American Journal of Emergency Medicine 32 (2014) 225–232

Contents lists available at ScienceDirect

American Journal of Emergency Medicine

journal homepage: www.elsevier.com/locate/ajem

Original Contribution

Optimized acute stroke pathway using medical advanced regulation for stroke and repeated public awareness campaigns☆,☆☆

Valéry Soulleihet, MD [a], François Nicoli, MD, PhD [b,c], Jacques Trouve, MD [d], Nadine Girard, MD, PhD [e], Laurent Jacquin, MD [f,*]

[a] Assistance Publique–Hôpitaux de Marseille, CHU Timone, SAMU 13, 13005 Marseille, France
[b] OLEA Medical, 13600 La Ciotat, France
[c] Assistance Publique-Hôpitaux de Marseille, CHU Timone, Service d'urgences neurovasculaires, 13005 Marseille, France
[d] Centre Hospitalier Henri Duffaut, SAMU 84, 84903 Avignon cedex 09, France
[e] Assistance Publique–Hôpitaux de Marseille, CHU Timone, Service de Neuroradiologie, 13005 Marseille, France
[f] Hospices Civils de Lyon, Hôpital Edouard Herriot, Service d'Accueil des Urgences Médicales, 69003 Lyon, France

ARTICLE INFO

Article history:
Received 15 July 2013
Received in revised form 8 November 2013
Accepted 8 November 2013

ABSTRACT

Objective: The aim of this study is to evaluate the efficiency of a specific organizational model for early stroke management associated with repeated public awareness campaigns on stroke warning signs.
Method: Our model is based on initial telephone triage of potential candidates for an intravenous thrombolysis by an emergency physician before a 3-party conference including basic life support team on scene and a stroke neurologist. We performed a time series analysis for a period of 5 years and a half, comparing the number of emergency telephone calls with that of intravenous thrombolysis treatment realized.
Results: In our organizational model, repeated awareness public campaigns increased both the number of emergency calls for suspected stroke and the selection of potential candidates for intravenous thrombolysis. Results from the time series analysis suggest that educational campaigns are a major factor influencing our emergency medical service activity. This result is correlated with the number of performed intravenous thrombolyses by the stroke center especially within a 3-hour delay (Spearman ρ, $P = .621$, $P = .000$ and $P = .439$, $P = .000$, respectively).
Conclusion: Educational programs repeated each year are useful to the population for learning how to recognize stroke symptoms and send straight away an emergency call. Combining the emergency action with an early remote evaluation by the stroke center team and a direct admission in imaging department shortens the time-to-treatment delay. This model is reproducible in different health care systems.

1. Introduction

The optimal management of acute ischemic stroke must consider an early transfer and hospitalization in a stroke center to provide a short-time access to intravenous thrombolysis or endovascular treatment. As "time is brain" is a reality in acute ischemic stroke, residual effects have serious consequences for the patient prognosis and the financial issues. A short time-to-treatment delay is the goal for an organizational model of a stroke center. Its achievement includes necessarily human and material resources in both prehospital and in-hospital settings, including large educational programs for public.

Previous works mostly focused on public stroke knowledge, the learning process of warning signs of stroke, and the influence of these educational campaigns on emergency alerts [1-9]. Only 2 studies reported the impact either on the emergency response activity, before and after an educational campaign, or on the number of performed intravenous thrombolyses [5,10], and there are no available data to evaluate the number of telephone calls to emergency medical services. Increasing public knowledge to alert emergency medical services and visit an emergency department (ED) is a first step to these campaigns. Secondarily, the evaluation should consider the number of performed thrombolyses realized and the delay for emergency calls to include public learning in the global quality of the management of acute ischemic stroke.

In France, emergency medical services (Service d'Aide Médicale Urgente) include a telephone triage realized by an emergency physician, the availability of mobile intensive care unit, and the option to directly send a patient to an appropriate hospital department without going through an emergency service. The aim of this study is to evaluate the efficiency of repeated public

☆ No financial support was needed.
☆☆ Intermediate results of this work have been presented at the European Stroke Conference in 2010 and were published as an abstract in *Cerebrovascular Diseases*, volume 29 (suppl 2) page 213.
* Corresponding author. Dr Laurent Jacquin, Hospices Civils de Lyon, Hôpital Edouard Herriot, Service d'Accueil des Urgences Médicales, 5 place d'Arsonval, 69003 Lyon, France. Tel.: +33 4 72 11 00 48.
E-mail address: laurentjacquin@yahoo.fr (L. Jacquin).

0735-6757/$ – see front matter.
http://dx.doi.org/10.1016/j.ajem.2013.11.018

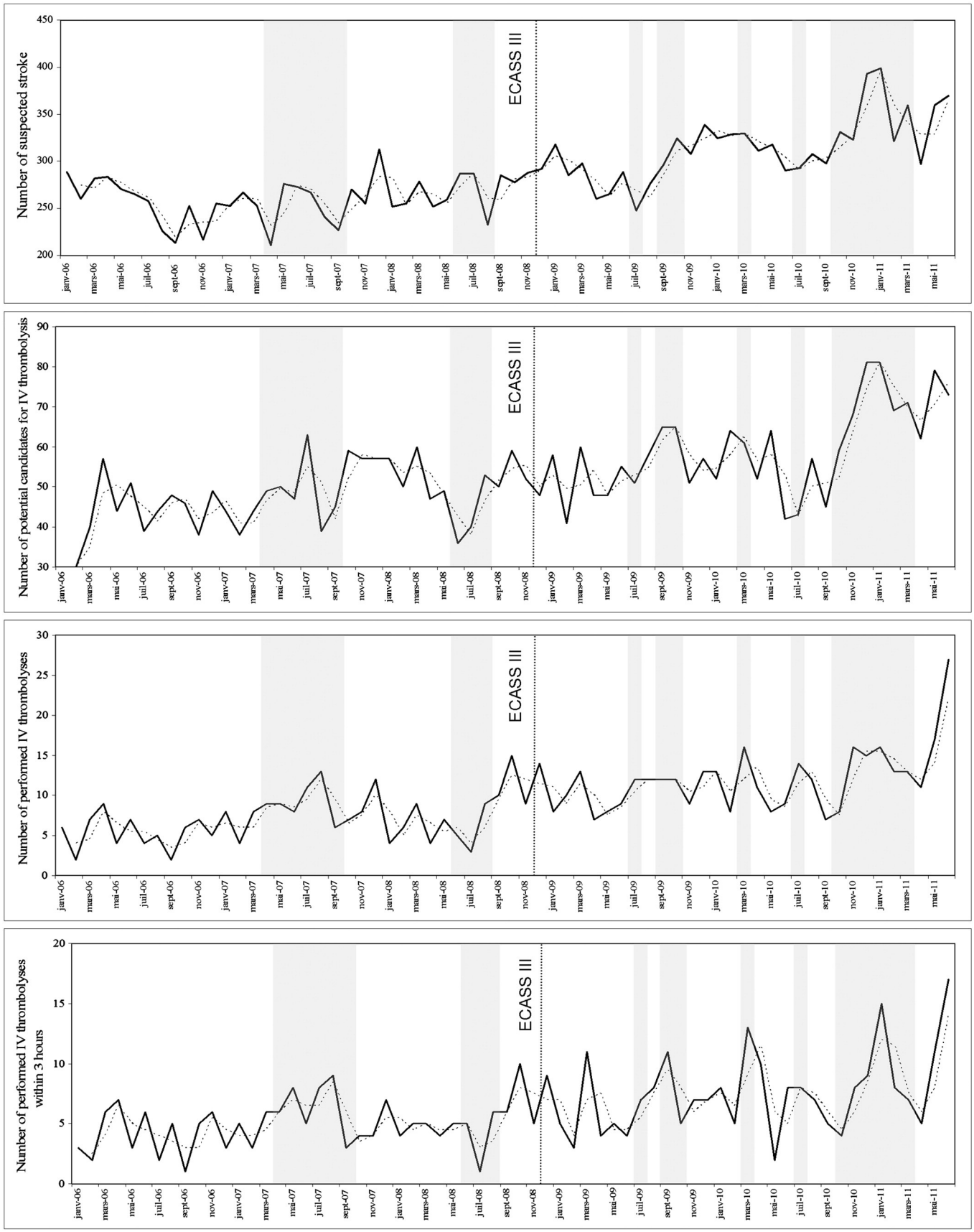

Fig. 1. Log of time series for the monthly number of suspected stroke, potential candidates for intravenous thrombolysis, performed intravenous thrombolyses, and performed intravenous thrombolyses in the first 3 hours. Dotted lines indicate the 2-month mobile average. Gray shades represent the awareness campaign.