

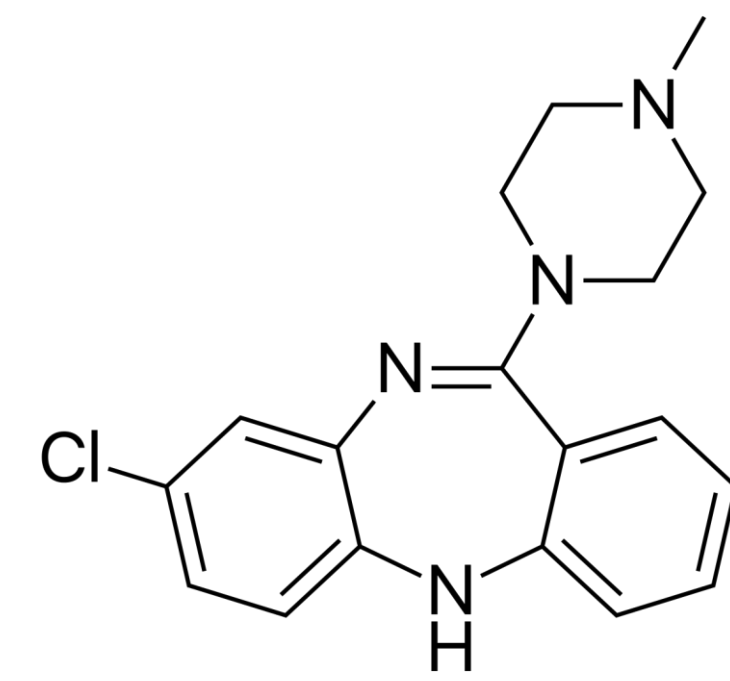
A case of olanzapine-induced neutropenia

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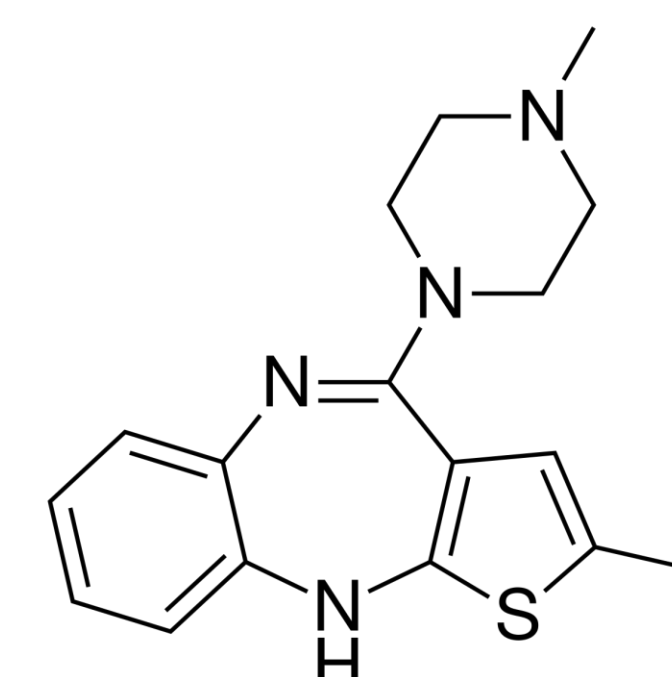


Background

- **Clozapine** is an antipsychotic highly effective in treating symptoms of schizophrenia, but limited in its use for treatment-resistant schizophrenia due to potential agranulocytosis.
- **Olanzapine** is structurally similar to clozapine but much less associated with agranulocytosis.



Clozapine



Olanzapine

We present a case that adds to a limited body of evidence of olanzapine-induced neutropenia and explore its implications.

Lab values:

- **Neutropenia:** absolute neutrophil counts (ANC) < 1.5x10⁹/L
 - *Mild:* < 1.0-1.5 x10⁹/L
 - *Moderate:* 0.5-1.0 x10⁹/L
 - *Severe:* < 0.5 x10⁹/L
- **Agranulocytosis:** < 0.2 x10⁹/L

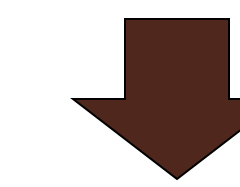
Discussion and review of literature

- Clozapine-induced agranulocytosis has been readily recognized and relatively well-studied, leading to a more judicious use of an otherwise effective antipsychotic. Olanzapine, despite its structural similarity to clozapine, has been reported much less frequently to induce agranulocytosis.
- A recent in vitro study showed that inflammasome-dependent signaling, a hypothesized mechanism of drug-induced agranulocytosis, was seen in human cells with clozapine but not with olanzapine (Sernoskie et al., 2022).
- We report a case of olanzapine-induced neutropenia that improved quickly following discontinuation of the agent. This adds to the limited number of existing reports of olanzapine-induced neutropenia as well as thrombocytopenia, which, like our case, improved quickly following discontinuation of olanzapine (Malhotra et al., 2015, Malik et al., 2018).
- This would suggest olanzapine may be a rare cause of drug-induced neutropenia, albeit in a mechanism different from that of clozapine.

Case

A 23-year-old African American male with no known psychiatric history presented with delusions, hallucinations, and disorganized speech, in the context of self-reported substance abuse, notably methamphetamine 3-4 days prior to admission.

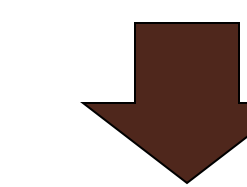
He was seen by our psychiatry service and started on Olanzapine 5mg daily.



Two days after olanzapine was started, patient's blood work showed a white blood cell count (WBC) of 2.4x10⁹/L and **absolute neutrophil count (ANC) of 0.6x10⁹/L**, significant for neutropenia. Patient had normal vital signs was not showing any signs of active infection.

Olanzapine has documented cases of neutropenia. Additionally, the patient was a chronic methamphetamine user. Methamphetamines are often contaminated with levamisole, which also has been documented to cause neutropenia.

A decision to switch antipsychotic agents was made to aid in determining the cause.



Olanzapine was switched to paliperidone 6mg daily. One week following the switch, WBC improved to 3.1x10⁹/L and ANC to 1.2x10⁹/L.

Conclusions

- Drug-induced neutropenia is a potentially dangerous but reversible side effect of some psychotropics.
- Clinicians should be aware that in patients taking olanzapine, unexplained neutropenia should warrant concern for iatrogenic cause from olanzapine.
- In such cases, early discontinuation of olanzapine should be considered.
- More study is needed to understand the mechanism of olanzapine-induced hematologic effects.

References

- Sernoskie, S. C., Lobach, A. R., Kato, R., Jee, A., Weston, J. K., & Uetrecht, J. (2022). Clozapine Induces an Acute Proinflammatory Response That Is Attenuated by Inhibition of Inflammasome Signaling: Implications for Idiosyncratic Drug-Induced Agranulocytosis. *Toxicological sciences*, 186(1), 70–82.
- Malhotra, K., Vu, P., Wang, D. H., Lai, H., & Faziola, L. R. (2015). Olanzapine-Induced Neutropenia. *Mental illness*, 7(1), 5871.
- Malik, Y. K., Sahoo, S., & Avasthi, A. (2018). Olanzapine-induced leucopaenia and thrombocytopenia in an elderly patient: a case report and review of the evidence. *General psychiatry*, 31(2), e000013.