Optimizing acute stroke pathway in Lombardy Region: a prospective interventional study

S. Vidale; M. Arnaboldi; G. Bezzi[1]; G. Bono[2]; G. Grampa[3]; M. Guidotti[4]; P. Perrone[5]; A. Salmaggi[6]; D. Zarcone[7]; A. Zoli[8]; E. Agostoni[9]

Dept of Neurology, Sant'Anna Hospital, Como; [1]Dept of Neurology, Civico Hospital, Sondrio; [2]University of Insubria, Varese; [3]Dept of Neurology, Circolo Hospital, Saronno; [4]Dept of Neurology, Valduce Hospital, Como; [5]Dept of Neurology, Civico Hospital, Legnano; [6]Dept of Neurology, A. Manzoni Hospital, Lecco; [7]Dept of Neurology, Sant'Antonio Abate Hospital, Gallarate; [8]Regional Agency of Emergency-Urgency, Milan; [9]Dept of Neurology, Niguarda Ca' Granda Hospital, Milan

Background and purpose: Thrombolysis is an effective treatment in ischemic stroke, but the principal limitation in its application is the time. In our large geographical area with more than 3 millions of inhabitants, we conducted a project to improve the management of stroke patients, reducing the avoidable time.

Variable	OR	95%CI	p
Age	0.945	0.932 – 0.959	< 0.001
Gender	0.906	0.637 – 1.288	0.581
NIH admission	1.087	1.059 – 1.115	< 0.001
EMS use	2.731	1.660 – 4.493	< 0.001
Triage Code	1.455	1.026 – 2.063	< 0.001

Figure 1

Materials and Methods: All consecutive patients admitted to 11 Hospitals in Northern Italy for stroke were enrolled during a 6 months period. A standard methodology in the acute management of stroke was introduced previously. This was based on: 1. public campaigns to increase the use of EMS; 2. the application of a stroke code at transport and at hospital triage. Demographical data, time of single steps of stroke pathway and treatment procedures were registered for each patients. Statistical analysis was conducted using t-test and chi-square test for univariate and logistic regression for multivariate analysis.

Results: 1688 patients were recruited (Median age: 76 years; male: 52.4%). 23% of patients had a severe stroke (NIHSS > 15) at admission, while only 10% presented poorer functional outcome at discharge. We observed a significant increase of EMS use than previous years (65.5% vs 50.8%; p < 0.01). A stroke code during transport was applied in 19.3% of subjects, while we registered an application of this code in 26.7% of patients at triage. The median of total, pre-hospital and in-hospital times were 190 minutes (120 – 363), 97 minutes (61 – 216) and 67 minutes (40 – 128), respectively. The use of EMS and the application of stroke codes reduced significantly all times (p < 0.01). 13% of patients was treated with thrombolysis. At multivariate analysis, we observed that thrombolytic treatment was more administered in patients transported with EMS (OR: 2.731; 95%CI: 1.660 – 4.493) and with a stroke code at triage (OR: 1.455; 95%CI: 1.026 – 2.063) (Figure 1).
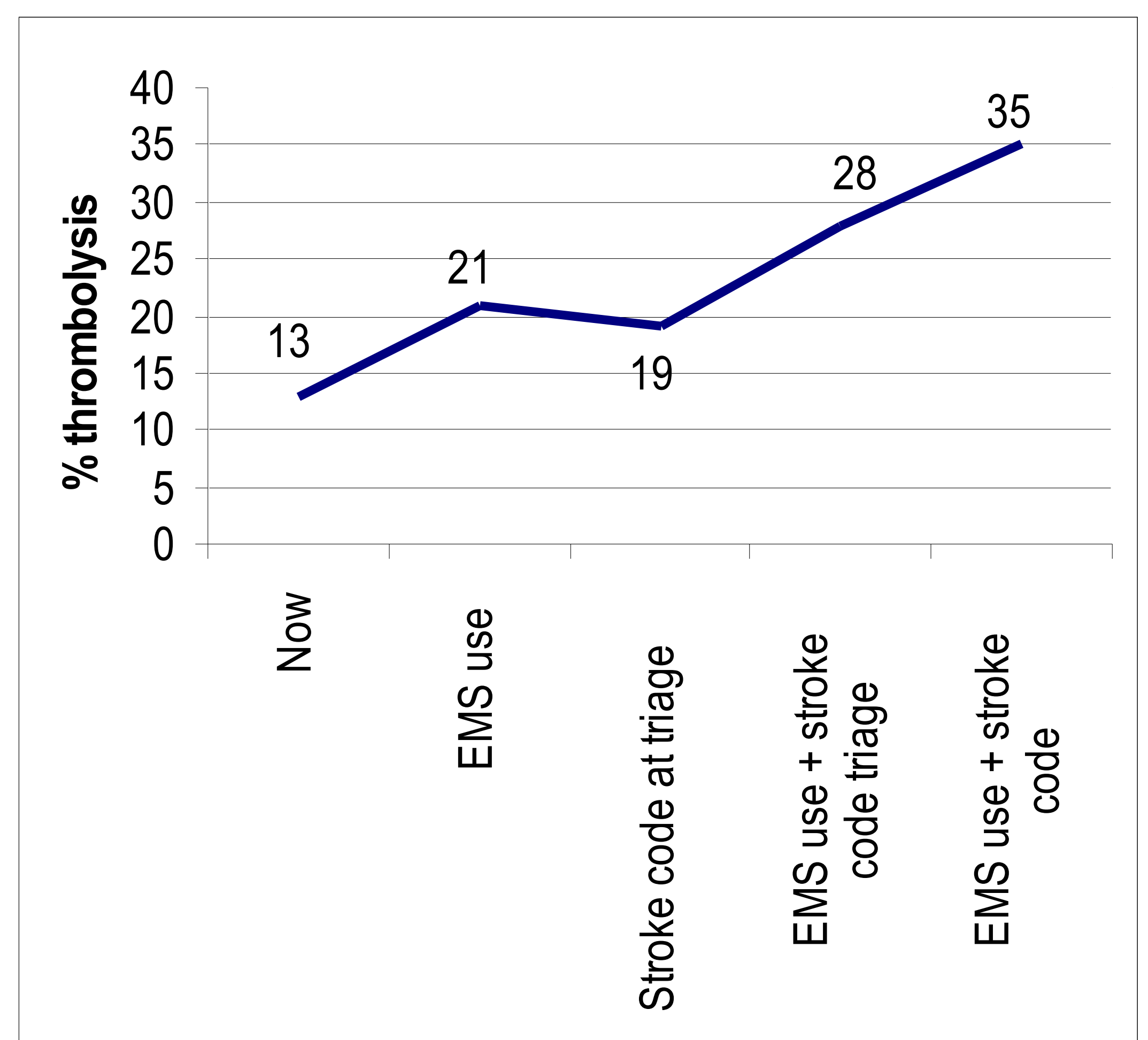

Figure 2: Projections of number of thrombolytic procedures if all corrective factors will be applied.

Conclusions: The optimization acute the stroke pathway contributed to increase the number of thrombolytic treatments. Our projections allowed calculating an increase of recanalization procedures up to 200% if the all corrective factors should be applied for each patients.