

A multicenter study based on the autopsies of patients who died during resuscitation<sup>4</sup> found a traumatic complication rate of 75% in the manual compression group and 91% in the mechanical compression group. Both groups had a mean CPR time of 35 minutes, slightly lower than the mechanical compression group in our series, but still a high percentage of traumatic complications. It is worth mentioning here that in our series there were several patients treated with mechanical compressions and short ROSC times who had potentially serious complications (Table 2).

Despite the descriptive nature and small sample size of our study, there were no differences in terms of survival and good neurological status at discharge between the 2 groups. These results agree with the evidence published to date: in 4 of the randomized studies<sup>1</sup> there was no demonstrated superiority of mechanical compression systems; equivalence was demonstrated in the CIRC study.<sup>2</sup>

The advanced life support algorithm in the 2015 ERC resuscitation guidelines<sup>5</sup> recommends the use of mechanical devices as a reasonable alternative when high-quality manual compressions are impractical or compromise the safety of the provider (transport, coronary angiography) or when prolonged CPR is necessary. In these cases, we believe that a low threshold of clinical suspicion for traumatic lesions and the systematic use of imaging to exclude them could help in the early detection of potentially serious complications.

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## An Early Post-discharge Intervention Planned to Reduce 30-day Readmissions in old and Frail Heart Failure Patients Remains Beneficial at 1 Year



### Una intervención precoz para reducir reingresos a los 30 días en pacientes ancianos frágiles con insuficiencia cardíaca mantiene su beneficio al año

#### To the Editor,

The Structured multidisciplinary outpatient clinic for Old and frail Post-discharge patients hospitalized for heart failure (STOP-HF Clinic) study was designed to reduce 30-day readmission rates and to facilitate the transition to primary care of vulnerable patients recently admitted for acutely decompensated heart failure (HF).<sup>1</sup> The interventions performed in the STOP-HF Clinic study have recently been reported.<sup>1</sup> In summary, this was a prospective study including 518 patients (age 82 years; Barthel score, 70; Charlson index, 5.6) and starting 4.9 ± 2 days after discharge. The STOP-HF Clinic study is a 1-month intervention (up to 2-3 months in very specific cases) that included a number of actions ranging from health literacy, early reassessment, increased quality of medical management, with intravenous therapies if needed, and personalized transition of care. The efficacy of the STOP-HF Clinic was confirmed, examining its 30-day impact with the official readmission data registry of the Catalan Health Service (CatSalut), which provides medical care to 7.5 million people in Catalonia, Spain. We reported a ~ 50% reduction in the all-cause 30-day readmission rate after an index hospitalization for HF, mainly driven by the reduction in HF-related readmissions.

Whether an early postdischarge intervention, such as the STOP-HF Clinic, may have an impact on subsequent readmissions

in the following year remained to be determined. Accordingly, our aim was to assess the 1-year readmission rate of the STOP-HF Clinic cohort and to compare, as a natural experiment, the 1-year readmission rate of the STOP-HF referral area against that of a control group comprising the patients in the remainder of the CatSalut area. For this long-term analysis, the primary endpoint was HF-related rehospitalization at 1 year. We also addressed all-cause death and the composite endpoint of all-cause death or HF-related hospitalization in the on-site cohort. At 1-year, 151 (29.2%) patients were readmitted at least once for HF (with a total of 204 hospitalizations) and 128 (24.7%) died; the composite endpoint occurred in 216 patients (41.7%).

Readmission rates within the STOP-HF referral area (~ 250 000 people) were compared with those of the CatSalut registry (~ 7.5 million people) during 2 time periods: pre-STOP-HF (2012-2013) and post-STOP-HF (2014-2015). The 1-year HF-related readmission rates were significantly lower in the STOP-HF referral area than in the CatSalut registry in the 2014 to 2015 period ( $P < .001$ ), whereas they were nonsignificantly different in the 2012 to 2013 period (Table). Indeed, in the 2014 to 2015, period a 36% reduction in 1-year HF-related hospitalizations in the STOP-HF referral area was observed, while rehospitalizations remained unchanged in the CatSalut registry. The Figure shows the probability actuarial curves of HF-related readmissions (Figure A) and all-cause readmissions (Figure B) after an index HF hospitalization within the CatSalut area and the STOP-HF referral area. Compared with the rest of the CatSalut area, the STOP-HF referral area showed a significant decline in HF readmissions during the 2014 to 2015 period, with the 2 curves following diverging paths starting before the first month and up to the 1-year follow-up ( $P < .001$  using the Wilcoxon-Gehan test).

**Table**  
CatSalut Population-based Data During the 2 Study Periods

Index admission 2012-2013 period			
	STOP-HF referral area	Catalan Health Service	P
Total index HF admissions	1251	30995	
All-cause 1-year readmissions	522 (41.7)	13272 (42.8)	.449
HF-related	293 (23.4)	7754 (25.0)	.206
Non-HF-related	229 (18.3)	5518 (17.8)	.410
Index admission 2014-2015 period			
	STOP-HF referral area	Catalan Health Service	P
Total index HF admissions	1296	31383	
All-cause 1-year readmissions	416 (32.1)	12925 (41.2)	< .001
HF-related	193 (14.9)	7644 (24.4)	< .001
Non-HF-related	223 (17.2)	5281 (16.8)	.681

Discharges with a primary diagnosis of chronic disease not involving the circulatory system and having no external cause, and readmissions due to a complication of the index admission.

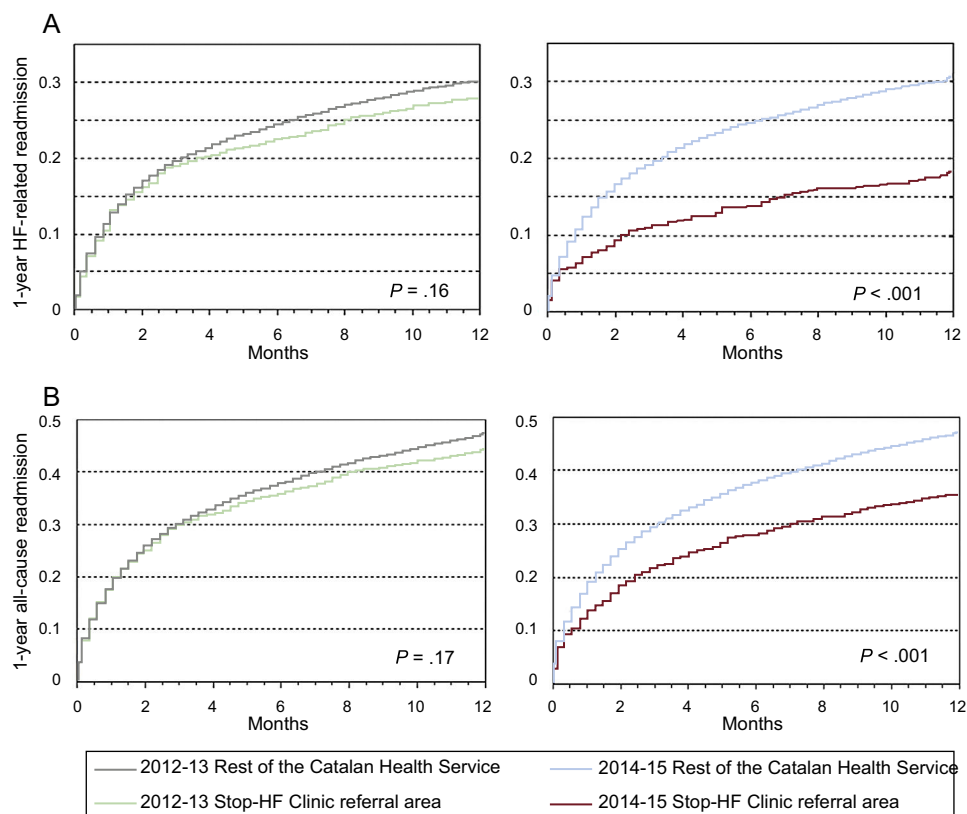
HF, heart failure; HF-related, recurrence of heart failure; Non HF-related, nonrecurrence of heart failure.

Data are expressed as No. or No. (%).

All-cause 1-year readmissions showed a similar trend; of note, this was only driven by the reduction in HF-related readmissions, as non-HF-related readmissions remained similar in the 2 study

periods (Table). This reduction in 1-year HF-related hospitalizations in the STOP-HF referral area was not related to an increase in mortality (31.3% vs 28.6%,  $P = .15$ ).

What is the most likely explanation for the long-term impact of such a short-term intervention? Three main mechanisms are proposed and discussed. First, when a prolonged strategy is not feasible—or cost-efficient—to be carried out over time, the number and the intensity of the actions included may play an essential role in the program's success. Considering an aging population such as ours, holistic management may be a key issue. Indeed, Saleh et al.<sup>2</sup> analyzed elderly Medicare beneficiaries randomized to receive a 45-day intervention including 5 activities, and the 1-year readmission analysis revealed that control participants were more likely to be readmitted than intervention participants (58.2% vs 48.2%) with a favorable cost-benefit analysis. A recent example of the benefits of comprehensive and multidisciplinary interventions (a 1 year-long intervention) is the Integrated Management Units for Patients with HF (UMIPIC) program,<sup>3</sup> which obtained a very significant reduction in 1-year HF readmissions when compared with the previous year. By contrast, time-limited but less broad interventions were unsuccessful in reducing mid- and long-term outcomes. Second, by acting during the most vulnerable phase, we may have been most effective. Indeed, the concept “hospitalization begets hospitalization” is currently well recognized. Thus, by reducing early-stage hospitalizations, we may be acting on subsequent hospitalizations, and this is of the utmost importance for patients' quality of life and for the sustainability of the health care system. Finally, an integrated approach that facilitates the transition to primary care management with a written medical



**Figure.** Actuarial curves of the probability of 1-year readmission in the STOP-HF referral area vs the CatSalut area before STOP-HF (2012-2013) and with STOP-HF (2014-2015).

A: Heart failure-related readmission. B: All-cause readmission.

P values reflect comparisons between the study groups.

HF, heart failure; STOP-HF, STructured multidisciplinary outpatient clinic for Old and frail Post-discharge patients hospitalized for Heart Failure.

report and drug prescription information transferred to the primary care physician very likely prolongs adequate patient management, keeping the patient within the “radar” of the health care system.

In conclusion, in a real-life, prospective, all-comers study that enrolled old, frail and vulnerable patients, an early short-term strategy aiming to reduce 30-day readmission rates remained beneficial up to 1-year, largely driven by HF-related readmissions.

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## Clinical Characteristics and Prognosis of Very Elderly Patients With Acute Coronary Syndrome Treated With Ticagrelor: Insights From the LONGEVO-SCA Registry



### Perfil clínico y pronóstico del paciente muy anciano con síndrome coronario agudo tratado con ticagrelor. Datos del registro LONGEVO-SCA

#### To the Editor,

Clinical practice guidelines recommend ticagrelor or prasugrel as first line drugs in non-ST-elevation acute coronary syndrome (NSTEMI), and clopidogrel has been relegated to patients with contraindications to these drugs (especially high risk of bleeding).<sup>1</sup> Elderly patients are under-represented in the clinical trials that support these recommendations. Possibly because of that, under-use of these drugs in everyday clinical practice has been described, especially in elderly patients with comorbidities.<sup>2–4</sup> There is very little information on antiplatelet treatment and its impact on geriatric assessment in elderly patients with NSTEMI.

The LONGEVO-SCA registry included patients aged  $\geq 80$  years with NSTEMI from 44 Spanish hospitals, where the patients underwent an in-hospital geriatric assessment and their 6-month prognosis was analyzed.<sup>5</sup> The primary endpoint of the study was total mortality and its causes at 6 months; secondary endpoints were the readmission, bleeding, and reinfarction rates and new revascularization procedures.

The aim of this analysis was to describe the clinical profile and outcomes in patients who survived to hospital admission, according to whether or not they were prescribed ticagrelor on discharge, excluding patients treated with oral anticoagulants ( $n = 86$ ). The analysis included total mortality, readmissions, bleeding (BARC 2, 3, or 5) and ischemic events (cardiac mortality, reinfarction, or new revascularization procedures) at 6 months. Cox regression was used for the adjusted analysis, with the variables that showed an association ( $P < 0.1$ ) with either exposure (ticagrelor) or effect: admitting unit, age, previous heart failure, atrial fibrillation, Killip class, hemoglobin, creatinine clearance, invasive management, left main trunk stenosis,

revascularization during admission, GRACE, CRUSADE and PRECISE-DAPT scores, and Lawton-Brody, Charlson, nutritional risk, and frailty indexes.

The analysis included 413 patients, 63 of whom (15.2%) received ticagrelor on discharge. These patients were admitted more often to critical care units, were younger, and more often male (Table 1). They had a higher prevalence of atrial fibrillation and bleeding prior to admission. Furthermore, they had slightly lower GRACE scores, with a lower bleeding risk profile. They underwent coronary angiography more often and had a higher percentage of left main trunk stenosis and a higher frequency of percutaneous revascularization.

The patients in the ticagrelor group had a greater capacity for instrumental activities, lower degrees of comorbidity, and a lower prevalence of frailty and nutritional risk.

The incidence of bleeding was low in both groups, with no significant differences (3.2% vs 5.4%). The patients in the ticagrelor group had a slightly lower incidence of ischemic events and a lower incidence of death or readmission (Figure 1). After adjustment for confounding factors, the effect of treatment with ticagrelor was clearly not significant for either ischemic events (hazard ratio [HR] = 0.81; 95% confidence interval [95%CI], 0.33–4.21;  $P = .807$ ) or mortality or readmission (HR = 0.79; 95%CI, 0.37–1.73;  $P = .565$ ).

The findings of this study are in line with those of previous publications and show the low rate of ticagrelor use in elderly patients in our setting,<sup>2</sup> which is inversely proportional to the ischemic and bleeding risk.<sup>3,4</sup>

Some factors limit the robustness of these findings. This was an observational registry, with probable selection bias and unmeasured confounding factors. The small size of the ticagrelor group made it difficult to study the impact of treatment on outcomes. Finally, a longer follow-up would have allowed us to optimize the study of mid-term outcomes, although it is known that the highest risk of bleeding is concentrated in the first months after an event.

Nonetheless, in light of these results, it seems justified to assert that, although the adjusted analysis did not show a clinical benefit, ticagrelor is reasonably safe for selected patients  $\geq 80$  years, despite their theoretical bleeding risk profile (more than 85% of the ticagrelor group had a PRECISE-DAPT score  $\geq 25$ , considered high