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Characteristics of Patients with Decreased Cognitive Function Undergoing Treatment for Acute Exacerbation of Chronic Heart Failure

—Basic Survey for Standardization of Nursing to Prevent Discontinuation of Treatment

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Abstract

The purpose of this study is to clarify the characteristics of patients with decreased cognitive function undergoing treatment for acute exacerbation phase of chronic heart failure as a basic survey with a view to the standardization of nursing to prevent discontinuation of treatment of patients with declining cognitive function in the acute exacerbation phase of chronic heart failure. As the first stage of the research, using the interview guide created based on the background of discontinuation of treatment and symptomatic monitoring from 33 target literature sources, seven certified chronic heart failure nurses and 15 certified dementia nurses were given semi-structured interviews. Data obtained from the interviews was analyzed by qualitative induction. As a result, we obtained opinions/views on 8 situations namely, "cognitive function at hospitalization", "characteristics at hospitalization, "characteristics when receiving examinations, procedures or treatment", "characteristics of course of treatment", "characteristics related to difficulties in grasping the symptoms of chronic heart failure and indices of deterioration", "characteristics when using diuretics", "characteristics concerning compliance with dietary restrictions" and "support required for discharge from hospital" concerning patients with declining cognitive function. In the future, it is necessary to prepare nursing protocols incorporating these contents for standardization of nursing.

Keywords

Heart Failure, Acute Exacerbation, Acute Phase, Dementia, Physical Disorder, Difficult to Respond, Difficult, Care, Nursing, Behavioral and Psychological Symptoms of Dementia (BPSD)

1. Introduction

Heart disease has a high rate of being cited as a health issue in elderly people aged 65 years or older [1] and, among them, the number of elderly people with dementia who are undergoing treatment for heart failure is expected to increase [2]. The majority of heart failure patients are elderly people aged 65 years or older [3], and elderly people over 80 years old tend to have a higher prevalence of dementia compared to other age groups [4]. In the United States, soaring medical costs related to treatment and care of heart failure were a social problem [5], but disease management of dementia patients was not regarded as a problem. In patients with cardiac disease who underwent in-hospital cardiac rehabilitation, it was reported that those with heart failure had significantly longer hospital stays than patients with myocardial infarction, and there were many with dementia coexisting in the background [6]. One fourth of elderly heart failure patients have repeated hospital admissions and expenditure of medical expenses in Japan is increasing [3]. Therefore, it is important to manage diseases for early recovery and to prevent heart failure in elderly heart failure patients with the complication of dementia.

At the time of treatment for the recovery of heart failure in elderly patients with dementia and heart failure, risks to life are high if routes are removed by the patient and nurses found it difficult to make the patient understand when they explained about their condition [7]. Similarly, dementia nursing-certified nurses who have experienced heart failure nursing had difficulties in dealing with the fact that treatment cannot be continued from the patient's perception of recognition, anxiety, excitement and delirium, etc. [8]. Meanwhile, it has been reported that Mild cognitive impairment (MCI) in the preliminary stage of dementia is one of the factors with low self-care capacity in overseas [9], but there is no research about disease management of chronic heart failure patients with decreased cognitive function.

In the acute exacerbation phase of heart failure, in left heart failure, pulmonary congestion accompanying an increase in left atrial pressure, low cardiac output and hypoperfusion of whole body organs causes dyspnea and shortness of breath, resulting in hypoxia. In the case of right heart failure, as the right atrial pressure rises, appetite disorders or edema, which are body congestion symptoms, are observed, and accompanied by a decrease in the level of consciousness and physical suffering [10]. In addition, it is difficult for dementia patients to adapt to anxiety due to hospitalization and sudden changes in the environment

and circumstances such as the behavioral and psychological symptoms of dementia (BPSD) and delirium and such patients are at high risk [11] [12]. Even in the acute exacerbation period of heart failure, infusions for treatment, oxygen masks, indwelling catheters and monitors, etc. are easily removed, interrupting treatment and delaying recovery [13] and causing an extended hospital stay. Therefore, during the acute exacerbation phase of the physical disorder, we suggest the need to consider countermeasures for safe and smooth treatment of patients [11]. However, acute exacerbated care for heart failure in patients with impaired cognitive function has not yet been standardized.

Based on this background, this study is a basic survey to standardize nursing to prevent discontinuation of treatment of patients whose cognitive function is lowered in the acute exacerbation phase of chronic heart failure and treatment in the acute exacerbation phase of chronic heart failure to reveal the characteristics of patients with impaired cognitive function.

2. Material and Methods

2.1. Subjects

2.1.1. Review of Documents

Using previous studies, we extracted the characteristics of patients with reduced cognitive function who received treatment in the acute phase of heart failure such as "There is no awareness of deterioration of heart failure and the patient is put in an unfamiliar environment", "Difficult to comprehend examination and treatment/patient is under stress and has subjective symptoms", "Continuation of treatment becomes difficult and will be interrupted" and "Symptoms of deteriorating heart failure are not ameliorated and recovery is delayed". Target literature in the past ten years until the end of March 2016 included the Medical Central Journal Web Ver. 5 and selected keywords are: "heart failure", "acute exacerbation", "acute phase", "dementia", "physical disorder", "difficult to respond", "difficult", "care", "nursing" and "BPSD". Types of literature included commentary on nursing care obtained from practice in addition to the original thesis paper. Publications that included content that matched the purpose of this study in the past ten years until the end of March 2016 were also included.

2.1.2. Participants

In order to clarify the characteristics of patients with decreased cognitive function who receive treatment for acute exacerbation of chronic heart failure from the viewpoint of experts in chronic heart failure (CHF) nursing and dementia nursing care, certified nurses with chronic heart failure experience and certified nurses in dementia nursing, we obtained 22 subjects. We asked candidates to participate in a certified nurses' education curriculum and we were introduced to certified nurses in both fields. We did not place importance on the years of experience because there is a difference in the starting year of the curriculum courses depending on the field of certified nurses.

2.2. Methods

2.2.1. Method of Extracting Task Contents Using Target Documents

Subject literature was used to illustrate the background of the discontinuation of monitoring of treatment and symptoms in situations where treatment is discontinued due to difficulty in handling patients with acute exacerbation of chronic heart failure with decreased cognitive function.

2.2.2. Survey Method, Contents, Period

We adjusted schedules individually and planned semi-structured interviews for about 2 hours in a private room. We asked about age, gender, years of nursing experience, and years of experience as a certified nurse and took details in the field notes. In the semi structured interviews, we created an interview guide based on the discontinuation of indicated treatment and symptomatic monitoring, in order to standardize nursing in the future, we gathered data about points to consider in creating nursing protocols through interviews concerning the characteristics of patients whose cognitive function had declined in the acute exacerbation period of chronic heart failure. The interview period was from late June 2016 to late January 2017.

3. Analysis Method

In order to increase the content validity of the data, data analysis of chronic heart failure nursing certified nurses and dementia nursing certified nurses were conducted separately. Data obtained by interview was analyzed by qualitative induction. Verbatim records were created and sections that described the characteristics of patients receiving treatment for chronic heart failure in the acute exacerbation phase whose cognitive function had decreased were extracted. The extracted contents were coded and classified into similar semantic contents.

4. Ethical Clearance of This Study

This research is approved by the Ethics Committee of the Graduate School of Health Sciences, Hirosaki University (Reference Number: 2015-047).

5. Results

5.1. Target Literature

There were 32 articles with contents consistent with this research purpose. In addition, one book in which nursing care based on evidence was shown was added, and 33 subjects [9] [13]-[42] were taken as target literature.

5.2. Background of Discontinuation of Treatment and Symptomatic Monitoring

From the target literature, the background of discontinuation of treatment and symptomatic monitoring performed in the acute exacerbation phase of chronic heart failure in patients with impaired cognitive function became clear (**Figure 1**).

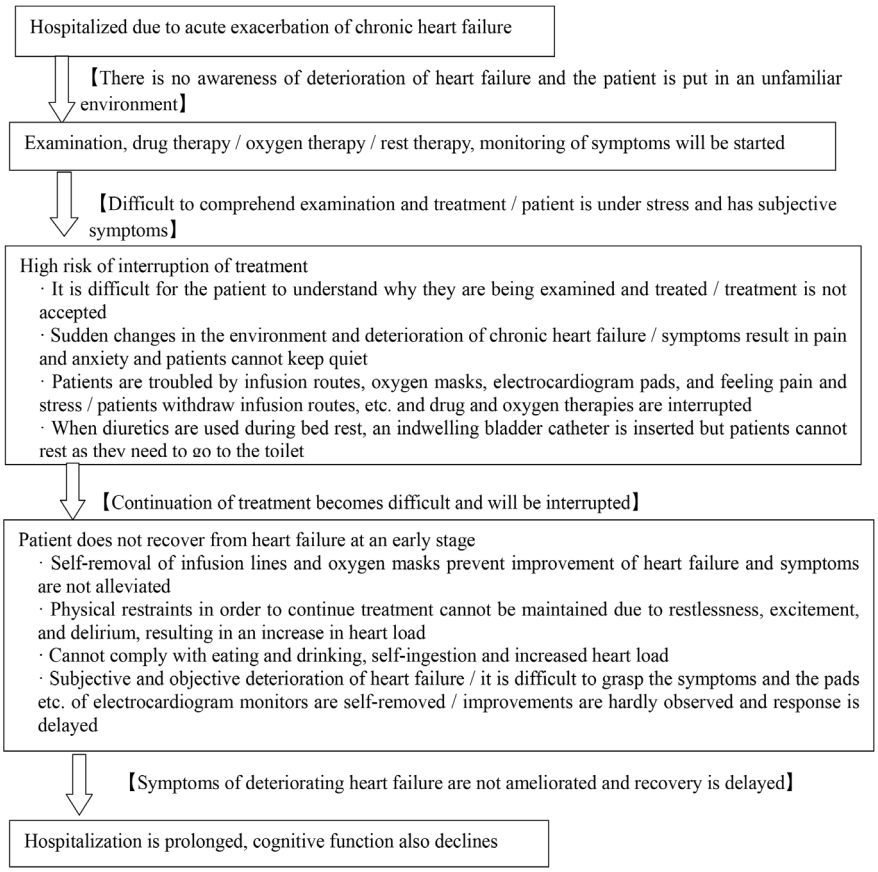

Figure 1. Background of discontinuation of treatment and symptomatic monitoring.

5.3. Outline of Target

Table 1 shows the outline of the certified nurses who were the subjects of this study. A total of 22 people, including 7 certified chronic heart failure nurses and 15 nurses with dementia nursing care experience, were eligible. Age was 41.7 ± 7.8 years for chronic heart failure nurses and 42.7 ± 5.7 years for certified dementia nurses. Average years of experience as a nurse were 18.4 ± 8.6 for chronic heart failure nurses and 20.2 ± 5.7 years for certified dementia nurses. The years of experience of certified nurses were 3.3 ± 1.3 years for certified chronic heart failure nurses and 4.3 ± 1.6 years for certified dementia nurses. Sex in certified chronic heart failure nurses was 6 females and 1 male and for certified dementia nurses, it was 12 females and 3 males.

5.4. Survey Results from Semi Structured Interviews

As a result of holding semi structured interviews using an interview guide prepared based on the background of the discontinuation of treatment and symptomatic monitoring in Figure 1, we obtained opinions/views on 8 situations namely, "cognitive function at hospitalization", "characteristics at hospitalization", "characteristics when receiving examinations, procedures or treatment", "characteristics of course of treatment", "characteristics related to difficulties in

Table 1. Outline of target.

Nurse	Sex	Type of certified nurse	Age	No. of years of experience (years)	No. of years of experience as a certified nurse (years)
A	Female	CHF nursing	37	13.3	3
B	Female	CHF nursing	47	13	4
C	Female	CHF nursing	48	27.5	5
D	Female	CHF nursing	40	18.5	3
E	Female	CHF nursing	41	18.5	3
F	Female	CHF nursing	51	31.5	4
G	Male	CHF nursing	28	6.8	1
H	Female	Dementia nursing	35	13.4	8
I	Female	Dementia nursing	51	26.5	3
J	Female	Dementia nursing	51	30.3	3
K	Female	Dementia nursing	42	21.5	5
L	Female	Dementia nursing	49	21.5	5
M	Female	Dementia nursing	35	13.3	4
N	Female	Dementia nursing	44	14.7	3
O	Male	Dementia nursing	48	23.3	3
P	Male	Dementia nursing	48	24.7	4
Q	Female	Dementia nursing	40	19.8	3
R	Female	Dementia nursing	41	20.8	4
S	Female	Dementia nursing	41	19.6	4
T	Male	Dementia nursing	34	10.6	4
U	Female	Dementia nursing	39	16.7	8
V	Female	Dementia nursing	43	26.9	4

grasping the symptoms of chronic heart failure and indices of deterioration", "characteristics when using diuretics", "characteristics concerning compliance with dietary restrictions" and "support required for discharge from hospital" and we divided the results into 8 situations and summarized them.

5.4.1. Cognitive Function at Hospitalization

For cognitive function recognized at the time of admission by nurses certified in chronic heart failure nursing, the number of codes was 36 and there were 19 classifications (Table 2).

Regarding cognitive function at hospitalization recognized by certified dementia nurses, the number of codes was 66 and there were 19 classifications (Table 3).

5.4.2. Characteristics at Hospitalization

Nurses certified in chronic heart failure nursing recognized that the number of codes at the time of admission was 18 and there were 6 classifications (Table 4).

Table 2. Cognitive function recognized at the time of admission by nurses certified in CHF nursing.

Classification	Number of codes
Difficult to identify dementia	10
Restlessness, desire to return home, anxiety, disorientation disorder, may have dementia	6
Subject to nursing protocols depending on how hospitalization is accepted and whether there is awareness	2
Refer to previous hospitalization in the case of re-hospitalization	2
Judge cognitive function by talking to facility staff	2
Frontal temporal dementia cannot be identified in HDS-R	1
In the case of re-hospitalization, dementia is becoming more severe	1
If patients have dementia they will be short-term hospitalized	1
The severity of dementia has not been measured	1
Diagnosis of dementia is partial and cannot be specified	1
It is better to regard the elderly as high risk	1
Sometimes a diagnosis is made without the patient being examined	1
The clinical site has not paid attention to whether the patient has dementia or not	1
Judge by asking family members	1
There are many mild cognitive impairments, but not diagnosed	1
Acquire information from intensive care unit and make judgment	1
Users of INOVAN injections are prone to delirium	1
It is difficult to distinguish between BPSD and delirium	1
It is difficult to create a nursing protocol based on the type and severity of dementia	1

Table 3. Cognitive function during hospitalization recognized by dementia nursing certified nurses.

Classification	Number of codes
Characterized by type of dementia	14
There are things that can be used to judge cognitive deterioration	12
Use cognitive function assessment tool	6
Heart failure affects cognitive decline	6
Get information from family members and related departments and judge cognitive function	5
Determination of dementia, type and severity is difficult	5
Characterized by the severity of dementia	4
There are times when it is possible to distinguish between dementia and delirium	4
It is difficult to show characteristics of delirium and onset of dementia	3
Nursing protocols cover the elderly	2
Memory is not decreasing at the time of decrease in consciousness/delirium	2
There are some factors that cause a decline in cognitive function/awareness level	2
Sometimes diagnosis of dementia is not examined	1

Table 4. Characteristics at hospitalization recognized by nurses certified in chronic heart failure nursing.

Classification	Number of codes
There are no subjective symptoms and it is easy to see the desire to return home	6
At hospitalization heart load is applied due to environmental change and symptoms of deterioration	4
Many unscheduled hospitalizations due to emergency transport caused by management of the situation before hospitalization and poor subjective symptoms	3
Patients are relieved if families and familiar doctors are involved	3
There are no subjective symptoms even without dementia	1
At the time of admission, the family expects aggressive treatment	1

Characteristics at the time of admission recognized by certified dementia nurses had 45 codes and 19 classifications (Table 5).

5.4.3. Characteristics When Receiving Examinations, Procedures or Treatment

Certified chronic heart failure nurses recognized features, treatment and characteristics recognized in treatment for which the number of codes was 18 and the number of classifications was 10 (Table 6).

With respect to the features recognized when certified dementia nurses recognized an examination or treatment, the number of codes was 12 and there were 9 classifications (Table 7).

5.4.4. Characteristics of Treatment Course

Nurses certified in chronic heart failure nursing recognized the characteristics of courses of treatment as follows: the number of codes was 18 and there were 6 classifications which were classified into three contents: 1) oxygen/monitoring, 2) excretion, 3) resting and BPSD (Table 8). Only categories with 4 or more codes are shown in Table 8.

For certified dementia nurses, the number of codes was 284 which were classified into four contents 1) intravenous drip, 2) oxygen/monitoring, 3) excretion, 4) staying at rest and delirium (Table 9). Only categories with 5 or more codes are shown in the table.

5.4.5. Characteristics Related to Difficulties in Grasping the Symptoms of Chronic Heart Failure and Indices of Deterioration

For characteristics related to difficulties in grasping the deteriorating symptoms of chronic heart failure as recognized by certified chronic heart failure nurses and indices of deterioration, the number of codes was 16 and there were 11 classifications (Table 10).

For certified dementia nurses, the number of codes was 47 and there were 18 classifications (Table 11). Only classifications with 2 or more codes are shown in the table.

Table 5. Characteristics at the time of admission recognized by certified dementia nurses.

Classification	Number of codes
If there is no pain the patients will return to normal condition	6
Delirium is easy to see and prediction is important	5
Relief-related involvement is necessary in care	4
The nurse needs explanation and contact to relieve the patient	4
Subjective symptoms are less likely to occur compared to other diseases	4
There are no difficulties in handling at the time of hospital admission or examinations with an acute invasive acute period	2
Age-related change in sensory organs affects adaptation to hospital environment	2
Building trust is important	2
Families affect patient motivation for treatment	2
Patients are calmed if their own living environment before hospitalization is incorporated	2
Heart failure becomes worse from the environmental change and excretion cannot be done properly	2
Physical restraints are likely to be used and panic may occur	2
It feels more real if a doctor is involved	2
Many hospitalizations occur outside medical hours	1
Different methods of hospitalization depending on the state of utilization of social resources before hospitalization	1
Patients with mild dementia may remember nurses at hospitalization	1
It is also difficult to grasp symptoms of deterioration in elderly people without dementia	1
In patients without knowledge there is a desire to go home	1
At the time of admission there is also a loss of awareness and the patients do not remember treatment or explanation	1

Table 6. Characteristics of inspections recognized by certified chronic heart failure nurses, treatment and treatment received.

Classification	Number of codes
From the administrative side after cardiac catheterization, the radial artery was used to avoid the femoral artery	5
It is necessary to explain clearly in a simple way	2
Drugs are used for resting during large invasive examinations	2
Cardiac catheterization obtains family cooperation, but is discontinued if drug use is ineffective	2
Do not monitor the instrument for continuous measurement	2
Consult with the key person to decide treatment policy in the terminal phase	1
If the patient cannot understand the examination, sit next to the patient and explain what is happening	1
If relationships are built and patients are surrounded by familiar faces, medical staff will not be rejected	1
The patients dislike echography gel	1
Changes in body temperature are observed after the start of the examination	1

Table 7. Characteristics of examination recognized by certified dementia nurses, treatment and treatment received.

Classification	Number of codes
Explain in a way that the patients can understand and be convinced	3
The patients feel bad when treated in large numbers	2
Blood sampling is often done	1
It is difficult to have blood drawn at the confusion stage after treatment starts	1
Explanation of treatment is not done properly	1
The patients have anxiety that the prospects are not good	1
Before choosing physical restraints, it is important to give a sense of security	1
Doctors and nurses should always follow up the examination	1
It is inevitable to take sedation with drugs at the time of examinations in consideration of safety	1

Table 8. Characteristics of courses of treatment recognized by nurses certified in chronic heart failure nursing.

Classification	Number of codes
Oxygen therapy and symptom monitoring	
It is necessary to adopt a fixed or inconvenient method to prevent the infusion from dropping out	6
Percutaneous arterial oxygen saturation (SpO_2) is measured each time, and if it is necessary to continue measurement, it is worn on the foot	4
The electrocardiogram monitor is often removed-requires innovation so that it cannot be seen and requires care of the skin where it is attached	4
Blood pressure and pulse oximeters are not sustained; they need to be measured each time	4
Excretion	
If it is difficult to continue due to discomfort from indwelling bladder catheters, it should be removed and excretion style should match the degree of bed rest	4
Patients will calm when they have an urge to use the toilet if they sit on the toilet even if they have an indwelling bladder catheter inserted	4
Resting and BPSD	
If the patient cannot maintain rest, incorporate activities according to the resting degree	7
During restlessness or excitement, check physical examination and examination data, avoid easy use of medicine, select what to consider and choose the best response	5
In the acute exacerbation period, in order to prevent discontinuation of treatment, physical restraints may be used	5
Study delirium and restlessness with the team including the family and make unified correspondence as much as possible	4
When there is anxiety and excitement, patients are calmed when they hear the voices of members of their families	4

Table 9. Features of courses of treatment recognized by certified dementia nurses.

Classification	Number of codes
Drip	
When inserting an intravenous drip, select a method that causes the least pain possible, devise a puncture site, the position of the route and fixation method	10
Oxygen therapy and symptom monitoring	
If the patient dislikes oxygen masks, continue oxygen therapy instead with cannula	7
Correspond to oxygenation if SpO_2 value decreases	6
Excretion	
People with strong self-reliance try to go to the toilet by themselves even if they are suffering	7
Because of excretion needs, the patient becomes hyperactive and disturbed and rest cannot be maintained	7
Patients who have a strong frequent need to go to the toilet are concerned about incontinence	7
Many male patients express discomfort when using bladder catheters regardless of urine volume and material	5
Minimize the insertion period of the indwelling bladder catheter, expand ALD by setting the excretion style according to the condition after removing the catheter	5
For discomfort from indwelling bladder catheters, improve symptoms by devising the size and fixing of the catheter and using suppositories, etc.	5
If a patient wishes to urinate, make sure the patient feels secure	5
Resting and Delirium	
Understand the characteristics of persons with dementia and support them in a manner that provides relief	10
Create a familiar environment as delirium is common early in hospitalization or at night	7
Understand the duration of action of antipsychotics and sleeping pills and use effectively	7
Nurse may use antipsychotics to allow treatment to continue	7
Physical restraint is used only when the patient absolutely cannot interrupt treatment	7
There are many consultations with approved nurses such as discontinuation of treatment and inability to maintain rest	7
Patients are hospitalized without recognizing the necessity of treatment	6
To prevent reversal of day and night, maintain lifestyle routines	6
Pay attention to side effects of antipsychotics arising from the characteristics and current medical history of elderly patients with dementia	6
Families may require assistance when patients have insomnia, restlessness or a desire to return to BPSD	5
The patient calms down when satisfying the patient's needs within the resting range	5
There are cases in which the appropriate choice is not made when using indications of restlessness or excitement	5

Table 10. Characteristics related to difficulties in grasping the deteriorating symptoms of chronic heart failure and indices of deterioration by certified chronic heart failure nurses.

Classification	Number of codes
After discharge from the hospital, decreases in volume of urination and weight gain will deteriorate as a measure of symptoms	4
Weight gain and shortness of breath worsen as a measure of symptoms	2
Increase in heart rate, wheezing and blood pressure rise will be a measure of worsening symptoms	2
Brain natriuretic peptide (BNP), echocardiography (left ventricular ejection fraction), chest X-ray (CTR) inspection results as deterioration index	1
Breathing difficulty and arrhythmia will be a measure of symptoms	1
Grasp symptoms from weight measurement, liveliness, facial expressions	1
Become worse from aspiration pneumonia	1
The patient cannot convey symptoms spontaneously	1
Differences from usual will be a measure of worsening symptoms	1
The doctor will ask the patient to explain the symptoms of deterioration	1
After leaving hospital, the people around the patient will notice change	1

Table 11. Characteristics relating to difficulties in grasping the deteriorating symptoms of chronic heart failure and guidelines for deterioration indicators as recognized by certified dementia nurses.

Classification	Number of codes
Decrease in level of consciousness, deterioration of respiratory state, cyanosis, decrease in SpO_2, not being able to lie supine, edema, weight gain, decrease in urine volume, decreased appetite, malaise, decreased left ventricular ejection fraction (EF) are all a measure of symptoms	8
Differences from usual will be a measure of worsening symptoms	5
In mild cases of dementia, it may be possible to convey subjective symptoms	5
There are no subjective symptoms	3
The patients cannot convey their symptoms spontaneously	3
Deterioration can be overlooked with loss of volition/spontaneity, hypoactive delirium/sluggishness	3
Wheezing and poor complexion are a measure of worsening symptoms	3
Appearance of BPSD is a measure of worsening symptoms	3
Restlessness, excitement, wandering, hyperactivity and aggressive BPSD are a measure of worsening symptoms	3
It is important to deal with the causes of BPSD	2
Tachycardia and heart rate increase are a measure of deteriorating symptoms	2

5.4.6. Characteristics When Using Diuretics

There were 21 codes and 8 classifications for the characteristics of diuretics when used as recognized by certified chronic heart failure nurses (Table 12).

For certified dementia nurses, the number of codes was 10 and there were 8 classifications (Table 13).

Table 12. Characteristics of diuretic drugs recognized by certified chronic heart failure nurses.

Classification	Number of codes
It feels uncomfortable and unpleasant and a response is necessary	5
Perform weight measurement	3
Pay attention to fixing method	3
Measure urine volume with diapers and portable toilets	3
Continue to measure urine volume when using a pump	3
Taking harmful effects into consideration, do not detain for a long time	2
Evaluate level of bed rest and examine monitoring methods	1
Consider methods other than urine volume measurement	1

Table 13. Characteristics of diuretic drugs recognized by certified dementia nurses.

Classification	Number of codes
Measure urine volume with a diaper	3
Measure urine volume while using Catecholamine	1
If tachycardia occurs or SpO_2 becomes 90 or less, it will be used as a guide for examining excretion assistance methods	1
Decide to continue the indwelling bladder catheter based on whether it is comfortable or not	1
Prioritize and assist with measurable methods	1
The patient self-extracts	1
There were people who removed the indwelling bladder catheter from the connector and walked around holding it	1
The patient feels strange about the indwelling catheter	1

5.4.7. Characteristics Concerning Compliance with Dietary Restrictions

For characteristics concerning compliance with dietary restrictions as recognized by certified chronic heart failure nurses, the number of codes was 38, and there were 26 classifications (Table 14). Only classifications with 2 or more codes are shown in the table.

For certified dementia nurses, the number of codes was 49 and there were 26 classifications (Table 15).

5.4.8. Support Required for Discharge from Hospital

Certified chronic heart failure nurses recognize that patients need support to be discharged from hospital. The number of codes was 46, and there were 20 classifications (Table 16). Only classifications with 2 or more codes are shown in the table.

For certified dementia nurses, the number of codes was 60 and there were 28 classifications (Table 17). Only classifications with 2 or more codes are shown in the table.

Table 14. Characteristics concerning compliance with dietary restrictions as recognized by certified chronic heart failure nurses.

Classification	Number of codes
People who observe restrictions tend not to drink even after the onset of dementia and therefore become dehydrated	4
Strict liquid restrictions are decreasing	3
Do not put liquids within reach of the patient	3
It is difficult to comply with liquid restrictions in recovery	3
Patients exceed salt restrictions and are re-hospitalized	2
Dehydration leads to renal failure	2
Consider replenishment methods for patients with insufficient meal intake	2

Table 15. Characteristics concerning compliance with dietary restrictions as recognized by certified dementia nurses.

Classification	Number of codes
Most patients do not want to drink	4
Different management methods depending on the time of onset of dementia	4
Temporarily relax salt reduction if there is loss of appetite	3
Have meals brought in if there is loss of appetite	3
When dietary restrictions continue, patients feel uneasy and angry	2
Share information on water intake	2
The nurses decide the time to intake liquids and recommend drinking	2
Salt management will become more difficult during the recovery period and at home care than in the acute phase	2
Provide liquids according to life history and luxury product consumption	2
Although feelings of thirst are not easily manifested, sometimes patients go to drink voluntarily	2

6. Discussion

We will discuss points to consider in preparing nursing protocols taking the characteristics of patients with decreased cognitive function in the acute exacerbation phase of chronic heart failure and future nursing standardization into account.

6.1. Cognitive Function at Hospitalization

As shown from responses such as "It is difficult to identify dementia", "It is difficult to create a nursing protocol based on the type and severity of dementia" and "It is difficult to determine dementia, type and severity", there are cases in which the diagnosis of dementia is not made at the time of admission.

Responses such as "It is difficult to distinguish between BPSD and delirium", "There are times when it is possible to distinguish between dementia and delirium and times when it is not possible" and "It is difficult to show characteristics

Table 16. Support required for discharge from hospital as recognized by certified chronic heart failure nurses.

Classification	Number of codes
Use in-home services so the patient can continue oral administration, salinity/activity management and monitor deteriorating symptoms	7
It is possible to continue medicine or weight management from before the onset of dementia as long as it is made into a habit	5
The most important thing is taking medication and continuing to take it	4
Make early visits possible if there is fluctuation in body weight and blood pressure measurements	4
Pay attention to how baths are taken so that heart failure does not get worse	3
Use the heart failure handbook if possible	2
Monitor weight at the time of discharge and ask patients to measure within a workable time frame	2
Early admission at the time of deterioration is important	2
Have the influenza and pneumococcus vaccines for prevention of infection	2
Patients will be hospitalized if they do not change their lifestyles and deteriorate	2
Use activity timing and state as ways to judge worsening symptoms	2
Prevent constipation with laxatives	2
As subjective symptoms are poor, deterioration of symptoms is grasped objectively	2

Table 17. Support required for discharge from hospital as recognized by certified dementia nurses.

Classification	Number of codes
It is necessary to consider introducing social resources and in-home services with awareness of discharge from the hospital	12
Inform families about the patient's situation and obtain cooperation	6
Medication management and weight monitoring are important after discharge from hospital	3
After discharge, sitting for long periods of time can lead to deterioration of heart failure	3
Loss of appetite, decrease in the number of toilet visits and lower limb edema are measures of deterioration	3
Infection prevention is important	3
Cooperation between staff leads to assistance	3
Eating, drinking and activities can be excessive in agricultural work	2
Salt intake is related to family lifestyle	2
Make sure to take medication by innovating numbers and times of doses	2
Make sure that lifestyle functions do not deteriorate due to early discharge	2
Understand what is difficult in everyday life	2
Ask the patient to reduce salt intake but do not give any guidance or restrictions	2

of delirium and onset of dementia" also show that it is clear that it is difficult to respond to the type and severity of dementia as it is not possible to distinguish between them. Therefore, at the time of admission, it is first necessary to screen patients with high risk of suspected dementia or delirium. There was also the opinion that "Nursing protocols cover the elderly". We do not distinguish between delirium and dementia, we think that it is reasonable to think that elderly people aged 65 and older are generally considered to be in a state of declining cognitive function during the period of acute exacerbation of chronic heart failure. Certified chronic heart failure nurses presented the opinion that "Users of INOVAN injections are prone to delirium". INOVAN is used with severe cardiac function issues, and it seems that mental symptoms such as delirium are likely to appear from hypoxic state at hospitalization. Predictive judgment of cognitive decline associated with cardiac function is also important, because treatment content also serves as a material for estimating the severity of cardiac function. The viewpoint of treatment for heart failure was specialized for certified chronic heart failure nurses.

Meanwhile, certified dementia nurses mentioned the indicators of assessment as objective evaluation of cognitive decline. The viewpoint of the assessment on the cognitive function using the tool was specialized in certified dementia nurses.

6.2. Characteristics at Hospitalization

There was an opinion that there were many unscheduled hospitalizations due to emergency transport caused by management of the situation before hospitalization and poor subjective symptoms as shown in Table 4. Patients with decreased cognitive function may not receive sufficient support and may be suddenly hospitalized as opposed to hospitalization during a regular outpatient visit. There was also the opinion that "At hospitalization heart load is applied due to environmental change and symptoms of deterioration". It is considered that there is maladaptation to the environment, that "Patients are relieved if families and familiar doctors are involved" and that providing a familiar environment prevents excessive heart load and leads to early recovery. Patients who did not have a noticeably lower level of consciousness at the time of admission corresponded to the opinion that "In patients without knowledge there is a desire to go home". As seen from the opinion of "Subjective symptoms are less likely to occur comparable to other diseases", it seems that patients are in a situation in which they do not recognize the necessity of hospitalization.

The opinions of "Heart failure becomes worse from the environmental change and excretion cannot be done properly" and "Age-related change in sensory organs affects adaptation to hospital environment" show that it is difficult to adapt to changes in the environment due to sudden hospitalization. As a result, as shown in the opinion of "Delirium is easy to see and prediction is important", patients are in a high-risk state of delirium. For that reason, nurses are involved

in building relationships of trust with patients and facilitating relaxation. As shown in the opinions of "Building trust is important", "Relief-related involvement is necessary in care" and "The nurse needs explanation and contact to relieve the patient", heart load resulting from anxiety can be prevented.

As shown in the opinion of "Patients with mild dementia may remember nurses at hospitalization", as patients with a mild decline in cognitive function have mild core dementia symptoms, ingenuity such as the opinion of "Patients are calmed if their own living environment before hospitalization is incorporated" that enables the environment before hospitalization to continue as far as possible is important. From the opinions of "Families affect patient motivation for treatment" and "It feels more real if a doctor is involved", we can see that assistance to cooperate with family and doctors and adapt quickly to sudden changes in the environment are required.

6.3. Characteristics in Receiving Examinations, Procedures or Treatment

Patients with decreased cognitive function are in a hypoxic state in the acute exacerbation phase of chronic heart failure and as shown in the opinion of "It is difficult to have blood drawn at the confusion stage after treatment starts", it seems that from the level of ordinary cognitive function, ability to understand was further deteriorated. Therefore, there is a need to "Explain in a way that patients can understand and be convinced" and "If the patient cannot understand the examination, sit next to the patient and explain what is happening".

Invasive examinations such as cardiac catheter examinations are sometimes carried out due to underlying diseases connected to heart failure. For that reason, opinions such as "Drugs are used for resting during large invasive examinations", "It is inevitable to take sedation with drugs at the time of examinations in consideration of safety" and "Cardiac catheterization obtains family cooperation, but is discontinued if drug use is ineffective" showed that safety was ensured using sedation. As shown in the opinion that "From the administrative side after cardiac catheterization, the radial artery was used to avoid the femoral artery", even after examination, safety management is also required in order to prevent complications based on the characteristics of patients with decreased cognitive function who cannot maintain rest.

Although there is no denial of opinions such as "Blood sampling is often done" with respect less invasive examinations, as shown in the opinion of "The patients dislike echography gel", examinations themselves are unlikely to cause pain even the patient doesn't like the feeling of cold.

As shown in the opinion of "Changes in body temperature are observed after the start of the examination", the risk of rising blood pressure also increases, so it is also necessary to keep patients warm so as not to cause excessive heart load.

As a response at the time of examination/treatment and at the time of hospitalization, doctors plan to take prompt treatment for early recovery and plan to start the treatment at an early stage and, as shown in the opinions of "The pa-

tients feel bad when treated in large numbers" and "Before choosing physical restraints, it is important to give a sense of security", dementia patients who have deteriorated cognitive function will have anxiety and distrust. There were opinions such as "If relationships are built and patients are surrounded by familiar faces, medical staff will not be rejected", "If the patient cannot understand the examination, sit next to the patient and explain what is happening" and "Doctors and nurses should always follow up the examination". Nurses strive to build a relationship of trust between themselves and the patient, accompanying them during examinations/treatment and explain everything. Also, as explained in the opinion of "Patient related anxiety that the prospects are not good", nurses explain in order to relieve anxiety at the prospect of a long treatment period which in turn leads to a reduction in the risk of excessive cardiac load.

6.4. Characteristics of Course of Treatment

As shown in the opinion of "Because of excretion needs, the patient becomes hyperactive and disturbed and rest cannot be maintained", there was the characteristic that treatment could be easily interrupted in the acute exacerbation period of chronic heart failure because patients pulled at intravenous drips and indwelling bladder catheters or because patients were unable to articulate what was wrong with them. According to the opinions that "When inserting an intravenous drip, select a method that causes the least pain possible, devise a puncture site, the position of the route and fixation method", "Minimize the insertion period of the indwelling bladder catheter, expand ALD by setting the excretion style according to the condition after removing the catheter" and "if the patient cannot maintain rest, incorporate activities according to the resting degree", it is necessary to advance nursing assistance to alleviate distress and discomfort, and to prevent excessive heart load resulting from disturbance and excitement.

In addition, if BPSD or delirium is not improved even with nursing aid, it is also necessary to consider the use of drugs at an appropriate time as shown in such as "Understand the duration of action of antipsychotics and sleeping pills and use it effectively" and "Even if patients take antipsychotics after the onset of delirium or agitation, the effects are weak".

6.5. Characteristics Related to Difficulties in Grasping the Symptoms of Chronic Heart Failure and Indices of Deterioration

With regard to how to understand the symptoms of deterioration of heart failure, both types of certified nurses used "Decrease in level of consciousness, deterioration of respiratory state, cyanosis, decrease in percutaneous oxygen saturation (SpO_2), not being able to lie supine, edema, weight gain, decrease in urine volume, decreased appetite, malaise, decreased left ventricular ejection fraction (EF) are all a measure of symptoms", "Brain natriuretic peptide (BNP), echocardiography (left ventricular ejection fraction), chest X-ray (CTR) inspection results as deterioration index" and "Breathing difficulty and arrhythmia will be a

measure of symptoms" to measure deteriorating symptoms. It is difficult for patients with impaired cognitive function to detect symptoms of heart failure deterioration [11] [13] and it is important to find out about worsening symptoms at an early stage using objective indicators.

6.6. Characteristics When Using Diuretics

There were opinions such as "It feels uncomfortable and unpleasant and a response is necessary", "The patient feels strange about the indwelling catheter" and "There were people who removed the indwelling bladder catheter from the connector and walked around holding it". This suggests that patients who intend to make excretory complaints or toilet excretion behaviors despite the placing of a catheter due to discomfort of the indwelling bladder catheter are subject to excessive heart load and may delay recovery. "Measure urine volume while using Catecholamine" and "Continue to measure urine volume when using a pump" show that, while using drugs with diuretic action, excessive heart load is applied by repeated urine volume and repeated toilet operation. In addition, in order to evaluate the therapeutic effect, indwelling catheter for the bladder is necessary. However, when repeating off-bed activities due to discomfort, since excessive heart load is applied, it is necessary to provide assistance after removing the indwelling bladder catheter and minimizing such as in "Measure urine volume with a diaper" and "Measure urine volume with diapers and portable toilets".

6.7. Characteristics Concerning Compliance with Dietary Restrictions

There was the opinion that there were "Different management methods depending on the time of onset of dementia". It became clear that management ability differs depending on whether the onset of heart failure is before or after the onset of dementia. It is difficult to feel dry mouth due to introduction of Tolvaptan, etc. in situations in which "Strict liquid restrictions are decreasing". In addition to this, in patients whose cognitive function has declined shown in "Most patients do not want to drink" and it is difficult to take actions to consume water spontaneously. It is necessary to note that dehydration leads to deterioration of heart failure rather than excessive intake as in "Dehydration leads to renal failure". On the other hand, there were the opinions that "It is difficult to comply with liquid restrictions in recovery" and "Although feelings of thirst are not easily manifested, sometimes patients go to drink voluntarily". In the recovery process, it was difficult to respond to excessive intake of liquid in patients with low self-reliant cognitive function. When preparing nursing protocols, in order to suppress the excessive intake of water during the recovery period of patients whose cognitive function with low autonomy has declined, a countermeasure method based on the contents of assistance such as "Share information on water intake" should be considered.

As for meal and salt intake management, as shown in opinions such as "When dietary restrictions continue, patients feel uneasy and angry" and "Patients ex-

ceed salt restrictions and are re-hospitalized", in the process of recovery from the acute exacerbation phase of chronic heart failure and home care, excessive intake of meals was a problem in patients with low self-reliant cognitive function. It is necessary to suppress excessive heart load from BPSD such as anger and stealing behavior by decreasing the period of restriction. Although there is excess dietary intake, the opinions of "Temporarily relax salt reduction if there is loss of appetite" and "Have meals brought in if there is loss of appetite" show that the symptoms of deterioration of heart failure and progression of dementia are associated with anorexia which is also a problem.

6.8. Support Required for Discharge from Hospital

There were opinions such as "It is possible to continue medicine or weight management from before the onset of dementia as long as it is made into a habit". "The most important thing is taking medication and continuing to take it", "Medication management and weight monitoring are important after discharge from the hospital" and "Make sure to take medication by innovating numbers and times of doses" and continuation of medication was regarded as important in home care management. On the other hand, there was the opinion of "Pay attention to how baths are taken so that heart failure does not get worse".

While preventing exacerbation, as well as implementing lifestyle habits such as "Patients will be hospitalized if they do not change their lifestyles and deteriorate" and "Make early visits possible if there is fluctuation in body weight and blood pressure measurements" continued monitoring of deteriorating symptoms was conducted, and guidance was given to seek early visits without waiting for regular checkups if deterioration was observed. When preparing the nursing protocol, as a nursing aid in the recovery process, management for taking medication was the best, even if the patients cannot change their lifestyle habits and early detection of deterioration of heart failure so that they can deal with it early is important.

7. Conclusion

There are cases in which dementia is not diagnosed at the time of admission, and the elderly in general are subject to the nursing protocol. Regarding characteristics at the time of admission, patients are at high risk of delirium from maladaptation to changes in the environment due to sudden hospitalization, and preventive aid is necessary. Characteristics in receiving examinations, procedures and treatment are thought to be low oxygen state with decreased understanding which reduces the feeling of anxiety and leads to the reduction of the risk of excessive heart load. The characteristics of the course of treatment include withdrawal of intravenous drip routes and it is necessary to consider the use of drugs at an appropriate time. It is important to find worsening symptoms at an early stage using objective indicators such as breathing and tachyarrhythmia as characteristics of deterioration of the symptoms of chronic heart failure and indices of deterioration. With regard to the characteristics when using diuretics, while

using drugs with diuretic action, urine volume is large and repetition of toilet action is applied therefore excessive heart load is applied. If insertion of an indwelling bladder catheter cannot be sustained, consider assistance methods that minimize heart load. Characteristics concerning adherence to dietary restrictions not only excessive food or liquid intake but also insufficient intake were a problem. It is expected that a content-validated nursing protocol will be created by combining the professional viewpoints of certified nurses in both fields with this study.

8. Limitation of This Research

In this study, since certified nurses responded to interviews based on past cases, we could not collect information on the type and severity of dementia in patients with impaired cognitive function.

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