

Paramedic - Evidence Based Medicine (P-EBP) Program

Paramedic CAT (Critically Appraised Topic) Worksheet

Title: Calcium Channel Blockers Vs. Adenosine

Report By: James McMaster, Marlee Montgomery

2nd Party Appraiser: Jen Greene

Clinical Scenario: You arrive on scene for a 42 year old female complaining of sudden onset heart palpitations with a history of SVT. Upon assessing the patient she is noted to be normotensive, in SVT at a rate of 190BPM on 12 lead ECG, denying chest pain and all other vital signs found to be within normal limits. After an unsuccessful attempt with vagal maneuvers, you're considering chemical cardioversion for this stable patient. As an inquisitive clinician, you wonder if the use of a calcium channel blocker would have greater efficacy of conversion back into a sinus rhythm as opposed to the use of the adenosine which you have access to.

PICO (Population – Intervention – Comparison – Outcome) Question:

In adult patients presenting pre-hospitally in a stable narrow complex tachycardia does the administration of a calcium channel blocker compared to adenosine impact success rates of conversion to a sinus rhythm?

Search Strategy:

((conversion OR sinus rhythm) AND (Adenosine OR Adenocard)) AND (Calcium Channel blocker OR diltiazem OR verapamil) AND ((Emergency Medical Services OR Emergency Medical Technicians OR paramedic* OR emergency medical technician* OR prehospital OR pre-hospital OR "out of hospital" OR responder* OR ambulance OR Stable OR Supraventricular Tachycardia OR SVT OR Narrow complex OR Sinus Tachycardia) AND (Calcium Channel blocker OR diltiazem OR verapamil))

Search Outcome:

71 results were yielded from the search. We reviewed 2 studies to investigate this CAT.



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Relevant Papers:

AUTHOR, DATE	POPULATION: SAMPLE CHARACTERISTICS	DESIGN (LOE)	OUTCOMES	RESULTS	STRENGTHS/ WEAKNESSES
<i>Alabed, 2017</i>	<p>The review includes seven RCT's conducted in six different countries with 622 participants who presented to an emergency department with SVT.</p> <p>Specifically, patients of any age with SVT diagnosed on 12-lead ECG within 24 hours of onset.</p>	<p>This was a systematic review.</p> <p>This was level I evidence.</p>	<p><u>Primary Outcomes:</u> conversion into a sinus rhythm, major adverse events.</p>	<p>3.2% lower odds of reversion with adenosine (95% CI 1.2 lower to 6.2 lower) - researchers did not find this to be statistically significant</p>	<p>+ good search strategy and methodology</p> <p>- variation in the RTC design can be a weakness, due to the "cross over design" where both medications were used</p> <p>- small sample size</p> <p>- differences in doses given of each drug between studies</p> <p>- no studies reported blinding of participants</p>



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<p><i>Delaney, 2011</i></p>	<p>Hemodynamically stable adult patients presenting with physician-defined PSVT in an acute setting.</p>	<p>This was a systematic review and meta analysis.</p> <p>This is level I evidence</p>	<p><u>Primary Outcome:</u> rate of reversion to sinus rhythm.</p>	<p>Pooled OR for successful reversion to sinus rhythm was 1.27 (95% CI: 0.63-2.57) favouring adenosine - difference was not statistically significant</p>	<ul style="list-style-type: none"> + collected data on adverse events + only included RCT's - variation in inclusion criteria - dosing strategies not consistent between studies - limited published data resulted in the inclusion of low quality studies
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Comments: *Alabed, 2017* did not report on length of hospital stay or patient satisfaction, which is a main gap in knowledge. A change in practice and drug preference with this level of evidence would likely be clinician dependent and potentially motivated by patient experience. Understanding how possible adverse effects of the drugs influences patient comfort and condition could be beneficial in making correlations between drug preference of clinicians. Additionally this study used articles (4) that reported included "cross-over" component, which meant the alternative drug was administered if the initially administered drug was unsuccessful. To reduce bias, this study included data only from "pre-cross over" phase/data from initial drug administration, but it's questionable as to whether or not this skewed the results. It was also noted in the results of the *Alabed, 2017* article, even though there was no statistically significant difference in the conversions rate, it is worth mentioning there were three adverse events of hypotension (2 of which resulted in a SBP of <90mmHg) noted during the administration of a calcium channel blocker and none with adenosine, adenosine noted to be the "safer" medication to use. *Delaney, 2011* also noted that there was not a statistically significant difference in the conversion rate however, adenosine had a more rapid response and "fewer severe effects",



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again noting the “severe effects” to be hypotension after the administration of a calcium channel blocker. *Delaney, 2011* does state that they were “unable to pool the available data on time until reversion, each of the four studies reporting it found that adenosine had its effects much faster than does verapamil”.

Consider: The information found in these articles does not provide data that is statistically significant in favour of one drug versus the other. Both adenosine and calcium channel blockers were found to be successful at converting SVT to sinus rhythm.

Clinical Bottom Line: The use of either adenosine or calcium channel blockers is highly effective in the treatment and conversion of a stable narrow complex tachycardia into a sinus rhythm.

References:

Alabed S, Sabouni A, Providencia R, Atallah E, Qintar M, Chico TJ. Adenosine versus intravenous calcium channel antagonists for supraventricular tachycardia. Cochrane Database Syst Rev. 2017 Oct 12;10(10):CD005154. doi: 10.1002/14651858.CD005154.pub4. PMID: 29025197; PMCID: PMC6485380.

Delaney B, Loy J, Kelly AM. The relative efficacy of adenosine versus verapamil for the treatment of stable paroxysmal supraventricular tachycardia in adults: a meta-analysis. Eur J Emerg Med. 2011 Jun;18(3):148-52. doi: 10.1097/MEJ.0b013e3283400ba2. PMID: 20926952.

