/low pressure and abnormal operation;
- Give the patient a comfortable position: elevate the head of bed by 30 degrees;
- 9-2 Laboratory tests: RBC 2.4 x 10¹²/L, HGB 73 g/L, HCT 0.225. According to the doctor's advice, the patient was given transfusion of RhD type B positive leukocyte-depleted suspended red blood cells 2U to improve anemia and relieve hypoxia;
- Aerosol inhalation was performed to dilute sputum according to medical order, and the ventilator was used to warm and humidify the airway;
- Sputum suction was performed as needed in each shift, and carers were instructed and assisted to turn and pat the back regularly to promote sputum excretion; sputum consistency, color, volume, and frequency of sputum suction were assessed during

sputum suction and the total amount of sputum was counted daily.

- Observe the character and quantity of minimally invasive drainage of pleural effusion

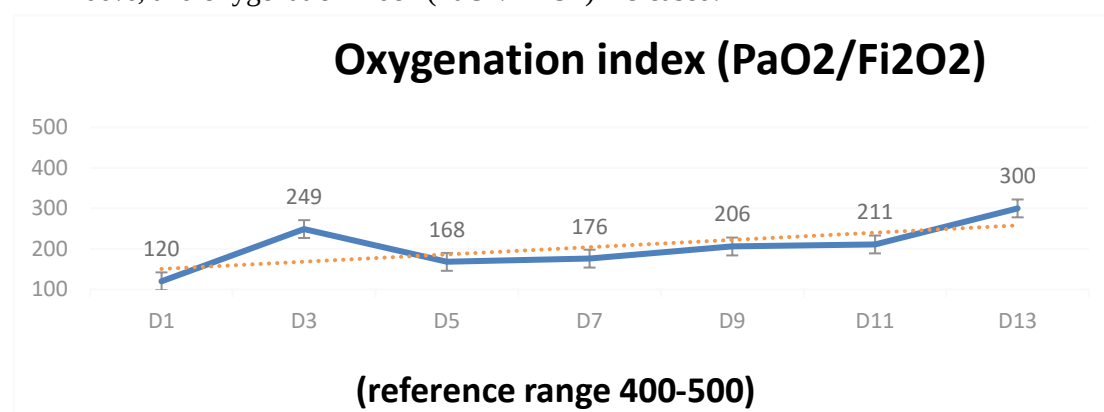


and ascites, and pay attention to whether to improve the hypoxic status of patients;

- Attention was paid to oxygenation index ($\text{PaO}_2/\text{FiO}_2$), respiratory rate and saturation. Monitor hypoxemia status for improvement;

2.1.3 Nursing evaluation:

- Zunyi was not weaned temporarily, R18-24 beats/min, SPO₂ was maintained at 91% ~ 100%, and oxygenation index ($\text{PaO}_2/\text{FiO}_2$) increased:



2.2 Body temperature: related to pancreatitis and pulmonary infection

2.2.1 Plan of Care:

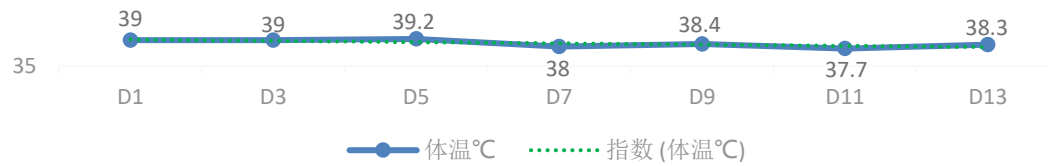
- Body temperature returned to normal range.

2.2.2 Nursing measures:

- Give fluid infusion and anti-infection symptomatic treatment according to the doctor's advice, use a micro-pump to ensure the drug infusion rate; monitor whether the plasma concentration is up to standard, and monitor the changes in inflammatory indicators;
- Closely monitor the patient's vital signs, measure the patient's body temperature every four hours and record it in the body temperature sheet;
- If necessary, perform physical cooling according to the doctor's advice (used physical cooling method: ice bag, warm water bath, ice blanket); or use antipyretic drugs, take body temperature again 30 minutes after administration, observe and record the cooling effect;
- Timely replace clothing and bed sheets when sweating a lot to increase patient comfort, while paying attention to the presence or absence of excessive fluid loss.

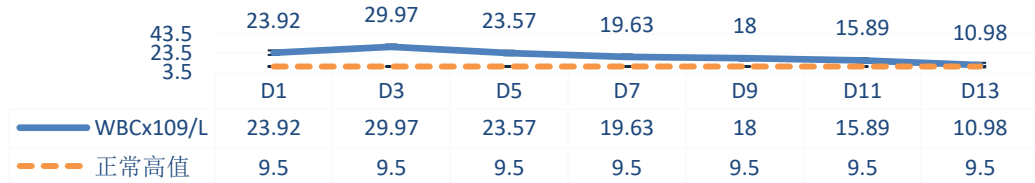
2.2.3 Nursing evaluation: At 8:00 on September 13, the patient's body temperature was 36.8°C.

Patient Daily Maximum Temperature Trend Chart

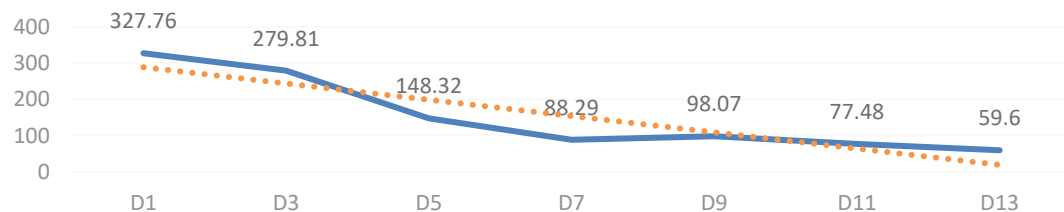


Inflammatory indicators showed a gradually decreasing trend (as shown below):

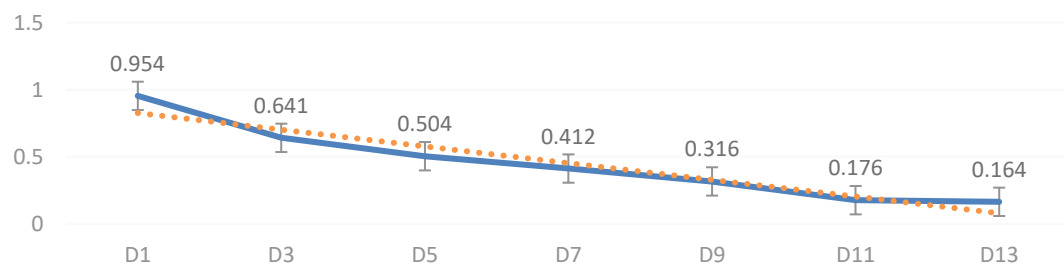
WBC (reference range 3.5–9.5) x10⁹/L



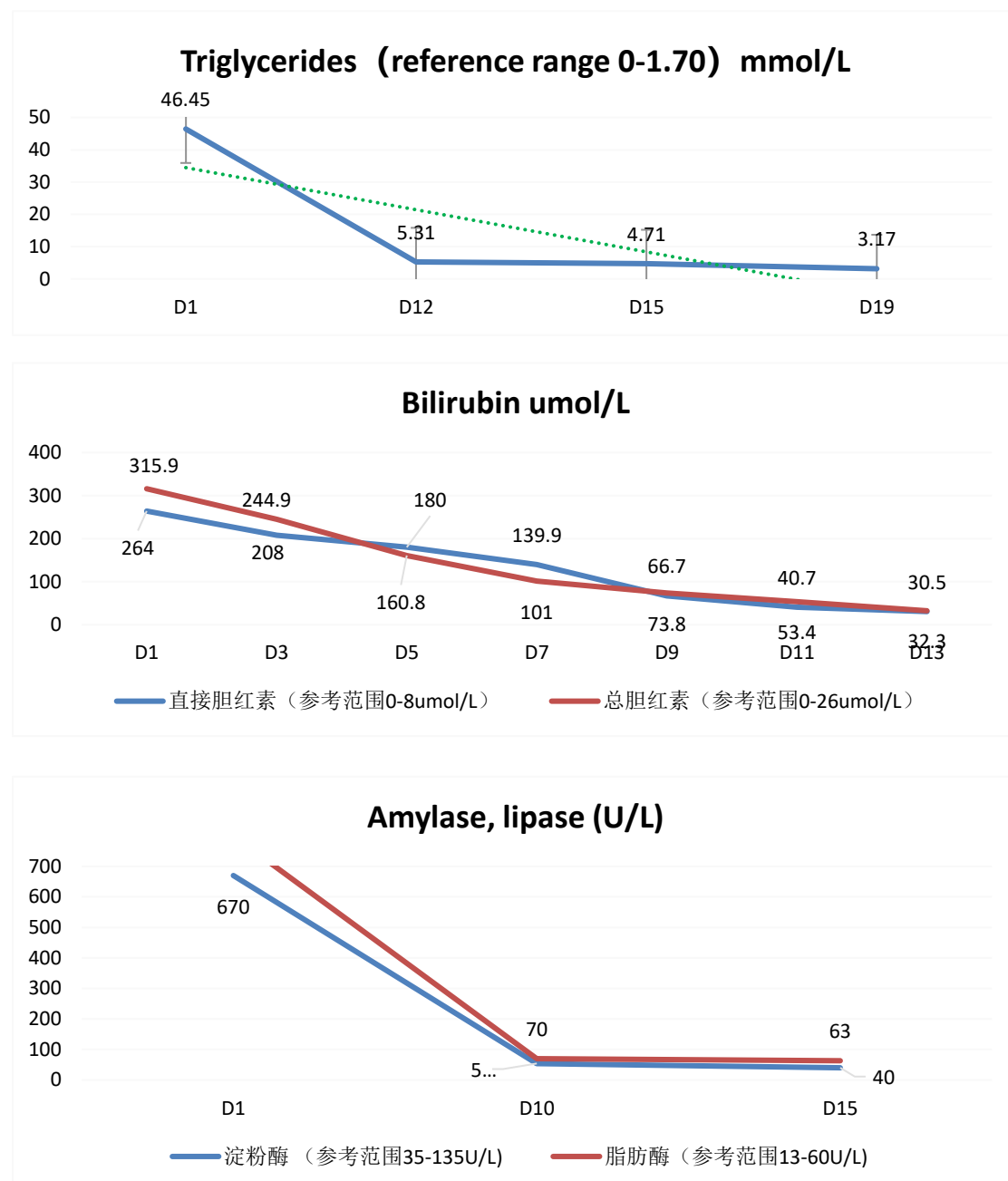
CRP (reference range 0–6) mg/L



ProCT (reference range 0–0.046)



Pancreatitis-related parameters gradually decreased (as shown below):



2.3 Fluid Overload: Associated with Pancreatitis Leading to Hypoproteinemia

2.3.1 Plan of Care:

- Resolution of anasarca;
- No heart failure occurred.

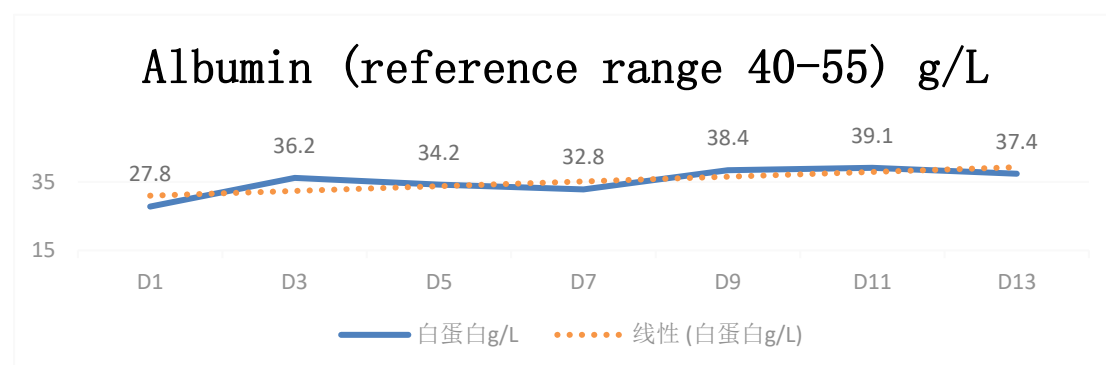
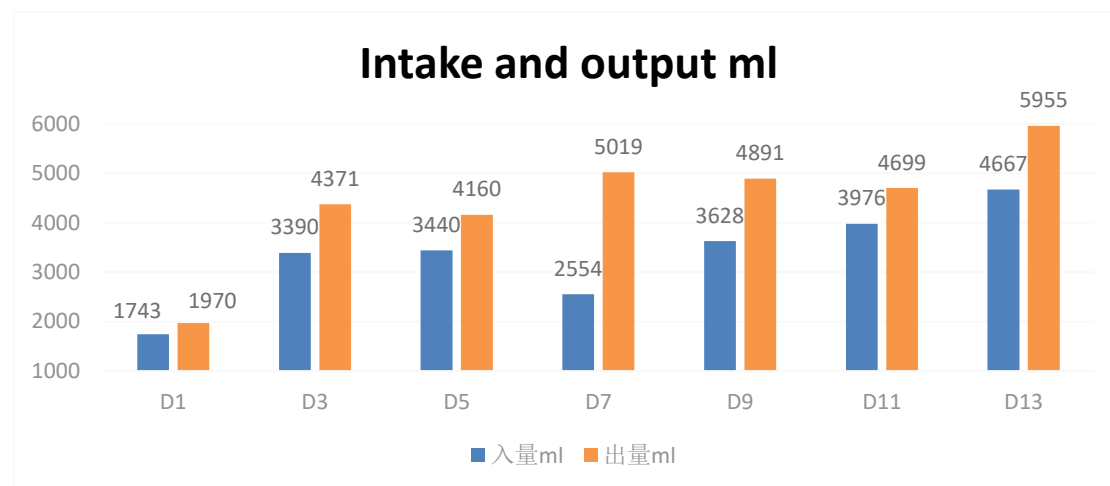
2.3.2 Nursing measures:

- The patient was given (rhubarb, Qingyi decoction, 123 solution) enema and external application of mirabilite to relieve abdominal pain and distension, [for 2];
- Abdominal circumference was measured daily and recorded;
- Observe and record the hourly urine volume, and accurately record the 24-hour intake and output;
- Timely track electrolyte and liver function reports to prevent water and sodium retention;
- Observe the compression of skin, turn over regularly, give foam dressing protection to

the bony prominence, and maintain the functional position of limbs.

2.3.3 Nursing evaluation:

➤ The patient's intake and output could maintain a negative balance, the anasarca subsided, and the abdominal circumference decreased from 99 cm to 95 cm on admission. No heart failure occurred.



2.4 Risk of falling into bed and getting out of tube: associated with pain and poor sedation

2.4.1 Plan of Care:

➤ Strengthen patrol, provide safe and effective preventive measures to avoid falling into bed and abnormal extubation.

2.4.2 Nursing measures:

- RASS and CPOT scores were given to each shift;
- Good bed rails, protective restraint of both upper limbs, skin restraint to strengthen patrol management;
- Gastric tube, tracheal tube, deep venous catheter, thoracic drainage tube, abdominal drainage tube and urinary catheter shall be labeled for classification. In case of excessive fever and sweating, the excipient film shall be replaced in time to ensure that all tubes are effectively fixed in place.
- The length of each catheter is appropriate and the catheter is kept unobstructed. The indwelling depth of the tube should be handed over during the shift. Before moving the patient's position, it is necessary to check that the catheter is fixed steadily without traction.

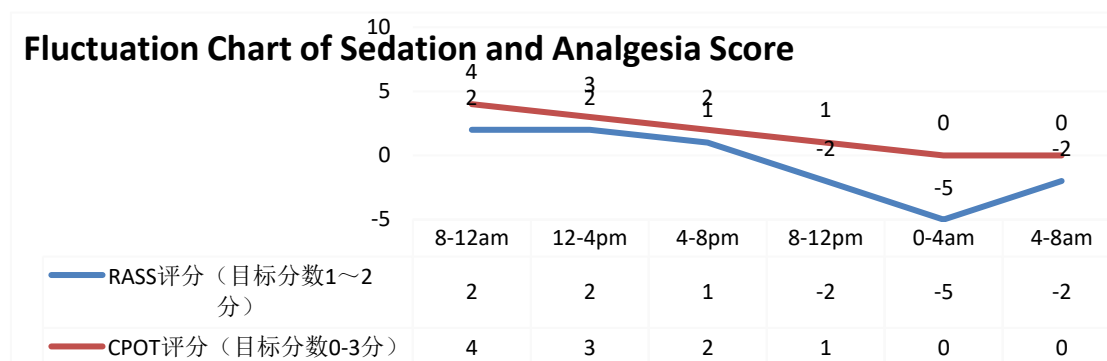
2.4.3 Nursing evaluation:

- The patient had no adverse events such as falling into bed or getting rid of tube after admission.

IV. Discussion

Abdominal pain is the most important clinical symptom in patients with HTG-AP. In addition to pain, various invasive procedures as well as ICU environmental factors can produce anxiety, agitation, delirium, etc., in patients with severe HTG-AP, which leads to reduced treatment cooperation and affects the prognosis [8]. Reasonable analgesic and sedative treatment can not only reduce the body's metabolic and oxygen consumption to adapt to the oxygen supply and demand levels of damaged organs, but also reduce the pathological damage caused by various stresses and promote the recovery of damaged organ function, which is conducive to improve the prognosis of patients with severe HTG-AP [7].

In this case, the patient had a history of long-term smoking and alcoholism, and was given a combination of midazolam 12 ml/h, dexmedetomidine 4 ml/h, and remifentanyl 10 ml/h during treatment in the EICU, but the effect was poor.



The RASS score fluctuated between + 3 and - 5 points during in-hospital treatment, and observations revealed that the RASS score fluctuated between + 2 and - 2 points during the day and between - 2 and - 5 points during the night. Due to many day treatments and procedures, the patient was irritable, restless, and even delirious, so the patient was subjected to limb restraint. Many simple nursing or treatment, such as measuring abdominal circumference, enema, etc., often require the assistance of multiple nurses and auxiliary personnel to complete, making it difficult to carry out nursing work. The patient's agitation also increases the great risk of falling to bed and unplanned extubation. Anti-falling bed and unplanned extubation have become one of the key and difficult points in daily nursing work.

In the daily care of the patient in this case, there was a deep venous access to infuse multiple fluids through the connection of multiple three-way tubes. This phenomenon may lead to imprecise infusion of sedative and analgesic drugs at a constant speed, which may be an important reason why the patient's RASS score fluctuated excessively at the same sedative and analgesic efficacy. It is recommended to use a separate pathway for the infusion of analgesic and sedative drugs to ensure the accuracy of drug input.

Modern Anesthesiology edited by Zhuangxinliang [9] believes that the first-pass elimination of midazolam through the liver is large, the bioavailability is less than

60%, the initial uptake of soluble midazolam in the liver is significantly increased, and long-term alcohol consumption can reduce the sedative and hypnotic efficacy of midazolam. The sedative used in this case was midazolam, which may be one of the reasons for the poor sedative effect of the patient.

The 2018 United States Clinical Practice Guidelines for the Prevention and Management of Pain, Agitation/Sedation, Delirium, Immobilization, and Sleep Disorders in Adult Patients in the Intensive Care Unit [10] recommends the preferred use of dexmedetomidine or dexmedetomidine for the maintenance of a mildly analgesic and sedative state in ICU patients, with the disadvantage that for patients with HTG-AP, analgesic and sedative drugs that can lead to elevated blood lipids. The study of Zhang Chunlin [11] confirmed that butorphanol tartrate is safe for analgesic sedation and can be used for analgesic sedation in patients with HTG-AP. The patient's current lipid levels were: triglycerides 3.17 mmol/L, total cholesterol 3.65 mmol/L, lipase 63 u/L, and amylase 40 u/L. Therefore, I recommend trying to communicate with the doctor whether to change the sedative and analgesic regimen, use imidazolam instead, increase the use of butorphanol tartrate, and observe the analgesic and sedative effects of patients. As for the effect on blood lipids, lipid-lowering therapy can be supplemented to avoid hyperlipidemia. In this case, the patient's blood lipids were also well controlled during treatment.

V. Summary

Through the nursing care of this patient with severe acute lipogenic pancreatitis complicated with severe pneumonia, I comprehensively mastered the nursing points and precautions of the disease, and also had a profound understanding of the monitoring and management of this patient. It has also accumulated valuable experience in bed protection and unplanned extubation. In the observation of the effect of sedation and analgesia in patients, new reflections have been triggered through learning and literature search. Due to the limitation of conditions, the sedative and analgesic program proposed in this paper fails to be confirmed in practice, hoping to be further confirmed in the future work under the principle of no injury and ensuring patient safety. In addition, whether the common infusion and micropump rate-controlled drugs in the same channel will affect the micropump drug pumping speed and pumping accuracy, thus affecting its efficacy or can be a research point for future clinical work.

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