Smoking Cessation with e-Cigarettes: Appropriate for Cardiac Patients?

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Objectives

- What is an e-cigarette?
- Are e-cigarettes safe?
- Are e-cigarettes effective?
- Are e-cigarettes safe in cardiac patients?

What is an e-cigarette?

- Most vaping devices consist of a:
  - battery
  - mouthpiece
  - heating element
  - chamber (reservoir containing the liquid)
- Devices typically use a battery to heat a liquid solution, which becomes vaporized.
- Vapour condenses into an aerosol, which is inhaled through a mouthpiece.

Vaping liquids and substances

- Vaping liquids/substances are typically flavoured and may or may not contain nicotine.
- Nicotine and/or the flavouring compounds are suspended in a liquid mixture.
  - Typically propylene glycol and/or glycerol
- Nicotine level can vary widely.
  - Range from very low levels to more nicotine than in a typical tobacco cigarette.
- Nicotine containing e-cigarettes became legal to sell in Canada in May 2018.

Vaping liquids and substances

- Flavouring compounds consist of chemicals and blends of chemicals to simulate different flavours.
- New regulations in the Tobacco and Vaping Products Act (TVPA -May 2018) ban the sale of products with flavors that appeal to youth.

Are e-Cigarettes Safe?

- Yes
- No
- Relative to what?

Vaping vs Smoking

- "Vaping is less harmful than smoking.
- Many of the toxic and cancer-causing chemicals in tobacco and the tobacco smoke form when tobacco is burned.
- Vaping products do not contain tobacco and do not involve burning or produce smoke.
- Except for nicotine, vaping products typically only contain a fraction of the 7,000 chemicals found in tobacco or tobacco smoke, and at lower levels."

(Health Canada, 2018)

Vaping vs Smoking

- "Switching from tobacco cigarettes to vaping products will reduce a person's exposure to many toxic and cancer-causing chemicals.
- As a step towards quitting cigarettes, many smokers may go through a transition period when they use both cigarettes and vaping products.
- Studies have shown short-term general health improvements in those who have completely switched from smoking cigarettes to vaping products."

(Health Canada, 2018)

Vaping vs Smoking

- "Vaping products and e-cigarettes deliver nicotine in a less harmful way than smoking, and may reduce health risks for smokers who are unwilling or unable to:
  - quit on their own or
  - quit using approved nicotine replacement therapies (such as gums, lozenges and patches) or medication
  - quit using counselling
  - While evidence is still emerging, some evidence suggests that e-cigarette use is linked to improved rates of success when quitting."

(Health Canada, 2018)

Vaping vs Smoking

- "Though evidence on the potential benefits and risks of vaping products is still emerging, Health Canada is of the view that while vaping products are harmful, they are less harmful than smoking cigarettes. Smokers who switch completely to vaping products can significantly reduce their exposure to toxic chemicals and carcinogens. "

Health Canada, 2018

E-Cigarettes - The Evidence

- Overview of Systematic Reviews by Public Health England
- 14 systematic reviews included
- 7 included meta-analysis and 7 were narrative reviews.
- Meta-analyses produced different results
  - Positive effect – Two
  - Inconclusive effect – Four
  - Negative effect – One

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/684963/Evidence_review_of_e-cigarettes_and_heated_tobacco_products_2018.pdf

E-Cigarettes - The Evidence

- Why different results
  - Differences in types of studies included (observational versus RCT)
  - Different study populations (some only current smokers)
  - Length of follow-up
  - Nicotine versus non-nicotine containing e-cigarettes
- "The authors of the systematic reviews arrived at the same conclusion that further RCTs of EC are needed."

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/684963/Evidence_review_of_e-cigarettes_and_heated_tobacco_products_2018.pdf

What about patients with CVD/cardiac patients?

What do the recommendations say?

AHA Policy Statement E-Cigarettes (Circulation 2014)

- *"The data on health effects to date, studied primarily in healthy people with short-term exposure, reveal little or no evidence of severe adverse events."*
- *"Respiratory irritation and the bronchial constriction from a propylene glycol aerosol raise concerns about harm to people with asthma and chronic obstructive pulmonary disease, but 1 small study reports no harm but rather benefit when users quit smoking or smoke fewer cigarettes per day."*
- ***"There are no reports of e-cigarette safety in patients with known cardiovascular disease."***

AHA Policy Statement E-Cigarettes (Circulation 2014)

- *"…although the adverse health effects of e-cigarettes are not known, they are likely to be much less than those of cigarette smoking, but could be significant in individuals with heart disease.."*

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Potential CV Effects of e-Cigarettes

- Conflicting evidence with respect to cardiovascular effects
  - Negative effects
    - Increased heart rate and blood pressure
    - Endothelial cell dysfunction and oxidative stress
  - No effects
    - Some studies have found no immediate effects on the coronary circulation, myocardial function, and arterial stiffness

J Am Heart Assoc. 2017

AHA Policy Statement E-Cigarettes (Circulation 2014)

Summary of Current Recommendations for Clinical Guidance

- E-cigarette use should be included in tobacco screening questions that are part of every health examination.
- Clinicians should be educated about e-cigarettes and should be prepared to counsel their patients regarding comprehensive tobacco cessation strategies.
- There is not yet enough evidence for clinicians to counsel their patients who are using tobacco products to use e-cigarettes as a primary cessation aid.

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AHA Policy Statement E-Cigarettes (Circulation 2014)

- If a patient has failed initial treatment, has been intolerant to or refuses to use conventional smoking cessation medication, and wishes to use e-cigarettes to aid quitting, it is reasonable to support the attempt.

- However, patients should be informed that although e-cigarette aerosol is likely to be much less toxic than cigarette smoking, the products are unregulated, may contain low levels of toxic chemicals, and have not been proven to be effective as cessation devices.

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AHA Policy Statement E-Cigarettes (Circulation 2014)

- In the absence of long-term safety studies of e-cigarette use, it may be appropriate to advise the patient to consider setting a quit date for their e-cigarette use and not to plan to use it indefinitely (unless needed to prevent relapse to cigarettes).

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European Heart Network E-cigarettes and Cardiovascular Diseases (2016)

- "We need hundreds of thousands of users and many more years of use in order to see any *long-term effects* of e-cigarette on cardiovascular health."

E-Cigarettes – Other Concerns

- Health Canada regulation of nicotine containing e-cigarettes is very recent (5/2018)
  - Not all products available may be compliant
- Potential for uptake by youth is concerning
- Nicotine poisonings (safety of cartridges)
  - "No nicotine" mislabelling
- Vapor chemicals
- Exposure from secondhand vapor
- Lithium battery explosions
- Long-term health effects unclear

Summary

- The evidence that e-cigarettes increase the odds of smoking cessation is conflicting.
- Health Canada generally supports their use given the well-know health-risks associated with smoking
- Evidence of safety of e-cigarettes in patients with cardiac disease remains largely unknown at this time