

Evaluation of disinfection of flexible nasendoscopes using Tristel wipes: a prospective single blind study

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ABSTRACT

INTRODUCTION The otorhinolaryngology department at Northwick Park Hospital uses the Tristel wipes system for cleaning nasendoscopes in the outpatient clinics. This system uses chlorine dioxide as its only disinfectant. The manufacturer claims the system provides safe sterilisation of nasendoscopes. However, there appear to be no reports in the literature to date that evaluate the efficacy of this system in a clinical setting. The aim of this study was to evaluate the 'in use' efficacy of Tristel wipes in decontaminating nasendoscopes and to identify any significant contamination between cleaning and usage.

METHODS A total of 31 cleaning episodes were performed. Each cleaning episode included two swabs after cleaning the scopes, one from the tip and the other from the handle. Another two swabs from the same areas were also taken before application to the patient. The microbiology unit evaluated all swabs for bacterial, fungal and mycobacterial growth.

RESULTS Overall, 123 swabs from 31 cleaning episodes were tested. None of the swabs taken from the tips ($n=31$) or handles ($n=31$) after cleaning with Tristel wipes developed any organism growth. Furthermore, none of the swabs taken from the tip of the scopes before using on patients ($n=31$) developed any growth. Of the 31 swabs taken from the handle before use, 3 developed significant staphylococcal growth.

CONCLUSIONS In our study, the 'in use' efficacy of Tristel wipes in cleaning the scopes of bacteria, fungi and mycobacteria was 100%. Attention to hand hygiene and the use of gloves should be considered when handling the cleaned scopes to minimise the risk of contamination between cleaning and application to patients.

KEYWORDS

Nasendoscope – Decontamination – Tristel wipes system

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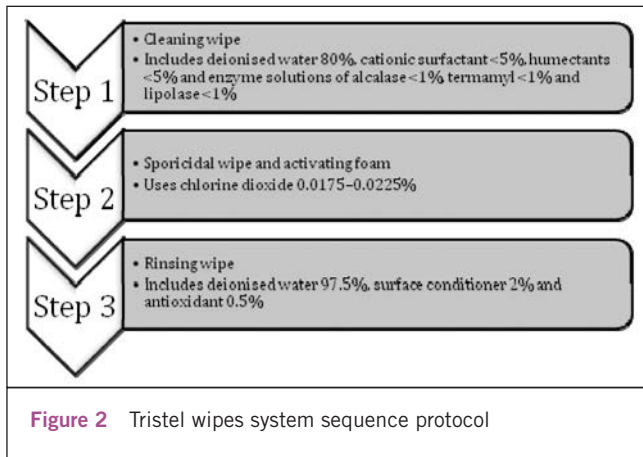
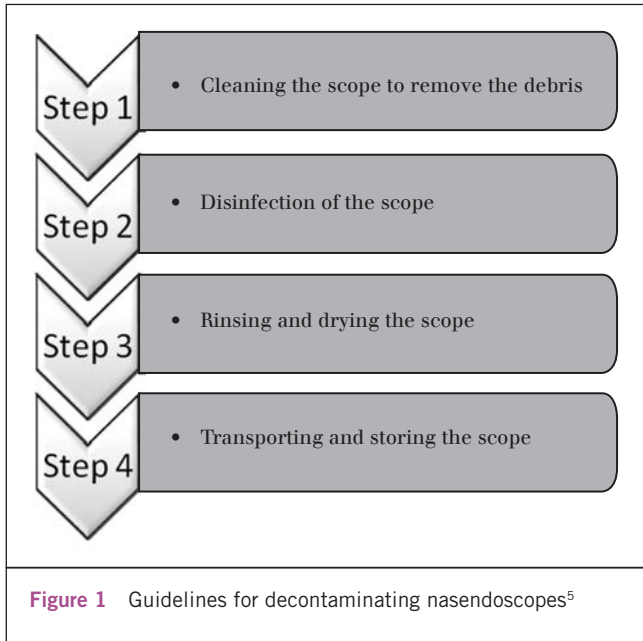
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The regular use of nasendoscopes in the clinical setting of otolaryngology departments is nowadays well established. However, one must consider the risks associated with this routine practice. The use of scopes between patients is a potential route of cross-contamination, particularly considering the diversity and quantity of flora in the upper aerodigestive tract. It has been shown that the insertion of instruments to the upper aerodigestive tract is followed by the adherence of 3,000–5,000 colony forming units of microorganisms to their surface.¹ The decontamination of endoscopes is therefore of critical importance although several alternative options exist. UK practices regarding this vary greatly. A study from 2005 demonstrated that of all otolaryngology units of the NHS in the UK at that time, 21% were using disposable sheaths, 12% alcohol wipes, 12% glutaraldehyde 2% solutions and 55% non-glutaraldehyde disinfectants such as peracetic acid, chlorine dioxide and *ortho*-phthalaldehyde (OPA).²

In our trust, we have been using the Tristel wipes system routinely for nasendoscope disinfection. This uses chlorine dioxide as its only disinfectant. The use of chlorine diox-

ide wipes has been shown to be cost saving compared with the use of disposable sheaths.³ The manufacturer of Tristel wipes (Tristel, Snailwell, UK) claims its system provides thorough and safe sterilisation of nasendoscopes. However, there are no clinical reports in the literature to date that evaluate the efficacy of this system in a clinical setting (as confirmed using MEDLINE® and the keywords 'Tristel wipes', 'nasendoscopes disinfection', 'chlorine dioxide' and 'wipes'). The aim of our study was to evaluate the 'in use' efficacy of Tristel wipes in decontaminating nasendoscopes and to identify any significant contamination between cleaning and usage.

In 2006 the Health and Safety Executive published a report stating that all glutaraldehyde-based disinfectants should have been withdrawn fully by 2005.⁴ The report also categorised all disinfectants according to their hazard potential: Group A (low hazard) included those that are chlorine or peroxygen based, Group C (medium hazard) those that are peracetic acid or OPA based and Group E (or special case, meaning that they should be considered only if all other disinfectants are not suitable) those that are 2% glutar-

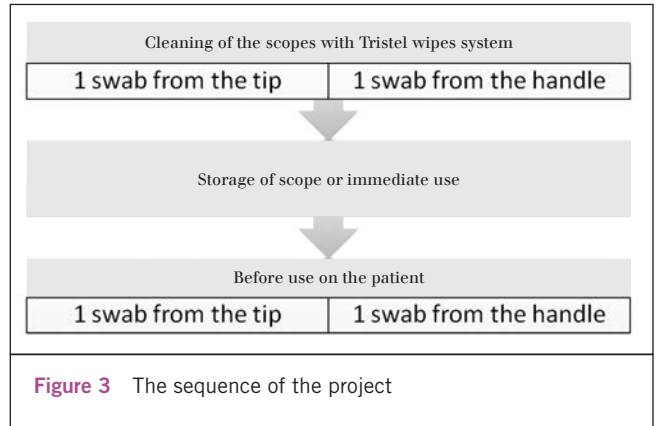


aldehyde. Following these guidelines, changes in practice have been imposed on many of us, usually without consultation, while evidence for change has been lacking.

In 2005 the British Association of Otorhinolaryngology – Head and Neck Surgery (BAO–HNS) published further separate guidelines to outline the practical steps to which one should adhere when decontaminating nasendoscopes. These describe a four-step procedure (Fig 1). Any disinfection method that bypassed any of the aforementioned steps could be responsible for cross-infection according to the authors.⁵

The Tristel wipes system used in our otorhinolaryngology department consists of a three-step disinfection process that follows in part the guidelines outlined in Figure 1. However, it does not include the fourth step (transport and storage of the scope) as in the outpatient setting at our institution, the scopes are cleaned and used in the same area.

With respect to the cleaning process, this is in accordance with the manufacturer’s guidance (Fig 2).⁶ The amount



of chlorine dioxide used is far below the workplace exposure limits set by the Health and Safety Executive, which are 0.28mg/m³ for a period of 8 continuous hours or 0.84mg/m³ for 15 minutes.⁷

Methods

A total of 31 cleaning episodes were selected randomly and studied from a number of general otorhinolaryngology outpatient clinics. All cleaning episodes were performed by a single person, fully trained in the practice of scope disinfection, according to the manufacturer’s instructions, and blinded to the study.

Each cleaning episode included decontamination of the scope with the Tristel wipes system as described by the manufacturer. Following the decontamination process, sterile microbiology culture swabs were taken from the tip of the scope, which is the part that interacts with the patient, and the handle of the scope that interacts with the user or transporter of the scope. The swabs were placed in sterile pots containing 5ml of normal saline.

The pots were stored in 4°C and transferred to the microbiology laboratory for microscopy and culture, to be tested for growth of bacteria and fungi. The swab taken from the tip was also tested for mycobacteria. The cleaned scopes were stored in sealed sterile bags ready to be used or given to the user for immediate use. The same process, with swabs from the same areas, was performed again immediately before use on the patient, in order to evaluate any contamination between the cleaning process and application (Fig 3).

Results

Of the 31 cleaning episodes, 3 episodes (9.6%) yielded positive cultures. The swabs taken from the tip of the scope after cleaning (n=31) and before use on the patient (n=31) were all negative for bacterial, fungal and mycobacterial growth. The swabs taken from the handle of the scope after cleaning with the Tristel wipes system were all negative for bacterial and fungal growth. There was no testing for mycobacteria.

The swabs taken from the handle of the scope before using on the patient grew *Staphylococcus aureus* in 3/31 cases

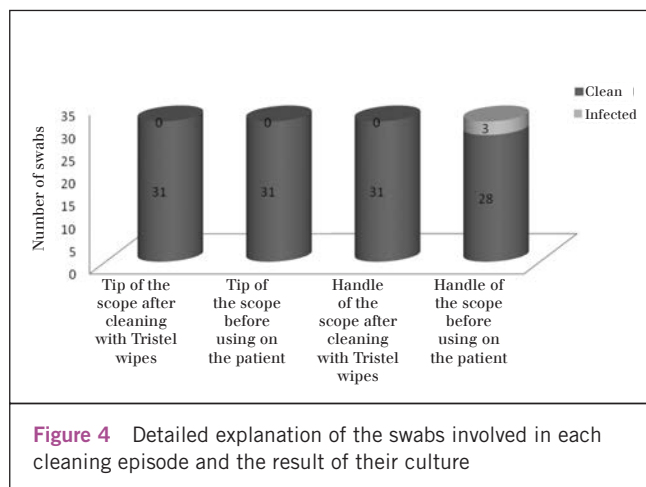


Figure 4 Detailed explanation of the swabs involved in each cleaning episode and the result of their culture

(9.6%) but no methicillin resistant *Staphylococcus aureus* or fungi were isolated. There was no testing for mycobacterial growth on the swabs taken from the handles of the scopes (Fig 4). The staphylococcal species (*Staphylococcus aureus*) that were grown from the handles of three scopes between cleaning and application on the patient were further tested with exposure to chlorine dioxide. This confirmed that these bacteria were all susceptible to disinfection with chlorine dioxide.

Discussion

It must be emphasised that nasendoscopes as used in otolaryngology and head and neck surgery do not possess either suction or biopsy channels and are therefore solid and without lumens, which can collect and harbour infected material, in contrast to bronchoscopes and gastroscopes. Furthermore, the implementation of the four-step decontamination process, unfortunately, still varies from hospital to hospital and even from clinic to clinic in the same trust.⁸ The use of the Tristel wipes system facilitates the appropriate use of the first three steps (cleaning, decontaminating and rinsing). In our study it has been shown that with this system there is adequate decontamination of the nasendoscopes from bacteria, fungi and mycobacteria.

Nevertheless, the identification of three scopes that grew *Staphylococcus aureus* in their handles between cleaning and application on the patient shows that there is still a risk of contamination in the area of the scope that is involved with the hands of the transporter or user between cleaning and using the scope. As the scopes were transported in sealed bags, it is more likely that this represents contamination from the user.

Although this part of the scope is not directly involved or in direct contact with the patient, microorganisms can perceptibly spread from the handle to other parts of the scope that enter the patient's upper aerodigestive tract. We would therefore reinforce the recommendation that staff members who clean these instruments use aseptic precautions, including washing hands and wearing gloves prior to handling them, to prevent nosocomial transmission as also di-

rected by the manufacturer. This reinforces the NHS cross-infection policy for anyone who is involved in the care of a patient or direct contact with medical instruments.

There are some limitations to this study. Only a small number of cleaning episodes could be included due to cost limitations. However, to our knowledge, this is the only study that evaluates the efficiency of the Tristel wipes system in a clinical setting. Although the study numbers may be considered small, the results obtained are very encouraging as they confirm that this disinfection technique provided decontamination of all the scopes tested.

Unfortunately, we were unable to test the scopes for viral or parasitic contamination due to the high costs, particularly as in an ideal study this would require each and every virus to be tested separately and specifically. We recognise that viral transmission, in particular, poses a cross-infection risk and we therefore feel that this is an area that needs to be addressed in future studies. Similarly, due to cost limitations, the scopes were only tested for mycobacteria on their tips and not on the handles. We also acknowledge that microbiology swabs are considered to be a suboptimal sampling technique for the detection of mycobacteria. However, in our study design there were no tissue specimens sampled that could be used for culture or histopathological analysis.

Conclusions

As highlighted in the BAO-HNS guidelines,⁵ we feel it is important to recognise that nasendoscopes are fundamentally different to larger bronchoscopes and gastroscopes and that they do not therefore need to be subject to the same cleaning regulations. **Nonetheless, according to the same guidelines, there is no strong evidence in the literature regarding cross-infection from using nasendoscopes. Our study provides good evidence for the efficacy of the Tristel wipes system in cleaning nasendoscopes and conclude that the cleaning of nasendoscopes with Tristel wipes is both safe and convenient.** We would recommend that staff members who clean these instruments use aseptic precautions, including washing hands and wearing gloves prior to handling them, to prevent nosocomial transmission as also directed by the manufacturer.

Our study provides the first available clinical evidence for the efficacy of Tristel wipes in the disinfection of nasendoscopes and we believe it could be included in any future revised national guidelines.

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