Postdischarge Assessment After a Heart Failure Hospitalization
The Next Step Forward

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Heart failure (HF) is the most frequent cause of hospitalization for patients >65 years of age.\textsuperscript{1-5} More than 1 million patients are admitted to the hospital with HF each year in the United States, and this number is likely to increase because of aging of the general population, improved survival after acute cardiovascular conditions, and prevention of sudden cardiac death. Hospitalization for HF is one of the most powerful independent risk factors for death among patients with HF. Mortality during the initial hospitalization ranges from 6\% to 7\% in Europe to 3\% to 4\% in the United States, depending on the length of hospital stay.\textsuperscript{1,2} Poor outcomes have universally been shown after discharge, with 60- to 90-day mortality rates of 5\% to 15\% and hospital readmission rates of 30\%.\textsuperscript{6,7} Depending on the duration of the first hospitalization and on the number of previous hospitalizations, the risk of dying after a hospitalization for HF is increased from 4-fold to 16-fold compared with before the hospitalization.\textsuperscript{8}

Whereas the prognosis of patients with chronic HF has improved in recent years, there has been no change in the high risk of death or rehospitalization after an HF hospitalization.\textsuperscript{6,9-11} This has multiple causes. First, the hospitalization for HF may be the expression of end-stage HF. In these patients, all therapies have already been tried and have become ineffective or were not tolerated. There are no chances to improve their symptoms and prognosis except with the use of assist devices or heart transplantation. These patients, however, are only a small proportion, <5\%, of all the patients hospitalized for HF. An improvement in outcomes is possible in the others.\textsuperscript{1,12} In addition to the lack of new therapies, incomplete relief from fluid overload, insufficient patient education, lack of implementation of evidence-based therapies, and poor postdischarge follow-up planning are among the main causes of their poor outcomes.\textsuperscript{2-4}

The transition from the in-hospital to the outpatient setting involves not only changes in the physician(s) providing care but also modifications in diet, self-dependence in the administration of new and complex drug therapies, demands for more physical activity, and confrontation with familial and social stresses. All of these factors make the early postdischarge period a vulnerable phase. Changes in fluid status and/or renal function frequently occur, and outcomes may be deeply affected.\textsuperscript{5,13} In addition, uptitration of lifesaving therapies such as neurohormonal antagonists may require many weeks, and thus only an early postdischarge follow-up may allow its completion. Postdischarge assessment is now deemed an essential component of the treatment of the patients hospitalized for HF.\textsuperscript{2-4} It directly follows the 3 earlier phases of evaluation and management of the patients with acute HF, summarized as the early or emergency department (ED) phase, the in-hospital phase, and the predischarge phase.\textsuperscript{2,7,13} However, it remains to be established who should perform the postdischarge assessment, in which patients and when it should take place, and what should be its components.\textsuperscript{2-4}

In this issue of Circulation, Lee et al\textsuperscript{13} relate the type of transition care with the outcomes of 10 599 patients with HF evaluated at EDs in Ontario, Canada, between April 1, 2004, and March 31, 2007. Data obtained with the National Ambulatory Care Reporting System clearly demonstrate the benefits of a postdischarge assessment performed by both the primary care (PC) physician and the cardiologist compared with the lack of any physician assessment but also with PC-only practice.

**Who Should Perform Postdischarge Assessment?**

The study by Lee et al provides answers to this question. Lee et al subdivided patients into 4 groups according to their postdischarge care: no physician visit (n = 1990), PC only (n = 6596), cardiologist only (n = 535), and collaborative care including a PC physician and a cardiologist (n = 1478). Internal medicine specialists who provided cardiology care were considered cardiac specialists. Compared with PC, collaborative care patients were more likely to undergo an assessment of left ventricular function (57.4\% versus 28.7\%), noninvasive stress testing (20.1\% versus 7.8\%), and cardiac catheterization (11.6\% versus 2.7\%). They were also more likely to be treated with angiotensin-converting enzyme inhibitors (58.8\% versus 54.6\%), angiotensin receptor blockers (22.7\% versus 18.1\%), \(\beta\)-blockers (63.4\% versus 48.0\%), spironolactone (19.8\% versus 12.7\%), and loop diuretics. In a propensity-matched model, PC was associated with significantly lower mortality compared with no physician evalua-
tion ($P<0.001$), thus showing the benefits of postdischarge follow-up. Collaborative care further reduced mortality compared with PC ($P<0.001$). Similar results were found for the composite end points of death, ED visits, and HF rehospitalization (the Figure), as well as for all-cause ED visits, rehospitalizations, and deaths.$^{14}$

Lee et al are to be commended for their comprehensive evaluation of such a complex reality as post-ED care follow-up. Their study shows the need and benefits of a collaborative approach including both the PC physician and the cardiologist after an ED admission for acute HF with a magnitude of effect that is comparable to that shown with neurohormonal antagonists or devices prescribed to treat HF. The present study also explores the potential mechanisms of this beneficial effect, including greater performance of diagnostic tests and implementation of lifesaving therapies. These data are consistent with previous studies comparing the treatment of patients with HF by PC physicians, internists, and cardiologists during either the in-hospital or the outpatient phase$^{2,15}$ and extend them to the early post-hospitalization phase, showing also the importance of this follow-up.

A potential limitation of the present study is the exclusion of early postdischarge events in order to have a comparison group of patients assessed by the PC physician. In another study from the same authors, ED visits for HF were followed by a high early mortality rate, with 4.0% of patients dying within 30 days and 1.3% in the first 7 days.$^{16}$ In addition, ED visits, but not hospitalizations, were analyzed in this study. This is pertinent because >30% of patients who underwent ED evaluation for HF were discharged without hospital admission in a similar cohort of patients.$^{16}$ The present study may lack data regarding clinical characteristics, comorbidities, and in-hospital course of the patients, so meaningful variables may not have been included in the propensity analysis. These limitations are acknowledged by the authors and are expected in studies based on the examination of large registries.

Despite its rationale, postdischarge assessment has been examined only recently.$^{5,7}$ Hernandez et al$^{17}$ have recently assessed the relationship between early physician follow-up and 30-day outcomes among 30 136 Medicare beneficiaries hospitalized for HF. Consistent with the study of Lee et al,
discharge from hospitals in which a greater proportion of patients received early follow-up evaluation was independently associated with lower rates of all-cause readmissions, although mortality was not affected.17

When Should the Postdischarge Assessment Be Performed?

As outlined above, the vulnerable phase occurs just after discharge from hospital. The incidence of death or rehospitalizations sharply increases early after discharge and gradually decreases thereafter, following an almost exponential pattern.8,18 This suggests that an early assessment, ie, 1 to 2 weeks after discharge, should yield the greatest benefit.

Which Patients?

The number of patients hospitalized for HF is so large that a postdischarge assessment strategy cannot be proposed for all. Ideally, postdischarge assessment should include only the patients who, in the predischarge phase, are found to be at high risk of cardiac events. Simple but powerful predictors of postdischarge events include blood pressure, QRS duration, renal dysfunction, serum levels of sodium, natriuretic peptides and troponin, and other comorbidities.1,3,5,7,18 The hospital length of stay and the number of previous rehospitalizations are also major prognostic variables.8,9,18

What Should the Postdischarge Assessment Accomplish?

The postdischarge evaluation provides the opportunity to reassess fluid status, to provide additional patient education, to review medications and adjust their doses, and to plan for goals of additional diagnostic and interventional procedures. Goals may target multiple mechanisms of HF, ranging from the prevention and treatment of congestion, and hence rehospitalization, to the improvement in symptoms and skeletal muscle function to beneficial cardiac remodeling, improvement in cardiac function, and enhanced prognosis.

The study by Lee et al14 suggests that the implementation of diagnostic examinations and evidence-based therapies by the PC physician and the cardiologist may favorably affect outcomes.1,5,7,18 The importance of the components of the post-discharge assessment, suggested in the Table, will have to be examined by future studies, since they have not been tested in the post-discharge phase. Their application in clinical practice may successfully turn the hospitalization for heart failure.

Disclosures

Dr Metra has received honoraria for participating in steering committees and advisory boards and giving speeches from Cardiokinetics, Corthera, Merck, and Servier. Dr Gheorghiade has served as a consultant for Abbott Laboratories, Astellas, AstraZeneca, Bayer Schering Pharma AG, CorTera, Cytokinetics, DebioPharm S.A., Errekappa Therapeutics, GlaxoSmithKline, Ikaria, Johnson & Johnson, Medtronic, Merck, Novartis Pharma AG, Otsuka Pharmaceuticals, Palatin Technologies, Pericor Therapeutics, Protein Design Laboratories, Sanofi-Aventis, Sigma Tau, Solvay Pharmaceuticals, and Trevena Therapeutics; and has received significant ($>10 000) support from Bayer Schering Pharma AG, DebioPharm S.A., Medtronic, Novartis Pharma AG, Otsuka Pharmaceuticals, Sigma Tau, Solvay Pharmaceuticals, and Pericor Therapeutics. The other authors report no conflicts.

References


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