

# PPIC® Closed Claim Case Review

## Monoamine Oxidase Inhibitors and Hypertensive Crisis

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### Abstract

Monoamine oxidase inhibitors (MAOIs) are a group of antidepressant drugs that inhibit the activity of the enzyme monoamine oxidase in presynaptic neurons, thereby increasing the amounts of monoamine neurotransmitters available for release at the presynaptic terminal. There are two categories of MAOIs: irreversible and reversible inhibitors. Irreversible MAOIs bind tightly to the enzyme and permanently inhibit its ability to metabolize any monoamine. This can lead to very dangerous interactions with the amino acids tryptophan and tyramine present in many foods, especially those that produce an enzymatic action or aging process such as cheese, meat, and fish. The hypertensive crisis that may result from these interactions is sometimes known as the “cheese effect.” Irreversibles are of two classes: hydrazines and nonhydrazines. Parnate is the only agent used for mental disorder in the US that is a non-hydrazine. Reversible inhibitors do not bind, so the enzyme is able to take part in the metabolism of the amino acids and other amines and is less prone to producing a hypertensive crisis. These are used more in Europe than the United States, likely due to the availability of other effective antidepressants lacking the drug-food interactions of MAOIs.

### Overview

This case involved a 45-year-old married female who suffered a stroke. Her medical history included hypercholesterolemia and depression. She had been seeing a psychiatrist intermittently since age 34 and treated with psych medications for anxiety and insomnia. Some of the medications tried included Xanax, Klonopin, Zoloft, Celexa, Effexor, Wellbutrin, Buspar, Trazodone, and Amitriptyline.

Documentation shows the claimant had persistent issues with sleeping, such as needing more than usual amounts of sleep when young and the onset of insomnia in later life. Her new diagnostic assessment when hospitalized was as follows:

Axis I: Major Depression, recurrent

Axis II: None

Axis III: Hypercholesterolemia

Axis IV: Psychosocial stressors; Financial difficulties, severity is moderate

Axis V: Current Global Assessment of Functioning is 35; highest Global Assessment of functioning is the past is 70.

When discharged, her treatment plan included antidepressants, participation in milieu therapy, and possible mood stabilizers. Medications included Remeron, Lithium, and Carbamazepine. She followed up with the insured in his office on multiple occasions with normal/unremarkable system reviews. In December 2004 the insured added 10mg Parnate, an MAOI, three times daily. The claimant continued to see the insured routinely with no changes until early 2006, when the Parnate was increased from (2) to (3) tablets three times daily. At that time, the claimant was documented as working more (40+ hrs/week) and enjoying work so much that she did not want to go back to previous types of jobs.

In early 2007 the claimant suffered a stroke. Her discharge diagnosis was left-sided intracerebral bleed secondary to AV malformation status postdecompressive craniotomy. Her neurologist's impression was status post-left parietal intracranial hemorrhage with intraventricular extension status post evacuation, likely secondary to labile hypertension (MAO-induced). She had cognitive dysfunction, right hemiplegia with ataxia and right side apraxia, and communication impairment with expressive greater than receptive aphasia. It was discovered that the claimant had been prescribed Zomig by her primary care physician. The insured did not coordinate care with the PCP or monitor for hypertension with the administration of the Parnate.

### Expert Opinion

Plaintiff experts believed that the claimant's use of Parnate and Zomig in combination caused her stroke. They said her moderate to severe impairments in cognitive functioning and significant motor and sensory deficits on the left side restricted her daily living activities in most areas. They also pointed out that there was no evidence

that the insured communicated with the PCP or was aware of the medications that the claimant had been prescribed. There was no evidence that the insured monitored her blood pressure or that he was aware of her hypertension or treatment for migraines.

Defense experts believed that the trial use of Parnate was reasonable. The insured's informed consent for this medication was thorough. The records establish this claimant responded favorably to Parnate, which defense experts stated also tends to lower blood pressure. They also pointed out that the timing of the stroke, early morning, was inconsistent with a hypertensive crisis caused by Parnate. Moreover, the claimant had taken the medication for two years without complications, and she had a history of hypertension and migraines that were other stroke risk factors.

## Discussion

While plaintiff experts offered standard of care criticisms, the defense answered that the diagnosis was correct. The claimant had benefited from the medication, had taken Parnate for over two years without complication, and the informed consent documentation was thorough. Because there was no evidence the claimant took Zomig around the time in question, there could be no evidence of cross interaction, and the plaintiff had other health issues that could explain her stroke. However, the absence of documentation that the insured monitored her hypertension, coordinated her care with the PCP, or was aware of her other medications was a significant weakness. The plaintiff argued that her history of hypertension combined with Parnate caused her stroke.

The defense was sorely compromised by the lack of charts documenting insured awareness of the patient's other health issues, vitals monitoring, and communication and coordination of care with her primary care provider. The case was settled for \$950,000.

## Risk Prevention Strategies

Below is a listing of foods and beverages that cannot be consumed when taking MAOIs and others that can be possibly eaten in moderation.

Don't eat or drink any of the following when taking MAOIs unless your doctor advises otherwise:

- aged foods
- alcoholic beverages (especially chianti, sherry, liqueurs, and beer)
- alcohol-free or reduced-alcohol beer or wine
- anchovies
- bologna, pepperoni, salami, summer sausage, or any fermented sausage
- caviar
- cheeses (especially strong or aged varieties), except for cottage and cream cheese
- chicken livers
- fermented foods
- figs (canned)
- fruit: raisins, bananas (or any overripe fruit)
- meat prepared with tenderizers; unfresh meat; meat extracts
- smoked or pickled meat, poultry, or fish
- soy sauce

Foods and beverages safe to consume in moderation:

- avocados
- beer
- caffeine (including chocolate, coffee, tea, cola)
- chocolate
- raspberries
- sauerkraut
- soup (canned or powdered)
- sour cream
- yogurt

## Summary

When prescribing an MAOI, make sure you know your patient. Is this someone who can follow a severely restrictive diet, or will they cheat here and there? With every serving of bologna, pepperoni, aged cheese, raisins, bananas, or chocolate, tyramine floods into the brain. Usually, MAO enzymes guard against this potentially harmful tyramine excess. But under an MAO inhibitor, the MAO enzyme can't stop tyramine from accumulating. This is what occurred when these drugs were first popularized in the 1960s. Before the connection between MAOI and tyramine was made, an unfortunate number of deaths resulted from brain hemorrhages.

Because of the risks of the MAOIs, they tend to be the antidepressant of last resort. It is used when nothing else works and a patient is willing to give up anything with the hope that the MAOI and diet restrictions will control their depression. So be sure to ask all the questions that must be asked. Have all other antidepressants been tried that do not have such severe food and drug restrictions? Have you set up a dietary consult to assist the patient in preparing for potentially drastic dietary changes? Are there any contraindicated medications or health conditions that would make it dangerous for the claimant to take an MAOI? How long does the patient need to be off current meds before it is safe to begin the MAOIs?

## References

Monoamine oxidase inhibitors. Drug Facts & Comparisons.

<http://online.factsandcomparisons.com/MonoDisp.aspx?monoID=fandc-hcp11283&inProdGen=true&quick=monoamine%20oxidase%20inhibitors&search=monoamine%20oxidase%20inhibitors>.  
Antidepressants: Selecting one that's right for you.

MayoClinic.com. <http://www.mayoclinic.com/health/antidepressants/HQ01069>