

# Anti-NMDAR encephalitis with pregnancy: a rare case report and literature review

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## Summary

**Introduction:** Anti-N-methyl-D-aspartate receptor (NMDAR) encephalitis is an autoimmune disorder that has been recently reported. Its pathogenesis has been uncertain up until now. To date, it has been seen to very rarely occur during pregnancy and delivery, and there are no established guidelines for its treatment in clinical practice. Here the authors report a rare case of a 24-year-old pregnant woman with anti-NMDAR encephalitis that occurred in the third trimester. After a positive treatment response, the outcomes of both the mother and baby were satisfactory. To the best of the present authors' knowledge, this is the first report on anti-NMDAR encephalitis occurring in the third trimester worldwide. This rare case enriches the sparse literature on anti-NMDAR encephalitis during pregnancy and could play a significant role in the diagnosis and treatment of such a disorder when seen in clinical practice. Therefore, the authors have documented their experience in dealing with such a disorder and briefly reviewed previously reported cases on this disorder and its occurrence during pregnancy.

**Key words:** Anti-N-methyl-D-aspartate receptor; Encephalitis; Pregnancy; Autoimmune disorder.

## Introduction

Anti-N-methyl-D-aspartate receptor (NMDAR) encephalitis is an autoimmune disorder that has been recently reported [1]. The disorder has been seen to very rarely occur during pregnancy and delivery, and there are no established guidelines for the treatment of such a disorder in clinical practice. To the best of the present authors' knowledge, there are no existing reports on this disorder occurring in the third trimester.

## Case Report

Here the authors report a rare instance of a 24-year-old pregnant woman with anti-NMDAR encephalitis that occurred in the third trimester. This was her first pregnancy, and she was without any past medical or psychiatric history. She was routinely examined during pregnancy and presented no signs or symptoms of the disorder in her first and second trimesters. During the 29<sup>th</sup> gestational week, she was admitted to West China University Hospital because of sudden psychomotoric, delirium, phonism, heteroptics, and incomprehensible talk, and action. She was managed by maintaining her fluid and electrolyte balance, and there were no specific abnormalities found in her head MRI. In the 31<sup>st</sup> gestational week, without any external stimulus, she suddenly had a tonic-clonic seizure with incontinence, characterized by a duration of three to six minutes every episode and occurring five and six times in one day. After that, she became confused. Her electroencephalogram revealed moderately abnormal activity, as shown in Figure 1. Subsequently, anti-NMDAR antibodies were identified in her CSF and peripheral blood; thus, she was diagnosed as hav-

ing anti-NMDAR encephalitis and was treated with gamma globulin, anticonvulsants, sedatives, and nutritional support. After a positive response to treatment, her condition was not completely resolved. To improve her condition, she was transferred to the authors' hospital at 33<sup>+2</sup> gestational weeks to terminate the pregnancy.

On admission to the unit, her vital signs were within normal limits, with heart and lung examination (–). Her mental status was confused, and she occasionally answered when being interviewed, with both a normal pupillary light reflex and no clenching of teeth. She had normal muscle strength and was Babinski negative bilat-

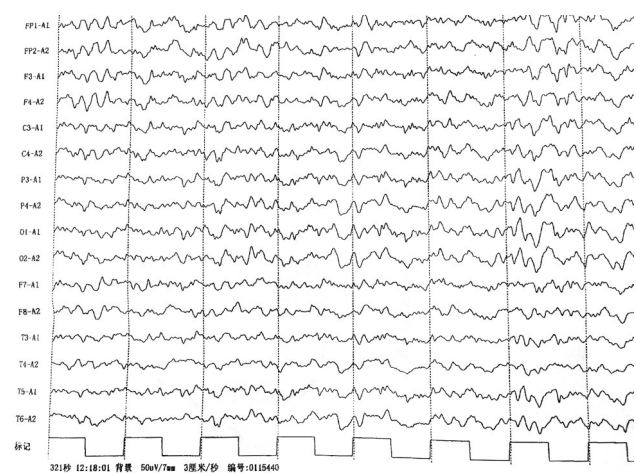


Figure 1. — The electroencephalogram of the patient.

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Table 1. — *Previously reported cases about NMDAR encephalitis with pregnancy.*

Reported time and author	Attack time and symptom	Ovarian pathology	Delivery week and mode	Outcome
Ito <i>et al.</i> , 2010 (first) [2]	17 weeks: rapid change in behavior and consciousness disturbance	No ovarian teratoma	Normal delivery at 37 weeks	Patient was well without sequelae, the baby was healthy
Kumar <i>et al.</i> , 2010 [3]	14 weeks: headache, malaise, bizarre behavior	Left immature teratoma	Cesarean section at 38 weeks	Healthy baby; home on day 184; substantial recovery at two-month follow-up
	8 weeks: abnormal, stereotyped behavior	Bilateral mature teratomas	Abortion at week 10 <sup>+</sup> 3 weeks	Home with minimal, deficits on day 87
	17 weeks: affective and behavioral change	No tumor or cyst	Spontaneous delivery at 37 weeks	Healthy baby; home 23 week after symptom presentation; full recovery at last follow-up
McCarthy <i>et al.</i> , 2012 [4]	8 weeks: catatonia and autonomic disturbance	left ovarian teratoma	Cesarean section at 32 weeks	Postpartum, patient and baby remain well
Shahani, 2015 [5]	22 weeks: headache bizarre behavior, and grandiose delusions	No tumor or cyst	vaginal delivery at 37 weeks	18 months after her initial episode, patient and baby remain well

erally. An obstetric examination was performed: the fetal heart rate was 153/minute, and the fetus had a cephalic presentation without maternal contractions or cervical dilatation. After careful evaluation of her condition, it was determined to be too difficult for her to deliver through the vagina within a short period of time. Therefore, an emergency cesarean section was performed under general anesthesia on the day of her admission. A healthy baby was born, with Apgar scores of 9 and 10 at one and five minutes, respectively. During the operation, a careful pelvic examination was performed and no abnormalities were found. After the operation, she was immediately shifted to the intensive care unit (ICU) of gynecology and obstetrics for close monitoring and further treatment. Her baby was not immediately tested for anti-NMDAR antibodies after delivery but has survived until now with no abnormal manifestations and an unremarkable brain MRI. On post-operative day two, the patient was transferred to the Neurology Department of West China University Hospital for better treatment. After a positive response to treatment, her condition was stable on the 52<sup>nd</sup> day after her operation; she was conscious for three to four hours every day and was able to communicate with her family, only having a partial seizure once every two to three days. She was admitted to the hospital for continued treatment and discharged home with minimal deficits on 92<sup>nd</sup> day after delivery.

Consent was obtained from the patient and relatives for publication of this case report and any accompanying images. This study was approved by the Institutional Review Board of West China Second University Hospital.

## Discussion

To date, there have only been few cases of anti-NMDAR encephalitis documented to occur during pregnancy [2-5]. The maternal and fetal outcomes in previous reports have usually been satisfactory, as shown in Table 1. The report by Ito *et al.* was the first description of a pregnancy with anti-NMDAR antibody encephalitis worldwide [2]. The patient was reported to be well and without sequelae after a normal delivery at 37 weeks, and the baby was healthy.

Here the authors reported a rare case of a 24-year-old primigravida in her third trimester with altered mental status and neurological symptoms associated with anti-NMDAR encephalitis. To the best of their knowledge, previously reported cases have occurred in the first or second trimester, and this case is the first report of anti-NMDAR encephalitis occurring during the third trimester worldwide.

The mechanism of such a disorder is unclear. Pregnancy is known to produce a special immune response between the mother and the fetus. It is speculated that the presence of the embryo or placenta triggers an abnormal antigen-antibody reaction and eventually results in anti-NMDAR encephalitis. The reason may be due to the fact that the largest amount of antibody transport occurs between the mother and the fetus usually in the third trimester [6]. Nonetheless, at the last follow-up, the patient remains fully recovered and her baby is healthy. The specific mechanism of such a circumstance however needs to be further explored.

Anti-NMDAR encephalitis is usually accompanied with an ovarian pathology, particularly dermoid tumors [4]. Although ultrasound detection is a safe and helpful method used for the screening of ovarian lesions during pregnancy, the correct diagnosis of this disorder is still heavily dependent on a careful pelvic exploration and pathological examination through laparoscopy or an open operation. Regarding the present case, a careful pelvic examination was performed, and no ovarian lesion was revealed during the operation. In this aspect, this case is different from most previous reports.

In conclusion, although there are no established guidelines for such a disorder, the present authors believe that the early identification and diagnosis of this disorder are very important. Severe cases should be transferred into the ICU for effectively controlling convulsions and pro-

viding the necessary mechanical ventilation support as early as possible. Effective monitoring and evaluation of the fetus are also crucial. Furthermore, the timing and mode of the termination of pregnancy are very critical for maternal and fetal outcomes. This rare case enriches the sparse literature on anti-NMDAR encephalitis during pregnancy and is significant for the diagnosis and treatment of such a disorder.

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