

Scientific letter

Management implications associated with switching from vitamin K antagonist anticoagulants to direct oral anticoagulants



Implicaciones de gestión del cambio de antagonistas de la vitamina K a anticoagulantes orales de acción directa

To the Editor,

The therapeutic positioning report (TPR) that regulates the funding of direct oral anticoagulants (DOACs) for patients with nonvalvular atrial fibrillation dates from 2016 and has not been updated with newer information from clinical trials¹ and clinical practice registries.²

In addition, there are cost analyses from a social³ and clinical perspective that include hemorrhagic and thromboembolic complications.⁴ However, there is no comparative analysis of the care burden of vitamin K antagonists (VKAs) vs DOACs. Therefore, we designed a study to analyze the care burden and economic costs in patients who were switched from a VKA to a DOAC, comparing the 6 months before and 6 months after starting the DOAC.

We performed a retrospective, observational study to evaluate the quality of care in the Noia Primary Care Service (PCS) of the Santiago de Compostela and Barbanza health care area. The Noia PCS, with 24 primary care physicians (PCPs) and 25 primary care nurses (PCNs), provides coverage to a population of 32 196, of whom 51.3% are women and 29.4% are older than 65 years. The study received the approval of the Galicia ethics committee for research involving medicines and was carried out following a current data management protocol.

Currently, after completing a guided training program for PCPs and PCNs working in health centers, the PCNs measure the international normalized ratio (INR) using portable coagulometers. The PCNs also adjust the VKA dose using a centralized computer program, unless the patient's INR is < 1.8 or > 4.2, or they have a metal heart valve, in which case this is done by the PCP.

The data set was generated during the prescription authorization process using the electronic medical record program IANUS and the pharmacy database SIAC-PF. The data set was regularized in February 2020 in accordance with Directive 7/2019 of the Galician Regional Government Department of Health on the

protocol for the management of data supplementary to medical records.

We included all patients with nonvalvular atrial fibrillation who were switched from a VKA to a DOAC between September 2015 and September 2019 and who met the following criteria: a) on treatment with a VKA for at least 7 months before the switch and on a DOAC for 6 months after the switch; b) all the switches from VKA to DOAC were made in line with the criteria and general recommendations of the TPR, since, to authorize starting a DOAC, the pharmacy inspector must review the patient's medical record.

The primary outcome variable was the number of PCP, PCN and hospital consultations, with costs calculated according to those published in Decree 56/2014 of the Galician Regional Government, which establishes the rates for health care services provided in health centers of the Galician Health Service.⁵ For hospital consultations, the cost was calculated using a weighted method between first, follow-up, and *high-resolution* or one-stop consultations. Secondary outcome variables were the costs of low molecular-weight heparin (LMWH), oral anticoagulants (VKAs and DOACs), INR test strips, and the follow-up monitoring blood tests performed.

To estimate the cost of test strips, we used the results of the ANFAGAL+ study, in which a mean 10.7 ± 0.2 measurements were performed over an observation period of 7.6 ± 0.2 months,⁵ entailing a mean expenditure of €2.70 in 6 months.⁶ The expenditure on blood tests was estimated using the cost provided by our central laboratory, based on an annual analysis for all patients (€5.33/y) except those older than 75 years or with a glomerular filtration rate < 60 mL/min, who require twice-yearly analyses (€10.66 /y).⁶

The variables analyzed, which were all quantitative and with nonnormal distribution, are presented as median [interquartile range] and were compared against each other using the Wilcoxon test. The statistical package SPSS 24.0 for Windows was used, and results with $P < .05$ were considered statistically significant.

A total of 202 patients were included, of whom 50% were women, with a median age of 82 [74–86] years. After the switch to DOACs, there was a decrease in all consultations: 2.5 PCP consultations/patient (33.3%), 10.0 PCN consultations/patient (75%) and 2.0 hospital consultations/patient (37.5%) (table 1, figure 1).

Table 1

Primary care and hospital consultations in the 2 periods and associated costs

	VKA period	DOAC period	Difference	<i>p</i>
No. of PCP consultations	9 [5–12.3]	6 [4–9]	–2.5	< .001
No. of PCN consultations	14 [11–18]	3 [2–5]	–10.0	< .001
No. of hospital consultations	5 [2–11]	3 [1–7]	–2.0	< .001
PCP costs (€)	623.2 [346.2–848.2]	415.4 [276.9–623.2]	–173.1	< .001
PCN costs (€)	384.0 [301.7–493.7]	82.3 [54.9–137.2]	–274.3	< .001
Hospital costs (€)	875.5 [350.2–1925.9]	525.3 [175.1–1225.6]	–350.2	< .001
LMWH costs (€)	64.3 [42.9–85.7]	1.0 [0.0–2.1]	–63.3	< .001

VKA, vitamin K antagonist; DOAC, direct oral anticoagulant; PCP, primary care physician; PCN, primary care nurse; LMWH, low molecular-weight heparin. Values are expressed as median [interquartile range].

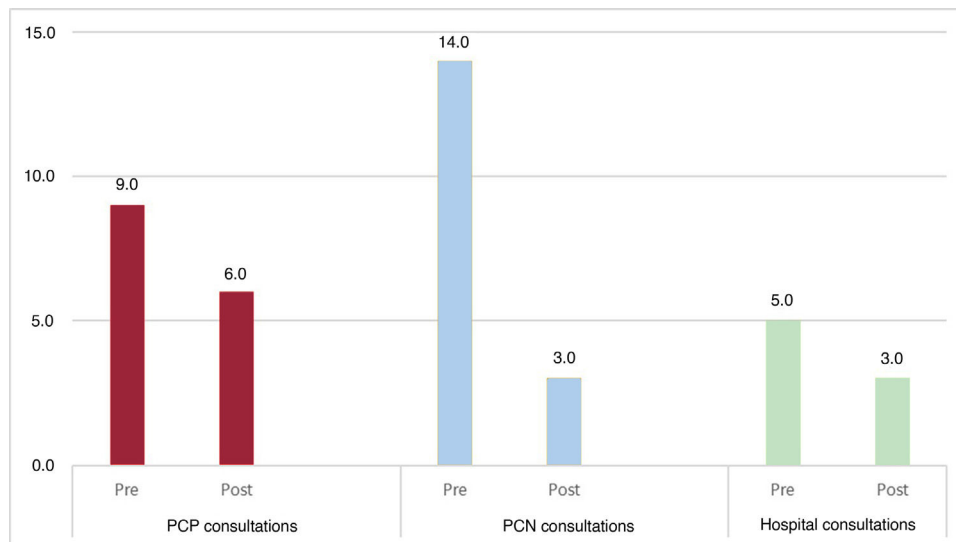


Figure 1. Changes in the number of primary care and hospital consultations in the two analysis periods. PCN, primary care nurse; Post, period with direct oral anticoagulants (DOACs) after changing the type of oral anticoagulant; Pre, period on vitamin K antagonists (VKAs) before changing the type of oral anticoagulant.

The analysis of drug-associated costs showed a significant decrease, of €63.3 (95% confidence interval [95% CI], –84.8 to –41.8; $P < .001$), in the use of LMWH.

The final balance showed that the introduction of DOACs entailed a decrease of €265.7 (–€997.1 to €258.7) per patient over 6 months. The reduction in costs for the whole of our PCC had a total saving of €89 654, 40.1% of the cost incurred in the period of treatment with VKA.

Regarding the external validity of this study, the interpretation of these results should be limited to patients who are followed up as outpatients, in a clinical management setting that has access to a shared electronic medical record, a tool that improves communication between care levels and facilitates continuity of care and comprehensive patient care.

In summary, we can conclude that, after switching from VKA to DOAC in line with the 2016 TPR for PCC outpatients, there was a reduction in care burden at all levels of care. The overall financial balance for the PCC, including the costs of oral anticoagulants, the INR test strips, and blood tests, had a saving of nearly €90 000, representing a 40.1% reduction in costs.

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AUTHORS' CONTRIBUTIONS

A. Pia-Morandeira conceived the idea and curated the database. All the authors participated in the writing, review, and approval of the manuscript.

CONFLICTS OF INTEREST

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Agustín Pia-Morandeira,^a Sergio Cinza-Sanjurjo,^{b,c,d,e} and Manuel Portela-Romero^{c,d,e}

^aCentro de Saude Noia, Área Sanitaria Integrada Santiago de Compostela, Santiago de Compostela, A Coruña, Spain

^bCentro de Saude Porto do Son, Área Sanitaria Integrada Santiago de Compostela, Santiago de Compostela, A Coruña, Spain

^cInstituto de Investigación Sanitaria de Santiago de Compostela (IDIS), Santiago de Compostela, A Coruña, Spain

^dCentro de Investigación Biomédica en Red de Enfermedades Cardiovasculares (CIBERCV), Spain

^eCentro de Saude Concepción Arenal, Área Sanitaria Integrada Santiago de Compostela, Santiago de Compostela, A Coruña, Spain

* Corresponding author:

E-mail address: sergio.cinza.sanjurjo@sergas.es (S. Cinza-Sanjurjo).

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Cardiopulmonary resuscitation training in schools: it's time to react



La formación en reanimación cardiopulmonar en las escuelas: es hora de reaccionar

To the Editor,

Out-of-hospital cardiac arrest (OHCA) is one of the leading causes of premature death. Despite efforts to improve OHCA prognosis, survival rates remain low, at about 8%.¹

Because measures such as high-quality chest compressions and early defibrillation increase survival, bystander cardiopulmonary resuscitation (CPR) can improve prognosis. Although the average bystander CPR rate is 58%, it varies widely among European countries (13%-82%).²

The recent European guidelines on CPR,¹ which include the previous recommendations of the European Resuscitation Council and the International Liaison Committee on Resuscitation and the Kids Save Lives campaign, strengthen the need to teach CPR in schools and support its effectiveness, and the related legislation has thus been adopted in various European countries. In Spain, with more than 6 million students, the legislation stipulates that first aid training be given in primary schools.³ However, there is no plan for CPR training.

Via the CPR Working Group of the Spanish Society of Cardiology (SEC), a descriptive cross-sectional study was conducted using 2 nonstandardized questionnaires. These questionnaires were developed by expert consensus due to a lack of validated questionnaires in the literature; the first was designed to determine the degree of CPR understanding of 10- to 18-year-old students, while the second was designed to elucidate the degree of implementation of CPR training by the principals of these schools. After receiving the contact details of the schools interested in participating, provided by some autonomous communities when the education ministries were consulted on various occasions by the SEC in person or by email, we sent the schools direct links to both online questionnaires. Between February and June 2019, the questionnaires were completed anonymously on the SEC website. The results were directly uploaded for ad hoc analysis with SPSS version 20 (IBM, United

States). The study was approved by the SEC and anonymity was guaranteed, given that the questionnaires requested no personal information beyond age.

Responses were received from 10 of the 14 autonomous communities that wished to participate; most responses (64.9%) were from Catalonia, mainly from Girona and Barcelona. After the exclusion of 395 forms due to completion failures, 5892 valid questionnaires from students were analyzed, as well as 343 from principals.

Participation was similar in boys and girls ($P = .7$) and the mean participant age was 14.7 ± 1.92 years (table 1). In total, 69.6% of the students had heard about cardiopulmonary arrest (CPA), with no differences by sex (70.8% of boys and 68.4% of girls; $P = .053$) and with the percentage increasing with age (59.6% of those aged < 13 years, 68.3% of those aged 13–16 years, and 85.8% of those aged > 16 years; $P < .001$). Notably, 70.1% had heard about automated external defibrillators (AEDs) and 35.3% knew the location of the nearest AED, a percentage that increased with age (33.4% of those aged < 13 years, 34.6% of those aged 13–16 years, and 40.7% of those aged > 16 years; $P = .002$). Only 31.2% knew the correct telephone numbers for emergency services (112 and 061) (table 2).

In addition, 36.2% had received CPR training, with a similar distribution by sex and an increase with age (< 13 years, 28.7%; 13–16 years, 33.9%; and > 16 years, 54.9%; $P = .002$).

Less than half of the sample (42.2%) knew that the theoretical criteria for identifying CPA are unconsciousness and lack of breathing, whereas 46.9% believed that pulse palpation was necessary.

Strikingly, of students with CPR training, only 29% knew the telephone number for emergency services and 40.8% correctly knew how to identify CPA.

Regarding principals, 343 responses were received. Half of the schools (49.4%) had offered CPR training to students, with no information on the time frame, and 61.3% to teachers at some time, but only 15.9% of the schools had a structured program within school hours. Just 29.7% of schools had material for teaching CPR, although 41.5% had an AED. Finally, 91.6% of principals and 94.5% of students were in favor of teaching CPR in schools. In addition, 4.2% of principals reported that there had been a sudden cardiac death in their school. For the indicated dates, between 1990 and

Table 1

Results of the survey of students regarding CPR knowledge/training

Variable	Respondents (n = 5892), %	Distribution by age group, %				Distribution by sex, %			Previous CPR training		
		< 13 y	13-16 y	> 16 y	P	Male	Female	P	Yes	No	P
Have received CPR training	36.2	28.7	33.9	54.9	.002	36	36.4	.722	—	—	—
Have heard about CPA	69.6	59.6	68.3	85.8	< .001	70.8	68.4	.053	100	30.4	< .001
Have heard about AEDs	70.1	66.1	67.9	84.8	< .001	73.2	67.1	< .001	83.7	62.3	< .001
Correct identification of CPA	42.2	43.9	45.7	56.1	< .001	40.6	43.8	.009	40.8	43	.05
Know emergency services number	31.2	33.4	30.3	33.2	.081	31.5	30.8	.59	29	32.4	.005
Know location of an AED	35.3	33.4	34.6	40.7	.002	36.6	34	.041	45.1	29.7	< .001
In favor of teaching CPR in schools	94.6	93.8	94.3	96.9	.005	93	96.3	< .001	97.7	92.7	< .001

AED, automatic external defibrillator; CPA, cardiopulmonary arrest; CPR, cardiopulmonary resuscitation.