

## Development of a Congestive Heart Failure Protocol in a Rehabilitation Setting

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### KEY WORDS

ACE inhibitors  
beta blockers  
congestive heart failure protocol  
renin-angiotensin

*A number of patients in a rehabilitation setting were being transferred to acute-care facilities with a diagnosis of congestive heart failure (CHF). A transfer penalty was charged to the rehabilitation facility based on each patient's length of stay. A multidisciplinary team was assembled with physician support to address the problem. The team's goal was to develop a CHF protocol with guidelines that would allow for more frequent nursing assessments and reporting to physicians. The protocol interventions were initiated consistently and monitored on each shift. These interventions allowed for more timely assessment and treatment of patients with signs and symptoms of CHF. As a result, the number of patients being transferred to acute-care hospitals has decreased, allowing patients to complete their rehabilitation process without interruption. The decreased number of patients being transferred to the acute-care setting has resulted in fewer transfer penalties for the rehabilitation facility.*

Congestive heart failure (CHF) affects approximately 5 million Americans, with an estimated 550,000 new cases each year (American Heart Association [AHA], 2007). Heart failure is the leading cause of hospitalization in the United States among people older than age 65 (Grossman & Brown, 2008). The average age of people with heart conditions is 75 (Abraham, 2007), with 52% of patients being women (Galvao et al., 2006). The condition is more common among African Americans than Caucasians (Kamath, Drazner, Wynne, Fonarow, & Yancy, 2008).

CHF is a complex syndrome that results from the heart's inability to sufficiently increase cardiac output to meet the body's metabolic demands. CHF prohibits the heart from pumping enough blood to meet the needs of body tissues. The body diverts blood away from less vital organs, particularly muscles in the limbs, and sends it to the heart and brain, which results in weakness and fatigue. Fatigue often is the first symptom of heart failure in older people. A balance of exercise and rest is important to strengthen the heart. Modified therapy in which therapy is limited to 1½ hours per day for up to 10 days can help patients overcome fatigue. The care plan also should incorporate a rest period between therapies. Patients also are instructed to take additional rest periods and practice energy conservation.

### CHF's Effects

CHF can be left-sided, right-sided, or both. Left-sided heart failure impairs the ventricles' ability to effectively empty. Diminished left-ventricular

function allows blood to pool in the ventricles and atrium and eventually back up in the pulmonary veins (the vessels that return blood from the lungs to the heart) and capillaries. Patients may experience dyspnea on exertion or when lying flat, dizziness, and orthostatic hypotension. Some patients may be unable to sleep unless sitting upright. In CHF, cardiac output does not match venous return. The heart cannot keep up with the normal demands placed on it; rising capillary pressure pushes sodium and water into the interstitial space, causing pulmonary edema. When patients lie down, fluid in the extremities moves into the systemic circulation. Because the left ventricle cannot handle the increased venous return, fluid pools in the pulmonary circulation, worsening pulmonary edema. Decreased breath sounds, crackles, and orthopnea may be noted. As fluid builds up in the lungs, it can cause persistent coughing or wheezing. The right ventricle may become stressed because it is pumping against greater pulmonary vascular resistance and left ventricular pressure. At this point, symptoms will worsen. In right-sided heart failure, the right ventricle will enlarge with the formation of stretched tissue. If a patient does not already have left-sided heart failure, he or she may experience increased heart rate, cool skin, cyanosis, decreased cardiac output, and palpitations. Backed-up blood flow distends the visceral veins, especially the hepatic veins. As the liver and spleen engorge and function is impaired, patients may experience anorexia, nausea, abdominal pain, weakness, and dyspnea related to abdominal distention. Left-sided

## Key Practice Points

1. Heart failure affects approximately 5 million Americans and is the leading cause of hospitalization in the United States in people older than 65 years.
2. Preventing a transfer to the acute-care facility allows patients to complete a rehabilitation program and saves the hospital from a transfer penalty.
3. Fulfilling the Congestive Heart Failure protocol is the responsibility of the entire multidisciplinary team.
4. Timely assessment of the patient allows for early interventions.

heart failure and rising capillary pressure cause fluid to leak into the veins, causing the feet, legs, ankles, or abdomen to swell with weight gain.

Fluid buildup affects the kidneys' ability to dispose of sodium and water, which causes fluid retention in the tissues. For this reason, patients usually are placed on a 2,000-mg (restricted) sodium diet. Problems such as nausea and lack of appetite occur when the digestive system receives less blood. Resting after meals allows the heart to pump blood to the digestive system.

The renin-angiotensin system, or the renin angiotension-aldosterone system, is a hormone system that regulates blood pressure and water (fluid) balance. Sodium depletion, reduced blood pressure, and dehydration stimulate the kidneys to secrete renin. Renin stimulates the production of angiotensin. Angiotensin causes blood vessels to constrict, resulting in increased blood pressure. Angiotensin also stimulates the secretion of aldosterone from the adrenal cortex. Aldosterone causes the tubules of the kidneys to retain sodium and water. This increases the volume of fluid in the body, which also increases blood pressure.

Some medications used to treat CHF are angiotensin-converting enzyme (ACE) inhibitors. ACE inhibitors are a type of vasodilator; these drugs widen or dilate blood vessels to lower blood pressure, improve blood flow, and decrease heart workload. Some examples of ACE inhibitors are enalapril (Vasotec), lisinopril (Prinivil, Zestril), and captopril (Capoten). These drugs can cause an irritating cough in some people. Side effects include dangerously low blood pressure, dizziness, and coughing (Doyle, 2009). Angiotensin II receptor blockers are drugs that have many of the beneficial effects of ACE inhibitors, yet do not cause a persistent cough; examples of these drugs include losartan (Cozaar) and valsartan (Diovan). Side effects may include dizziness, fatigue,

headache, nausea, and cough (Doyle). Digoxin (Lanoxin), which is a digitalis, slows the heartbeat and may be initiated in patients with atrial fibrillation. Side effects include fatigue, dizziness, light flashes, yellow-green halos surrounding visual images, and nausea (Doyle). Beta blockers are a class of drug that slows the heart rate, which increases the time available for left ventricular filling and coronary flow, particularly during exercise, and reduces blood pressure (Zile & Calucci, 2008). Examples include carvedilol (Coreg), metoprolol (Lopressor), and bisoprolol (Zebeta). These drugs also reduce the risk of abnormal heart rhythms. Side effects may include weight gain, tiredness, dizziness, and sensitivity to cold (Doyle). Patients who have a slow heart rate, elevated systolic blood pressure, peripheral vascular disease, asthma, or chronic obstructive pulmonary disease or who have certain heart rhythm abnormalities should not take beta blockers (Doyle). Diuretics, often called water pills, make patients urinate more frequently to keep fluid from collecting in the body. These drugs decrease fluid in the lungs so patients can more easily breathe; examples include bumetanide (Bumex) and furosemide (Lasix). Because diuretics can cause loss of potassium and magnesium, physicians may prescribe supplements of these minerals and monitor these levels with blood tests. Aldosterone antagonists primarily are potassium-sparing diuretics, but have additional properties that help the heart to work better and increase life span (Mayo Clinic, 2008). Medications for CHF are started at a very low dose and increased over time as the patient tolerates; this reduces the likelihood of side effects.

### Launching the Protocol

The body's metabolic demands are greatly increased during the rehabilitation process, and this can cause patients to go into CHF. Rehabilitation exercises increase heart rate, blood pressure, and myocardial oxygen consumption, which can worsen CHF. Low-intensity exercise helps patients with heart failure improve their strength and quality of life. Scientific evidence has demonstrated that the role of exercise can significantly improve cardiopulmonary function, functional status, and psychosocial status of people with heart failure (Certo, 2001).

The clinical nurse specialist at Forum Health Hillside Rehabilitation Hospital observed that a number of patients were being transferred to an acute-care facility with a CHF diagnosis. This not only interrupted the patients' rehabilitation process, but also cost the rehabilitation hospital in terms of a transfer penalty. A literature search was performed to identify whether a CHF protocol was available for rehabilitation settings. The literature search, as well as contact with

other rehabilitation hospitals in the area, failed to reveal such a protocol. The rehabilitation physicians at Forum Health Hillside Rehabilitation Hospital in Warren, OH, had access to heart specialists in the area and consultation with patients' heart specialists to further identify proper CHF treatment. The AHA had issued "Clinical Guidelines for the Management of CHF" for acute-care hospitals (American College of Cardiology & AHA, 2005). After careful review of these AHA guidelines, a decision was made to adapt them in the rehabilitation setting.

A multidisciplinary team was developed that consisted of a clinical nurse specialist as the facilitator, along with two registered nurses, two physicians, one physical therapist, an occupational therapist, an infection control practitioner, and a respiratory therapist. The committee's goal was to develop a CHF protocol that would allow for more frequent nursing assessments to identify early CHF signs and symptoms and report them to attending physicians. Before the protocol was implemented, patient assessments were completed on admission and ongoing. After implementation of the CHF protocol, patients were assessed each shift for CHF signs and symptoms to allow for more timely interventions and possibly prevent transfer to an acute-care facility with a CHF diagnosis. It was determined that all patients with a history of CHF would be placed on the protocol. The physician or registered nurse could write an order for the protocol. Patients with no prior history

of CHF but who exhibited signs or symptoms of the condition, and patients at high risk for CHF, also were placed on the protocol. The CHF protocol was added to the physician order sheet. CHF was added to the nursing documentation record, and the nurse who implemented the CHF protocol signed to indicate the patient was placed on the protocol.

The committee's task at hand was to develop a protocol for CHF that would lend itself to the rehabilitation setting. The protocol consisted of a physical assessment of feet, ankles, and the abdomen for swelling; vital signs; and lung sounds that would be performed every shift. Intake and output would be monitored every shift. Weight checks would be performed three times a week, either on Monday, Wednesday, and Friday or Tuesday, Thursday, and Saturday based on day of admission. The day shift would obtain the Monday, Wednesday, and Friday weights, and the afternoon shift would obtain the Tuesday, Thursday, and Saturday weights. The weight checks were performed consistently at the same time of day, with patients wearing the same amount of clothing and stepping on the same scale for accuracy. In this way, there was equal distribution of work load on each shift. A dry-erase board was placed in a convenient location to remind staff to check weights on each shift. Patients also were placed on a 2,000-mg sodium diet, and any other restrictions ordered by the physician were enforced. It is important to strictly monitor intake and output for CHF patients and for

**Table 1. Congestive Heart Failure Protocol Guidelines**

<ol style="list-style-type: none"> <li>1. The physician will order the congestive heart failure (CHF) protocol for all patients admitted with a history of CHF.</li> <li>2. Any patient (without prior history) exhibiting signs or symptoms of CHF or who is at high risk for CHF (i.e., coronary artery bypass graft) will also be placed on the CHF protocol.</li> <li>3. The RN also may write an order for the CHF protocol.</li> <li>4. The nurse will initiate the CHF protocol by signing and dating the nursing protocol for CHF and initialing after CHF protocol under "Precautions" on the nursing documentation record.</li> <li>5. The CHF protocol will be placed in the Kardex for continuous use. The patients will be weighed three times weekly starting with the day of admission.</li> <li>6. The weights to be done on Monday, Wednesday, and Friday are to be done by the day shift. Please weigh the patient at the same time each day.</li> <li>7. The Tuesday, Thursday, and Saturday weights will be done by afternoon turn. Please weigh the patient at the same time each day.</li> <li>8. A red magnetic heart will be placed on the overbed board to indicate the patient is on the CHF protocol.</li> <li>9. Accurate intake will be kept based on the measurement list. The measurement list is kept in each patient room, kitchen, and on the medication cart, as well as in physical/occupational therapy.</li> <li>10. Accurate output is kept using a hat for commode use for female patients.</li> <li>11. Male patients may take their urinal to physical/occupational therapy in a plastic bag attached to the handle of the wheelchair.</li> <li>12. A red heart will be placed on the therapy schedule card to alert physical/occupational therapy that the patient is on the CHF protocol.</li> <li>13. Upon discharge, the patient will be given the discharge instructions for heart failure.</li> </ol>
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physicians to monitor the effectiveness of treatment changes. The dietary department was asked to review the intake measurement list for accuracy. After corrections were made, the measurement list was placed in each patient room, the unit kitchen, and on the medication cart as well as in the physical and occupational therapy departments so all staff would have access to accurate amounts for allowed foods and fluids. A method was needed to help staff identify patients on the CHF protocol so that strict urinary output could be obtained. A half sheet of 8½ x 11 paper was used to make a sign that read “CHF Protocol MEASURE ALL URINE.” The sign had a row of red hearts around the border and was hung in each patient’s bathroom. Guidelines were developed to help staff implement and follow the CHF protocol (Table 1).

Some questions were identified when the protocol was implemented; for example, how would the therapy departments know a patient was on the CHF protocol, how would they measure urine if the patient had to use the bathroom in the therapy department (previously the patient was brought back to the nursing unit to urinate), and how would the equipment be cleaned to meet infection-control standards? The

therapy schedule card attached to each patient’s wheelchair was used to identify patients on the CHF protocol; a red heart was placed on the card. The red heart on the schedule card would alert therapists that the patient would need to have any intake or output measured and reported to the nursing unit. Measuring patients’ output when they voided in therapy posed the question of cleaning the equipment. Men took their urinal in a plastic bag with a draw-string top for use in the therapies. The plastic bag was placed on the wheelchair handle for transport. Women would use a hat for commode use. The infection-control practitioner developed a procedure to clean equipment when used in therapies that was consistent with infection-control standards.

When evaluating the protocol, the staff felt they needed a quick visual when they walked into patient rooms to identify that a patient was on the protocol. The committee decided to add a magnetic strip to the overbed board. Red hearts were cut out using a foam material, and a magnetic strip was placed on the back of the heart. A red magnetic heart would be attached to the overbed board to indicate the patient was on the CHF protocol. Nurses then could identify patients

**Figure 1. Discharge Instructions for Heart Failure**

<p>Weigh yourself daily:</p> <ul style="list-style-type: none"><li>• Same time each day</li><li>• After urinating</li><li>• With the same amount of clothing</li><li>• Using the same scale.</li></ul> <p>Take your medications as ordered. <b>Do not skip medication doses.</b></p> <p>Avoid alcohol.</p> <p>If you smoke, please quit. If you don’t succeed, quit again.</p> <p>Reduce your caffeine intake (coffee, tea, soft drinks, chocolate, etc.).</p> <p>Limit your sodium intake to 2,000 mg per day.</p> <p>Call your physician if you have a significant change, such as</p> <ul style="list-style-type: none"><li>• 2–3-pound weight gain in 1 day or 5-pound gain within 1 week</li><li>• Increased shortness of breath, especially when lying down</li><li>• Chest pain, heaviness, or discomfort</li><li>• Increase from your usual weakness or fatigue</li><li>• Increased swelling of feet, ankles, hands, or abdomen.</li></ul> <p>Increased nausea or lack of appetite</p> <p><b>Limit liquid intake</b> to 2,000 cc per day unless otherwise directed by your doctor (no more than eight 8-ounce glasses).</p> <p>Keep your regular doctor appointments.</p> <p>Gradually increase daily walking and other physical activities as tolerated.</p> <p>Get adequate rest to avoid becoming overly tired.</p> <p>Nurse’s signature _____</p> <p>I have read and understand the above. I received a copy.</p> <p>Patient or (significant other) signature: _____</p> <p>Date: _____ Time: _____</p>
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who required protocol interventions such as checks for lung sounds, weight, and intake and output.

The committee also wanted to address discharge instructions for CHF patients to ensure continuity of care (Figure 1). Discharge instructions included weight checks; medication use; intake of alcohol, caffeine, sodium, and fluids; getting adequate rest; and when to call the doctor. All patients discharged had a dietary consult so they could learn which foods should be included on a 2,000-mg low-sodium diet. They also learned to recognize high-sodium items such as processed foods, fast foods, canned vegetables, and salted snacks. The staff taught patients that an increase in shortness of breath or weakness would be important if these symptoms were experienced without exertion.

After the team developed the CHF protocol with guidelines for use, the clinical nurse specialist taught the protocol and provided instruction on recognizing CHF signs and symptoms to the nursing staff working on all three shifts to ensure consistency in implementing the protocol guidelines. The clinical nurse specialist also taught the CHF protocol to the therapy departments.

Protocol interventions were monitored as a quality-improvement initiative. The interventions were initiated consistently and monitored each shift, and allowed for more timely nursing assessment, identification of signs and symptoms of worsening CHF, and treatment. The number of patients being transferred to acute-care hospitals had decreased, and the rehabilitation hospital decreased its number of transfer penalties. Prior to the initiation of the CHF protocol, of the patients transferred to the acute-care setting, 5% had a diagnosis of CHF. After the protocol was implemented, the percentage of patients transferred who had CHF dropped to 0.5%.

## Conclusion

More timely assessments and interventions have prevented some rehabilitation patients from transferring to acute-care facilities. When patients are not transferred, they are able to complete their rehabilitation process, meet their rehabilitation goals, and realize better outcomes. Preventing interrupted stays also meant the facility at which this protocol was implemented could avoid paying transfer penalties. A future research study needs to identify whether these interventions made a significant difference in the number of transfers to acute-care facilities. Before the CHF protocol was initiated, 5% of the patients transferred to the acute-care setting

had a diagnosis of CHF. After implementation, only 0.5% of patient transferred to the acute-care setting had a diagnosis of CHF.

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