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Portrait of coronary revascularization by percutaneous coronary intervention and coronary bypass grafting in Québec, 2015-2018

English summary

Une production de l'Institut national
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Québec

SUMMARY

Portrait of coronary revascularization by percutaneous coronary intervention and coronary bypass grafting in Québec, 2015-2018

Introduction

In Québec, one in ten adults suffers from coronary artery disease (CAD) which has major consequences on the quality of life and life expectancy of affected persons. Treatment options for CAD include medical therapies and revascularization of the coronary arteries, either by percutaneous coronary intervention (PCI) or by coronary artery bypass graft surgery (CABG). Since 2017, the Canadian Institute for Health Information (CIHI) has published the results of quality indicators for PCI and isolated CABG, in collaboration with the Canadian Cardiovascular Society (CCS). For each of these interventions, in-hospital mortality and rate of readmission at 30 days are reported at the national, provincial and individual centre levels using an analysis of a hospital discharge database (the *Base de données des congés des patients,* BDCP) [ICIS, 2019]. CIHI includes Québec data on cardiac surgery in their analyses, but not for PCI since the latter intervention is not systematically recorded in the MED-ÉCHO (*Maintenance et exploitation des données pour l'étude de la clientèle hospitalière*) databank, which is used to integrate Québec data into the BDCP [INESSS et ICIS, 2011].

Due to linkage between the database for physician billing of the Québec health insurance body (*Régie de l'assurance maladie du Québec,* RAMQ) with the BDCP, the *Institut national d'excellence en santé et en services sociaux* (INESSS) is now able to generate the quality indicators developed by CIHI. It is in this context that the Québec health ministry (the *ministère de la Santé et des Services sociaux,* MSSS) gave INESSS the mandate to produce a portrait of the use and results of PCI through an analysis of Québec medico-administrative data.

The principal objective of this report is to present a portrait of use and outcomes of PCI performed in Québec between 2015 and 2018 while paying special attention to:

- structural characteristics of the cardiac care network;
- characteristics of patients treated by PCI;
- the trajectory of care and services received before and after PCI; and
- in-hospital mortality in the 30 days following PCI.

Since isolated CABG is another treatment option for coronary artery disease, the outcomes of this surgical intervention are also presented, using work by CIHI, in order to provide a global portrait of revascularization in Québec. Despite the inherent limitations of medico-administrative data, it is possible to glean several broad observations

regarding differences between delivery of cardiac care in Québec and elsewhere in Canada.

Results

Structural characteristics

- The system of cardiac care in Québec is composed of a network of more than 80 hospitals of which 8 offer both PCI and cardiac surgery and 7 others offer PCI alone. The number of interventional cardiologists in Québec varies from 3 to 15 per centre and the same cardiologist can regularly practice in specialized centres with and without on-site cardiac surgery.
- From 2015-2016 to 2017-2018, 51,043 PCI were carried out within the continuum of care. The rate of use of PCI in 2017-2018 in Québec was one of the highest when compared to other provinces. In addition, an important variation in rate of PCI use was observed across administrative health regions even after adjustment for differences in age and sex.
- Given the presence of numerous PCI centres distributed over many regions in Québec, the percentage of patients transferred from one hospital to another is considerably lower (at 29%) than elsewhere in Canada (at 43%).
- On average, the annual volume of PCI per institution in Québec in 2017-2018 is 1,144, thus almost three times higher than the minimal volume of 400 recommended by the Canadian Cardiovascular Society. Nevertheless, in comparison with centres elsewhere in Canada, annual institutional PCI volume remains low in Québec.

Patient characteristics

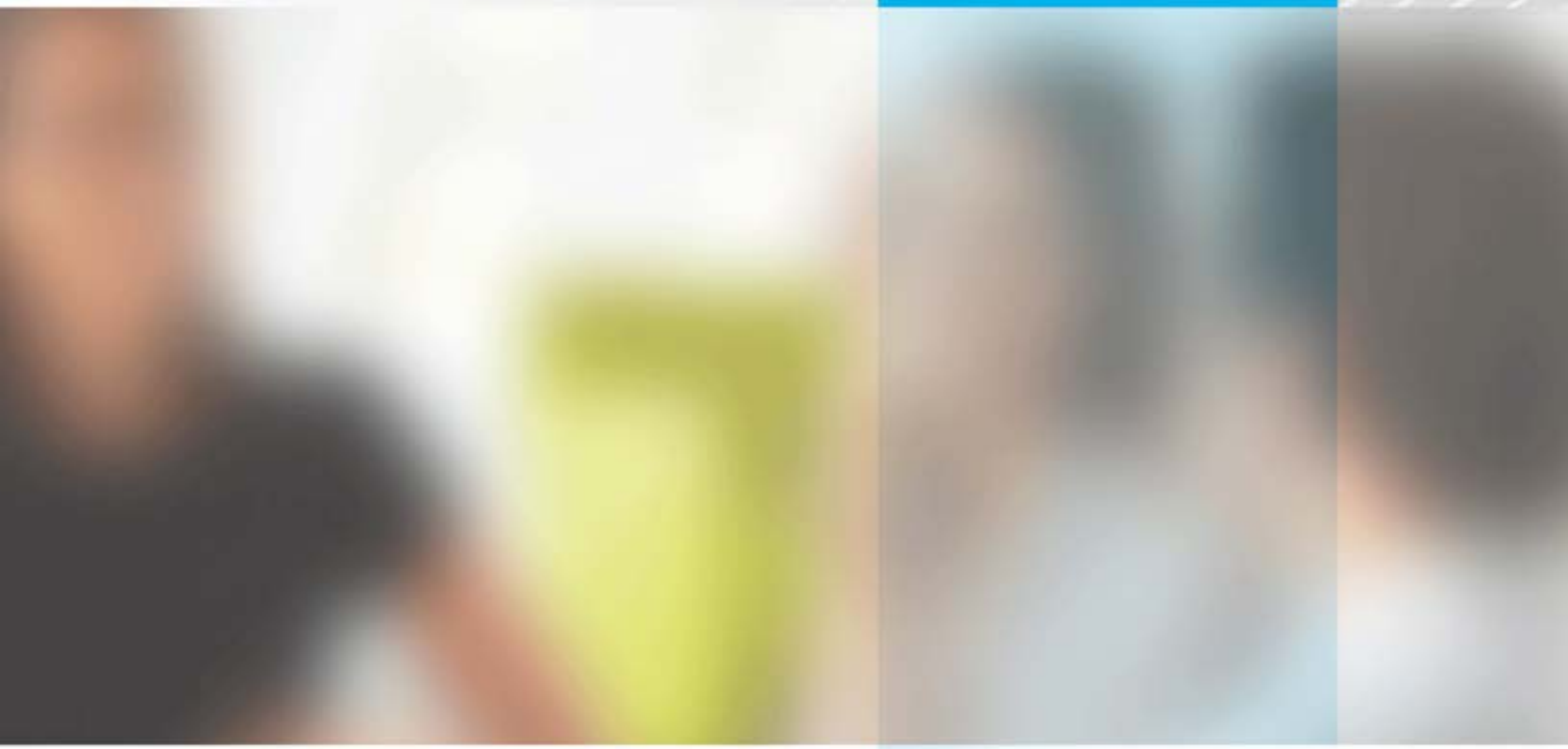
- The majority of patients (79%) treated with PCI in Québec are between 50 and 79 years of age. However, more than one person in 10 (14%) is aged 80 years or older. Females represent a relatively smaller proportion (29%) of all PCI patients, but the proportion of females is higher in the subgroup of the oldest patients. Indeed, almost half (48%) of patients 85 years of age or older are females.
- In comparison with the rest of Canada, patients treated with PCI in Québec are more likely to be female and 80 years of age or older.
- According to the information available in MED-ÉCHO, slightly more than half (56%) of patients received PCI for an acute myocardial infarction with (25%) or without (31%) ST segment elevation. Documentation of cardiogenic shock was found for 3% of PCI patients. In the other Canadian provinces, the proportion of PCI performed to treat an acute myocardial infarction with elevation of the ST segment (STEMI) is higher than that observed in Québec, while the proportion of interventions carried out for cardiogenic shock is lower.
- Despite the fact that 10% of Québec patients had no comorbidities documented in MED-ÉCHO, patients treated in Québec are more likely to present a higher burden of comorbid disease.

In-hospital mortality at 30 days

- During the observation period, 3% of Québec patients treated with PCI died in hospital during the 30 days following the intervention. In comparison, the incidence of mortality observed elsewhere in Canada is 2.3%, representing an absolute risk difference of + 0,7 (95% CI : 0,5 – 0,8).
- According to the available medico-administrative data and a Bayesian risk-adjusted model, the standardized ratio for in-hospital mortality at 30 days varies between 0.6 and 1.48 across the 15 centres offering PCI in Québec.
- The centres with the highest volumes (the highest tercile having ≥ 1,500 PCI) and those with on-site cardiac surgery are observed to have lower in-hospital mortality at 30 days. This observation persists in a multivariate analysis that took differences in patient characteristics between centres into account. In centres without on-site surgery, lower mortality is also observed in those with catheterization physicians in their teams who also work at centres with on-site surgery. Such results must be interpreted with caution, since many confounding factors, not measured in the present study, might explain these differences.
- Finally, reports by CIHI concerning cardiac surgery indicate that average annual volume and rate of mortality in Québec correspond to the median values for Canada.

Conclusions

The Québec continuum of care for coronary artery disease is one of the most complex in Canada, with a large number of hospitals offering differing types of services over a vast geographic territory in which a population of more than eight million persons resides. The 15 centres offering PCI differ from each other along organizational lines, as well as with respect to the volume of interventions per institution, the number of clinicians and patient profile. The limitations related to the available data require that any interpretation of the results presented be done with caution. Nonetheless, the observed variation in mortality between Québec centres, that is not explained by the factors which we were able to evaluate, highlights the importance of continued monitoring, more in-depth analyses and, above all, the need to document information concerning interventions and patients in a more complete and standardized manner in medico-administrative databases. In addition, since management of coronary artery disease implies a choice of treatment between PCI, CABG or medical therapy alone, an evaluation of the care journey of all patients with this condition would be undoubtedly more informative of the quality of management than the assessment of a single intervention. Such novel approaches should thus be considered for future evaluations of the quality of cardiac care.



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