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T-Control, in the era of COVID-19

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Introduction

In December 2019, a new phenomenon of unknown magnitude for our current society kicked off, with the appearance of a new virus and, consequently, a new disease of respiratory origin, in China. Due to the extremely rapid transmission and the initial lack of knowledge about the behavior of the virus, this event has shown the shortcomings of each country and each healthcare system, globally. Thus, the healthcare problem turned into a public health, social and economic problem as well.

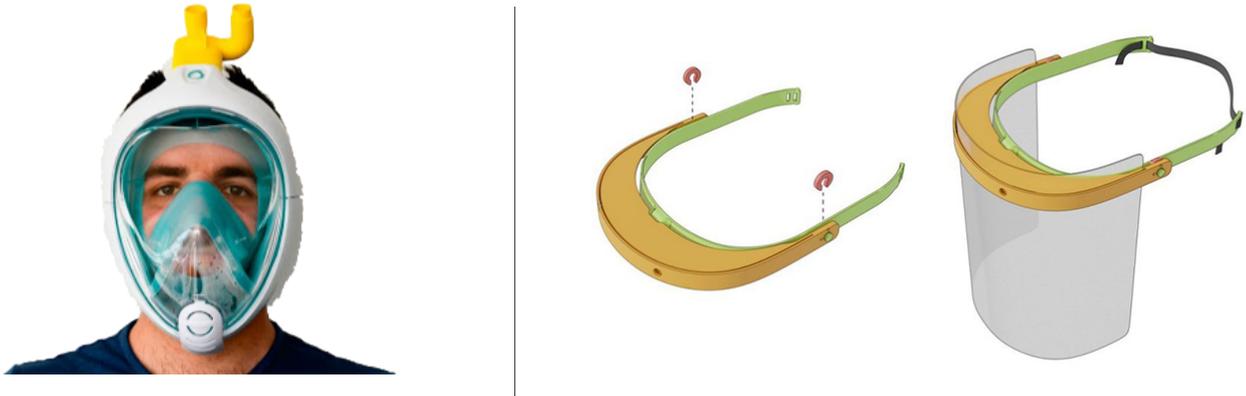
A few months later, we already began to see clearly which were the most successful strategies and which were the most important deficiencies that aggravated the problem.

Taking into account the initial denial and the lack of information, one of the most serious shortcomings was not providing adequate protection devices to the healthcare personnel, that not only helped the disease to spread, but also put the healthcare professionals' health at risk. Thousands of them had to be isolated, just when the demand for their work started to soar.

In Spain, nearly 48,000 healthcare workers have been infected and many more have had to be isolated, even without actually testing everyone.

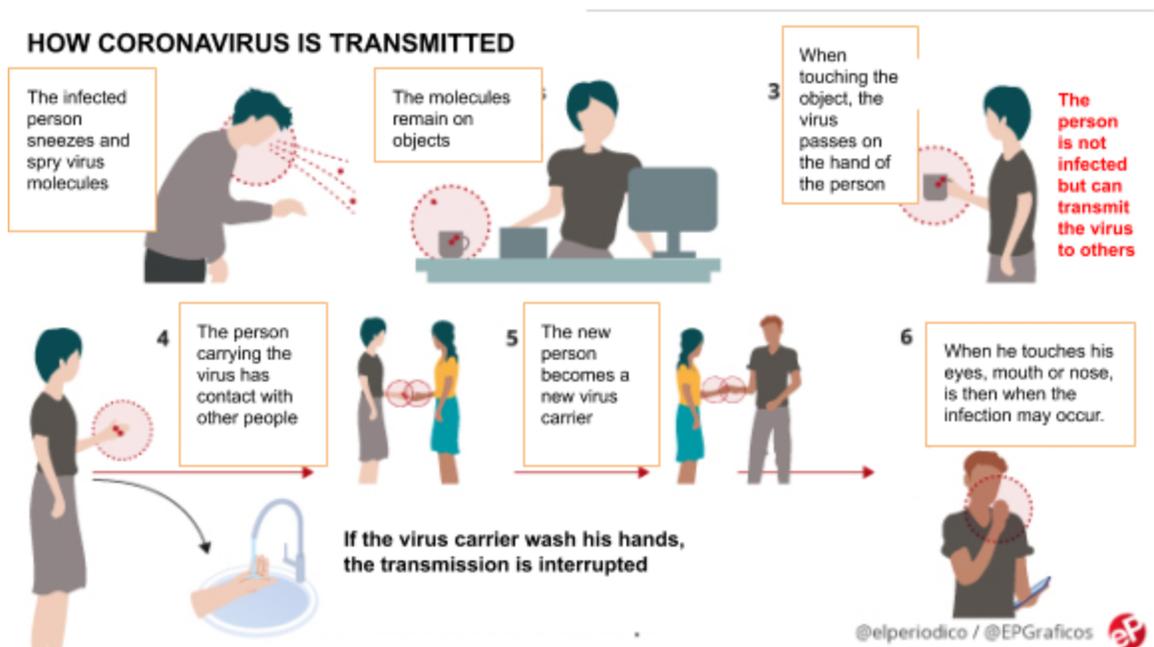
R&D solutions

Once aware of the high contagiousness and lethality of this virus, huge efforts have been made in order to manufacture those specific devices that can prevent the spread of the virus, mainly through the respiratory route. The focus was placed on the creation of different types of masks, screens, nebulizers, etc.



The transmission of COVID-19

There are still quite a lot of aspects to be investigated and cleared. It seems that Covid-19 is not only transmissible through the orally exhaled droplets, as can be seen in the following image.



Although this image is of great help to the general population, it falls short for healthcare professionals, who are today still exposed to other body fluids possibly transmitting COVID-19. They require higher protection, due to the continuous exposure to patients affected by the virus.

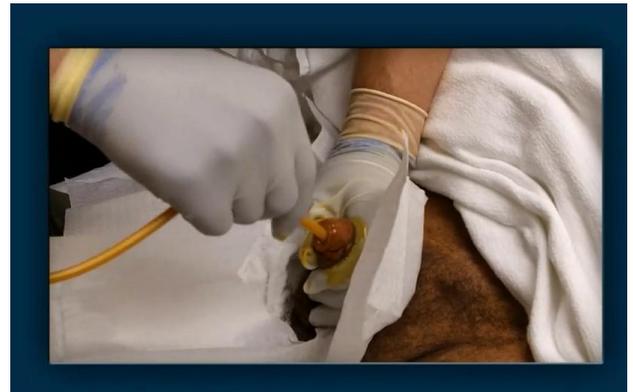


In a study conducted by scientists of the Public Health Center of Shanghai¹, it was observed that 6.9% of the patients showed COVID-19 in their urine sample. Moreover, 75% of these were still positive after the nasopharyngeal samples had turned to be negative.

Furthermore, an animal study² showed that animals excreted the virus in the urine for up to 8 days after the infection.

An additional human study³ in China detected the virus in urine, even without urine irritation and finally, in April 2020, a new study⁹ was published about infectious virus isolated from urine.

In May 2020 a German study³ showed not only the virus detected in urine, but also the identification of other abnormalities in the urine sample in those patients with worse prognosis. These abnormalities included blood presence in urine as well.



During the insertion of a bladder catheter, the healthcare personnel is exposed to urine leaks and spillages, as the catheter reaches the bladder and urine is drained. In case of acute urine retention, the pressure is even higher when the urine leaves the bladder, increasing the risk of spillages or leakage.

¹ Yu ling, The persistence and clearance of viral RNA in 2019 novel coronavirus disease survivors, 2020

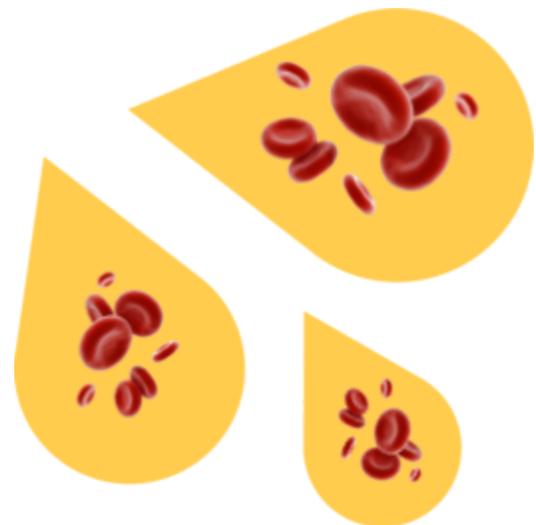
² Youngll Kim, Infection and Rapid Transmission of SARS-CoV-2 in Ferrets,2020

³ Oliver Gross, COVID-19-associated nephritis: early warning for disease severity and complications?, 05/20

Urine drained from the bladder is not always pure. Due to the insertion of the catheter itself and especially in patients who present an added difficulty for catheterization, such as patients with prostate hypertrophy, the urine may be accompanied by blood.

A study of 294 patients with acute urine retention showed that around 11% of the catheterized patients had hematuria⁴.

The chances of contagion in these circumstances can be significantly higher, not only in the case of COVID-19, but also in other serious cases, such as Ebola or Sars, whose presence has been proven, in - apart from blood - urine as well.



Total Cases (worldwide)

Total Cases = total cumulative count (4,355,466). This figure includes deaths and recovered or discharged patients (cases with an outcome).



Source: Worldometer - www.worldometers.info [1]

Taking into account that about 6% of the infected may need to be admitted to the ICU⁵, probably be connected to a ventilator and be catheterized, this would mean **261,300 patients worldwide** today, based on the number of cases officially confirmed by the WHO. If we add to this figure all the patients that are admitted to hospital and need to be catheterized, the total number may be even higher.

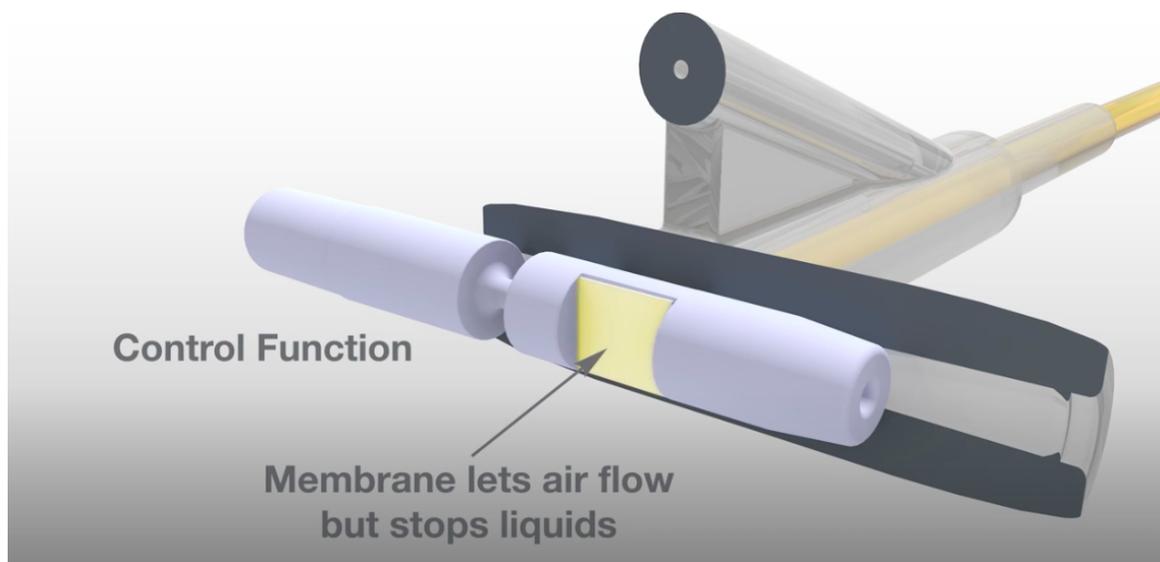
⁴ Cristopher Gabriel, Hematuria Following Rapid Bladder Decompression

⁵ Jason Phua MRCP. Intensive care management of coronavirus disease 2019 (COVID-19): challenges and recommendations

¿How can T-Control help to protect our healthcare professionals?

T- Control is a urinary catheter that -thanks to an integrated valve- offers full control of the urine flow at all times. This means that from the very first contact, the removal of the device from its original packaging, it guarantees the safety of the healthcare professional who performs the insertion.

Thanks to a specially designed membrane in the device, the air gradient is allowed to leave the system, but - although the urine flow is still visible - the urine can not leak at any time in any way.



Once the healthcare professional is ready and prepared, and so decides, can the urine start to flow into a sample taking container, a reusable container for its measurement and subsequent recording, or the collection bag, in case the healthcare professional considers it needed. This allows us to comply with the prevention recommendations of the Spanish Association of Urology⁶, among others, in a much more effective way.

Once the insertion process is finished, the valve enables us to open and close the urine flow without excessive manipulation of the device, and at the same time keeps the urine from

⁶ <https://www.aeu.es/Noticias.aspx?IDN=4225>

staining the patient's clothing, sheets, etc., which could generate exposure to biological fluids again, with additional workload and time needed to properly clean the environment.

According to the WHO guidelines, following the recommendations for sanitation and hygiene in healthcare settings is extremely important in order to provide adequate care for patients and protect the healthcare personnel from risks of infection. These include the safe management of excreta (feces and urine), with emphasis on ensuring that no one comes into contact with these substances without protection and that they are treated and disposed correctly.

It should be noted that in Spain, in mid-May 2020, about 20% of the infected patients have been health workers.

Summary

After seeing the immense dimensions of the impact of this virus, and considering that no health system can be perfectly prepared to respond to a challenge of this magnitude, we must place more emphasis on preventing and reducing the risk of those factors that we do know and we can influence.

With the help of adequate protection devices, we can improve the effectiveness of our response to situations, which are similar to the current one, in the following ways:

- Reducing additional risks related to still unknown agents and illnesses
- Slowing the transmission
- Offering protection to the healthcare staff and reducing their occupational risks
- Reducing the workload
- Obtaining immediate cost-savings in the short term in extreme situations as the current one and obtaining cost-saving on the long term, in general

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