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Knowledge of the Egyptian emergency physicians about the use of rt-PA in acute ischemic stroke

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Abstract

Background: The administration of recombinant tissue plasminogen activator (rt-PA) has increased the focus on acute ischemic stroke (AIS) as an emergency condition. The emergency physicians have to rapidly recognize the patients who are candidates for rt-PA and refer them to the specialized stroke team within the proper time window. The knowledge of the emergency physicians about the benefit and the drawbacks of this therapy is crucial and it affects their attitudes towards its use.

Objective: To apply a survey on the Egyptian emergency physicians aiming to investigate their knowledge about the use rt-PA therapy in AIS.

Methodology: A self-administered questionnaire was sent to the emergency physicians who are working in three Egyptian governorates.

Results: Out of 120 emergency physicians, the total knowledge of the study group was good with a score of $7 \pm 1.8/11$. Most of the participants mentioned the correct answers (over 50%) for all items except for one question regarding the blood glucose control before the use of rt-PA. Significant positive correlation was noted between the knowledge score and the age.

Conclusions: The surveyed emergency physicians had a good knowledge about the use of rt-PA in AIS, yet, this knowledge is mainly theoretical. Therefore, tutorials, clinical training, and active engagement in the stroke care team are warranted to improve their clinical practice.

Keywords: Acute ischemic stroke, rt-PA, Emergency physicians, Knowledge, Egypt

Introduction

Cerebrovascular stroke (CVS) is considered the second leading cause of death and dementia [1]. Although it is a major health problem in the Egyptian population, there is no active nationwide registry for CVS and, consequently, accurate data on its epidemiology are scarce [2].

Nowadays, acute ischemic stroke (AIS) is a treatable condition with great influence on the patients' survival and recovery [3]. The administration of intravenous thrombolysis using the recombinant tissue plasminogen activator (rt-PA) has increased the focus on AIS as an emergency condition [4, 5]. In order to get the maximum benefit from rt-PA therapy, prehospital delay and onset to treatment time (OTT) have to be minimized [6].

Emergency physicians have a crucial role in the stroke care system. They have to rapidly recognize the patients who are candidates for thrombolysis through performing a brain imaging and referring those patients to the specialized stroke team within the proper time window. In rural areas, with a lack of on-site stroke expertise, emergency physicians might take the upper hand in the administration of rt-PA with the support of a remote neurology consultation [7–10].

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Although most major general hospitals could supply an infrastructure for the rt-PA therapy, physicians' insufficient knowledge may contribute to a diminished use of this valuable therapy. As an example, many physicians would overemphasize the intracranial hemorrhage as an adverse effect associated with this therapy [11]. Consequently, the physicians' attitude would have a negative impact on the patients or their families. The later will likely refuse the rt-PA therapy after consultation [12].

In this study, we aimed to apply a survey on the Egyptian emergency physicians to investigate their knowledge about the use of intravenous rt-PA therapy in AIS.

Methodology

The present study was based on a self-administered questionnaire that was designed after reading different international reviews and researches [10, 12, 13].

This cross-sectional study was conducted from January to June 2019. It targeted all the physicians who are working in the emergency departments of Fayoum University Hospitals and Fayoum General Hospital in Fayoum Governorate; Abu Qir Central Hospital in Alexandria Governorate; Tanta University Hospitals, El Menshawy General Hospital and El Santa Central hospital in Gharbia governorate. All emergency physicians who participated in the study are currently licensed by the Ministry of Health.

The questionnaire was sent personally through data collectors or via e-mails. The first part of the questionnaire included the demographic data and the basic characteristics of the physicians' cohort (age, sex, specialty, and duration of experience in years). The second part that is formed of 8 items explored the knowledge about the manifestations of AIS (cranial nerves, extremities, and speech deficits added to time of onset). Finally, the third part consisted of 11 multiple choice questions (MCQ) covering the knowledge about the use of rt-PA within 4.5 h from the onset of AIS. A 3-point scale was used in this MCQ (true, false, and do not know) in which the correct answer was scored 1, while do not know and the wrong answer were scored 0 with a maximum total score of 11. The questionnaire was piloted on 30 respondents for its acceptability and reliability. It was subjected for editing through re-writing, adding, and deleting some questions. For the assessment of internal consistency, Cronbach's alpha was used with $\alpha = 0.79$.

Statistical analysis

The collected data were organized, tabulated, and statistically analyzed using the IBM Statistical Package for Social Sciences (SPSS) software version 22 (2013, USA). Data were presented as mean ± standard deviation (SD) for continuous variables and frequency with percentages was used for categorical variables. To determine the relation between different quantitative variables, Spearman's correlation was performed. Linear regression was applied to determine the predictors of the knowledge score. Also, logistic regression was performed to identify the predictors of the knowledge score. A p value ≤ 0.05 was considered statistically significant.

Results

The current study included 120 emergency physicians. Their general characteristics are shown in Table 1.

Concerning the second part of the questionnaire, all the participants (neuropsychiatry, internal medicine, and cardiology residents) knew the manifestations of AIS.

Regarding the third part of the questionnaire, the total knowledge of the study group was generally good with a total score of 7 ± 1.8/11. Most of the participants mentioned the correct answers (over 50%) for all items except for one question about the blood glucose control before using rt-PA (6.7%). Concerning the correct answers about rt-PA therapy, 63.3% of the study population knew that it is a legislated drug, 96.7% knew that it is used in the treatment of AIS, and 90% answered that it is the best possible treatment option for AIS. Only 53.3% were aware of the window period for rt-PA. Finally, 70% answered correctly that the best treatment route for AIS is intravenous. Further details are illustrated in Table 2.

The mean knowledge score was higher among the residents of neuropsychiatry (8.6 ± 1.6/11) compared to others (6.4 ± 1.5/11) with statistical significance ($p < 0.0001$). On the other hand, the mean knowledge score was higher in females compared to males (7.2 ± 1.8 vs. 6.5 ± 1.9/11), but it did not reach a statistical significance ($p = 0.113$).

There was a statistically significant positive correlation between the knowledge score and the age ($r = 0.198$, $p = 0.03$). However, no other correlation reached a statistical

Table 1 Distribution of all physicians by background characteristics

	N (120)	%
Age		
Mean ± SD	25.7 ± 1.9	
Sex		
Male	24	20
Female	96	80
Duration of experience in years		
Mean ± SD	2.1 ± 1.6	
Specialty		
Neuropsychiatry residents	36	30
Others (residents of internal medicine and cardiology)	84	70

N number, *%* percentage, *SD* standard deviation

Table 2 Percent distribution of all participants according to knowledge (N = 120)

	True		False		Do not know	
	N	%	N	%	N	%
Is rt-PA, used in the treatment of AIS, a legislated drug?	76	63.3	4	3.3	40	33.3
Can rt-PA be used in the treatment of AIS?	116	96.7	4	3.3	0	0.0
Is rt-PA the best possible treatment option of AIS?	108	90	12	10	0	0.0
Is antiplatelet agent alone or in combination with a neuroprotective agent is the best possible treatment option of AIS?	80	66.7	28	23.3	12	10
Is heparin the best possible treatment option of AIS?	96	80	12	10	12	10
Are neuroprotective agents such as citicholine or edavarone the best possible treatment option of AIS?	76	63.3	8	6.7	36	30
Is the Window period for rt-PA 4.5 h?	64	53.3	52	43.3	4	3.3
Is Intravenous thrombolytic therapy for AIS the best treatment route of AIS?	84	70	4	3.3	32	26.7
Do we have to control the blood pressure in AIS before using rt-PA?	72	60	16	13.3	32	26.7
Do we have to control the blood glucose level in AIS before using rt-PA?	8	6.7	80	66.7	32	26.7
Are intravenous fluids used in AIS?	64	53.3	36	30	20	16.7
Total score (11)	Mean 7 ± 1.8					

N number, % percentage, rt-PA recombinant tissue plasminogen activator, AIS acute ischemic stroke

significance using the Spearman correlation. Meanwhile, the multiple linear regression analysis revealed that specialty and age were significant predictors of knowledge score ($p < 0.05$) as shown in Table 3.

Discussion

Emergency physicians are often the first contacts with the AIS patients and their attitude towards rt-PA is a critical factor in the use or non-use of this treatment. Emergency physicians help in shaping the treatment protocols and their perceptions influence the attitudes of others [14].

The total knowledge of all the physicians included in the study was 7 ± 1.8/11. Most of them mentioned the correct answers (over 50%) for all items except for one question regarding the blood glucose control before using rt-PA. These results agree with those obtained in a previous study [15] where the authors observed greater acceptance for thrombolysis in AIS. Nearly all respondents characterized rt-PA therapy as either ideal or acceptable and approximately one-quarter indicated that its use represented a legal standard of care in eligible

AIS patients. The majority (83%) indicated that they would use rt-PA when the ideal setting is provided at their local hospitals.

Older surveys provided acceptance estimates ranging from 53 to 60% [16, 17]. Possible explanations for these findings include positive changes in the attitudes towards the AIS treatment, differences in the survey cohort compared to prior studies, and differences in the surveys' design.

Our results showed that the mean knowledge score was significantly higher among the residents of neuropsychiatry compared to others. This is in concordance with Alharbi and co-authors [18] who reported that 72.8% of the neurology residents support the use of rt-PA in AIS patients. Also, higher acceptance rates (90.1%) were found among the Chinese neurologists as reported by Wang and his colleagues [19]. This increased acceptance may be attributed to the increasing evidence supporting the validity and effectiveness of thrombolytic therapy [20].

However, Ma and his group [12] showed that the mean accuracy rate of the provided questions pertaining

Table 3 Multiple linear regression showing predictors of knowledge score

	β	t	p	95% confidence interval for B	
				Lower bound	Upper bound
Constant	5.409	2.723	0.007	1.474	9.343
Sex	0.328	0.917	0.361	-0.381	1.037
Specialty	− 2.194	− 7.252	< 0.0001	− 2.793	− 1.595
Experience in years	− 0.124	− 1.372	0.173	− 0.304	0.055
Age in years	0.196	2.661	0.009	0.05	0.342

β beta coefficient, t t value, p p value

the physicians' knowledge about rt-PA displayed a broad range (0.8 to 96.2%), and the mean total score for respondents was very low. Although the participants were neurologists, they had poor knowledge about the use of rt-PA in AIS. The researchers attributed their results to the low rate of fibrinolytic therapy's use in China.

Our results showed that the mean knowledge score was higher in females compared to males, but it did not reach a statistical significance. This result needs further investigation to find out whether there is sex predominance or there are any unexplored factors affecting this association.

Furthermore, there was a significant positive correlation between the knowledge score and the age. This finding is in agreement with Alharbi and colleagues [18] who showed that the confidence was significantly more likely to be reported by the senior rather than the junior residents. This could be reasonably explained by to the duration of clinical experience and the increased knowledge about rt-PA that is expected to be higher among the seniors.

Multiple linear regression analysis showed that the significant predictors of the study population knowledge were the specialty and age. These findings were in agreement with Scott and co-authors [21] who showed that there was a greater acceptance of rt-PA among the older and non-emergency medicine trained physicians.

Conversely, Grady and his colleagues [15] reported that almost half of the respondents in their survey supported the use of rt-PA in AIS and only 20% of them highly agreed its use. Respondents were nearly four times more likely to agree on its use only if they received guidance from a professional consultant.

Our study was limited by the following: the questionnaire was simply designed and did not include all aspects of knowledge regarding the rt-PA therapy. The reason behind this was our aim to make the questionnaire more convenient and to get a higher response rate. However, if respondents attained maximal scores in this questionnaire, they might not manage optimally in clinical practice. Another limitation is that the neuropsychiatry residents in the university hospitals consisted only of 30% of the study group and were not representing the physicians throughout the whole country. It would have been more optimal to obtain further data through a wider cooperation with other hospitals around the country. Finally, given the recent historical implementation of stroke care units in Egypt, caution is warranted in generalizing the results obtained in our study.

Conclusions

The emergency physicians are the cornerstones in the stroke care system. Their knowledge towards the use of rt-PA in AIS is crucial in order to recognize and refer the AIS patients in the proper time window. Fortunately, nearly all Egyptian emergency physicians who responded to this survey indicated that rt-PA use in eligible patients is ideal and acceptable. It is mandatory for all Egyptian emergency physicians to be involved, educated, and engaged in the stroke care system to enhance their clinical practice especially after the recent implementation of several stroke units across Egypt.

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