# Thrombolytic therapy in acute ischemic stroke during pregnancy: A 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

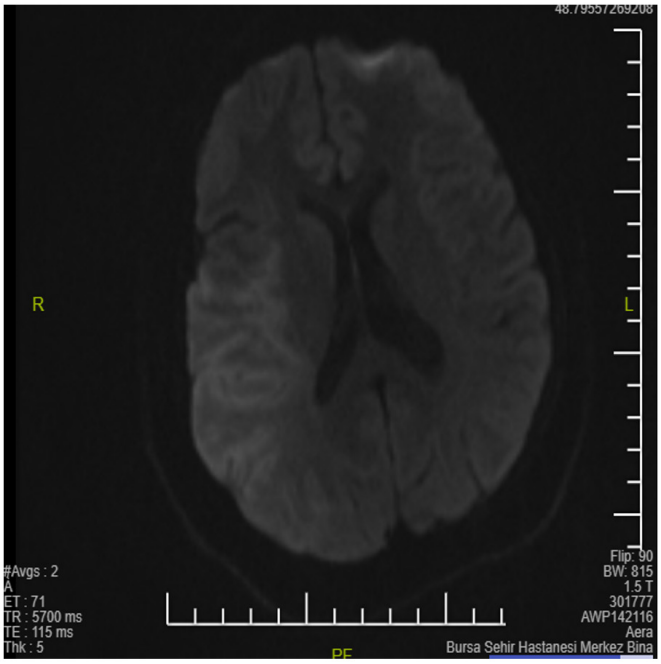


**Figure. 1.** First diffusion magnetic resonance imaging sequence

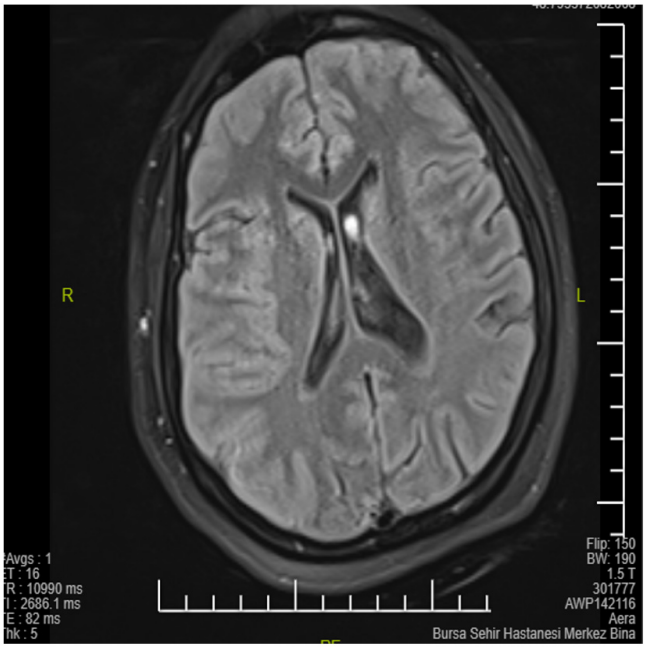


**Figure 2.** First magnetic resonance imaging with fluid-attenuated inversion recovery sequence

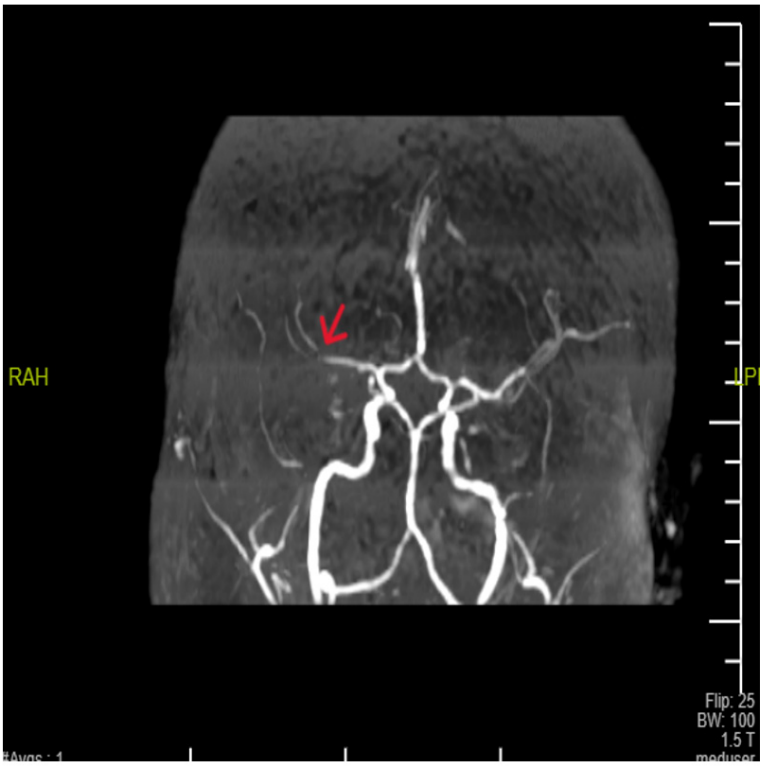


**Figure 3.** Occlusion in the middle cerebral artery M2–M3 segment on magnetic resonance angiography

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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