

MESSENGER

News and Information from  Charter Main

Covid-19 Update and Information

For those of us fortunate enough to hunker down and stay indoors during the current COVID-19 pandemic, our thoughts go out to the health care workers in our hospitals looking after our sick and infirm. We are lucky to have such dedicated individuals who day to day flirt with an invisible enemy, striking at random, striking some with lethal ferocity others mildly, seemingly with no discernible pattern.

As you take precautions every day to avoid illness and your infectious disease control personnel look at every aspect of your daily working lives to protect you and your loved ones, they are demanding greater guarantees that the scans you perform and the equipment you use, meet the highest standards of health and safety for both you and your patients' protection.

With this in mind, over the past few weeks Charter Main Medical Technologies has received many calls from technologists to provide documented assurances that the equipment and consumables used to perform V/P S.P.E.C.T. lung images are safe and meet the highest standards of safety and cross-contamination control. **At the outset, the V/P S.P.E.C.T. scan should ALWAYS be performed.**

A Perfusion-only study DOES NOT supply all of the information required to provide a definitive diagnosis. Many things are going on in the lung which only a Ventilation study, in concert with a Perfusion study, can detect. The synergy of these two scans can provide much valuable information of the total lung function. It may be that vascular defects are developing, such as vasculitis, as the COVID-19 virus attacks the capil-

laries too. The extent of functional parenchymal changes might be much greater, morphologically, than can be visualised on CT.

What I hope to do in this Newsletter is give you confidence that the consumables and equipment used in a V/P S.P.E.C.T. study are perfectly safe and have many built in safe-guards to prevent cross-infection.

COVID -19 is one of many corona viruses.

The information should satisfy the closest scrutiny of your infectious disease professionals. First of all a bit about the disease. We know that it is called COVID-19 but the virus that causes the disease is named severe acute respiratory syndrome coronavirus 2 or SARS-CoV-2 (3).

COVID-19 is one of many corona viruses. It is primarily a respiratory disease and therefore may require a lung Ventilation scan to achieve a definitive diagnosis.

It is called COVID-19 to avoid confusion with other corona viruses like, SARS-CoV (severe acute respiratory syndrome), H1N1, and MERS-CoV (Middle East respiratory syndrome)—all outbreaks of corona viruses which have occurred in the past 20 years. Corona viruses are a family of viruses that cause respiratory infections from the common cold to much more severe, life-threatening diseases. According to the World Health Organisation (WHO) the virus is spread when someone inhales the droplets containing the virus after someone coughs or sneezes or touches a surface that is contaminated then touches their eyes, mouth or nose (1,2).

As with all corona viruses, prevention is better than cure. Good hygiene, social distancing, staying at home when ill, avoiding crowded situations, and washing hands each time you cough or sneeze are essential (7,8,9).

In the hospital setting, practicing hand-hygiene whenever you touch any surface is mandatory.

BUT.

COVID-19 virus may survive on copper for 4 hours, on cardboard for 24 hours and 72 hours on stainless steel and plastic. These figures are subject to dispute with some suggesting that COVID-19 may survive on copper for 18 hours, 55 hours on cardboard, 90 hours on stainless steel and up to 100 hours on plastic. Three hours seems to be the time that the virus can remain viable airborne (4,16).

So the general rule seems to be that if you touch something, no matter what, clean your hands BEFORE touching your mouth, nose or eyes.

Use of masks remains a contentious issue. W.H.O. tells us that the use of masks is only necessary if a person is coughing or sneezing or when taking care of someone with a suspected infection (6). Some countries mandate their use, local rules vary and the masks must be changed regularly to avoid saturating them and trapping the virus on moist surfaces.

This of course has led to hoarding and speculation and to price increases of up to 6 fold for masks while N95 respirators and gown prices have tripled. COVID-19 uses the enzyme ACE2 to access host cells. This enzyme is found most abundantly in type II alveolar cells of the lungs. The virus hitches a ride on the ACE2 enzyme and enters the host cell (5). Disease progression can lead to respiratory failure and

death.

The standard method for testing is reverse transcription polymerase chain reaction (rRT-PCR), (10) though one Chinese study found that CT scans showed ground-glass opacities in 56% of patients but 18% showed no radiological findings (11).

The corona virus is about 125 nano-meters in diameter. However, it often travels in biological aerosols through coughing and sneezing and in this instance the COVID-19 virus and its carrier aerosol may measure between 500 nano-meters and 3,000 nano-meters (13).

The size of Technegas particles have been estimated by Senden et al. at between 30 to 60 nano-meters (14). Lemb et al. established that the Technegas particles were between 60 and 160 nano-meters in size and settled on average size of 97 nano-meters (15). It would be safe to therefore assume that the size of a Technegas particle is probably around 100 nano-meters but may be much smaller depending on the efficiency of the production process.

The Technegas generator has a non-return valve preventing internal contamination of the generator and it is virtually impossible for air to be blown back into the generator. The single use, disposable consumables in the Venti-Set kit are the interface between the Technegas generator and the patient. There are several important points to make about the kits:

1) Non-return valve. The kits ALL have a non-return valve to prevent the possibility of contaminating the generator (see diagram below)

2) The HEPA filter within the Vent-medis consumable complies with the standard and filters 99.99985% of all particulates (specifications of the HEPA filter available upon request). As mentioned above, the size of a Technegas molecule is of the order of 100 nano-meters. The size of a COVID-19 virus is of the order of 125 nano-meters (up to 500 nano-meters and more as an aerosol). Additionally, IF Technegas was getting through the H.E.P.A. filter, the camera room would be contaminated VERY quickly. It therefore stands to reason that since this DOES NOT occur and a particle the size of Technegas is trapped in the filter that

a virus bigger than the Technegas molecule should also be trapped. The HEPA filter works by capturing microbes, dust and particulates. The filter consists of a complicated mix of filaments and fibres that carry a static charge which attracts microbes and particles like a magnet. On their way through the filtration system the particles are captured and retained in the filter. In addition, Brownian Motion occurs further adding to the entrapment process (13).

ONLY ARGON AND AIR ESCAPE INTO THE ATMOSPHERE!!!

3) Another point to make is the larger diameter of the tubing used in the Vent-medis consumable. This may seem trivial BUT these COVID-19 patients and, for that matter all patients with a compromised respiratory system, find breathing difficult and the larger tubing allows for greater patient comfort.

4) And finally the issue of "social distancing" must be addressed.

a) Technegas requires the patient to breathe only two or three times to achieve the required count rate in the lung. This is in comparison to several minutes using conventional swirlers or DTPA devices. This reduces the risk of contamination for staff

b) It is possible that a mask can be strapped to the mouth of a COVID-19 suspected patient and that the patient is then ventilated by use of the Easy-Breather whereby the staff member could be safely at the required distance while the patient breaths.

c) A separate room could be established for patients suspected of carrying the COVID-19 virus. Specially trained staff could then perform the V/P S.P.E.C.T. scan.

d) If dramatic Ventilation changes are indeed occurring in real practice, and this is yet to be established, before being detected on CT, then a small dose of Technegas could be administered initially and perhaps a Planar scan performed. If there are no abnormal features seen then a normal V/P S.P.E.C.T. scan can follow as it would be unlikely that the patient is carrying the COVID-19 virus. These investigations await an intrepid investigator!!

e) The remote delivery button on the Technegas generator could

also be used. The patient could be made ready, mask strapped to them and Technegas remotely administered.

f) Finally, a Perfusion-only scan still requires the technologists to inject patients.

Finally, we have to bear in mind the situation we may be facing:

A patient, who does not know that he or she is carrying the COVID-19 virus enters the doctor's office coughing, sneezing and spluttering. He or she opens and closes doors and touches things while in the waiting room like books then pays for the service and keys in their P.I.N. They may be referred to a specialist hospital for further tests like a V/P S.P.E.C.T. lung scan. All the while, while they may be symptomless, they are infectious as the virus incubates and they are spreading it whenever they breathe or touch anything.

In the scanning room, once again, whether patients are adhering to social distancing regulations or not, if they are elderly requiring assistance to get onto and off tables for the scan, staff can only be protected by adhering to the rules themselves.

I hope that the points made in this letter make a difference to your daily lives and TAKE CARE.

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From Charter Main *Medical Technologies*

Charter Main Medical Technologies is a medical technology company established to provide Imaging Solutions to the medical community.

Its aim is to provide options to support your nuclear medicine imaging business with respect to the purchase of:

1. Vent-medis disposable kit for Ventilation scintigraphy – a cost-effective generic medical device manufactured and CE registered in Europe used to deliver a lung imaging agent, ‘Technegas’, to patients in a V/P S.P.E.C.T. imaging study.
2. Software to assist the interpretation of V/P S.P.E.C.T. lung imaging (coming soon).
3. Service and maintenance of your Technegas generators.

While Charter Main Medical Technologies is a new company, it has aligned itself, through strategic distributor arrangements, with some of the largest service providers globally. In Australia and New Zealand, it is represented exclusively by Landauer Australia P/L which will provide the services and products needed by nuclear medicine specialists in performing imaging studies.

Charter Main Medical Technologies, as represented by Landauer Australia P/L will ensure that your old and reliable Technegas generators will be maintained at full functional capacity and performance levels through our services.

Charter Main Medical Technologies will also provide you with discounted and cost-effective Vent-medis kits, a disposable, single-use-only medical device to deliver the radio-labelled lung imaging pseudogas (Technegas) into your patients’ lungs. Vent-medis kits have a large, high purity crucible of 0.3mL capacity and pure carbon contacts and all are TGA registered (ARTG No: 319260).

IN MOST INSTANCES YOUR OLD TECHNEGAS GENERATOR CAN BE REINSTATED AND BROUGHT BACK TO FULL FUNCTIONAL CAPACITY AND CHARTER MAIN MEDICAL TECHNOLOGIES HAS THE EXPERTISE AND KNOWLEDGE TO MAINTAIN YOUR EQUIPMENT.

The Technegas Generators are robust devices designed and manufactured to operate for many, many years when professionally serviced and maintained.

In conclusion, if you are cost conscious regarding your lung imaging infrastructure and costs of consumables (Vent-medis sets), then Charter Main Medical Technologies looks forward to providing you with excellent and proven maintenance and repair services.

Yours truly,

Your Dedicated

Charter Main Support Team

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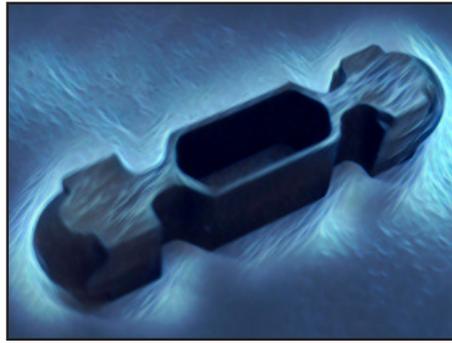
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Vent-Medis disposable kit for Ventilation Scintigraphy

**Large 0.3ul
highest purity
graphite crucible**



Vent-Medis Kits include the improved high-purity, high-volume carbon crucible with a 0.3ul bowl capacity. This crucible saves time and minimises multiple simmers allowing the use of dilute Tc-99m generator elutions thus reducing operator radiation exposure.

**Rugged design
smooth-bore
patient
delivery set**



The inhalation breathing unit contains a high efficiency HEPA, exhalation filter, T-piece with robust non-return valve, a robust one meter smooth-bore tubing with 15mm inner diameter and the special generator connection. A rigid mouthpiece and a nose clip complete the set.

**High purity
and long life
graphite
contacts**



With every Vent-Medis Box you get one pair of high-purity carbon contacts for 50 scintigraphic examinations. The carbon contacts are very robust and fit the Generator specifications with great contact reliability.

Vent-Medis Kits -

Larger volume crucible equals more efficient use of dilute Tc-99m eluate

High-Efficiency HEPA filter

Time and cost saving

Less radiation through reduced simmers

Improved and more reliable crucible contact

More rugged design

Improved packaging

TGA Certified

Reliability of supply

CE marked

Major price advantage

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