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Original Research Article

Acute stroke care practice among emergency and medicine staff in Qassim region, Saudi Arabia

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ABSTRACT

Background: Stroke is a major cause of morbidity and disability worldwide. However, its outcomes have improved in the last few years with advancement in acute stroke treatment, including the use of tissue plasminogen activator (t-PA) within 4.5 hours of onset, which led several international guidelines to adopt it as the standard of care. In this study, authors sought to assess the knowledge, practices, and attitudes of emergency and medicine staff in Qassim, Saudi Arabia toward acute ischemic stroke care.
Methods: A quantitative observational cross-sectional study involving 148 physicians from emergency and medicine departments (only three neurologists) was conducted in three main hospitals of the Qassim region, Saudi Arabia. Information was obtained from a self-administered questionnaire. A logistic regression model was used to control for potential confounding factors.
Results: Ninety-two percent of participants were aware of t-PA. Eighty-seven percent of participants thought that t-PA was an effective treatment for acute ischemic stroke. Only 20% of participants had given t-PA or participated in the use of t-PA in acute ischemic stroke. Moreover, 64% of participants believed that allowing blood pressure to remain high was the most appropriate action in the first 24 hours in acute ischemic stroke patients who presented outside the t-PA window.
Conclusions: Most of the emergency and medicine staff are well informed about t-PA, but the majority of these physicians have never given t-PA or participated in the administration of t-PA to a stroke patient. The main finding here is the positive outlook among emergency and medicine physicians in Qassim toward training in acute stroke care and administering t-PA for stroke, which will positively impact patient outcomes.

Keywords: Attitude, Knowledge, Qassim, Saudi Arabia, Stroke, Thrombolytic therapy, Tissue plasminogen activator

INTRODUCTION

Stroke is a major health cause of physical disability and mortality worldwide and has serious impacts on the health of individuals, and the social and economic costs of a nation. The estimated stroke prevalence rate across Saudi Arabia is approximately 50/100,000.[1,2] The combination of an aging population and the increased risk of stroke with age is expected to lead to a near-future stroke crisis, as recent studies on the Saudi population strikingly concluded that 23% of Saudis are diabetic, 25% are hypertensive, 31% are overweight and 4% have coronary artery disease.[3] The benefit of tissue plasminogen activator (t-PA) for ischemic stroke within 4.5 hours of onset is well-established.[4] A previous study conducted in Riyadh, Saudi Arabia, among emergency services personnel reported that there was a lack of knowledge of the cardinal stroke symptoms, and the uses and therapeutic time window of t-PA.[5] A recent study conducted in Riyadh, Saudi Arabia, among emergency physicians revealed a relatively low level of knowledge and the presence of negative attitudes toward t-PA use.[6]

Thrombolytic programs have been implemented in many hospitals in Saudi Arabia, but the situation among hospitals in the Qassim region is currently suboptimal. Emergency and medicine physicians are the primary providers of acute stroke care in Qassim due to the current shortage of neurologists, with a total of only four neurologists in the three major hospitals in Qassim at the time of this study and the lack of stroke care organization and patient access to IV-t-PA. The study aimed to elucidate the level of knowledge, practices, and attitudes of emergency and medicine staff toward acute ischemic stroke care and t-PA use in the Qassim region, Saudi Arabia.

METHODS

A quantitative observational cross-sectional study was conducted at three main governmental hospitals in the Qassim region, Saudi Arabia, that are run by the ministry of health. Two hospitals in Buraidah city: King Fahad Specialist Hospital (385 beds tertiary referral hospital, with 385 beds), and Buradiah Central Hospital (300 beds secondary hospital). The third hospital is King Saud Hospital in Unaizah city (294 beds secondary hospital).[7] Physicians were recruited from medicine and emergency departments from June 2019 to December 2019. The inclusion criteria were all physicians from medicine and emergency departments while those who were absent were excluded.

The self-administered questionnaire was developed based on the review of different literature included the following sections:[5,6,8]

1. Descriptive data, including age, gender, level of education, job title, nationality, years of experience, and estimated number of stroke patients seen per week.
2. Knowledge, practice, and attitudes regarding t-PA.

The questionnaire was reviewed by neurologists and epidemiologists. A pilot study was conducted with a sample of 10 participants and was used to test the clarity of the questionnaire and the logistics of data collection. The results of the pilot study were not included in the main study.

Microsoft excel was used for data entry and SPSS V.21 was used for analysis. All variables were calculated using frequencies and percentages. In bivariate analysis, a simple logistic regression was used to test the association between categorical variables using odds ratios with 95% confidence intervals. Authors conducted a multiple logistic regression analysis with responses to the question "Do you consider t-PA a standard of care for ischemic stroke within 4.5 hours from the onset in eligible patients" as the dependent variable and other variables as independent variables. P-values less than or equal to 0.05 were considered a strong evidence against null hypothesis.

RESULTS

A total of 148 physicians participated in this study. The results revealed that 39% of participants were 30-40 years old, most participants were men (82%), and most were non-Saudi nationals (65%). Nearly two-thirds of the participants were from medicine department with only two neurologists, while the remaining third were emergency physicians. Nearly one- third of the participants were specialists, and the remaining two-thirds were either residents in training, consultants, or staff physicians. Authors found that 39% of participants had more than 10 years of experience, 34% had less than 5 years of experience, and 27% had between 5 and 10 years of experience. In addition, 56% of physicians have seen between one and five stroke patients each week (Table 1).

Table 1: Numbers and percentages of descriptive characteristics among the study participants (n=148).

Characteristics	Number	%
Age (years)		
<30	40	27
30-40	57	39
>40	51	34
Gender		
Male	122	82
Female	26	18
Nationality		
Saudi	52	35
Non-Saudi	96	65
Department		
Medicine	109	74
Emergency	39	26
Job title		
Resident in training	61	41
Specialist	51	34
Consultant	22	15
Other	14	10
Experience in practice (years)		
<5	50	34
5-10	39	26
>10	58	39
Number of stroke patients seen (weekly)		
<1	16	11
1-5	83	56
>5	49	33

Regarding the level of knowledge, practices, and attitudes of participants toward t-PA, 92% of participants were aware of t-PA as a treatment for acute ischemic stroke and knew about the time window for t-PA administration. Eighty-seven percent of participants thought that t-PA was an effective treatment for acute ischemic stroke, and 82% of participants recommended t-PA as a standard of care for acute ischemic stroke within 4.5 hours of onset in eligible stroke patients. Only 20% of participants had

given t-PA or participated in the use of t-PA for ischemic stroke. Moreover, 64% of participants believed that allowing blood pressure to remain high was the most appropriate action in the first 24 hours in acute ischemic stroke patients who presented outside the t-PA window. Forty-seven percent of participants recommended training emergency physicians to administer t-PA when there is no stroke expertise, and 72% of participants reported that they were willing to be enrolled in education and training activities to administer t-PA for stroke (Table 2).

Table 2: Numbers and percentages regarding the level of knowledge and attitudes of participants toward t-PA.

Question	Response	Number	%
Are you aware of t-PA?	Yes	136	92
	No	12	8
What is the time window for t-PA administration?	4.5 hours	136	92
	6 hours	4	3
	Not aware	8	5
Do you think t-PA is an effective treatment for acute stroke within 4.5 hours of onset?	Yes	128	87
	No	3	2
	I don't know	17	11
Do you consider t-PA a standard of care for ischemic stroke within 4.5 hours from onset in eligible patient?	Yes	122	82
	No	9	6
	I don't know	17	12
Have you given t-PA or participated in t-PA being given for a stroke patient in your hospital?	Yes	30	20
	No	118	80
What is the most appropriate action in the first 24 hours regarding BP in an acute ischemic stroke patient who presents outside the t-PA window?	Allow BP to be high	95	64
	Lower BP	46	31
	I don't know	7	5
In the absence of stroke expertise, what do you recommend?	Train ER physicians to give t-PA	69	47
	Train interns to give t-PA	39	26
	No t-PA should be offered	40	27
If needed, would you be willing to enroll in training to administer t-PA for stroke?	Yes	107	72
	No	13	9
	Uncertain	28	19

Table 3: Unadjusted and adjusted analysis of factors associated with the recommended use of t-PA among patients with stroke.

	Recommended use of t-PA		Crude OR (95% CI)	Adjusted OR (95% CI)
	Yes, N (%)	No, N (%)		
Age, years				
<30	35 (88)	5 (12)	1.92 (0.61-6.08)	1.74 (0.13-23.9)
30-40	47 (83)	10 (17)	1.29 (0.50-3.36)	0.84 (0.18-3.81)
>40	40 (78)	11 (22)	1	1
Gender				
Male	101 (83)	21 (17)	1.15 (0.39-3.38)	1.70 (0.43-6.68)
Female	21 (81)	5 (19)		
Nationality				
Saudi	45 (87)	7 (13)	1.59 (0.62-4.07)	1.21 (0.15-9.74)
Non-Saudi	77 (80)	19 (20)		
Department				
Medicine	95 (87)	14(13)	3.02 (1.25-7.28)	1.94 (0.62-6.13)
Emergency	27 (69)	12 (31)		
Job title				
Consultants	18 (82)	4 (18)	0.95 (0.29-3.09)	0.89 (0.20-4.01)
Others	104 (83)	22 (17)		

Continued.

Experience in practice, years				
<5	43 (86)	7 (14)	2.34 (0.87-6.26)	0.91 (0.08-10)
5-10	37 (93)	3 (7)	4.7 (1.27-17.41)	4.48 (0.90-22.2)
>10	42 (72)	16 (28)	1	1
Number of stroke patients seen, weekly				
<1	14 (93)	1 (7)	5.06 (0.60-42.4)	3.76 (0.35-40.9)
1-5	72 (86)	12 (14)	2.17 (0.9-5.23)	1.44 (0.49-4.22)
>5	36 (74)	13 (26)	1	1
Are you aware of t-PA?				
Yes	114 (84)	22 (16)	2.59 (0.72-9.36)	0.98 (0.17-5.66)
No	8 (67)	4 (33)		
What is the time window for t-PA administration?				
4.5 hours	117 (87)	18 (13)	10.4 (3.06-35.3)	8.53 (1.83-39.7)
6 hours, not aware	5 (60)	8 (40)		
What is your best action in the first 24 hour regarding BP in acute ischemic stroke patient who presents outside the t-PA window?				
Allow BP to be high	85 (90)	10 (10)	3.68 (1.53-8.86)	2.78 (0.88-8.73)
Lower the BP I don't know	37 (70)	16 (30)		

Bivariate analysis showed that participants who recommended the use of t-PA tended to be physicians working in medicine departments who had 5-10 years of experience, and who were aware that 4.5 hours was the appropriate time window for t-PA administration. In multivariate analysis, participants who were aware of the 4.5-hour time window for t-PA administration were more likely to recommend the use of t-PA (Table 3).

DISCUSSION

Despite the convincing evidence for thrombolysis in the management of acute stroke, particularly during the first 4.5 hours, Saudi Arabia struggles to move from traditional stroke care, with approximately 95% of patients being cared for at nonspecialized stroke hospitals and not receive any reperfusion therapy.[9] In Saudi Arabia, the estimated proportion of eligible stroke patients who received IV t-PA is still <1%, although it is currently standard care and has been approved since 1996.[9] One of the major challenges is the shortage of neurologists. A previous study conducted in Saudi Arabia in 2011 reported that there were solely 83 practicing neurologists working in Saudi Arabia at that time, almost half of whom practiced in the capital city of Riyadh.[10] Emergency and medicine physicians are the primary providers of acute stroke care in Qassim due to the current shortage of neurologists, with a total of four neurologists in the three major hospitals in Qassim at the time of this study, which accounts for the lack of stroke teams and stroke units. In this study, the majority of participants were well informed about t-PA for the treatment of acute stroke. Interestingly, although more than 80% of participants believed that t-PA is an effective treatment for acute ischemic stroke and recommended t-PA as a standard of care for ischemic stroke within 4.5 hours of onset in eligible stroke patients, only 20% of participants had given t-PA or participated in the use of t-PA for a stroke patient. The lack of experience may affect proper acute stroke care. Regarding the strategy of "permissive hypertension", 64% of the physicians correctly answered the question about the appropriate action in the first 24 hours regarding blood pressure in an acute ischemic stroke patient who presented outside the t-PA window, but the rest of the participants were not aware of the strategy of "permissive hypertension" in the first 24 to 48 hours. It is crucial for patients with acute ischemic stroke to be handled with high priority because of the narrow time window for t-PA. In the current situation in Qassim, with the shortage of neurologists, emergency and medicine physicians should be educated and trained in acute stroke care. The majority of medicine and emergency physicians in the largest three hospitals in Qassim are willing to be enrolled in training to administer t-PA for stroke, which will positively impact patient outcomes especially given the current suboptimal care available for stroke in Qassim.

CONCLUSION

This study provided background information on acute stroke care in the largest three hospitals in the Qassim region, given the current neurologist shortage and the lack of stroke care organization and patient access to IV-t-PA. Most of the emergency and medicine staff are well informed about t-PA for the treatment of acute stroke, but the majority of these physicians have never given t-PA or participated in the administration of t-PA to a stroke patient. The main finding here is the positive outlook among emergency and medicine physicians in Qassim toward training in acute stroke care and administering t-PA for stroke, which will positively impact patient outcomes especially given the current suboptimal care available for stroke. This finding also provides opportunities for more remote collaboration and consultation with neurologists with stroke expertise.

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