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Evaluation of FAST Education Given to Medical Faculty Students: A Structural Form

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ABSTRACT

Objectives: This study aims to evaluate the effectiveness of ultrasound training, particularly e-FAST (extended-focused assessment with sonography for trauma), in enhancing the skills of medical students.

Methods: Conducted in a tertiary university hospital's emergency department from February to March 2022, the study involved 30 volunteer students from each year of a 6-year medical program. Following ethics approval, participants underwent a pre-test, a 1-hour theoretical e-FAST training, a practical training, and a post-test. The Rasch model was employed for data analysis.

Results: Post-training, there was a notable improvement in students' understanding of e-FAST, especially in the 2nd and 5th years, indicating significant learning gains. The Wright maps aligned participant abilities and item difficulty levels, confirming the training's effectiveness. However, the study's single-center nature and limited sample size are noted as limitations.

Conclusion: The study demonstrates that the e-FAST training model enhances medical students' ultrasound skills. The findings support integrating ultrasound training into medical school curricula, particularly in later years, to improve diagnostic capabilities in future medical practitioners.

Keywords: FAST, Ultrasound, Education.

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INTRODUCTION

Bedside ultrasonography is a practical diagnostic tool that can be easily performed at the bedside [1]. In addition, it is known to increase intervention success and reduce complications when used in interventional procedures [2]. Among the advantages of ultrasound are that it provides great convenience in the evaluation of unstable patients because it does not require transportation of the patient, and that it can be used safely in sensitive populations such as pregnant women because it does not emit ionizing radiation. Ultrasound, which is widely used in the fields of cardiology [3], obstetrics [4], and gastroenterology [5], has become increasingly widespread in recent years and has started to be used by emergency medicine, anesthesia, and surgery branches [6,7,8].

However, because it is operator-dependent, this method can also be useless or misleading when used without proper training [9]. Although ultrasound training is included in the education process in some specialties, efforts to include it in the medical school education curriculum have still not achieved its goal. Studies have shown that it is not yet clear how ultrasound training should be given before graduation, at what stage it should start, and how useful it is [10]. e-FAST (extended-focused assessment with sonography for trauma) is focused on ultrasonography of the trauma patient and allows rapid evaluation of unstable patients, especially in emergency departments, without being moved [11].

This study evaluated the success of ultrasound training given to medical school students in each education year.

METHODS

Study type and setting

This study is a before and after study. The study was carried out in the emergency department of a tertiary university hospital between 01/02/2022-31/03/2022. Before initiation of the study, approval was obtained from the local ethics committee (approval number 0432).

Subject selection

Students studying at the faculty of medicine were included in the study. The duration of medical school education is 6 years and 30 volunteers from each class were included in the study. Signed consent was obtained from all participants stating that they participated voluntarily.

Evaluation of e-FAST education

Volunteers from each class were evaluated separately on different days. First, a 20-question pre-test was administered to the volunteers and their baseline knowledge levels were measured. Immediately after the pre-test, a 1-hour theoretical e-FAST training was given. Then, bedside e-FAST practical training lasting at least 15 minutes was applied to each volunteer. During the training, e-FAST was first explained in practice by the instructor, and then the volunteer was allowed to apply e-FAST on his own, accompanied by the instructor. A healthy volunteer was used as a model in training. After the training was completed, the volunteers were given a 20-question post-test.

Statistical Analysis

The data were evaluated in the JAMOVI 2.3.28 open source statistical package program. Data analysis was performed using the Rasch model. In the model, parameters were estimated for each item such as measurement unit, difficulty parameters, placement index, fit index. The fit analysis of the Rasch model was performed and the results were evaluated using model fit statistics, statistical values and graphs. Participants' abilities and difficulty of the items were visually represented using Wright Maps.

RESULTS

Table 1 contains the Rasch model fit analysis and statistical results to assess participant reliability. Model fit is an important measure that evaluates how well the Rasch model fits the data. The fit of a model indicates that the model explains the data well and that its predictions are close to the actual data.

Person Reliability is a value that measures the

Table 1: Suitability Evaluation of the Before and After Model

	Person Reliability	p
Pre-test	0.470	0.035
Post-test	-0.176	<.001
H_0= the data fit the Rasch model		

reliability of the measurement tool used. A high participant reliability indicates that the measurement tool provides consistent and reliable results. It reflects the reliability of Rasch's analysis in measuring participants' performance. Participant reliability before the training was 0.470 and -0.176 after it.

MADaQ3= The p-value obtained by Holm correction and the p-value for the average of the absolute values of the centered Q_3 statistic is used to evaluate whether the model fits the data. The Rasch model is statistically significant since the p-value obtained with Holm correction is $p < 0.05$ both before and after training. Additionally, the statement "Ho= the data fit the Rasch model" in the table shows that the data fits the Rasch model.

Table 2 evaluates the performance of each item and its contribution to the measurement unit. The accuracy rates, difficulty levels, and statistical suitability values of the items enable the evaluation of the quality and reliability of the survey, which is a measurement tool.

Proportion expresses how many participants answered each item correctly. Before the training, item 1 was answered correctly by 92.05% of the participants, while item 4 was answered correctly by 5.68%. After the training, item 11 was answered correctly by 100% of the participants, while item 14 was answered correctly by 4.55%.

The Measure column shows the difficulty level of each item in the unit of measurement. If the values are negative, they represent that the items are difficult,

Table 2: Item Statistics Before and After Training

	Pre					Post				
	Proportion	**Measure**	**S.E.Measure**	**Infit**	**Outfit**	**Proportion**	**Measure**	**S.E.Measure**	**Infit**	**Outfit**
Item 1	0.9205	-25.640	0.399	1.038	1.103	0.9659	-33.440	0.587	1.000	1.000
Item 2	0.7841	-13.632	0.265	0.913	0.866	0.7955	-13.581	0.264	1.000	1.000
Item 3	0.2045	14.346	0.270	1.032	1.107	0.1136	20.541	0.336	1.000	1.000
Item 4	0.0568	29.237	0.464	1.052	1.692	0.0682	26.150	0.423	1.000	1.000
Item 5	0.7727	-12.941	0.261	1.092	1.150	0.9773	-37.612	0.715	1.000	1.000
Item 6	0.6364	-0.5924	0.228	1.031	1.045	0.2045	13.581	0.264	1.000	1.000
Item 7	0.6364	-0.5924	0.228	0.970	0.966	0.0568	28.094	0.460	1.000	1.000
Item 8	0.7841	-13.632	0.265	0.968	0.927	0.9545	-30.445	0.512	1.000	1.000
Item 9	0.6705	-0.7521	0.233	0.996	1.012	0.2386	11.602	0.250	1.000	1.000
Item 10	0.4432	0.2452	0.221	1.076	1.080	0.9773	-37.612	0.715	1.000	1.000
Item 11	0.7614	-12.272	0.256	1.036	1.047	10.000	-362.431	8.39e+6	NaN	0.000
Item 12	0.4318	0.2942	0.222	1.007	1.000	0.0909	23.026	0.371	1.000	1.000
Item 13	0.5341	-0.1427	0.220	0.984	0.981	0.7955	-13.581	0.264	1.000	1.000
Item 14	0.3864	0.4938	0.225	1.005	0.986	0.0455	30.445	0.512	1.000	1.000
Item 15	0.4886	0.0510	0.220	0.945	0.936	0.2045	13.581	0.264	1.000	1.000
Item 16	0.7614	-12.272	0.256	0.971	0.990	0.9659	-33.440	0.587	1.000	1.000
Item 17	0.3068	0.8660	0.237	1.000	0.974	0.9886	-44.659	1.006	1.000	1.000
Item 18	0.6705	-0.7521	0.233	0.928	0.914	0.5455	-0.1823	0.214	1.000	1.000
Item 19	0.4886	0.0510	0.220	0.933	0.922	0.4773	0.0910	0.213	1.000	1.000
Item 20	0.6591	-0.6981	0.232	1.013	1.024	0.9318	-26.150	0.423	1.000	1.000

Table 3: Comparison of pre-and post-training total scores and periods

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Test statistics	*p*
Pre Total	13,27±1,95[a]	12,64±1,78[a]	11,82±2,99[ac]	10,45±1,69[bc]	9,25±3,8[b]	11,9±1,45[ac]	18,106	**0,003** €
Post Total	11,82±1,47	11,36±1,34	11,18±1,25	11,27±1,01	11,45±1,47	11,33±1,11	2,607	0,760 €

Numerical variables are given as mean±standard deviation. € Kruskal-Wallis test

Table 4: Comparison of pre-and post-training total scores and periods

	Pre-Total	Post Total	Test Statistics	p
Year 1	13,27±1,95	11,82±1,47	-1,587	0,112 ȳ
Year 2	12,64±1,78	11,36±1,34	-2,072	**0,038** ȳ
Year 3	11,82±2,99	11,18±1,25	-1,37	0,171 ȳ
Year 4	10,45±1,69	11,27±1,01	-1,394	0,163 ȳ
Year 5	9,25±3,8	11,45±1,47	-2,783	**0,005** ȳ
Year 6	11,9±1,45	11,33±1,11	-1,521	0,128 ȳ

Numerical variables are given as mean±standard deviation. ȳ Wilcoxon test

and if they are positive, they represent that the items are easier to understand. According to these results, 12 items had negative values before the training, including items 1, 2 5, 6, 7, 8, 9, 11, 13, 16, 18, and 20. Three of these 12 items, 6, 7, and 9, became easier to understand after the training. After the training, 11 items, 1, 2, 5, 8, 10, 11, 13, 16, 17, 18, and 20 had negative values. While items 10 and 17 were easily perceived before the training, they became more challenging to perceive after the training. While items 12, 14, and 15 were easily perceived before the training, their values increased after the training and reached the level of much more easily perceived items.

The Standard Error Measure column expresses the standard error of the measurement estimate of the items. A lower standard error indicates that the measurement is more accurate. The standard errors of items 13, 15, and 19 before the training were 0.220. This value represents the items with the lowest standard error among the 20 items. The estimates of these 3 item measurements are more precise than the other items. The standard error of Item 4 is 0.464, which is the item with the highest standard error. The measurement of Item 4 is relatively accurate, with a standard error of 0.464. After training, item 19 has a standard error of 0.213. The estimates for this item's measurement are more precise than other items. The standard error of item 17 is 1.006, which is the item with the highest standard error. The measurement of item 17 is relatively precise.

The Infit and Outfit columns measure the statistical fit of each item in the unit of measurement. These values help evaluate the contribution and consistency of the substances to the measurement unit. These values are ideally expected to be close to 1. Values different from 1 indicate that the contribution of the substances to the measurement unit is undesirably irregular. Before the training, item 12 was statistically the most appropriate, contributing to the measurement unit, with values of Infit 1.007 and Outfit 1.000. After the training, all items except item 11 are statistically the most appropriate items with their contribution to the measurement unit.

When the results of item 11 in the table are examined, there is a misfit in the unit of measurement. The fact that it has a very low level of difficulty and is also ambiguous with a high error indicates that this item does not fit the measurement model. Removing item 11 from the survey does not affect the measurement power of the survey. It is appropriate to remove item 11 from the survey.

As a result of Rasch analysis, the Wright Map is obtained (Figures 1-3). Wright Map is a type of chart obtained by combining two sections on the same

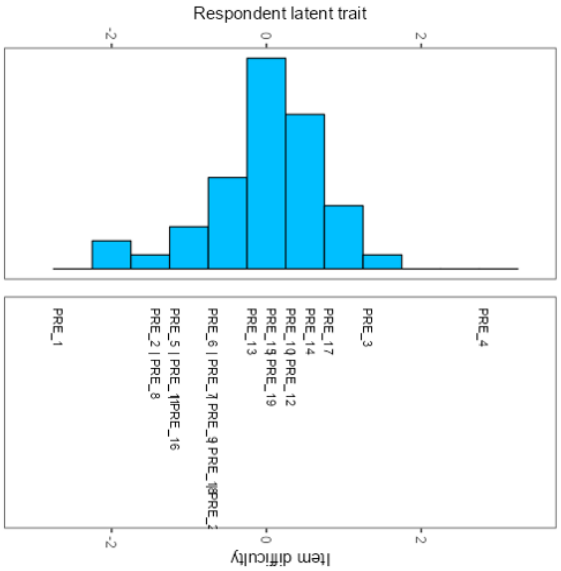

Figure 1: Pre-Training Wright Map

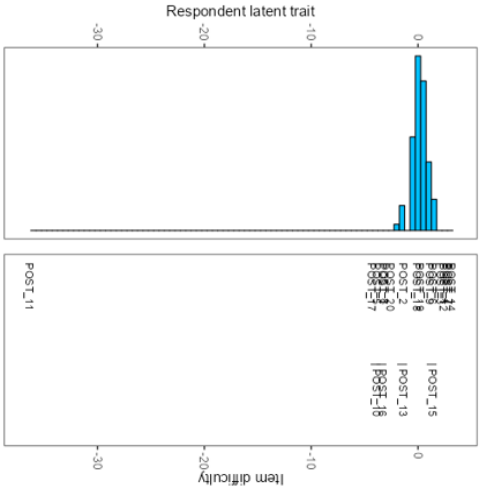

Figure 2: Wright Map with 20 Items After Training

plane. Here, the upper area represents the ability levels of the participants, and the lower area represents the difficulty levels of the items. With the Wright Map, the ability levels of the participants and the difficulty levels of the items can be evaluated by combining them on the same axis.

According to Figure 1, 12 items had negative values before the training, including items 1, 2 5, 6, 7, 8, 9, 11, 13, 16, 18, and 20. The perception levels of the participants regarding these items are quite low.

According to Figure 2, 11 items, including items 1, 2, 5, 8, 10, 11, 13, 16, 17, 18, and 20, have negative values after the training. The perception levels of the participants regarding these items are quite low. The fact that it has a very low level of difficulty and is also ambiguous with a high error indicates that item 11 does not fit the measurement model. The Wright Map obtained when item 11 is removed from the survey is shown in Figure 3.

According to Figure 3, if item 11 is removed from the survey after the training, 10 items, including items 1, 2, 5, 8, 10, 13, 16, 17, 18, and 20, have a negative value. The perception levels of the participants regarding these items are quite low.

There is a statistically significant difference between the years before the training ($p<0.05$). There is a difference between year 5 and year 1, 2, 3, and 6 (Table 3). The total score average of year 5 is lower than that of years 1, 2, 3, and 6. There is a difference between year 4 and Term 1, 2. The total score average of Term 4 is lower than the score average of Term 1 and 2.

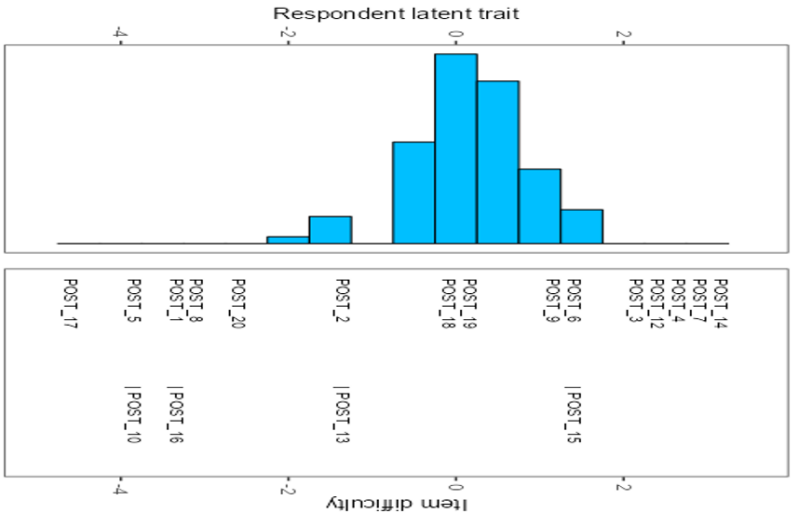

Figure 3: Wright Map with 19 Items After Training

When the pre- and post-training scores are examined according to years, there is a statistically significant difference between the pre-and post-training scores in years 2 and 5 ($p < 0.05$). While the pre-training scores were higher in Year 2, the post-training scores were higher in Year 5 (Table 4).

DISCUSSION

In the study, a 20-question test, as a measuring instrument that we developed, was applied to medical faculty students who received e-FAST training before and after the training. Our Rash analysis showed that the pre-test and post-test are sufficient and reliable for evaluating e-FAST training. This result means that it can be used to evaluate the e-FAST education of students in other medical faculties in Turkey. Although there are some ultrasound training studies conducted with undergraduate students in the literature, this study is, to our knowledge, the first study in which a measurement tool whose reliability has been proven through Rash analysis has been developed [12,13].

There are many ultrasound training studies in the literature. Many of these are usually based on an assessment by a survey [12,13,14]. However, to our knowledge, this is the first study to evaluate the effect of the training provided on the intelligibility of the questions. When item intelligibility was compared before and after training, While six items became easier to understand after training, only two became more difficult to understand. There was no significant change in other items. As a result, the training generally increased the intelligibility of the items. According to the standard error measurement, the accuracy of all items in the pre and post-tests is high; item 4 for the pre-test and item 17 for the post-test is lower than the other items but is still relatively high. According to this result, the training program we prepared increased students' ultrasonography literacy.

When the contribution of the items to the measurement unit was evaluated with Infit and Outfit measurements, the contribution and consistency of all items to the training unit for the pre-test and all items except item 11 for the post-test were found to be appropriate. When the 11th item, considered incompatible with the measurement unit, was removed from the test, it was deemed appropriate to remove it because the measurement power of the training model did not change. In the Wright map graphics obtained as a result of the Rash analysis, the ability level of the participants and the difficulty level of the items for the pre-test comply with the bell curve. However, this fit was obtained for the post-test after removing the incompatible item 11. Therefore, it would be appropriate to apply our measurement tool as 19 items, with item 11 removed.

Rempell et al. In a study conducted with 1st and 2nd-year medical faculty students, they suggested that the bedside ultrasound training module could be an important contribution to learning anatomy and improving physical examination skills. However, no comparison was made between years [13]. Boivin et al. Although they showed that 3rd and 4th-year students obtained higher pre-training scores than 1st and 2nd-year students in the ultrasound program they added to the curriculum for medical school students; they did not make a post-training comparison [15]. When the total scores before and after the education were compared with the student's education year, the average score of the students in the 4th and 5th years was found to be lower, and a statistically significant difference was observed between the education years. After the training, no significant difference was seen between the years of training, which means that the homogeneity of the groups was achieved with the training. Additionally, when the mean total score of the pre-and post-training tests was compared according to the year of education, a significant difference was found between the pre-and post-tests in the 2nd and 5th years. While the mean score decreased after the training in the 2nd year, the mean score increased after the training in the 5th year. This result can be interpreted as saying that it may be early for students to receive ultrasound training in the first years, which are still in the pre-clinical stage, but they can benefit from this training as of the 5th year.

The most important limitation of this study is that it is single-center, and the number of volunteers is small. In addition, since the study was conducted only on e-FAST training, it may not fully reflect ultrasound training. Further studies can be conducted with different ultrasound protocols.

CONCLUSION

As a result, the educational model created to evaluate e-FAST education in medical school students was found to be consistent, reliable and usable. It can be used as a reliable tool in efforts to introduce ultrasound training into the medical school curriculum.

Conflict of Interest

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Ethical Approval

The protocol of the study was approved by the Medical Ethics Committee of Izmir Katip Çelebi University, İzmir Türkiye. (Decision number: 0432).

Authors' Contribution

Study Conception: KÇ; Study Design: KÇ, EU; Literature Review: KÇ, EU; Critical Review: KÇ, FE; Data Collection and/or Processing: KÇ, FE,; Analysis and/or Data Interpretation: KÇ; Manuscript preparing: KÇ.

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Thrombolytic therapy in acute ischemic stroke during pregnancy: A case report

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Case Report

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ABSTRACT

Intravenous tissue plasminogen activator (IV tPA) is a proven treatment method for acute ischemic stroke. In this report, we share a case where IV tPA treatment was administered during the 6th week of pregnancy due to acute ischemic stroke, and there were no problems in the mother and baby during long-term follow-up. Here, we present a 32-year-old female patient, in the 6th week of her pregnancy, presented to our emergency department at the 47th minute of the onset of symptoms. National Institute of Health Stroke Scale (NIHSS) score was 10. On diffusion-weighted magnetic resonance imaging (MRI), an infarction was observed in the right middle cerebral artery, and on cranial MR angiography, a thrombus was detected at the level of the right middle cerebral artery M2-3. Thrombolytic therapy was initiated 90 minutes after the onset of the first symptoms. No maternal or fetal problems were detected. The patient had a Modified Rankin Score of 0 at 3 months. We administered IV tPA treatment to the pregnant patient who presented with severe stroke symptoms considering the benefits outweighed the risks.

Keywords: First trimester, pregnancy, thrombolytic therapy

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INTRODUCTION

Stroke is estimated to affect approximately 30 out of 100,000 pregnancies [1], which is much higher than the stroke rates seen in the young adult population [2]. Intravenous tissue plasminogen activator (IV tPA) is a proven treatment method for acute ischemic stroke [3], and cannot cross the placental barrier because it is a large molecule [4]. IV tPA is listed as pregnancy category C [5].

There is currently not enough evidence regarding the effectiveness and safety of IV tPA in pregnant patients experiencing acute ischemic stroke. The old guidelines listed pregnancy as a relative exclusion criterion [6]. Therefore, randomized controlled trials could not be performed in these patients [7]. Experiences have been shared in the literature as case reports or case series.

In this report, we share a case where IV tPA treatment was administered during the 6th week of pregnancy due to acute ischemic stroke, and there were no problems in the mother and baby during long-term follow-up.

CASE REPORT

A 32-year-old female patient, in the 6th week of her 3rd pregnancy, presented to our emergency department with sudden onset right-sided weakness and speech impediment at the 47th minute of the onset of symptoms. Anamnesis revealed that the patient had experienced an ischemic stroke during her 2nd pregnancy, did not regularly use the prescribed antiplatelet therapy, and had a history of smoking one pack per day for 7 years. During the neurological examination in the emergency department, the patient was drowsy, speaking in a dysphasic manner, and had paralysis in the left upper and lower extremities. Glasgow Coma Scale score was 14, and admission National Institute of Health Stroke Scale (NIHSS) score was 10. Blood pressure was normal, and electrocardiogram and blood tests performed in the emergency room showed no pathology. Brain computed tomography (CT) and cranial–cervical CT angiography were not performed due to the risk of radiation exposure, as the patient was pregnant. On diffusion-weighted magnetic resonance imaging (MRI), an infarction was observed in the right middle cerebral artery, and on cranial MR angiography, a thrombus was detected at the level of the right middle cerebral artery M2-3 (Figures 1–3). After providing information about thrombolytic therapy to the patient and her family, consent was obtained from the family. Thrombolytic therapy was initiated 90 minutes after the onset of the first symptoms. The patient, weighing 81 kg, received 72.9 mg (0.9 mg/kg) of IV tPA, administered as a 7.3 mg bolus followed by 65.6 mg over 60 minutes. During the neurological examination 24 hours after the procedure, there was hemiparesis with 2/5 strength in

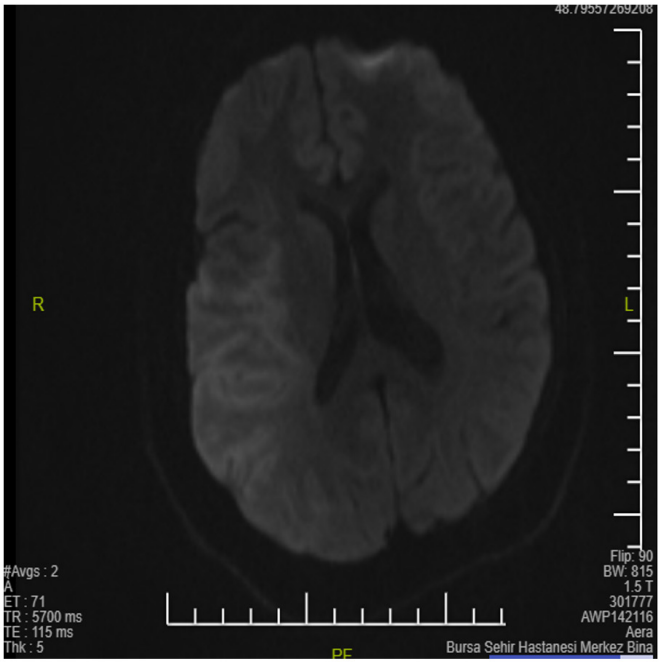

Figure. 1. First diffusion magnetic resonance imaging sequence

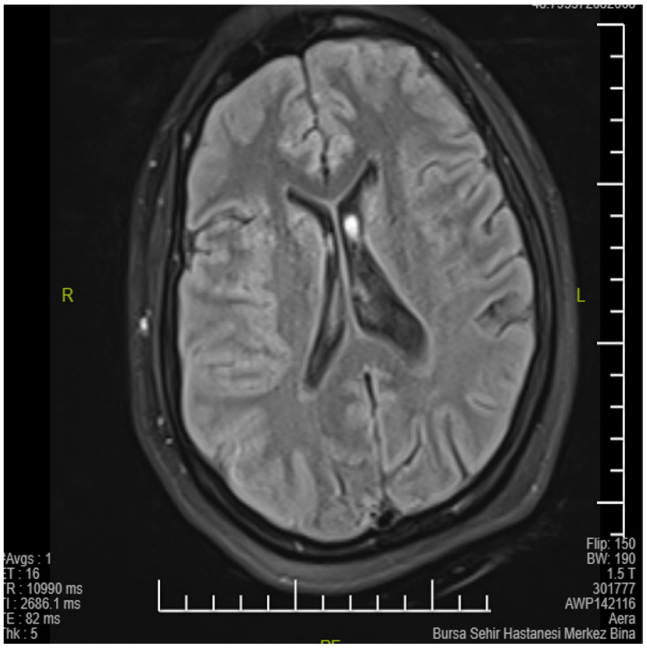

Figure 2. First magnetic resonance imaging with fluid-attenuated inversion recovery sequence

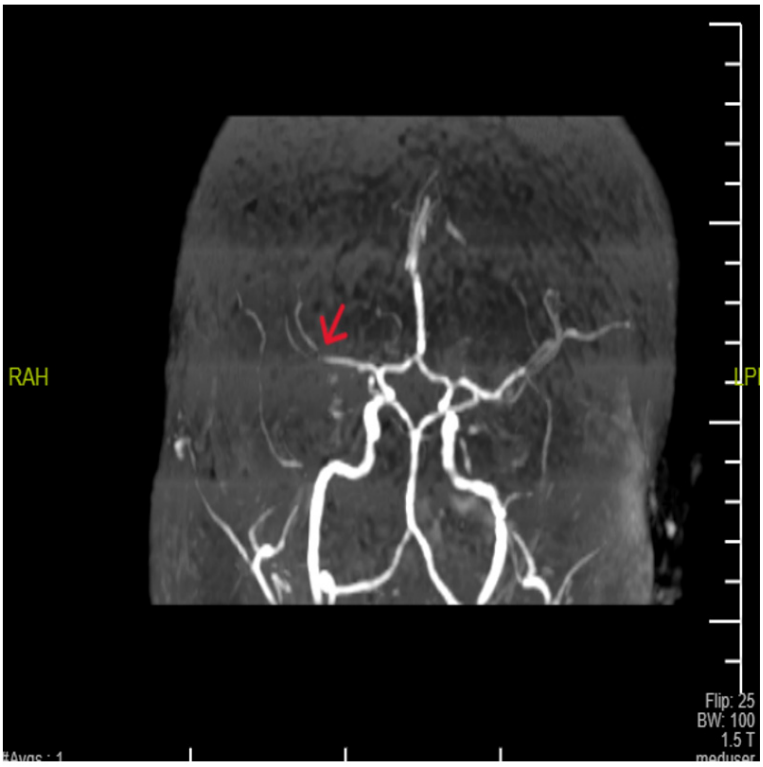

Figure 3. Occlusion in the middle cerebral artery M2–M3 segment on magnetic resonance angiography

the left upper extremity and 3/5 strength in the left lower extremity. NIHSS score was 5. MRI performed 24 hours after the procedure revealed no hemorrhage. The patient was started on 100 mg of aspirin and low molecular weight heparin at a dose of 2 × 0.6 cc per day and evaluated by an obstetrician before and after thrombolytic therapy. No maternal or fetal problems were detected. The cardiological evaluation revealed no pathology that could be a source of cardioembolism. Carotid vertebral Doppler ultrasonography was normal. Vasculitis markers, prothrombotic factors, and genetic examinations revealed no pathology that could cause stroke. The patient was discharged with a Modified Rankin Score of 4 and prescribed 100 mg aspirin daily. At the 32nd week of pregnancy, the baby was born without complications through normal vaginal delivery and remained in the incubator for 40 days. The patient had a Modified Rankin Score of 0 at 3 months. No abnormalities were observed in the first 4 years of the baby‘s life.

DISCUSSION

In clinical practice, neurologists often perceive IV tPA as risky during pregnancy and are reluctant to use it in pregnant patients with acute ischemic stroke [8].

In a nationwide case-control study conducted in Finland over 30 years, women between 18 and 50 years of age who received IV tPA during pregnancy or postpartum were compared with those who received IV tPA and were not pregnant. It was found that pregnant or postpartum women had a higher rate of early and significant neurological improvement compared to controls, and good functional outcomes at 3 months were reported to be similar in both groups. For patients who received IV tPA during pregnancy or postpartum, no cases of preterm birth or perinatal death were reported [9].

In a study using data obtained from the Get with the Guidelines-Stroke Registry in the US, 338 pregnant and postpartum women who received reperfusion therapies for acute ischemic stroke were compared with 24,303 non-pregnant women, and no significant differences in complications and outcomes were observed. It was reported that pregnant or postpartum women had a lower probability of receiving IV tPA compared to non-pregnant women, that they experienced more severe strokes, and that no significant differences were observed between the two groups in terms of reperfusion therapy rates [10].

In a study conducted in France, pregnant or postpartum women who received IV tPA and/or thrombectomy for acute ischemic stroke were compared

with non-pregnant women, and no differences were observed in terms of bleeding complications and outcomes. Preterm birth or perinatal death was not reported in any of the patients who received IV tPA during pregnancy or postpartum [11].

The current European Stroke Organization guidelines on stroke in women do not make an evidence-based recommendation on the use of IV tPA during pregnancy because there is insufficient evidence. Expert consensus statements have suggested that IV tPA can be used during pregnancy after appropriate evaluation of the benefit/risk profile on an individual basis [7].

The American Heart Association/American Stroke Association guidelines recommend that IV tPA can be considered in pregnant patients with moderate to severe acute ischemic stroke after weighing the risks and benefits to the mother and fetus [3, 5].

Canadian Stroke Best Practice Consensus suggests considering IV tPA in pregnant women with acute ischemic stroke if there are symptoms causing disability that meet thrombolytic therapy criteria [4].

Women with a history of pregnancy-related stroke have a 2% risk of experiencing a stroke in subsequent pregnancies [12]. The patient presented in this report had experienced an ischemic stroke during her 2nd pregnancy and discontinued the antiplatelet therapy she was using during follow-up. IV tPA was administered when she presented with acute ischemic stroke during her 3rd pregnancy. However, although the amount of radiation used for brain CT in routine practice is much lower than the dose that would cause fetal anomalies, MRI is considered to be safe in pregnant stroke patients as long as no contrast agent (gadolinium) is used [13,14]. We chose not to perform cranial CT on our patient because she experienced a stroke during the organogenesis period (2–8 weeks), which is the period of highest risk for congenital anomalies during pregnancy.

CONCLUSION

We administered IV tPA treatment to the pregnant patient who presented with severe stroke symptoms, prioritizing the mother's health, considering the benefits outweighed the risks. We observed no perinatal complications in the patient and the baby. No problems were observed in the child during the 4-year follow-up period. Based on the literature, unless there are other contraindications, we believe that thrombolytic therapy should not be withheld solely because of pregnancy.

Conflict of Interest

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Ethical Approval

The protocol of the study was approved by the Medical Ethics Committee of Izmir Katip Çelebi University, İzmir Türkiye. (Decision number: 0432).

Authors' Contribution

Study Conception: KÇ; Study Design: KÇ, EU; Literature Review: KÇ, EU; Critical Review: KÇ, FE; Data Collection and/or Processing: KÇ, FE,; Analysis and/or Data Interpretation: KÇ; Manuscript preparing: KÇ.

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