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Long-term left ventricular assist devices: Real-world evolving portrait of use and outcomes in Québec from 2010 to 2017

English summary

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Québec

SUMMARY

Long-term left ventricular assist devices: Real-world evolving portrait of use and outcomes in Québec from 2010 to 2017

Context

End-stage chronic heart failure is characterized by marked symptoms at rest, refractory to medical and surgical treatment, and is associated with a high risk of mortality in the short term. While cardiac transplantation is often the treatment of choice, some patients can benefit from implantation of a left ventricular assist device (LVAD). In 2012, the Ministry of Health and Social Services (MSSS) gave the Institut national d'excellence en santé et en services sociaux (INESSS) the mandate to conduct an evaluation of this complex technology in the real-world care context. This report presents a portrait of the evolution of use of left ventricular assist devices in Québec in light of results from INTERMACS (the Interagency Registry for Mechanically Assisted Circulatory Support) as well as quality standards published by INESSS in 2016.

The present evaluation concerns all patients who received a LVAD in Québec between January 1, 2010 and December 31, 2017, with a follow-up of clinical outcomes until December 31, 2018. These data are examined according to three periods: 2010-2012, 2013-2015 and 2016-2017. The data were extracted from patient charts by medical archivists, in collaboration with a designated health care professional from each institution with a LVAD program.

Main findings

Organizational structure and rate of implantation

- Implantation of long-term LVADs in adults is carried out at three hospitals with a cardiac transplantation program: the Montreal Heart Institute, the McGill University Health Centre in Montreal and the Québec Heart and Lung Institute in Quebec City.
- In total, 167 persons received a LVAD between 2010 and 2017. The volume of implantations varied from 12 in 2013 to 30 in 2017 at the provincial level and from 0 to 12 annual procedures by centre. Despite an increase in volume in recent years, by 2017 the programs had not yet reached the minimum volume of 15 annual implantations per centre recommended in the standards of care published by INESSS [2016].
- The rate of implantation per million inhabitants, which has increased in Québec over time, is similar to that observed in Ontario and British Columbia in 2015, while it represents about half the rate observed in the United States in 2017.

Characteristics of patients who received an LVAD

- The mean age of the 57 patients in Québec in whom the device was implanted in 2016-2017 is 56 years and most patients (> 80%) are males, similar to the characteristics of patients in INTERMACS (2012-2017).
- Over the three observation periods (2010-2012, 2013-2015, 2016-2017), the proportion of Québec patients aged 40 to 59 years decreased, while that of patients 60 to 69 years old increased.
- Implantation of this device in patients older than 70 years is rare in Québec.
- The 22 patients receiving their LVAD as destination therapy have an average age 10 years older than the mean age of all patients.
- In each observation period, the greatest proportion of patients were classified in the INTERMACS clinical profile group 3, which is defined as "stable but inotrope dependant".
- The prevalence of factors associated with a poorer prognosis (right ventricular function, previous coronary bypass surgery and the severity of the INTERMACS clinical profile) decreased among Québec patients over time.
- Québec patients who received an LVAD have a similar profile to those in INTERMACS with respect to renal function and nutritional status, while mass and body surface area are relatively lower among the patients in Québec.

Processes of care and features of the LVAD implantation

- In general, recourse to certain interventions during the 48 hours prior to the LVAD implantation (e.g. short-term mechanical assistance) is less frequent in Québec compared to that reported by INTERMACS.
- The implantation of centrifugal flow LVADs is on the increase in Québec as well as in the United States.
- There has been little change in the proportion of Québec patients who received their LVAD as destination therapy over time, while an important increase in use of this strategy has been reported by INTERMACS.
- The length of hospital stay after the LVAD implantation procedure is Québec has remained relatively stable over time, at about 4 weeks.

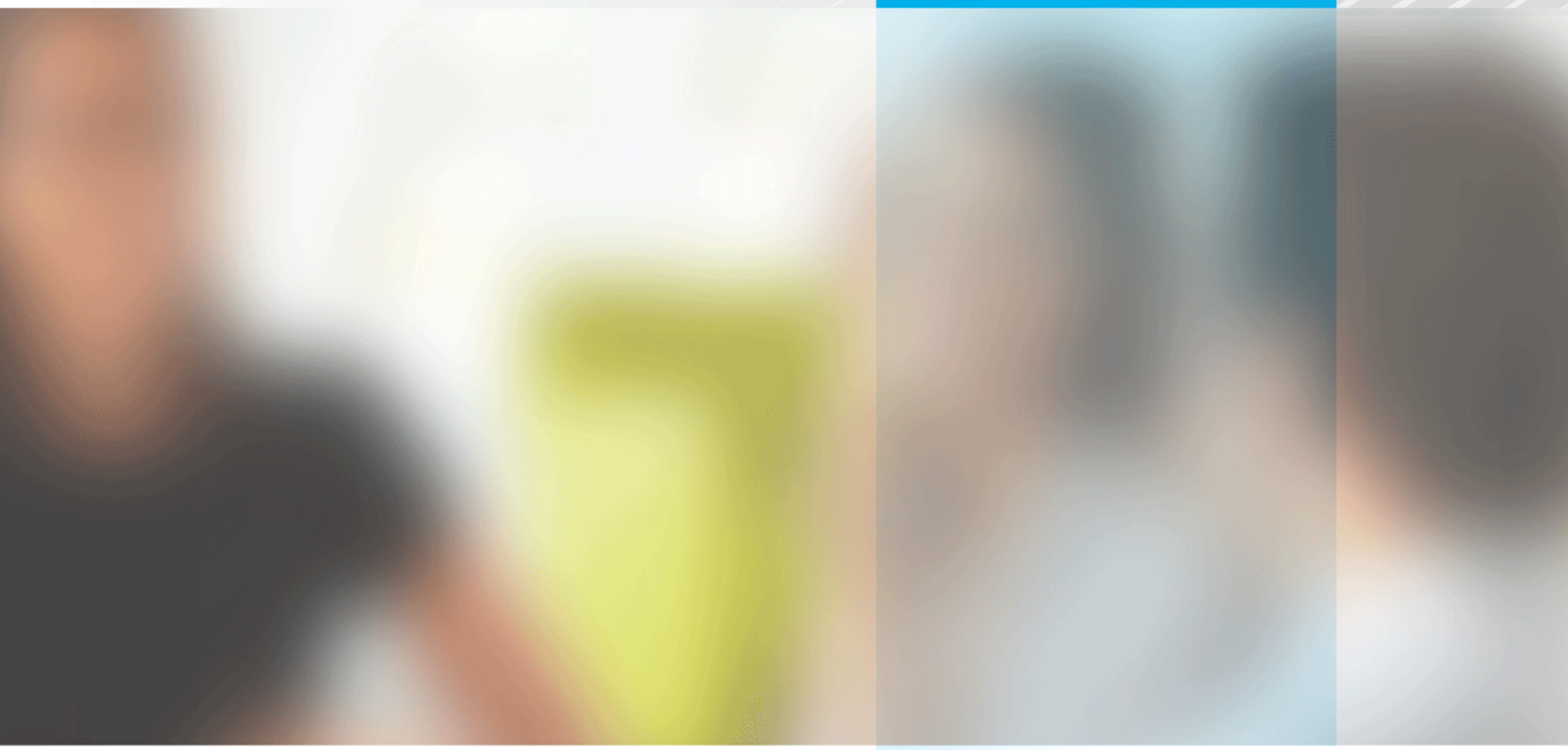
Clinical outcomes

- Among the 167 patients who received an LVAD between 2010 and 2017 in Québec, the following outcomes were observed at 1 year post-implantation: 60% (n = 100) were still alive with continued LVAD support, 13% (n = 22) had died on support, almost 1 in 4 patients (23%; n = 38) had received a heart transplant and 4% (n = 7) had had their device explanted following myocardial recovery.

- The distribution of these clinical outcomes at 1 year was similar across the three periods of observation in Québec and comparable to that reported by INTERMACS for 2006-2017.
- Among the 22 Québec patients who received an LVAD as destination therapy between 2010 and 2017, 86% (n = 19) were still alive with LVAD support at 1 year, 9% (n = 2) had died on support and 1 patient (5%) had received a heart transplant.
- Among all patients who received an LVAD between 2010 and 2017, 58 patients (35%) were still alive with LVAD support on December 31, 2018. The median survival time for these patients was 2.9 years.
- Among the 34 patients (20%) who died during the follow-up period (up to December 31, 2018), median time to death was 72 days. However, at least 8 (25%) of the deaths occurred after 2 years of support.
- Among the 65 patients (39%) who subsequently received a heart transplant during the follow-up period (up to December 31, 2018), the median delay before transplantation was about 10 months. However, the heart transplantation was undertaken more than 4 years after LVAD implantation in at least one patient.
- Among the 10 patients (6%) who experienced myocardial recovery, the median delay before explantation of their device was about 6 months.

Conclusions

LVAD programs in Québec appear to be able to appropriately identify patients who are likely to benefit from implantation of a long-term left ventricular assist device: the prevalence of risk factors associated with a poorer prognosis decreased among LVAD recipients during the period of observation. Despite a somewhat limited number of implantations between 2010 and 2017, this evolving portrait shows good clinical outcomes that are comparable to those observed in the numerous North American centres participating in INTERMACS.



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