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Dear Doctor,

Greetings from Micro Labs limited. We are happy to bring **"CRITICONNECT"** containing latest information in the field of Critical care medicine.

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Looking forward to your valuable feedback

Best Regards,
Medical Team, Micro Labs Ltd



AI to predict the chances of ventilator requirement for patients

When coronavirus patients are admitted, physicians have trouble determining which of them would need intensive care and a respirator. There are also common causes that come into effect, others that physicians are yet to truly grasp.



As such, computational scientists at the University of Copenhagen are now designing artificial intelligence-based computer models that quantify the probability of requiring a ventilator or intensive treatment for a particular patient. The latest project is being carried out in partnership with Rigshospitalet and the hospital Bispebjerg.

Algorithms can extract massive volumes of various sources of data. Next, they should consider similarities in the data from patients with Danish coronavirus that have been through the program up until now. Doctors therefore hope to recognise common characteristics within the patients most badly affected. That could turn out to be the amount of white blood cells, the utilization of other medications or something else.

Bispebjerg's chief physician Espen Solem and Frederiksberg Hospitals state they are conscious of some aspects that raise risk, such as age, alcohol, diabetes and cardiac attacks, but certain variables are involved. Young adults ended up on ventilators, even elderly people performing better without knowing why. Now the machine will detect trends which we can't recognize ourselves.



These trends are being contrasted with newly-hospitalized patient records. The documentation consists of X-rays, scans and assessments of patients collected around the time of their hospital admission, coupled with their electronic health reports. Both data must go to a supercomputer where our model determines in minutes how probable a single patient is to need a ventilator, and how many days must pass before such a need occurs.

While the templates will not be seen as a guideline for managing particular people, they can also be seen as a preparation method and can make a huge difference for medical personnel. This would be a huge benefit, according to Espen Solem, if we realize from the start that a particular patient is somebody we ought to devote special care to, and allocate resources for.

Progress on the machine models is ongoing this week and Mads Nielsen hopes to be ready in two or three weeks for the initial, rough ones. Mads Nielsen says they expect that their models will be utilized during this initial phase of coronavirus infections-otherwise, the second wave they foresee in autumn would be helpful. Perhaps the templates will also be shipped to areas where the pandemic is failed to grow as extensively as Denmark does.

Hospitals should be able to learn, using such templates, what proportion of hospitalized patients would potentially need a ventilator within a week. This allows them to prepare and distribute their capital in the best way imaginable.

E-Cigarette Associated Severe Lung Injury Needing Venovenous Extracorporeal Membrane Oxygenation

INTRODUCTION

Electronic cigarettes (E-cigarettes, ECs) are electronic products that heat a substance into an aerosol (vapor) for inhalation, typically consisting of propylene glycol and glycerol, with or without nicotine and flavors, contained in removable or refillable cartridges or a reservoir;

They have become increasingly common, particularly among young people, after ECs first appeared on the market in 2006. E-cigarettes are advertised as a cleaner and "healthier" option to regular cigarettes, and it is implied in the mainstream media that ECs enable smokers avoid long-term smoking, or allow smokers who are unable to fully quit smoking to minimize their tobacco product consumption. Nonetheless, the amount of nonsmoking teens using ECs with or without nicotine is growing significantly.

In addition to the possible adverse consequences of nicotine per se, the other significant safety issues about EC-use are the possible for hazardous aldehyde contaminants, such as formaldehyde, acetaldehyde, propanal and acrolein, which are believed to be produced as thermal decomposition products following heating of the key EC-liquid components propylene glycol and glycerol.

Certain pollutants inhaled by an EC-smoker during a "vaporization" session may include o-methylbenzaldehyde, carcinogenic nitrosamines, terpenic compounds such as limonene (probably used as flavoring agents by the manufacturers), as well as heavy metal and silicate particles ($> 1 \mu\text{m}$) like nanoparticles ($< 100 \text{ nm}$).

Ironically, it was also stated that the emission rates of aldehydes emitted by EC aerosols with and without flavorings are usually quite small and that elevated levels of formaldehyde pollution attributable to premature oxidation of propylene glycol can only be induced by unsustainable EC usage circumstances such as overheating (remaining) small EC-liquid levels in elevated-voltage cartridges. It produces the bad taste of "hot puffs" for EC-smokers and is why consumers generally avoid it.



Schematic of an electronic cigarette

The following case study reports a severe case of e-cigarette product use-associated lung injury with complex course requiring venovenous extracorporeal membrane oxygenation.

CASE PRESENTATION

After acute respiratory collapse and bilateral pulmonary ground-glass blindness on chest CT, a 17-year-old girl with gastrointestinal and respiratory symptoms was admitted to our PICU. She recorded a history of smoking e-cigarette that included either nicotine or delta-9-tetrahydrocannabinol oil prior to initiation of symptoms although thorough infectious workup was unrevealing. She was issued a probable diagnosis of lung damage connected with the usage of e-cigarettes or the smoking drug.

The PICU team started a high-dose IV methylprednisolone 1 mg / kg offer in conjunction with the pulmonology and medical toxicology. She proceeded to need positive pressure ventilation after incremental changes, and established pneumomediastinum with progression to stress pneumothoraces and a chronic air leak. Incapable of preserving the oxygenation, she was put for a sustained course on venovenous extracorporeal membrane oxygenation and had a tracheostomy role. Medical path, intensity, and variety of therapies have differed greatly in impaired patients around the world.

Respiratory symptoms were the most serious, but the spectrum of symptoms in the use-associated lung injury e-cigarette or vaping drug include constitutional symptoms (fevers, weight loss) and gastrointestinal symptoms (nausea, vomiting, diarrhea). Steroid use has, in many instances, culminated in significant health developments.

Many patients of serious disease, though, such as our resident, necessitated high-dose IV antibiotics, intubation, and venovenous oxygenation of the extracorporeal membrane. The underlying etiology and pathophysiology of lung damage connected with e-cigarette or vaping drug use remains unclear.

The disease is being vigorously monitored by the Centers for Disease Control and Prevention, along with state / local health authorities and the Food and Drug Administration.

Clinicians ought to be mindful of the recent e-cigarette or smoking drug use-related lung injury crisis, and inquire about smoking in patients with gastrointestinal and respiratory symptoms. Possibilities for diagnosis are anecdotal and include a multidisciplinary approach.

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Can Ferritin Levels Predict Poor Outcomes in Children with sepsis?

INTRODUCTION

An abrupt increase in ferritin is part of the natural host reaction to infection, and recent experiments in vivo and in vitro have demonstrated the immunomodulatory impact of ferritin and its specific subunits, light chain ferritin (L-ferritin) and heavy chain ferritin (H-ferritin). Among Brazilian children with extreme sepsis and septic shock, lack of increased ferritin response (ferritin level < 200 ng / mL) is correlated with 23 percent mortality, increased ferritin response (ferritin level 200–500 ng / mL) is associated with better result 9 percent mortality, and 58 percent mortality is associated with a hyperferritinemic response (ferritin level > 500 ng / mL). It indicates that an elevated amount of ferritin is beneficial during sepsis but that a dose is not too strong, perhaps because ferritin is injurious at higher doses or hyperferritinemia is a sign of injurious hyper-inflammation.

This study is performed to determine serum ferritin assessed as a prognostic marker within 48 hours of admission, and to investigate the correlation with adverse results in a pediatric patient population with sepsis and high prevalence of iron deficiency anemia in which this biomarker is regularly calculated.

METHODS

All patients 6 months to 18 years old (n = 350) admitted with a diagnosis of sepsis, suspected or proven, were eligible for inclusion. Exclusion criteria were length of PICU stay less than 8 hours and inherited or acquired disorder of iron metabolism that could interfere with serum ferritin levels.

RESULTS

Three-hundred twelve patients had their ferritin levels measured within 48 hours, and only 38 did not. The prevalence of iron deficiency anemia (hemoglobin < 11 g/dL) and mean corpuscular volume < 80 fl was 40.3%. The median of the highest serum ferritin level within 48 hours was 150.5 ng/mL (interquartile range, 82.25–362 ng/mL), being associated with mortality ($p < 0.001$; Exp(B), 5.170; 95% CI, 2.619–10.205). A 10-fold increase in ferritin level was associated with a five-fold increase in mortality. There was a monotonic increase in mortality with increasing ferritin levels ($p < 0.05$). Regarding the discriminatory power of ferritin for mortality, the area under the receiver operating characteristic curve was 0.787 (95% CI, 0.737–0.83; $p < 0.0001$).

CONCLUSIONS

High levels of Serum ferritin predicts mortality in children with sepsis admitted to the ICU. It can be an important biomarker that can easily be monitored. Although this study was done in iron deficiency prevalent country of south America it would be interesting to know if this trend is present globally too



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