

Decontamination methods for flexible nasal endoscopes

Faisal Javed, Salil Sood and Graham Banfield

Abstract

A national survey was carried out to investigate the current UK practice for decontaminating flexible nasal endoscopes. A postal questionnaire was sent to Sisters in Charge of 200 ear, nose and throat (ENT) outpatient departments in the UK, with an overall response rate of 60.5%. Decontamination with chlorine dioxide wipes was the most favoured method, used in 58% of the hospitals that participated in this survey. Automated machines were also used in many places (34%). Only a few hospitals used flexible sheaths (7%). Many departments do not use a separate protocol for high-risk patients.

Key words: Flexible nasal endoscope ■ Decontamination ■ Chemical wipes ■ Automated machines ■ Disinfection

The regular use of flexible nasal endoscopes in the clinical settings of ear, nose and throat (ENT) departments is now well-established (Tzanidakis et al, 2012). They are used to examine the anatomy of the nasal cavity, the postnasal space, the pharynx and the larynx; when diagnosing benign and malignant disease; and to look for foreign bodies.

Like rigid endoscopes, flexible nasal endoscopes can become contaminated with mucous, debris, micro-organisms and in some cases even blood with each use, and must therefore be decontaminated before use in the next patient. Blood-borne diseases, such as HIV and hepatitis B and C, and other infectious diseases, such as tuberculosis, are also commonplace in routine ENT practice (Kanagalingam et al, 2002). Decontamination of endoscopes is thus of critical importance as use of scopes between patients is a potential route of cross-contamination.

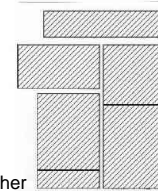
Another great fear with regard to cross-contamination is prion-related disease such as Creutzfeldt-Jakob Disease (vCJD). Thus measures should be taken to reduce these avoidable infection risks, as failure to use a proper method of decontamination can almost certainly cause nosocomial outbreaks, as has been shown in the case of gastrointestinal endoscopes and bronchoscopes (Spach et al, 1993). According to Spaulding's classification of levels of disinfection required for medical devices, a flexible nasal endoscope is classified as a semi-critical item, as it makes contact, directly or indirectly,

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with intact mucuous membranes and non-intact skin, and thus needs a high level of disinfection as the minimal requirement for decontamination (Baker and McCullagh, 1997).

There are different decontamination methods available, including chemical systems, endoscope sheaths, automated washing machines and autoclave sterilisation. Currently, no single best decontamination method has been identified as each carries its own merits and disadvantages (Phua et al, 2012). In 1999, a national survey showed a lack of standard practice for decontaminating flexible nasal endoscopes with only 65% of departments using chemical disinfection methods for decontaminating their scopes (Banfield and Hinton, 2000). In 2005, ENT UK, a national representation body in ENT, published its guidance on decontamination for flexible nasal endoscopes. This document outlined the various decontamination methods that can be used, along with the various steps that should be followed when decontaminating the scopes. In 2010, this guidance was updated and provided all hospitals with informed and acceptable choices for decontaminating their flexible nasal endoscopes in their



clinical practice.

In 2012, a national survey was carried out to investigate what different decontamination methods ENT departments now use for cleaning their flexible nasal endoscopes.

Materials and methods

A postal questionnaire was designed to establish the methods used for disinfection of flexible nasal endoscopes in ENT outpatient departments. The questionnaire was piloted at Great Western Hospital, Swindon, and subsequently sent to Sisters in Charge of 200 ENT outpatient departments in the UK. The targeted hospitals were identified by the drfoster website (www.drfosterhealth.co.uk) and included teaching hospitals, district general hospitals and private hospitals. Those hospitals that failed to return the questionnaire were followed up either by a telephone enquiry or by email. The follow-up enquiries were done by the first author (FJ) and included the same questions as in the original survey. The survey was done between July 2012 and November 2012.

Results

One hundred and three questionnaires were returned satisfactorily completed. A further 18 replies were obtained by telephone or email, giving an overall response rate of 60.5% (121). All the departments questioned used flexible nasal endoscopes and most (84%) were also equipped with rigid nasal endoscopes. Eighty-seven percent of departments claimed to have written protocols for cleaning their flexible nasal endoscopes and in 84% of departments, nurses were given formal training for cleaning their endoscopes.

Decontamination methods

The majority of the hospitals (119) used chemical-based disinfection methods for decontaminating their flexible nasal endoscopes. The different decontamination methods and chemical disinfectants used by all hospitals are summarised in *Tables 1 and 2*.

Pre-cleaning

Pre-cleaning before decontamination was done by the majority of the departments who replied to the survey—96% pre-cleaned their endoscopes using an enzyme detergent before formal disinfection.

High-risk groups

Only 41% of departments claimed to use separate protocols for high-risk patients; 35% said that they did not have a separate protocol for high-risk patients. The remaining departments either did not know or did not reply to this question.

Discussion

Considerable variation exists in the practice of disinfecting flexible nasal endoscopes after use in a patient. Factors influencing this constant variation include more involvement

of infection control teams; increased demand for rapid turnover of scopes to maintain timely clinic appointments, especially in departments with a limited number of flexible nasal endoscopes; and pressures on trusts to maintain services cost-effectively.

In our survey, chlorine dioxide (Tristel) wipes were the most commonly used method for disinfecting flexible scopes. The endoscope is initially wiped with a pre-clean wipe before being wiped with the chlorine dioxide-impregnated wipes (sporocidal wipes). The endoscope is then rinsed with a rinse wipe. The process takes about 2 minutes. Chlorine dioxide is active against vegetative bacteria, mycobacteria, fungi, viruses and spores. It is also specifically active against hepatitis C virus and HIV after 30 seconds of contact time (ENT UK, 2005). Many researchers have also cited the excellent biofilm-removing properties of chlorine dioxide (Simpson et al, 1993). Biofilm is an accumulated mass of bacteria and extracellular material that is tightly adhered to a surface and cannot be easily moved. Biofilms are present in the sinuses of 70% of patients who have chronic sinus infections, which also highlights the importance of taking measures to remove this bio-burden during the decontamination process too (Rudy et al, 2012).

Although some may perceive chemical wipes to be less effective than automated machines, they gained popularity for two main reasons: the lack of any reports of infection spread from one patient to another in the literature; and the guidance published by ENT UK (2010), which deemed Tristel wipes appropriate, provided staff are trained to carry out the decontamination process effectively. A study that involved taking swabs from 31 flexible nasal endoscopes after cleaning them with Tristel wipes also showed that Tristel wipes are safe for decontamination (Tzanidakis et al, 2012). The guidance published by the Choice Framework for Local Policy and Procedure (CFPP 01-06) (Department of Health (DH), 2013) also permits the practice of manual cleaning and manual disinfection of these endoscopes as an 'essential quality requirement' (EQR), as these scopes are low-risk items (endoscopes without lumens). The majority of the departments in our survey said that their nurses were trained in decontaminating scopes, which also validates the use of Tristel wipes for decontamination.

The use of automated machines continues to evolve. Although the CFPP 01-06 guidance has recommended use of manual cleaning followed by an endoscope washer-disinfector as best practice, this is more costly. Other factors that may preclude the use of machines include the need for more scopes to maintain clinical service, extra space to install the machines, extra staff or staff time if the scopes need to be taken to the central decontamination unit, and ongoing maintenance costs.

However, a cost analysis comparing Tristel wipes with automated machines has shown that machines can be more cost-effective than Tristel wipes in the long run (Phua et al, 2012). In our survey, automated machines were used by only one third of respondents for decontamination of scopes. Another eight hospitals using Tristel wipes indicated that they planned to switch to automated machines in the near future.

Flexible sheaths have always been least popular. Their detractors argue that sheaths reduce the quality of the optical image and can also damage the scopes. In the previous survey (Banfield and Hinton, 2000), only 10 hospitals used sheaths. Our survey has not shown any increase in their use.

Pre-cleaning is an essential part of the decontamination process. In a telephone survey in 2002, pre-cleaning with only soap and water was the most commonly used method, with only 8% of departments using an enzymatic detergent for pre-cleaning their scopes (Lim and Gupta, 2006). In another survey, 96% of hospitals pre-cleaned their scopes, but only 11% of departments used enzymatic agents for this purpose (Oakley et al, 2005). In our survey, the majority of departments used enzymatic detergent for pre-cleaning their scopes. One of the **Tristel** wipes is a pre-clean wipe containing an enzymatic agent, which is used initially to rinse the scope before cleaning it with sporocidal wipes. Most of the departments using automated machines also pre-cleaned their scopes with enzymatic detergents too.

Glutaraldehyde use is closely regulated, as it is subject to the Control of Substances Hazardous to Health Regulations (Health and Safety Executive (HSE), 1999). Inhalation of volatile vapours released by glutaraldehyde can irritate the respiratory tract and splashes to the skin or eyes can cause local burns. The hazard that this chemical poses to staff has reduced its popularity as a disinfectant. In the previous survey (Banfield and Hinton, 2000), 2% glutaraldehyde was used in 52% of the hospitals. Another survey in 2005 showed a reduction in its use by up to 12% (Oakley et al, 2005). According to our results, the use of glutaraldehyde is now almost non-existent.

Decontaminating scopes after use in high-risk patients (such as those with suspected or known CJD) has always been a matter of controversy. The Department of Health has advised that scopes be quarantined until the CJD status for that patient is known. If the patient is proven to be CJD-positive, then the scope should be destroyed. An alternative is to use disposable flexible nasal endoscopes, which cost £250 each. Sheaths are not an acceptable alternative. Less than half of the departments that replied to our survey said that they would use a separate protocol for high-risk patients.

The results from this survey has helped us to illustrate a national trend on how different hospitals decontaminate their flexible nasal endoscopes. The results have also helped identify areas that could be further improved to increase patient safety and care. Following flexible endoscopy of the nose and throat, the endoscopes should be cleaned and decontaminated to an acceptable standard. It is also important to remove any residual mucus, blood and debris from the endoscope after it has been used to reduce the chance of biofilm formation. A traceability system for equipment, especially where used on patients with, or at increased risk of, vCJD, is very important. It is also essential to ensure that the appropriate precautions are put in place when performing flexible nasal endoscopy on patients who are suspected of having vCJD, have been

identified as being at increased risk of vCJD, or have been diagnosed with vCJD. Practice settings should also provide safe environments for staff when decontaminating the scopes. Each hospital should have written policies and procedures for decontamination that are reviewed annually and readily available within the practice setting.

Conclusion

The findings of this survey suggest that, given the high emphasis placed on infection prevention and control in healthcare settings, most hospitals now decontaminate their flexible nasal endoscopes using methods that have been recommended by published national guidance. It is acceptable to use chemical wipes, as they are cheap and there is no evidence of increased risk of cross-infection with this system. Automated machines can be costly, which should be taken into account before installing them. Flexible sheaths do not seem to have any added advantage and thus are still used very sparingly. The quality of patient care could be improved further by urging all departments to use separate protocols for high-risk patients. BJN

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single blind study. *Ann R Coll Surg Engl* 94(3):185-8. doi: 10.1308/003588412X13171221589937.

Decontamination method	Number of hospitals n=121
Chemical wipes	70 (58%)
Automated machines	41 (34%)
Flexible sheaths*	8 (7%)
Chemical soak system	2 (1%)

*All hospitals using flexible sheaths also used other methods of decontamination / disinfection between use of scopes (see Table 2)

Decontamination method	Chemical disinfectant used	Number
Chemical wipes	Chlorine dioxide (Tristel wipes)	68
	Suprox (deionised water with hydrogen peroxide)	2
Automated machines	Peracetic acid	14
	Chlorine dioxide	10
	Septo DN (glyoxol/glutaraldehyde)	1
	Lancerzyme (isopropyl alcohol)	1
	Did not know	4
Flexible sheaths*	Chlorine dioxide wipes	4
	Peracetic acid and chlorine dioxide solution (automated machines)	2
	Alcohol wipes	2
Chemical soak system	Chlorine dioxide (Tristel)	1
	Peracetic acid (PeraSafe)	1

KEY POINTS

- This is a national survey to evaluate what different decontamination methods ear, nose and throat (ENT) departments use for cleaning their flexible nasal endoscopes
- According to this survey, most hospitals decontaminate their flexible nasal endoscopes using methods recommended by published national guidance
- Chemical wipes were the most favoured method, used in the majority of the hospitals in this survey
- In most hospitals, nurses are given formal training in decontaminating flexible nasal endoscopes
- Many hospitals do not use separate protocols for high-risk patients