

# NMDAR Encephalitis: A Rare Presentation with Bilateral Dermoid Cysts

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## Abstract

The NMDA receptor is a protein in the brain that helps control thoughts, mood and movements and therefore antibodies against NMDA receptors are likely to have an important role in altering these functions. About 1% of dermoid cysts present with neurological symptoms. This is the case of a young girl was admitted in Critical Care with encephalitis of unknown aetiology and was extensively investigated for the cause. She was found to have small bilateral dermoid cysts following the removal of which she had prompt recovery.

Anti-NMDAR encephalitis is a serious, potentially fatal condition that is often initially confused with schizophrenia spectrum mental illness which leads to inevitable delays in diagnosis and management. Thinking out of the box and involving MDT is the key to management in more complex and rare cases. Dermoid cysts or mature ovarian teratomas should be the first differential in young women presenting with NMDAR encephalitis.

**Keywords:** NMDA receptor • Brain • Aetiology

## Introduction

Dermoid cysts are most common benign neoplasms in young women and are usually asymptomatic or found incidentally on pelvic imaging. They may present with pain and pressure symptoms. However, literature also describes a rare paraneoplastic syndrome associated with Anti-N-methyl-D-aspartate (NMDAR) encephalitis in patients with dermoid cysts; reported incidence being 1.17% [1]. These patients present with psychiatric and neurological symptoms of acute and sub-acute nature which makes it very difficult to differentiate it from organic and psychiatric causes. A study described the most common presentation was psychosis followed by seizures and memory impairment [2]. It is more common in adolescent females [3,4] with the youngest case reported at 4 months [5].

Encephalitis can have either an infectious or autoimmune aetiology. NMDA encephalitis is the most common form of autoimmune encephalitis, caused by the interaction between an antibody and its target, located on glutamate receptor type N-Methyl-D-Aspartate (NMDA) of neuronal surface. An association of encephalitis and ovarian teratomas was first described in 2005 [5], with NMDA receptor antibodies reported in 2007 [6]. Studies suggest that ovarian teratomas are associated with 50% cases of NMDA encephalitis [7].

Although several case reports [8-13] have been described in literature, there is still little awareness about the condition among the gynecologists, who have a major role in the treatment. More cases are published mainly in psychiatric and pediatric journals that have limited access to gynecologists. Therefore, in this case we wanted to highlight the gynecological aspect of the

management. Another aspect that makes this case more distinguished is the fact that the patient presented with bilateral dermoid cysts while most of the other cases described in literature are with unilateral dermoid cysts.

## Case Presentation

A teenage girl presented to A and E with neuropsychiatric symptoms, acute confusional state and hallucinations. ACT head and lumbar puncture was carried out at the time of presentation which were unremarkable. She was admitted with the suspicion of NMDA encephalitis and started on levetiracetam and I/V methylprednisolone empirically. MRI head was performed as inpatient which was also normal.

One week after admission the patient had an episode of seizures leading to aspiration and was ventilated because of low GCS. In the next three weeks of her stay she was treated with three doses of methylprednisolone followed by a maintenance Prednisolone 60 mg. She also had 5 cycles of plasma exchange. However, she did not make adequate progress. Moreover, she also developed hospital acquired pneumonia and upper limb DVT as additional co morbidities and had a tracheostomy. The neurology team started her on I/V immunoglobulins. A whole body CT scan was carried out and no other pathology was found, except for bilateral dermoid cysts. Opinion from the gynecology team was sought and after gynae-oncology MDT discussion a laparoscopic bilateral cystectomy was recommended. Tumor markers were sent which normal apart from LDH which was 56 (slightly raised) Figure 1.

## Differential diagnosis

**Acute psychotic disorder:** Patient presented with sudden onset of altered behaviour and visual hallucinations. She had been visualizing demons before onset of her altered behaviour to her mother. On admission initially diagnosis was psychosis but as the investigations progressed it was gathered that it was encephalopathy of autoimmune origin.

**Infective encephalitis:** Most of the patients that present with acute onset symptoms have an infective aetiology and therefore all the investigations and therapy is directed towards treating an infective cause unless ruled out

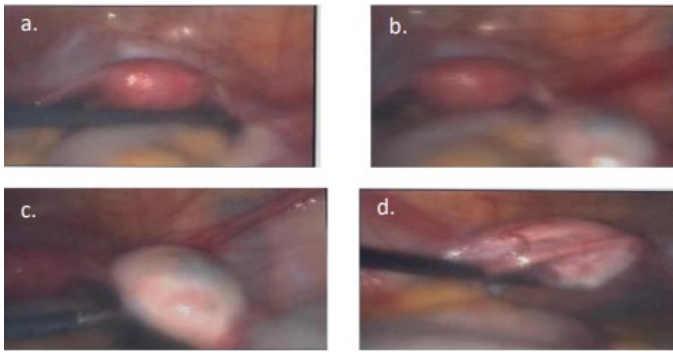
## Treatment

On the 44<sup>th</sup> day of her admission she underwent uncomplicated laparoscopic bilateral cystectomies. The histopathology report confirmed mature teratomas containing neurological tissue

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**Figure 1:** The pictures were taken at laparoscopy. (a) Panaromic view of pelvis, (b) Left ovarian dermoid, (c) Left ovarian dermoid and (d) Right ovarian dermoid.

## Outcome and follow-up

Patient started to recover soon after the operation regaining responsiveness. She is currently under joint care of neurology and rehabilitation team to help her recover from the residual disease.

## Results and Discussion

NMDA encephalitis is a well reported condition with a proven association with ovarian teratomas. However, because of diagnostic difficulty and variation in presentation there is a significant delay in treatment which increases the morbidity in these patients. Detailed investigations of CSF and serum should be performed to rule out infections, metabolic and autoimmune causes. Imaging studies should also be performed to identify any tumors such as teratomas. Five cases have been reported with bilateral ovarian teratomas in the literature so far [14-18]. All of these patients have made good recovery following removal of the dermoid cysts and residual disease has not been reported in them.

It has been estimated that 25% of patients with anti-NMDAR encephalitis experience permanent neuropsychiatric debilitation or death even when they receive mainstay treatment. Relapse is estimated to occur in 15% to 24% of patients and is more common in individuals who do not have underlying tumours. Nonetheless, approximately 75% of patients with anti-NMDAR encephalitis recover or have mild sequelae [8]. In some cases it has taken up to a year to reach a diagnosis [13] with the average presentation to surgical removal reported as 74 days [6]. Anti-NMDA antibody encephalitis should not be ignored by gynaecologists whose role in management is central [19].

## Conclusion

NMDAR encephalitis is a potentially lethal form of encephalitis associated with ovarian teratomas. A very low threshold of pelvic imaging should be considered in patients presenting with NMDAR positive encephalitis and early referral to gynae must be sought to improve prognosis of the patient. Robust pathways for diagnosis and early MDT involvement will ensure a better outcome.

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