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# Safety and Efficacy of Electronic Cigarette Use in Smoking Cessation

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## Abstract

- Smoking is the most prevalent cause of avoidable mortality in the world
- Smoking cessation decreases likelihood of developing CV disease, stroke, cancer, and chronic lung diseases
- The purpose of this study is to assess if E-Cig's are effective in smoking cessation and to evaluate the safety of their use

## Introduction

• There are numerous aids to assist with smoking cessation; electronic cigarettes are closest to mimicking conventional cigarettes

## Statement of the Problem

- Electronic cigarettes have become very prevalent
- Research on electronic cigarettes is behind production, marketing, and use of product
- E-Cig's are marketed as safer alternative to combustible cigarettes

## Research Question

In patients who smoke cigarettes, are electronic cigarettes a safer alternative to conventional cigarettes and can they be used as an effective tool for smoking cessation?

## Pathophysiology

- Nicotine is the chemical associated with addiction; it binds centrally to nicotinic acetylcholine receptors
- Binding stimulates release of numerous neurotransmitters including dopamine, a chemical involved in reward pathway
- When dopamine is lowest, less nicotine is required to produce similar effect
- Nicotine is not easily broken down and stays in the body for extended periods of time leading to desensitization

## E-Cigarette Device

- Contains mouthpiece, cartridge, vaporizer, battery, and a light indicator
- Cartridge often contains nicotine, water, propylene glycol, glycerin, flavorings, and other additives
- Inhalation activates the battery to heat and vaporize chemicals for inhalation. This also activates the indicator light.



## Literature Review

### Prospective memory



- CAMPROMPT scores show prospective memory is not effected with use of E-Cigs during quitting

### Smoking cessation



- A 12 month RCT showed conventional cigarette consumption decreased from 20.67 to 12.67 daily by week 52 including a 13% abstinence rate
- Another 24 month RCT showed decreased from 25 cig/day to 4 representing a 84% decreases and a 22% abstinence rate.
- Most common side effects with electronic cigarettes: dry cough (11.1%), throat irritation (7.4%), nausea (2%)

### Comparative studies (NRT vs E-Cig vs Un-aided)

- E cigs show a 1.63x greater rate of abstinence compared to NRT.
- E cigs show a 1.61x greater rate of abstinence compared to un-aided attempts.

### Second hand smoke

Secondhand smoking KILLS!

- When comparing emissions of E-Cigs to conventional cigarettes it was found that:
  - Volatile organic compounds, carbon monoxide, nicotine, and aerosol particles increased in conventional cigarettes.
  - Electronic cigarette only.



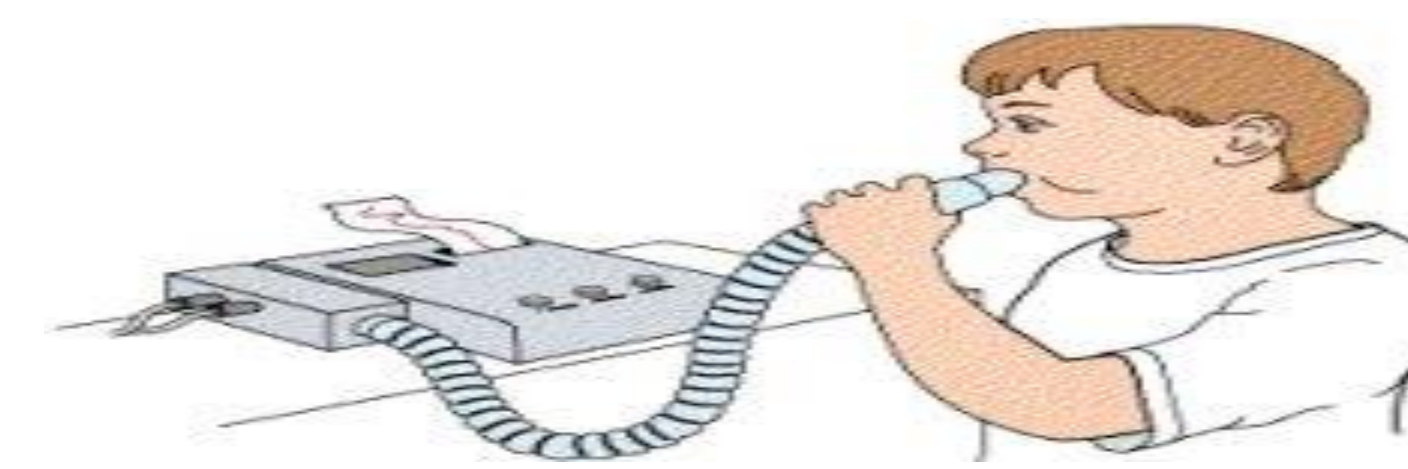
### Acute coronary effects

- Echocardiograms compared at baseline and after consumption of E-Cig/Conventional cigarettes show:
  - E-cig: No change in HR, systolic pressure, or pressure rate product after consumption
  - Found an increase in diastolic blood pressure.
  - Doppler flow after E-Cig showed no acute changes in flow
  - Conventional cigarettes: Increase in HR, systolic & diastolic pressures, and pressure rate product.

### E-Cigs in young adults

- Community cohort study showed opinions of young adults regarding E-cig use correlated with future use and addiction.

### Respiratory function



- Spirometry results in asthmatic smokers who converted to E-Cigs showed improvement of FEV1, FVC, and FEF25-75 as well as decreased exacerbations
- IOS measurements after E-Cig use showed increased airway impedance but significantly less than conventional cigarettes.

## Discussion

- Electronic cigarette use decreases prospective memory loss associated with smoking cessation
- Abstinence rates of conventional cigarettes have shown to range from 13%-22% in various clinical trials.
- E-Cigs have higher cessation rates compared to NRT and unaided cessation
- Most commonly no side effect reported, though dry cough, throat irritation, and nausea were reported
- Second hand smoke exposure decreased in E-Cig use compared with conventional cigarettes.
- Decreased acute coronary effects were observed with E-Cig use compared to conventional cigarettes.
- Respiratory studies are conflicting
  - increased improvement in asthmatics exacerbations and spirometry readings
  - Increased impedance in IOS readings
- E-Cigs are a risk for furthering addictions as well as creating addictions particularly in young adults who are easily impressionable.



## Applicability to Practice

- Electronic cigarettes can have a place in smoking cessation, though strict regulation is needed.
- These products should not be available to young adults and teenagers who are easily impressionable
- More research needs to be done regarding long term side effects and carcinogen contents
- Electronic cigarettes may be beneficial in those with asthma, COPD, and CV disease who have previously tried to quit smoking and failed.

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