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# Antibiotics Attack: The Neurological Side Effects of Metronidazole.

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**ABSTRACT:** Globally, metronidazole is a widely used antibiotic. The most frequently reported adverse effects include hypersensitivity responses, nausea, and vomiting. However, metronidazole use has occasionally been linked to neurotoxicity. The most prevalent neurological symptom is sensory loss due to peripheral neuropathy involvement. A rare but treatable side effect of metronidazole usage is central neurotoxicity. From a headache to localized neurological impairments to altered mental status, the symptoms can vary. When a patient's condition changes suddenly, neuroimaging is the primary method used to make the diagnosis.

## I. BACKGROUND:

A common antibacterial that is a member of the nitroimidazole class is metronidazole. It is widely used as anti-anaerobic and anti-protozoal drug. Given for treatment of infections such as brain abscesses, pelvic inflammatory disease, bacterial vaginosis, Clostridium difficile colitis, and other anaerobic infections because of its great efficacy against anaerobic bacteria and protozoa. Metronidazole has been in use for more than 5 decades. Minor adverse reaction symptoms include nausea, vomiting, diarrhea, mouth dryness. Long-term usage or high cumulative dosages have been linked to neurotoxicity, which can show up as disruptions of the central and peripheral neurological systems, despite its wide range of clinical applications and generally good safety profile.A rare but potentially dangerous side effect, metronidazole-induced neurotoxicity is typified by a range of neurological symptoms, such as peripheral neuropathy, encephalopathy, ataxia, dysarthria, altered sensorium, and seizures. Although symptoms usually go away when a medicine is stopped. The diagonosis is mainly by magnetic resonance imaging(MRI).

## II. CASE PRESENTATION :

A 26-year-old female patient with no medical history, no home medications, no smoking history, and no alcohol use was admitted to the hospital for a laparoscopic ovarian cystectomy to remove a cyst from the ovary. The surgery was successful, and the patient was treated with the antibiotic metronidazole for infection prevention. However, approximately 40 hours after starting metronidazole, the patient experienced hearing loss, altered sensorium, ataxia, imbalance, mental confusion, difficulty speaking, and an inability to recognize people.

MRI findings confirmed that the patient was suffering from metronidazole-induced neurotoxicity. Metronidazole was immediately discontinued, and treatment was initiated with steroids. After about 12 weeks of treatment, the patient regained some consciousness and was able to recognize family members and relatives. However, her speech remained unclear. Over time, her condition improved, and after a year, she had fully recovered.

During the initial phase of the 12-week treatment period, the patient's condition was poor. She behaved like a 1- to 2-year-old child, frequently flipping over the bed, screaming loudly, and crying without any apparent reason. However, as the treatment progressed, she gradually became calmer and eventually made a full recovery.

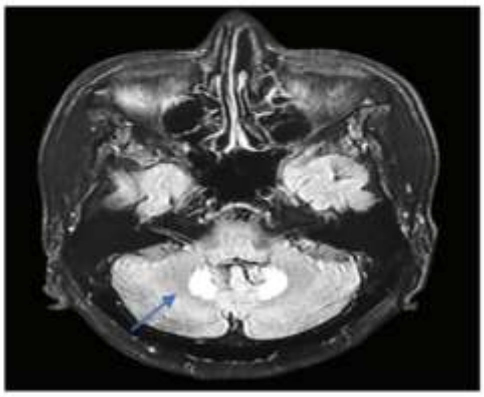

**Figure 1:Before Treatment**

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**Figure 2 : After Treatment**

**DIFFERENTIAL DIAGONSIS :**

- Metabolic (electrolyte imbalance, hypoglycemia, uraemic encephalopathy).
- CNS (normal pressure hydrocephalus, closed-head injury, lesion that occupies space (tumor, brain abscess)).
- Cerebrovascular accidents and transient ischemic attacks are examples of vascular events.
- prolonged hypoxia.
- hepatic mind disorders.
- state of postictal depression.
- disorders of psychiatry (psychosis).
- HIV, syphilis, toxoplasmosis, and tuberculosis are all infectious.
- substance misuse or cessation of use.
- endocrine (storm from thyrotoxicosis, myxoedema coma).
- Magnetic resonane imaging (MRI)
- CSF examination

## III. DISCUSSION :

The precise mechanism of metronidazole-induced neurotoxicity is still unclear, but several theories have been proposed. However, in order to elucidate the most plausible process, several theories have been put out in the literature. When the concentration in the CSF fluid reaches a therapeutic level, its toxicity is exacerbated by its extracellular space concentration.Six Seven The encephalopathy's primary etiology is vascular spasm, which may result in moderate, curable ischaemia.Six Seven The oxidation of catecholamines by metronidazole produces radicals that decrease tissue oxygenation, raise the concentration of water in nerve axons, and ultimately cause axonal swelling, which is mostly visible on MRI.

One of the primary medications used to treat anaerobic and protozoal infections is metronidazole. Although it is generally safe and well tolerated, the most frequent side effects linked to systemic metronidazole therapy are gastrointestinal issues and hypersensitivity reactions. It can also result in effects on the nervous system, such as changes in mental status, weakness, peripheral neuropathy, vertigo, nausea, and vomiting. However, ataxia and dysarthria were less common symptoms.

Numerous incidences of acute and chronic cerebellar poisoning have been documented in the literature recently. It's interesting to note that the majority of these patients had MR imaging findings that include dentate nucleus signal alterations. Since stopping the use of metronidazole might lead to a quick clinical improvement and resolution of signal alterations, it is critical to recognize the pattern of imaging abnormality. It's unknown exactly how cerebellar poisoning works.

This instance demonstrates that, while being infrequently documented, metronidazole-induced neurotoxicity is a major side effect of the drug.

## IV. CONCLUSION :

Metronidazole-induced neurotoxicity is an uncommon but dangerous side effect that can appear quickly, as it did in this instance. Ataxia, altered sensorium, hearing loss, cognitive impairment, and other severe problems resulted from neurological symptoms that started about 40 hours after the patient started metronidazole, despite the fact that the patient had no prior medical history or risk factors. The symptoms' progression—which included emotional instability, disorientation, and childlike behavior—emphasized the wide-ranging effects on the central nervous system. MRI imaging was essential in verifying the diagnosis, highlighting the value of neuroimaging when neurological deterioration is inexplicable. The metronidazole had to be stopped right away in order to stop further decline. A progressive recovery was made possible by the administration of corticosteroids and supportive care, but the process was drawn out, requiring 12 weeks for partial improvement and over a year for full resolution.

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