Dynamic Coronary Roadmap in Real Practice

Dynamic Coronary Roadmap en la práctica real

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Contrast-induced nephropathy (CIN) remains a significant complication after percutaneous coronary intervention (PCI), particularly in elderly patients, diabetics, or those with preexisting chronic kidney disease. (1,2)

A significant body of evidence demonstrates a direct, dose-dependent association between the administered contrast volume and the risk of acute kidney injury. (1-3) In this context, total contrast volume is no longer a purely technical parameter but has become a relevant clinical variable that can be monitored and optimized during percutaneous procedures. (2,3)

In recent years, different strategies have been developed to reduce the contrast volume load during PCI. Low-contrast PCI, the systematic use of intravascular imaging, and the incorporation of software for navigation and planning have proven to be effective tools for reducing unnecessary injections and optimizing decision-making during the procedure. (4) Likewise, from an institutional perspective, excessive contrast media use increases direct costs for materials and indirect costs derived from renal complications, length of hospital stays, and use of complementary tests, with a negative impact on the efficiency of the healthcare system. (2,3)

In this context, Abud et al. evaluated the impact of the Dynamic Coronary Roadmap (DCR) as a tool to reduce the total contrast volume during PCI. This observational, retrospective, single-center study included 480 patients and compared DCR-guided procedures with conventional angiography. The authors demonstrated a significant reduction in the total contrast volume and in the volume used specifically during PCI, with no differences in radiation dose or serum creatinine levels between the two groups. (5)

The study provides relevant local evidence and underscores the concept that incorporating navigation tools can contribute to a more rational use of contrast media, primarily by reducing redundant injections and improving procedure planning. However, from a constructive perspective, it is important to contextualize these findings. Although the absolute reduction in contrast volume observed (20–30 mL) was statistically significant, it did not translate into measurable clinical changes, decreases in creatinine levels, or reduction of adverse kidney events. Furthermore, this is a single-center study with highly experienced operators, where baseline contrast volumes are already low, which could limit the magnitude of the incremental benefit of DCR.

In conclusion, DCR is presented as a useful tool within a comprehensive strategy to reduce contrast volume, particularly in high-risk patients. The study by Abud et al. represents a valuable contribution to this field and paves the way for future multicenter studies aimed at better defining its clinical impact in selected populations.

Ethical considerations

Not applicable.

Conflicts of interest

None declared.

(See authors' conflict of interests forms on the web).

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AUTHORS' REPLY

Firstly, we would like to thank Dr. Pérez Asorey for his critical reading and constructive feedback on our work, as well as for the conceptual framework he provides on the clinical relevance of contrast-induced nephropathy and the need for strategies to optimize the total volume administered during percutaneous coronary interventions (PCIs).

We agree that the absolute magnitude of the reduction in the contrast agent used must be interpreted in context. In our cohort, the group guided by Dynamic Coronary Roadmap (DCR) showed a significant reduction in total contrast volume (median 120 mL vs. 140 mL). In turn, after adjusting for clinical and procedural variables, the estimated reduction was 37.3 mL per patient (95% CI: 24.3–50.5 mL). We acknowledge that a reduction of this magnitude may seem "incremental" in individual terms; however, we believe that its potential value is expressed in the context of (i) institutional strategies for continuous improvement (reduction of redundant injections, among others) and (ii) higher-risk subgroups, where every mL counts.

We understand that a key point for interpretation is that the DCR group included a significantly higher proportion of complex PCIs (39.6% vs. 17.6%). In other words, DCR was more commonly used in more demanding scenarios, where, in actual practice, contrast consumption is substantially higher. The fact that the reduction persists (and remains after multivariable adjustment) suggests a relevant signal of the tool's operational benefit in more complex anatomies and therapeutic strategies.

Regarding the absence of differences in renal function, we share this cautious interpretation. Although CIN was defined in the protocol as an increase in creatinine within 48–72 hours, the comparison presented was based on changes in creatinine levels measured prior to discharge. Moreover, the study was not powered to detect infrequent clinical outcomes. In this context, we consider it reasonable that a single-center observational study does not show "hard" clinical changes, even with a consistent reduction in contrast media, especially when baseline contrast volumes are already relatively low.

In conclusion, we interpret DCR as a valuable complementary tool within a comprehensive low-contrast PCI strategy, and we agree on the need for future multicenter studies (ideally prospective and regional) focused on populations at higher renal risk, with standardized creatinine measurement in the 48–72 h window and assessment of renal and economic outcomes.

Sincerely yours,

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The study *Results of the ARGEN-CCV Argentine Registry of Cardiovascular Surgery* is a fundamental contribution to the evaluation of cardiac surgery in Argentina, presenting prospective and multicenter data on operative mortality and early outcomes. (1) The implementation of national registries is a key strategy for improving the quality of care and allows local results to be placed in the context of international standards, particularly those established by the *Society of Thoracic Surgeons* (STS) and the *European Association for Cardio-Thoracic Surgery* (EACTS).

The *STS Adult Cardiac Surgery Database* is currently one of the most robust clinical registries worldwide, with thousands of procedures included and a

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high degree of standardization in the definition of operative mortality and risk adjustment. Contemporary STS reports show that the observed mortality for isolated myocardial revascularization surgery remains around 1%, while isolated valve surgery has values close to 1-2%, with significant increases in combined or more complex procedures depending on the clinical characteristics of the patient undergoing surgery. (2) These data have been consolidated as international benchmarks for quality assessment.

Similarly, the EACTS has developed its *Adult Cardiac Database*, which allows surgical outcomes in multiple European countries to be analyzed and mortality rates between different centers to be compared. Publications derived from this database and using its risk score (EUROSCORE II) have reported mortality rates comparable to those of the STS for isolated procedures, with a progressive increase in multivalve or combined surgeries, reflecting the impact of surgical complexity and patient risk profile. (3)

In this context, the mortality rates reported by the ARGEN-CCV should be interpreted taking into account the heterogeneity of the participating centers and the characteristics of the Argentine health system and its patients. The marked socioeconomic inequality in Argentina has been linked to a significant increase in postoperative in-hospital mortality in cardiovascular surgery. Patients from lower-income households had lower health insurance coverage, a greater proportion of emergency surgeries, a higher burden of comorbidities, and more limited access to specialized care centers, which impact postoperative outcomes. (4) Therefore, the overall results of the registry are not within ranges comparable to those reported by the STS and EACTS for similar procedures, especially in isolated surgeries, suggesting that there is a lot of work ahead of us to align ourselves with international standards.

A relevant aspect highlighted by recent publications from both STS and EACTS is the need to look beyond in-hospital or 30-day mortality. Contemporary studies have shown that a significant proportion of deaths related to cardiac surgery occur after discharge, which may underestimate the real impact of the procedure if restrictive definitions are used. (5) In this regard, the ARGEN-CCV offers a platform with the potential to evolve towards longer follow-up models and even more robust comparisons, since patients are generally operated on and definitely discharged from the same institution.

In conclusion, the ARGEN-CCV represents a strategic initiative for Argentine cardiovascular surgery. It is essential to maintain databases in which all cardiovascular centers in the country participate. This will reinforce its value as a tool for quality assessment and future planning, and lay the foundation for continuous improvement based on reliable and internationally comparable data.

Ethical considerations
Not applicable.

Conflicts of interest
None declared.

(See authors' conflict of interests forms on the web).

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AUTHORS' REPLY

We appreciate Dr. Parodi's letter and comments. We would like to point out that an attempt was made to follow up patients after hospitalization, but this was frustrated by the lack of adherence by many researchers to data collection, which is why the little information we had obtained was dismissed and only the follow-up during hospitalization remained.

On the other hand, it is worth clarifying that the registry was not designed to validate data with the most commonly used scores.

We fully agree with Dr. Parodi's comments about the need for larger registries with longer follow-up and covering as many centers as possible at the federal level. Permanent and updated registries will be necessary to take these results into account and eventually validate them with the scores currently in use.

Esteban Romeo
On behalf of the authors