COVID-19 and Vaping: An (Incredibly Brief) Evidence Review

# Evidence Summary

There is so very little evidence on the relationship between COVID-19 and vaping/e-cigarettes, it is not possible to draw any real conclusions beyond highlighting interesting opinions and potential avenues for further exploration

* The best summary of the situation so far comes from Majmundar et al (2020) writing in Nicotine and Tobacco Research as they highlight both the lack of research as well as the social media discussion on vaping & COVID-19.
* There is conversation from the brief evidence is that vaping, much like smoking is not a protective factor and anything that lessen lung strength/capacity could, theoretically, negatively effect outcomes, which puts to bed any early theories purporting smoking to be a protective factor.
* From a physiology perspective there is a potential link around Angiotensin-converting enzyme 2 (ACE2) and COVID-19 and the impact of smoking and vaping on ACE2 – which may increase risk. Brake et al (2020) argues this potential issue – calling for further research. **I think this is a potential area of exploration, ‘what damage do e-cigs (potentially) do and what is their relationship with COVID?**
* Javelle (2020) also argues against use of vaping products as they may increase risk of worsening outcomes: *“Considering their potential acute pulmonary toxicity, vaping products should be considered at risk of enhancing respiratory disease caused by SARS-CoV-2”* which is backed up by Kabbani & Olds (2020),
* Javelle (2020) also postulate a risk of dissemination of COVID-19 particles by infected through the act of vaping – again no evidence to support
* EVALI ( e‐cigarette, or vaping, product use‐associated lung injury)is also highlighted – though there is no solid evidence in what I’ve found linking it to COVID-19, beyond author speculation

# Literature Search Results

**Title: Electronic cigarette and vaping should be discouraged during the new coronavirus SARS-CoV-2** pandemic.

Source: Archives of Toxicology. (no pagination), 2020. Date of Publication: 2020.

**Title: Vaping during the COVID-19 pandemic: NOT GOOD!!.**

Source: Laryngoscope Investigative Otolaryngology. (no pagination), 2020. Date of Publication: 2020.

Author: Harrill W.C.

**Title: Does COVID19 Infect the Brain? If So, Smokers Might Be at a Higher Risk.**

Source: Molecular pharmacology. 97 (5) (pp 351-353), 2020. Date of Publication: 01 May 2020.

Author: Kabbani N.; Olds J.L.

Abstract

COVID19 is a devastating global pandemic with epicenters in China, Italy, Spain, and now the United States. While the majority of infected cases appear mild, in some cases, individuals present serious cardiorespiratory complications with possible long-term lung damage. Infected individuals report a range of symptoms from headaches to shortness of breath to taste and smell loss. To that end, less is known about how the virus may impact different organ systems. The SARS-CoV2 virus, which is responsible for COVID19, is highly similar to SARS-CoV. Both viruses have evolved an ability to enter host cells through direct interaction with the angiotensin converting enzyme (ACE) 2 protein at the surface of many cells. Published findings indicate that SARS-CoV can enter the human nervous system with evidence from both postmortem brains and detection in cerebrospinal fluid of infected individuals. Here, we consider the ability of SARS-CoV2 to enter and infect the human nervous system based on the strong expression of the ACE2 target throughout the brain. Moreover, we predict that nicotine exposure through various kinds of smoking (cigarettes, electronic cigarettes, or vape) can increase the risk for COVID19 neuroinfection based on known functional interactions between the nicotinic receptor and ACE2. We advocate for higher surveillance and analysis of neurocomplications in infected cases. SIGNIFICANCE STATEMENT: The COVID19 epidemic has spurred a global public health crisis. While many of the cases requiring hospitalization and intensive medical care center on cardiorespiratory treatment, a growing number of cases present neurological symptoms. Viral entry into the brain now appears a strong possibility with deleterious consequences and an urgent need for addressing.Copyright © 2020 by The American Society for Pharmacology and Experimental Therapeutics.

**Title: Smoking upregulates angiotensin-converting Enzyme-2 receptor: A potential adhesion site for novel coronavirus SARS-CoV-2 (COVID-19).**

Source: Journal of Clinical Medicine. 9 (3) (no pagination), 2020. Article Number: 841. Date of Publication: March 2020.

Abstract

The epicenter of the original outbreak in China has high male smoking rates of around 50%, and early reported death rates have an emphasis on older males, therefore the likelihood of smokers being overrepresented in fatalities is high. In Iran, China, Italy, and South Korea, female smoking rates are much lower than males. Fewer females have contracted the virus. If this analysis is correct, then Indonesia would be expected to begin experiencing high rates of Covid-19 because its male smoking rate is over 60% (Tobacco Atlas). Smokers are vulnerable to respiratory viruses. Smoking can upregulate angiotensin-converting enzyme-2 (ACE2) receptor, the known receptor for both the severe acute respiratory syndrome (SARS)-coronavirus (SARS-CoV) and the human respiratory coronavirus NL638. This could also be true for new electronic smoking devices such as electronic cigarettes and "heat-not-burn" IQOS devices. ACE2 could be a novel adhesion molecule for SARS-CoV-2 causing Covid-19 and a potential therapeutic target for the prevention of fatal microbial infections, and therefore it should be fast tracked and prioritized for research and investigation. Data on smoking status should be collected on all identified cases of Covid-19.Copyright © 2020 by the authors. Licensee MDPI, Basel, Switzerland.

**Title: Public health concerns and unsubstantiated claims at the intersection of vaping and COVID-19.**

Source: Nicotine & tobacco research : official journal of the Society for Research on Nicotine and Tobacco. (no pagination), 2020. Date of Publication: 14 Apr 2020.

Author: Majmundar A.; Allem J.-P.; Cruz T.B.; Unger J.B.

Title: Veno-venous extracorporeal life support for the successful treatment of severe acute respiratory syndrome from e-cigarette use.

Source: ASAIO Journal. Conference: 30th Annual Extracorporeal Life Support Organization Conference, ELSO 2019. United States. 65 (Supplement 2) (pp 17), 2019. Date of Publication: September-October 2019.

Author: Baumann A.; Kumar N.; Whitson B.; Satyapriya S.V.; Bhatt A.

Abstract

The use of e-cigarettes is increasing across the United States, specifically among young adults.1 Despite public opinion that such products are generally safe, there is significant concern that e-cigarettes could be equally harmful to the lungs as smoking tobacco.2 The pathologic effects of e-cigarette use remains unclear. A single previous case report3 illustrates how residual chemical injury from e-cigarette usage can cause respiratory failure; however, the exact pathology hypothesized to result from e-cigarettes is not known. We present two cases successfully using veno-venous extracorporeal life support (ECLS) in the treatment of presumed e-cigarette induced respiratory failure. A 42 year-old female and a 56 year-old male, both with a recent past medical history of non-specific respiratory symptoms, independently presented to the emergency department for ongoing dyspnea despite receiving outpatient antibiotic treatment for presumed community acquired pneumonia. Both patients underwent extensive in-hospital workup to rule-out infectious causes. Broncho-alveolar lavage revealed lymphocytosis and diffusive alveolar disease with no specific etiology. Upon hospital admission, both patients progressively developed severe acute respiratory distress syndrome and refractory hypoxemia requiring venous-venous extracorporeal membranous oxygenation (ECMO). Due to the idiopathic nature of both patients' respiratory failure, we presume that their respiratory symptoms were likely due to recent recreational e-cigarette usage, which was confirmed with the patients' family. Both patients were successfully weaned and decannulated from ECLS.

Ahc, M. (2020). "Be Vigilant Distinguishing Between EVALI and Flu-Associated Pneumonia." ED Management **32**(4): N.PAG-N.PAG.

If dealing with the COVID-19 outbreak and peak flu season are not enough, frontline providers in the ED also need to remain on the lookout for cases of e-cigarette or vaping product use-associated lung injury (EVALI). One big problem is that the symptoms of these illnesses can overlap, making it difficult to distinguish between flu-associated pneumonia and EVALI.

Edney, A. and A. LaVito (2020). "Vaping Could Compound Health Risks Tied to Virus, FDA Says." Bloomberg.com: N.PAG-N.PAG.

Vaping may leave users with underlying health conditions at higher risk of serious complications if they contract the respiratory disease caused by the novel coronavirus, the Food and Drug Administration said. After multiple delays, e-cigarette makers have until May to apply to the FDA for clearance to continue marketing their products. [Extracted from the article]

Gretler, C. (2020). "Big Tobacco Rides Out Virus Storm Amid Work-at-Home Smoking." Bloomberg.com: N.PAG-N.PAG.

(Bloomberg) -- Big Tobacco is one of the sectors that's sticking to its forecasts as the coronavirus outbreak hardly dents cigarette demand -- and may be leading to smokers lighting up on the job when they work at home. Michael R. Bloomberg, founder and majority owner of Bloomberg News parent Bloomberg LP, has campaigned and given money in support of a nationwide ban on flavored e-cigarettes and tobacco. [Extracted from the article]

Copyright of Bloomberg.com is the property of Bloomberg, L.P. and its content may not be copied or emailed to multiple sites or posted to a listserv without the copyright holder's express written permission. However, users may print, download, or email articles for individual use. This abstract may be abridged. No warranty is given about the accuracy of the copy. Users should refer to the original published version of the material for the full abstract. (Copyright applies to all Abstracts.)

Kary, T. (2020). "FDA Says Smokers May Have Higher Risk of Catching Covid-19." Bloomberg.com: N.PAG-N.PAG.

(Bloomberg) -- The U.S. Food and Drug Administration made a second revision on its stance about the risks of Covid-19 and nicotine, saying that cigarettes also increase the chances of catching the disease. The FDA said in its prior statement that the effects of vaping on Covid-19 are unknown, while cautioning that it exposes the lungs to toxic chemicals. [Extracted from the article]

Copyright of Bloomberg.com is the property of Bloomberg, L.P. and its content may not be copied or emailed to multiple sites or posted to a listserv without the copyright holder's express written permission. However, users may print, download, or email articles for individual use. This abstract may be abridged. No warranty is given about the accuracy of the copy. Users should refer to the original published version of the material for the full abstract. (Copyright applies to all Abstracts.)

Kary, T. (2020). "FDA Shifts Its Covid-19 Stance on Vaping, Smoking Impact." Bloomberg.com: N.PAG-N.PAG.

(Bloomberg) -- The U.S. Food and Drug Administration modified its stance on Covid-19 and vaping, saying it has an unknown effect on the risk of the new coronavirus, while warning that smoking can create worse outcomes. "E-cigarette use can expose the lungs to toxic chemicals, but whether those exposures increase the risk of Covid-19 is not known", the agency said Wednesday in an emailed response to a question from Bloomberg News. [Extracted from the article]

Kary, T. (2020). "Philip Morris Money Is Funding Pro-Vaping Coronavirus Spin." Bloomberg.com: N.PAG-N.PAG.

(Bloomberg) -- New York City Mayor Bill de Blasio pointed a finger at the vaping industry last month as he discussed a 22-year-old New Yorker who'd been hospitalized with Covid-19. Philip Morris's sister company, Altria Group Inc., sells IQOS in the U.S. and has a stake in Juul. [Extracted from the article]

Singh, A. G. and P. Chaturvedi (2020). "Tobacco use and vaping in the COVID-19 era." Head & neck.

Health crises have become a popular topic of discussion. In the wave of the ongoing pandemic, experts have suggested the role of vaping and other tobacco product use exemplifying the vulnerability of the population to contract the COVID-19. We discuss some of the events that led up to these conclusions and also offer a unique insight into another form of tobacco use that is potentially propagating its spread especially in the South Asian region-chewed tobacco. Both of these have been a perennial issue that head and neck cancer surgeons have been dealing with. Governments and head and neck cancer care providers now have an opportunity to deal with a common enemy in the midst of this pandemic. (© 2020 Wiley Periodicals, Inc.)

# Sample Search Strategy

1 exp coronavirus/ (13141)

2 exp Coronavirus Infections/ (12629)

3 (coronavirus\* or coronovirus\* or coronavirinae\* or Coronavirus\* or Coronovirus\* or Wuhan\* or Hubei\* or Huanan or "2019-nCoV" or 2019nCoV or nCoV2019 or "nCoV-2019" or "COVID-19" or COVID19 or "CORVID-19" or CORVID19 or "WN-CoV" or WNCoV or "HCoV-19" or HCoV19 or CoV or "2019 novel\*" or Ncov or "n-cov" or "SARS-CoV-2" or "SARSCoV-2" or "SARSCoV2" or "SARS-CoV2" or SARSCov19 or "SARS-Cov19" or "SARSCov-19" or "SARS-Cov-19" or Ncovor or Ncorona\* or Ncorono\* or NcovWuhan\* or NcovHubei\* or NcovChina\* or NcovChinese\*).ti,ab. (23843)

4 (SARSCoV2 or SARS-CoV2 or SARSCov19 or SARS-Cov19 or SARSCov-19 or SARS-Cov-19 or Ncovor\* or Ncorona\*or Ncorono\* or NcovWuhan\* or NcovHubei\* or NcovChina\* or NcovChinese\* or SARS2 or SARS-2 or SARScoronavirus2 or SARS-coronavirus-2 or SARScoronavirus 2 or SARScoronovirus2 or SARS-coronovirus-2 or SARScoronovirus 2 or (SARS adj2 coronavirus2)).ab,ti. (107)

5 (((((respirat\* adj2 (symptom\* or disease\* or illness\* or condition\*)) or (seafood or food or outdoor\*)) adj2 Market\*) or pneumon\*) adj10 (Wuhan\* or Hubei\* or China\* or Chinese\* or Huanan\*)).ab,ti. (1286)

6 Middle East Respiratory Syndrome Coronavirus/ (2012)

7 ("middle east respiratory syndrome\*" or "middle eastern respiratory syndrome\*" or MERSCoV or "MERS-CoV" or MERS).ti,ab. (4743)

8 ("severe acute respiratory syndrome" or SARS).ti,ab. (11607)

9 ("SARS-CoV-1" or "SARSCoV-1" or "SARSCoV1" or "SARS-CoV1" or SARSCoV or SARS-CoV or SARS1 or "SARS-1" or SARScoronavirus1 or "SARS-coronavirus-1" or "SARScoronavirus 1" or "SARS coronavirus1" or SARScoronovirus1 or "SARS-coronovirus-1" or "SARScoronovirus 1" or "SARS coronovirus1").ti,ab. (3876)

10 ((outbreak\* or wildlife\* or pandemic\* or epidemic\*) adj1 (Wuhan\* or Hubei or China\* or Chinese\* or Huanan\*)).ti,ab. (92)

11 (coronavirus\* or coronovirus\* or coronavirinae\* or CoV or HCoV\*).ti,ab. (15672)

12 ((corona\* or corono\*) adj1 (virus\* or viral\* or virinae\*)).ab,ti. (545)

13 1 or 2 or 3 or 4 or 5 or 6 or 7 or 8 or 9 or 10 or 11 or 12 (39399)

14 electronic cigarette/ (6083)

15 (ecig\* or e-cig\* or e-voke\* or vape\* or vaping).ab,ti. (5480)

16 14 or 15 (7304)

17 13 and 16 (7)

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*