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THE UROLOGIST, PERSONAL PROTECTIVE EQUIPMENT (PPE) AND COVID-19: A REVIEW OF CURRENT CHALLENGES AROUND THE USE OF PPE AS WELL AS MEASURES TO REDUCE THE RISK OF NOSOCOMIAL COVID-19 TRANSMISSION

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ABSTRACT

Background and Objective

To review the literature from a urologist's perspective regarding the use of Personal Protective Equipment (PPE), associated challenges, and other potential measures that can be taken to reduce the risk of nosocomial COVID-19 transmission.

Material and Methods

A literature review using PubMed, Cochrane Review, and Google Scholar database search was performed using the keyword terms "COVID-19", "Coronavirus", "Personal Protective Equipment" (PPE), "healthcare workers" (HCW), "protection", "masks", and "urology". Non-English articles were excluded. We present a summary of key guidance provided by regulatory bodies as well as some of the key articles published to date relating to PPE.

Discussion

SARS-CoV-2 virus is found mainly in the respiratory system but is also in blood, feces, semen, and urine. Both standard infection control precautions (SICPs) and transmission-based precautions (TBPs) are necessary to reduce nosocomial transmission of COVID-19 infection. PPE includes gowns, gloves, masks or respirators, goggles, and face shields; however, wearing PPE is only part of many precautionary measures that are necessary to prevent viral transmission. When used appropriately PPE not only protects HCWs from patients but also protects patients from HCWs who may be asymptomatic carriers of COVID-19 infection. Attention should also be paid to fit testing and fit checking, donning and doffing, and ever-evolving guidelines on PPE. Wearing PPE for a long time is also technically challenging and may adversely affect surgical outcomes. Shortages of PPE in the supply chain during the peak of the pandemic as well as concerns about substandard PPE should be considered for a possible second wave of COVID-19. Other key measures to minimize nosocomial SARS-CoV-2 virus transmission are a symptom and temperature screening of patients and staff; controlling the flow of patients, staff, and relatives in hospitals; self-isolation by patients before elective surgery; a robust testing protocol for both patients and staff; patient and staff cohorting; physical distancing; good hand hygiene; respiratory etiquette including face coverings for patients, staff and visitors;

proper disposal of waste and enhanced cleaning; thorough cleaning and sterilization of surgical equipment performed post-operatively; choosing suitable anesthetic methods to minimize aerosolization of the virus; and if possible ensuring a negative-pressure theatre environment while dealing with COVID-19 positive patients. As scientific and regulatory bodies continue to issue updated guidance as more data is collected and a better knowledge base is developed regarding COVID-19 employers and staff need to keep up to date with guidance also.

Conclusion

COVID-19 will be around for the foreseeable future and infection rates may fluctuate as restrictions are eased. HCWs including urologists should take appropriate PPE measures not only in theatres, clinics, and endoscopy suits but also when performing simple tasks such as urine dipsticks, catheter, nephrostomy management, digital rectal examination (DRE), prostate biopsies, etc. as SARS-CoV-2 can be detected in feces, urine, and semen. Both employers and HCWs should adhere strictly to current guidelines and work together to minimize nosocomial transmission of COVID-19 infection.

Keywords: *COVID-19; Coronavirus; Personal Protective Equipment (PPE); healthcare workers (HCW); protection; masks; urology*

INTRODUCTION

Since the first report of COVID-19 in December 2019, over 33 million people have been confirmed positive on testing with more than 1 million lost lives globally.[1]

Healthcare workers (HCWs) who are exposed to high-risk aerosol-generating procedures (AGP), including anaesthesiologists, otolaryngologists, ophthalmologists, maxillofacial surgeons, neurosurgeons, and laparoscopic surgeons are at greater risk of occupational exposure to COVID-19 infection compared to other HCWs. However, urologists are also at risk of occupational exposure to the disease as SARS-CoV-2 RNA has also been found in blood, feces, semen, and urine.[2,3] SARS-CoV-2 can be detected for longer periods in stool samples compared to respiratory and serum samples in COVID-19 positive patients.[4] It is therefore possible that digital rectal examination (DRE), taking a prostate biopsy, or performing procedures that involve urine exposure could increase the risk of disease transmission.

Hence, the urologist needs to be familiar with Personal Protective Equipment (PPE) and other preventive measures to ensure they protect not only themselves and other staff from the risk of infection but also reduce the risk of transmission of COVID-19 to their patients.

METHODS

A literature review using Pubmed, Cochrane Review, and Google Scholar database search was performed using the keyword terms "COVID-19", "Coronavirus", "Personal Protective Equipment" (PPE), "healthcare workers" (HCW), "protection", "masks", and "urology". Non-English articles were excluded. We present a summary of key guidance provided by regulatory bodies as well as some of the key articles published to date relating to PPE.

DISCUSSION

1. SARS-COV-2 DETECTION IN URINE AND STOOL

COVID-19 can lead to the development of severe acute respiratory syndrome (SARS). The virus is mainly isolated from respiratory specimens i.e. nasopharyngeal and oropharyngeal swabs, sputum, lower respiratory tract aspirates, and broncho-alveolar lavage.[4] However, it is also found in blood, feces, semen, and urine.

The proportion of urine specimens with detectable SARS-CoV-2 in confirmed COVID-19 patients is very low despite the expression of viral receptor Angiotensin-Converting Enzyme (ACE) - 2 in the urinary tract including kidney, bladder, and testes.[2,3] One study which included 274 urine specimens of 74

COVID-19 patients found positive urine samples in 2 patients. The live virus could not be isolated by culture from these 2 positive specimens.[4] Another small study detected SARS-CoV-2 in one patient's urine out of 9 patients included in the study.[5] However, none of the 72 urine samples tested positive in another relevant study.[6] A single case report did culture viable viral cells in urine 12 days after the patient was diagnosed with COVID-19.[7] A systemic review and meta-analysis on the presence of SARS-CoV-2 virus in urine of infected patients found 3.7% of urine samples from 430 patients to be positive for the virus, albeit with low viral loads in most patients.[8] Urologists should keep this in mind while performing endourological surgeries or procedures that expose them to urine.

Several studies have found that stool specimens can remain positive for SARS-CoV-2 for much longer periods than respiratory and serum samples.[9,10] One study found SARS-CoV-2 RNA in 8 out of 74 COVID-19 patients where 129 stool samples were examined.[4] This also may be important during urology procedures, for example, performing DRE and transrectal or transperineal biopsies of the prostate.[11]

Although the significance of positive urine or fecal specimen is unclear, it would be prudent to exercise caution during urological procedures until more evidence becomes available on the potential transmission of COVID-19 through urine and stool samples.

2. The Risks for Patients Undergoing Surgery

An area of significant concern for patients and surgeons has been the risk of acquiring COVID-19 as a healthcare-associated infection (HAI) while having surgery with the risk of increased peri and postoperative morbidity and mortality.

An international, multicentre, cohort study analyzed 1128 patients who underwent surgery during the pandemic (emergency surgery 835 patients, elective surgery 280 patients) and had SARS-CoV-2 infection confirmed within 7 days before or 30 days after surgery.[12]. Preoperatively, 294 (26·1%) patients had confirmed SARS-CoV-2 infection. Overall pulmonary complications was observed in 577 (51·2%) patients - 428 (51·3%) after emergency surgery and 147 (52·5%) after elective surgery (p = 0·873). In total 268 (23·8%) patients, 214 (25·6%) following emergency surgery and 53 (18·9%) following elective surgery, passed away within 30 days of the procedure (p = 0·020). Urological surgery accounted for 3.3% of the surgical procedures in this study with pulmonary complications in 57.1% of patients and a mortality rate of 32.4%. There was no difference in postoperative pulmonary complications and 30-day mortality rates between patients with a pre-operative and post-operative diagnosis of COVID-19 infection. 30-day mortality in patients with pulmonary complications was around 38% (219 of 577), which accounted for nearly 82% (219 of 268) of all deaths.

Patients with SARS-CoV-2 infection experienced a noticeably more post-operative pulmonary complication and mortality compared to the baseline figures reported in the literature before the COVID-19 pandemic. For example, the 30-day postoperative mortality rate in SARS-CoV-2 infected patients (23.8%) was greater than even the highest-risk subgroups of the 2019 NELA report which stated 30-day mortality rates of 16·9% in patients having a high pre-operative death risk, 16·8% in patients with an unpredicted admission in the critical care unit, and 23·4% in frail patients aged over 70 years.[13]

Just above 70% of patients became COVID-19 positive in the post-operative period. It is possible that the pre-operative COVID-19 testing strategy was inadequate or that some of the patients had false-negative COVID-19 swab tests pre-operatively. However, it is also possible that patients may have contracted COVID-19 through nosocomial infection during or after their surgery.

Another study that assessed the feasibility of non-emergency surgery in a COVID-19 cold site during the pandemic demonstrated that out of 500 patients only 10 (2%) had COVID-19 infection post-operatively.[14] Three patients (1%) passed away within 30 days of surgery; however, no mortality was noted due to COVID-19 infection. Grade 3 or more Clavien-Dindo complications were recorded in 33 patients (7%) overall and in only one patient (3%) with post-operative COVID-19 infection. Their conclusion was proper pre-operative testing, better PPE measures and COVID-19 free green sites for surgery may reduce the death rates and complications following surgery during the current pandemic.

Therefore, screening for COVID-19 preoperatively is vital, and delaying surgery in COVID-19 positive patients is essential if possible. There is also a need for an open discussion with patients around the risk of getting COVID-19 infection in the peri and post-operative period and the higher risk of COVID-19 associated pulmonary complications after surgery during the pandemic. Non-urgent procedures should be postponed and non-operative treatment if possible should be the preferred option in non-urgent cases.

3. Risk to HCWs

A recent study using a with in hospital Susceptible - Exposed - Infectious - Recovered (SEIR) transmission model highlights that around 20% of COVID-19 infections in patients occur while in hospital, and 89% of COVID-19 infections in HCWs were due to nosocomial transmission.[15] Noticeably, most of the infections in HCWs were due to infections occurring between staff rather than infection from patients.

Another study reported the incidence of COVID-19 infection in asymptomatic HCWs at a London hospital.[16] Of 400 asymptomatic staff who had nasal swabs at different time-points, the COVID-19 positive rate was 7.1% initially. However, this reduced to 1.1% amongst 269 HCWs after 5 weeks. Eight of the HCWs had more than one positive test. It has been suggested that nosocomial infections may have been reduced with the use of effective PPE.

According to the Chinese Centre for Disease Control and Prevention, only 3.8% of all COVID-19 cases were healthcare workers. Although 15% of the cases were classified as severe or critical, the mortality rate in this group was 0.2%.[17] Infection rate among the HCWs was as high as 29% in the earlier stage of the pandemic; however, this decreased dramatically possibly due to improved and more robust PPE measures being put in place for the protection of healthcare workers.

4. Measures to Reduce Nosocomial Transmission

Both standard infection control precautions (SICPs) and transmission-based precautions (TBPs) are necessary by HCWs when looking after patients with a known or suspected infection.[18,19] Key measures to minimize HAIs include symptom and temperature screening of patients and staff; controlling the flow of patients, staff, and relatives in hospitals; self-isolation by patients before elective surgery; a robust testing protocol for both patients and staff; patient and staff cohorting; physical distancing; good hand hygiene; respiratory etiquette including face coverings for patients, staff and visitors; proper disposal of waste and enhanced cleaning. Also, appropriate hand washing during and after a procedure, thorough cleaning and sterilization of equipment performed post-operatively, choosing suitable anesthesia methods to minimize aerosolization of the virus, and if possible using a negative-pressure theatre environment for dealing with COVID-19 positive patients can reduce virus transmission in the peri-operative period. Finally, the concept of the clean COVID-19 site should include not only the hospital and patients but the staff that works there. The Centre for Disease Control and Prevention (CDC) and Public Health England (PHE) have published detailed guidance on infection prevention and control measures which if adhered to should reduce hospital transmission of COVID-19.[20–22]

5. PPE In Use

The use of PPE is primarily to protect healthcare staff from patients, but it can also protect patients from staff who are asymptomatic carriers of COVID-19.[20–22] It is therefore essential for urologists to wear the correct PPE to protect not only themselves but also their patients from possible infection.

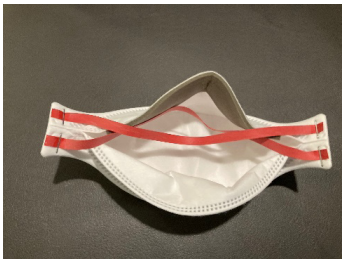
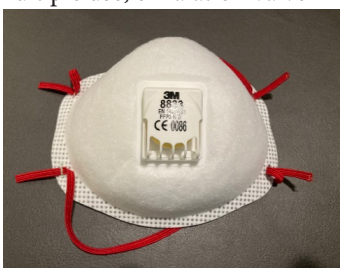
There are different types of PPE, including gowns, gloves, masks or respirators and goggles or face shield. A summary of the available face masks or respirators is presented in Table 1. Filtering facepiece - 3 (FFP3) surgical respirators are not fully fluid-resistant unless 'shrouded'. Facepiece respirators with an exhalation valve can make it quicker and easier to exhale air compared to non-valved respirators. Therefore, they may be more comfortable to wear, and less moisture builds up inside the respirator. However, the valved respirators can also let particles out from the wearer into the air without filtering because the valve opens when exhaling and thus can contaminate a sterile field. Powered air-purifying respirators (PAPR) also carry the same risk of contamination of a sterile field from the unfiltered exhaled air.

TABLE 1 A Summary of the Commonly Available Face Masks and Respirators

Face Masks/ coverings	Filtration Effectiveness	Advantages	Disadvantages
 Single-use surgical mask Type II	3.0 microns > 95% 0.1 microns 0%	• Comfortable • Cheap	• No protection against smaller airborne particles • No splash protection
 Fluid resistant surgical mask (FRSM) Type IIR	3.0 microns > 95% 0.1 microns > 95%	• Protects against large droplets	• Chance of leakage around the edges
 Surgical mask, Off-The-Face/ Anti-Fog Tie-on fastening with a duckbill pouch design	3.0 microns > 95% 0.1 microns > 95%	• Anti-fog properties • Splash/fluid resistant • Comfortable and breathable • Hypoallergenic	• Chance of leakage around the edges
 High fluid resistant surgical mask	3.0 microns > 95% 0.1 microns > 95%	• Level 3 fluid resistance. Passes highest level of protection (160 mmHg) as per the American Society for Testing and Materials (ASTM)	• Chance of leakage around the edges
 Fluid resistant surgical mask (FRSM)Type IIR with visor extension	3.0 microns > 95% 0.1 microns > 95%	• Protects eyes from splashes	• Chance of leakage around the edges

(continued)

TABLE 1 (continued)

 Filtering facepiece respirator (FFR) - disposable, no valve	American Standard • N95 - 0.3 microns > 95% • N99 - 0.3 microns > 99% • N100 - 0.3 microns > 99.97% European Standard - Filtering face piece (FFP) • FFP1 - 0.3 microns > 80% • FFP2 - 0.3 microns > 94% • FFP3 - 0.3 microns > 99%	• Reduces exposure to small particles • Tight fitting allows minimal leakage • N99 is an alternative to FFP3	• Expensive compared to surgical mask • Not fluid resistant • No protection against gases and vapours • Wearer may experience breathing resistance
Filtering facepiece respirator (FFR) - multiple use, exhalation valve 	Same as disposable FFR	• Can be reused • Less breathing resistance	• Potential risk of contamination of a sterile field from the unfiltered exhaled air
 FFP3 Type IIR, Shrouded valve	0.3 microns > 99%	• Additional splash resistance	• Expensive compared to FFP3
 FFP3 mask with goggles	0.3 microns > 99%	• Additional eye protection	• Expensive compared to FFP3

(continued)

TABLE 1 (continued)

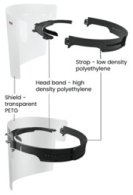
 Elastometric half facepiece respirator	Filters are available in three efficiency levels – N95, N99 and N100	• Reusable • Protection against gases and vapours • Better fit due to adjustable straps	• Needs replacement of cartridges/ filters • If with exhalation valve, potential risk of contamination of a sterile field from the unfiltered exhaled air
 Elastometric full facepiece respirator	Filters are available in three efficiency levels – N95, N99 and N100	• Additional eye protection	• Same as half facepiece
 Powered air purifying respirator (PAPR) with a loose-fitting hood	0.3 microns > 99.97%	• Can be used if not N95 fit-tested, failed fit test or having facial hair • Significant splash protection • Protection against gases and vapours • Reusable • Low breathing resistance • Easy to see the wearer's face	• expensive compared to N95 • May interfere with visual field • May interfere with hearing • Batteries need recharging • Needs trained staff for maintenance and disinfection • Potential risk of contamination of a sterile field from the unfiltered exhaled air

Concerns have therefore been raised about the use of valved facepiece respirators and PAPRs in a surgical setting.[23] The use of a surgical mask under a PAPR or over a facepiece respirator with an expiratory valve to attain standard protection from a wearer's exhaled air has therefore been recommended in the operating theatre (OT).[23,24] However, a study on the use of PAPR in a laminar flow OT did not show any rise in particulate transfer to the surgical field.[25] In another study, surgical masks, and PAPRs reduced contamination of the sterile field by 98.48% and 100% respectively compared to no face covering.[26]

Table-2 summarizes the currently available types of face masks, face shields, face visors, and goggles as well as advantages and disadvantages of use.

Goggles mainly aim to prevent splashes to the eyes and this makes them important in urology practice. As there is evidence of the presence of COVID-19 virus in urine and the majority of urological procedures include exposure to the patient's urine it is important to protect the eyes of staff. Indirectly ventilated goggles fogless and are preferred to directly ventilated goggles. However, a facial visor or shield must always be used in conjunction with a surgical mask or an FFP3 mask

TABLE 2 A Summary of the Available Various Types of Face Shields or Goggles

Personal Protective Equipment	Advantages	Disadvantages
 Protective goggles	• Light - can be worn over spectacles • Cheap	• Less protection from spillage as there is no seal
 Low-pressure visor  High-pressure visor	• Cheap • Easy to make • Protects from direct spillage	• Do not protect against respiratory transmission, so should be worn with a facemask • Low-pressure visors may fold more easily or buckle making the view more difficult
 Standard goggles	• Protects from direct spillage	• Not fully sealed against fluid spill • No anti-fog property, therefore chance of misting
   Indirect vented Goggles (face sealing)	• Protects more than standard goggles as face sealing • Indirect ventilation design improves air circulation and reduces fogging in hot or humid conditions	• Degree of extra discomfort in prolonged use
   Helmet-type visor	• More comfort than tight-fitting face masks • Protects from direct spillage	• Expensive • Decontamination issues • Issues with hearing other staff • Often heavy

when an aerosol-generating procedure is performed as a visor or face shield alone will not protect against respiratory transmission of COVID-19.[27]

6. Theatre mechanics and intraoperative PPE

While operating in patients with suspected or confirmed COVID-19 infection it is suggested that theatre ventilation, either laminar flow or conventional, should remain fully on.[22,28] This leads to rapid dilution of the aerosols in the OT and protects staff present in the room. Adjacent areas where air from OT will emerge are not considered to be at risk because the air will be highly diluted.[22,28]

In an ideal situation, a designated negative-pressure OT would be preferred for COVID-19 positive patients undergoing surgery, but this type of theatre is not widely available.[29] Facilities that lack negative-pressure OTs may dedicate one or more theatres for operating on confirmed or suspected COVID-19 patients with designated staff and anesthetic equipment, and deep cleaning of the OTs after the procedure to minimize viral transmission.[29]

Ventilation and air change within the OT determine the clearance of infectious particles following an AGP. It is estimated that a single air change can remove around 63% of airborne contaminants; and after five air changes, below 1% of airborne contamination is likely to persist.[22] Thus, a minimum of 20 minutes is deemed appropriate in a room having 10-12 air changes per hour (ACH).[22,30] Around one hour is needed to achieve the same level of decontamination in a single room having six ACH.[22] It is therefore important to know how many ACH is being conducted in a theatre so that a safe time interval can be allowed before entering it after an AGP, particularly if staff is not wearing an FFP-3 mask.

The suspected or confirmed COVID-19 patient undergoing surgery should be transferred directly to the OT and should wear a surgical face mask if tolerated. The process of induction of anesthesia and recovery should take place in the theatre and staff within 2 metres of an AGP should wear FFP3 respirators and full gowns. Cleaning should take place as per local policy with specific attention to the points of hand contact on the anesthetic machine. OT should only be used after 20 minutes if conventionally ventilated or after 5 minutes if ultraclean ventilation is in use.[22]

There are some minor variations in recommendations on intraoperative PPE between institutions. These are summarized in Table 3.

7. Practical Issues with PPE

There are a few technical and non-technical concerns regarding PPE.

A. Fit checks and fit testing

Before using a tight-fitting respirator it is critical to ensure the fit is appropriate to enable protection as well as comfort for the wearer. If the seal between the respirator and the wearer's face is inadequate, contaminated air can enter the mask and therefore be inhaled by the wearer. Factors affecting fit are shape and size of the face, beard, eyewear, and jewelry. A fit test should be conducted by a trained person appointed by the employer before an employee uses a new type of respiratory protective equipment (RPE) for the first time.[36] The employee should also carry out positive and negative-pressure fit checks each time they put on an RPE to ensure the RPE is positioned correctly.[37] Thus, both the employer and the employee should take responsibility for ensuring the RPE they are wearing is safe for them to use to reduce the risk of disease transmission.

B. Donning and doffing

Donning and doffing of PPE are extremely important as improper technique increases the risk of self-contamination.[38] There are many references and pictorial guides, as well as online videos demonstrating proper techniques and these should be rigidly adhered to.[39]

C. Changing guidelines

Guidelines on appropriate types of PPE are continuously evolving making it hard for HCWs to remain up to date. Therefore, the employer should ensure regular updates on personal protective measures are provided to staff through bulletins and frequent training sessions are organized to ensure staff knows when and what PPE to use as well as adhering to current guidelines and recommendations.

TABLE 3 Recommendations Regarding Intraoperative Face Mask or Respirators from Relevant Institutions

Institution	Personal Protective Equipment Recommendation
American Association of Gynecologic Laparoscopists (AAGL)[31]	A standard surgical mask or N95 depending on the clinical situation.
Royal College of Surgeons (RCS) of England[28]	N95 respirator mask during procedures that have the potential to aerosolize the virus.
Task force assembled at Stanford University[32]	N95 mask for COVID-19 positive patients. Face shield along with the N95 mask to prevent droplets from accumulating, which could extend the use of each mask.
Centre for Control of Disease and Prevention (CDC)[23]	N95 respirator when operating.
Public Health England (PHE)[33]	Those within 2 metres of an aerosol-generating procedure need to wear FFP3 respirators.
Indiana University (IU) Health[34]	N95 masks if aerosol-generating procedures on the respiratory tract are being performed to COVID-19 positive patients. Standard surgical masks for COVID-19 negative patients.
The American Society of Anesthesiologists (ASA) joint statement[35]	For anesthetists during AGP for all patients - fitted N95 masks, PAPRs (if not N95 fit-tested, having facial hair or failed fit test) or CDC approved respirator.

D. Prolonged wearing of PPE

Wearing PPE for a long time is technically challenging as it can cause discomfort, fatigue, dizziness, headaches, fogging, poor vision, dehydration, and hyperhidrosis.[40,41] Moreover, performing lengthy endourological procedures with PPE may lead to difficulty communicating verbal instructions along with possible increases in unnecessary fluoroscopy time, procedural time, and overall theatre turn-around time which may result in poorer surgical outcomes for patients and an increase in ancillary procedure rates.

E. Demand, supply, and availability of PPE

A sudden rise in global demand and inadequate pandemic preparedness has resulted in shortages in the supply chain for PPE.[42] Not only does this cause anxiety amongst HCWs but also puts a strain on health services already suffering from staff shortages. Optimization strategies suggested by the CDC offer a continuum of options for use when PPE is in short supply or exhausted.[43] Contingency and crisis capacity measures supplement conventional capacity measures and should be applied sequentially. Measures include reducing the number of patients attending hospital, cancelling elective and non-urgent procedures, excluding HCWs not essential for patient care, and extended use and/or limited reuse of reusable PPE when appropriate. Healthcare facilities should promptly return to standard practices when PPE is readily available. Similar guidance has also been provided by PHE on PPE shortages.[44]

F. Substandard or poor-quality PPE

As well as shortages of PPE there have been reports of poor-quality PPE supplies that do not meet safety standards putting both patients and HCW's lives at risk of contracting COVID-19 infection. The Health and Safety Executive (HSE) has issued a safety alert against the use of KN95 facemasks as there is no independent assurance of their quality and it has been confirmed by testing that they do not meet safety standards.[45] HSE has recalled around 1.5 million KN95 masks and halted around 25 million items of inappropriate FFP3 respirators entering the supply chain. There was also a surge in homemade and non-medical companies providing PPE to the

NHS free of charge i.e. homemade visors; however, such equipment should not be used unless it has been approved by HSE or the local NHS Trust for safe use. The British Medical Association (BMA) Guidance states that if adequate amounts of properly tested PPE are not available this matter should be raised with the local trust and HCWs can refuse to treat patients if staff PPE is deemed to be unsafe or inappropriate.[46]

8. Hand Sanitizer

Hand hygiene is one of the cornerstones of infection prevention as it is essential to minimize colonization and transmission of COVID-19 across the public, patients, and HCWs. The key factor in determining the efficacy of hand sanitizers is its alcohol concentration. The WHO recommends it must contain 80% volume/volume (v/v) alcohol (ethanol) or 75% v/v isopropyl alcohol formulated in an aqueous solution. A recent study tested solutions of this strength and found these to be effective against the virus, however, they did not test preparations with less than 75% alcohol.[47] Other factors to determine effectiveness are the quantity applied on hands, time of exposure, and the application or rubbing technique.[48] It is vital to ensure that the appropriate strength of alcohol hand sanitizer is available throughout healthcare settings as substandard products are being supplied.[49]

9. The Law and PPE in the UK

According to the 1974 Health and Safety at Work etc Act, the employer must provide staff with suitable PPE unless risks to their health and safety have been adequately controlled by other means. The European Union (EU) PPE directive states that PPE should be relied on only where the risks posed by work cannot be avoided by other means. The HSE is responsible for enforcing any breaches. However, NHS staff can also take their action against the trust if there is a lack of resources or appropriate and safe PPE are not available for them to use.[50]

CONCLUSION

COVID-19 will be around for the foreseeable future and infection rates may fluctuate as restrictions are eased. HCWs including urologists should take appropriate PPE measures not only in theatres, clinics, and endoscopy suits but also when performing simple tasks such as urine dipsticks, catheter, nephrostomy management, DRE, prostate biopsies, etc. as SARS-CoV-2 can be detected in feces, urine, and semen. Recommendations should be regularly reviewed and adapted to the local environments until a reliable vaccine and definitive therapeutics for COVID-19 are developed. Both employers and HCWs should adhere strictly to current guidelines and work together to minimize nosocomial transmission of COVID-19 infection and protect both staff and patients during the pandemic.

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