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## Early recognition of tricyclic antidepressant overdose: A case report

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Tricyclic antidepressants (TCAs) are commonly used to treat a number of disorders, including neuropathic pain, major depressive disorder, obsessive-compulsive disorder and others. The development of new antidepressant medications have reduced the use of TCAs but the incidence of TCA overdose remains significant, representing the seventh leading cause of toxic exposures in 2008. This case presentation identifies not only classic presenting symptoms of TCA overdose but also commonly overlooked early signs and symptoms including early EKG changes. Review of initial presenting symptoms and laboratory/EKG findings aid in the early recognition of TCA overdose in the non-ER/EMT setting.

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## Comparison of efficacy of stimulants vs. non-stimulants in childhood and adulthood ADHD

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**Introduction:** Attention deficit hyperactivity disorder (ADHD) is one of the most common neuropsychiatric disorders of childhood and adolescence. Approximately 5.9-7.1% of children and 5.0% of adults meet criteria for ADHD. It manifests with symptoms of hyperactivity, impulsivity and/or inattention that significantly interfere with functioning. Stimulants such as methylphenidate and amphetamine salts are the two major categories of pharmacological treatment for ADHD and are considered the first-line treatment. Norepinephrine reuptake inhibitors such as atomoxetine and bupropion are considered second line treatment. Alpha-adrenergic agonists such as clonidine and guanfacine are considered if the patient has failed to respond to two stimulant trials, experiences intolerable side effects or if there are concerns regarding substance abuse. Comparisons among these medications are hindered by the absence of direct comparative trials. Our objective was to determine the relative efficacy of different medications in treating ADHD in children and adults with ADHD.

**Methods:** A literature search was conducted using PubMed and included all studies examining the efficacy of stimulant and non-stimulant medications in the treatment of ADHD in youth and adults, published in English language in North America, Europe and Australia from 2005 to 2015. Meta-analysis with forest plot was employed to assess the differences between different groups of medications in response to therapy and side effects.

**Results:** In both youth and adult population, placebo controlled studies reveals that atomoxetine, bupropion and stimulants significantly improved ADHD symptoms ( $p < 0.05$ ). Stimulants were superior to placebo in reducing ADHD symptoms in which the effect size of stimulants was more robust, compared to non-stimulants. There is no significant difference in suicide related events in atomoxetine and stimulants. Similarly, sleep disturbances and loss of appetite are comparable amongst atomoxetine, bupropion and stimulants ( $p > 0.05$ ). Alpha 2 agonist monotherapy as well as add on therapy, significantly decreases ADHD symptoms which was associated with more robust decrease of ADHD symptoms on monotherapy, compared to add-on therapy (-0.59 vs. -0.33,  $p = 0.01$ ), stimulant therapy in both adult ( $n = 133$ ) and children ( $n = 900$ ) is associated with mild increase in systolic blood pressure (SBP: 2 mmHg (0.8-3.2,  $p = 0.005$ ), and resting heart rate (RHR: 5.7 (3.67.8,  $p = 0.001$ ), compared to placebo groups.

**Conclusions:** Stimulants, norepinephrine reuptake inhibitors and alpha 2 agonists are associated with significant favorable effects on ADHD symptoms in both adults and youth population. Stimulants have a superior effect size, compared to other treatments. Atomoxetine has comparable improvement of ADHD symptoms in responders. Alpha 2 agonists as monotherapy more than as add-on treatment significantly improve both impulsivity and hyperactivity/inattention. The risks of suicide, increase in resting heart rate and systolic blood pressure are very low; however it should be closely monitored in patients treated with stimulants.

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