

## Double Whammy: Self Pharmacotherapy in the age of unregulated OTCs

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### Abstract

**Background:** In today's age of easy accessibility and online shopping, the use of over the counter supplements (OTCs) has been drastically increasing. This led to the development of polypharmacy of complementary medicine, despite limited knowledge on their regulations and toxicities. Here, we report a case of unintentional polypharmacy of niacin and nitric oxide precursors leading to superlative effects of orthostatic hypotension, flushing, and possible adrenal insufficiency, via a mechanism which has not been fully researched in human beings.

**Case:** A sixty-five-year-old male with recent history of coronary artery disease came to the hospital presenting with sudden onset of facial flushing and dizziness starting one hour earlier. Orthostatic vitals were positive and cardiac workup was negative.

Patient's symptoms have completely subsided after a dose of full-dose aspirin. On additional history, patient admitted to the chronic use of OTC niacin and nitric oxide precursor supplements for muscle building. On further testing, the patient was diagnosed with adrenal insufficiency.

**Conclusion:** To our knowledge, OTCs do not undergo stringent FDA regulations as prescribed medications. Due to the limited knowledge of their safety profile and their widespread availability, consumers have increasingly been relying on OTCs use. We believe stringent regulations and reporting underrecognized supplements usage, could help open new doors for research and curtail their use.

**Keywords:** Niacin; Nitric Oxide; Adrenal Insufficiency; Over the counter supplements, Polypharmacy

## Introduction

According to consumer healthcare products association, US consumers make twenty-six trips a year to purchase over the counter (OTC) products, while visiting a doctor on average, three times a year [1]. Despite unclear benefit and under-recognized harm, use of OTCs continues to increase. We report one such case of an elderly man with known cardiovascular history who was admitted for concerns of ongoing cardiovascular event.

## Case

A 65 year old male with a past medical history of recent coronary artery bypass graft surgery for coronary artery disease, Type 2 Diabetes Mellitus, Hypertension and Tobacco abuse presented to the emergency department with complaints of pre-syncope episode associated with flushing and dizziness since one hour prior to arrival. He denied loss of consciousness, vomiting, diarrhea, chest pain, palpitations, and changes in vision, ataxia or weakness. He reported missing his dose of aspirin which he claims to be compliant with regularly. On examination, he was well built and muscular with facial flushing. Orthostatic vitals were positive, but patient appeared clinically euvolemic. Labs were significant for Hb 15.6 and hematocrit 47.2%, but normal comprehensive metabolic panel, troponin, urine drug screen, electrocardiogram and echocardiogram. Due to patient's significant cardiac history, he was given full dose aspirin, which relieved all of his symptoms. Upon further inquiry, he admitted to using OTC Niacin and a muscle building supplement containing nitric oxide (NO) precursors arginine and citrulline on a daily basis. Additionally, a morning cortisol was also found to be 4.5.

## Discussion

Widespread availability of OTC supplements has allowed customers easy access to these drugs. Interestingly, these supplements are not subject to the same stringent FDA regulations that conventional pharmacotherapy is, often leading to excessive use and under-recognized toxicities. Our patient's presentation from concomitant use of niacin and nitric oxide precursors in the background of known coronary artery disease is just one such example.

Historically, niacin which was used to treat hyperlipidemia had fallen out of favor because of adverse effects related to its use. Additionally NO precursor use is being increasingly used for its ability to promote endurance and muscle building in animal models. It has also been studied for its role in lowering blood pressure and improving cardiac function without uncertain clinical benefit in limited human studies [2]. It is this very property that led to orthostatic hypotension, dizziness, and flushing in our patient. His clinical presentation was worsened by overlapping adrenal insufficiency from what we suspect to be intermittent anabolic steroid use. Animal studies have shown the role of NO in dysregulation of adrenal blood flow resulting in adrenal hormone suppression [3]. However, no human studies have been performed, opening new avenues for research.

## Conclusion

Our case highlights the importance of detailed history including asking about OTC supplement use particularly in high risk patients. Prompt recognition and reporting of these toxicities may help curtail more serious adverse events. This is not only an area that requires active research but also would help make the case for stronger national regulation to curtail unrecognized harm from these supplements.

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