News Release

Impact of frailty on mortality and adverse events after durable left ventricular assist device implantation: Insights from the J-MACS registry

Key Points

•An analysis of 1,458 cases from the nationwide registry (J-MACS Registry) revealed that frailty at 3 months after left ventricular assist device (LVAD) implantation was associated with mortality, hemocompatibility-related adverse events, and right heart failure.

•Preoperative factors such as older age, greater preoperative frailty, more severe heart failure, and longer surgical time were independently associated with greater postoperative frailty.

•Frailty assessment after LVAD implantation may serve as a valuable tool for identifying patients at high risk for adverse long-term outcomes. The importance of early interventions to mitigate frailty progression is also underscored.

Summary

A research group consisting of Dr. Shingo Kazama, Assistant Professor at Advanced Heart Failure Center, Nagoya University Hospital, Dr Toru Kondo, Lecturer at the same center, Professor Toyoaki Murohara of the Department of Cardiology, Nagoya University Graduate School of Medicine and Professor Masato Mutsuga of the Department of Cardiac Surgery analyzed the association between frailty and long-term outcomes in patients with advanced heart failure after LVAD implantation, using data from a nationwide registry.

Heart failure is a condition in which the heart loses its ability to pump enough blood throughout the body, and it can become life-threatening as the disease progresses. LVAD therapy is used in patients with advanced heart failure not only to improve survival, but also to serve as a bridge to heart transplantation. Although clinical outcomes have improved in recent years with advances in device technology, the risks of mortality and complications remain substantial, making long-term management after implantation critically important. Frailty refers to a state of reduced physiological reserve and increased vulnerability to health problems characterized by physical decline, chronic disease-related wasting, malnutrition, and other factors. While frailty has been reported to be associated with prognosis in the general heart failure population, its relationship with long-term outcomes in patients who underwent LVAD implantation has not been fully understood. In this study, we evaluated frailty status at 3 months after LVAD implantation using the Frailty Index in 1,458

patients enrolled in the J-MACS registry.

The results showed that greater frailty was associated with a higher risk of death, hemocompatibility-related adverse events, and right heart failure. These findings suggest that frailty assessment may be an important indicator of adverse event risk in patients after LVAD implantation. The results of this study were published online in advance in the Journal of Cardiac Failure on March 13, 2026.

Research Background

For patients with advanced heart failure, LVADs are widely used as an effective treatment that improves survival. However, even after implantation, these patients are known to remain at high risk of death and complications in the long term.

Frailty, on the other hand, refers to a state of increased vulnerability to stressors resulting from the combined effects of physical functional decline, wasting related to chronic disease, malnutrition, and psychological and social factors. In patients with heart failure, frailty has been associated with prognosis, but the relationship between frailty after LVAD implantation and long-term outcomes has not been fully clarified.

Research Results

In this study, 1,458 patients enrolled in J-MACS were analyzed, and frailty at 3 months after LVAD implantation was assessed using a Frailty Index consisting of 33 items, including physical findings, vital signs, comorbidities, blood test results, quality of life, and cognitive function. The primary endpoint was all-cause mortality, and the secondary endpoints were hemocompatibility-related adverse events, driveline or pump infection, right heart failure, fatal ventricular arrhythmias, and pump malfunction. The results showed that approximately 65% of patients were frail, and 230 patients died during a median follow-up period of 1,237 days. Mortality rates per 100 patient-years were 2.2 in the non-frail group, 4.8 in the more-frail group, and 12.2 in the most-frail group, indicating that mortality increased with greater frailty.

In addition, frailty was associated with an increased risk of hemocompatibility-related adverse events and right heart failure, whereas no association was observed with driveline or pump infection, fatal ventricular arrhythmias, or pump malfunction. Furthermore, preoperative frailty, older age, more severe preoperative heart failure, and prolonged operative time were associated with postoperative frailty. These findings suggest that frailty assessment may serve as an important risk indicator for adverse events in the

management of patients after LVAD implantation (Figure 1).

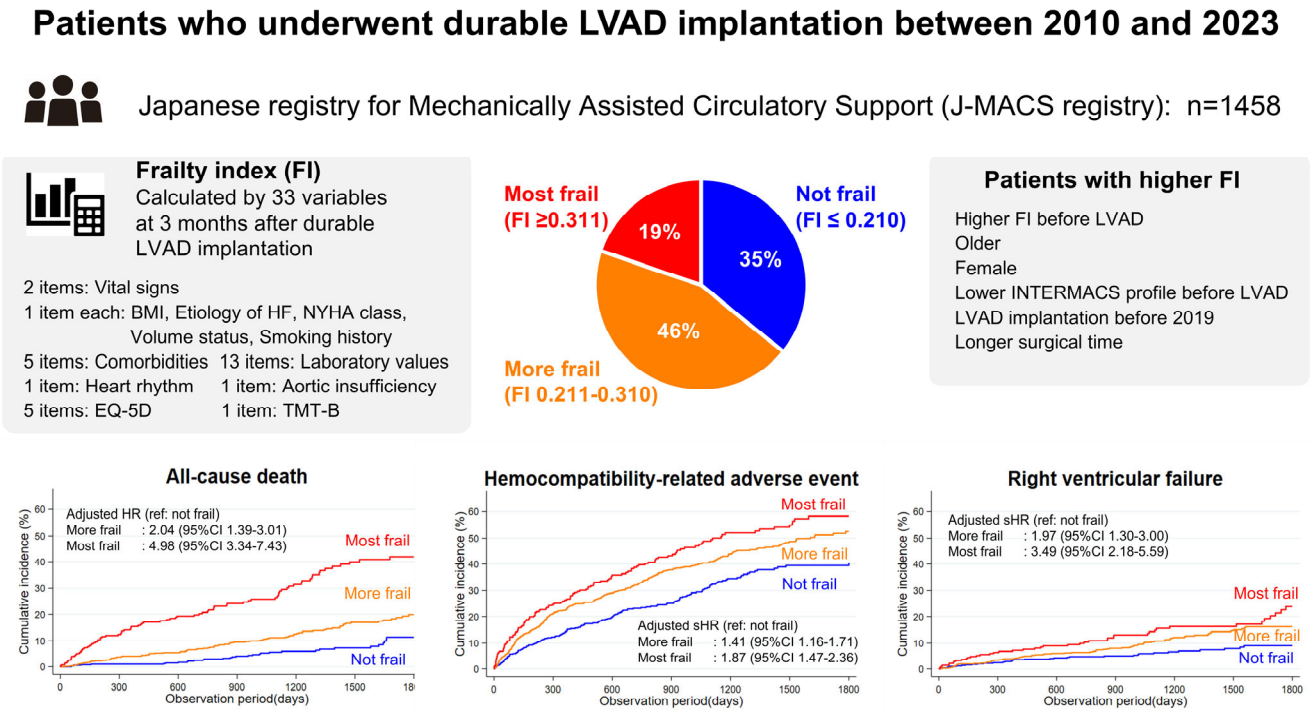

Figure 1: Frailty and Prognosis in Patients After LVAD Implantation

Research Summary and Future Perspective

Continuous assessment of frailty from the early period after LVAD implantation may help identify high-risk patients at an early stage and lead to more appropriate long-term management. In the future, it will be important to investigate whether proper pharmacological therapy, optimization of LVAD settings, rehabilitation, nutritional interventions, and comprehensive support addressing physical, cognitive, and psychological aspects can prevent or improve postoperative frailty and thereby contribute to better long-term outcomes. In addition, another important issue for future research is whether timely LVAD implantation before further disease progression can reduce postoperative frailty.

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