

Main Article

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Abstract

Objective. Tonsillectomy is a common procedure performed nationally. The personal protective equipment and surgical gowning practices used during this procedure vary widely. We compiled a survey of ENT specialists to gain a national opinion about gowning in tonsillectomy with the aim of determining whether we could make it more environmentally friendly whilst maintaining the highest safety standards.

Method. We developed a nine-question survey that was piloted prior to final implementation. The questionnaire was sent to senior registrars and consultant otolaryngologists in the UK.

Results. The survey was completed by a total of 63 ENT specialists. It was found that 82.54 per cent of clinicians would consider wearing a reusable gown that would be sterilised between each procedure.

Conclusion. Our survey suggests most ENT clinicians would consider using a more environmentally friendly surgical gown and some may even consider wearing no gown at all, although many are understandably concerned about the transmission of infection or blood splatter.

Introduction

Climate change is the greatest threat to public health in the 21st century.^{1,2} At the 2021 United Nations Climate Change Conference, 50 countries committed to climate-resilient, low-carbon and sustainable health systems, demonstrating the importance of the issue.³ It has long been a goal of the National Health Service (NHS) to reduce its carbon footprint,⁴ with the eventual aim of achieving a net-zero NHS.⁵

The impact of surgical procedures on the environment has been widely documented. Operating theatres use three to six times more energy than the rest of the hospital and produce a quarter of regulated medical waste.⁶ Otolaryngology surgery has been shown to produce 1.7 kg of waste per case.⁷

Broadly, sterile surgical gowns can be disposable or reusable. Reusable gowns can be made from cotton, polyester or a polyester-cotton blend.⁸ However, cotton gowns and polyester-cotton blended gowns have fallen out of favour because they do not adequately resist liquid or microbial penetration.^{9,10} Gowns can be treated with repellent finishes to help protect from water- and oil-based liquids, and antimicrobial finishes are also used to reduce bacterial cross-contamination.^{11,12} Reusable gowns are more environmentally friendly than their disposable counterparts.^{13,14} The Ronald Reagan UCLA Medical Centre found that reusable gowns could be laundered effectively 75 to 100 times in their pilot study.¹⁵ The use of reusable gowns shows a 28 per cent reduction in energy consumption, a 30 per cent reduction in greenhouse gas emission, a 41 per cent reduction in blue water consumption and a 93 per cent reduction in solid waste generation in comparison with the use of disposable gowns.¹³

When analysing the safety of reusable 100 per cent polyester surgical gowns after 75 washes, it was found that impact penetration water resistance, hydrostatic pressure water resistance, risk of tear and seam strength were all above the Association of the Advancement Instrumentation PB70 performance specifications,¹⁶ indicating that they have a strong barrier performance.

In their review comparing single-use and reusable gowns and drapes in healthcare, Rutala *et al.* suggested that there was no difference in preventing surgical site infections when comparing the two gown types.¹¹ In addition, it has been suggested that the lack of widespread, documented evidence stipulating an increase in bacterial infection on use of reusable gowns is a testimony to their strength.¹⁴

Tonsillectomy is a common procedure performed nationally for recurrent infections, sleep-disordered breathing or malignancy. We compiled a survey of ENT specialists to gain a national opinion about gowning in tonsillectomy with the aim of finding out if gowning could be made more environmentally friendly whilst maintaining the highest safety standards.

Methods

We developed a nine-question survey, which was piloted prior to final implementation. The questionnaire was sent to a sample of senior registrar and consultant

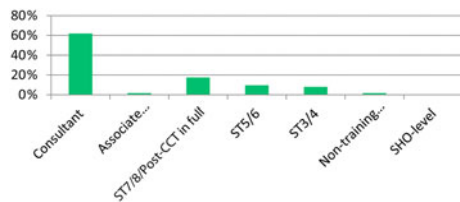


Figure 1. Responses to the question 'What is your current level?'. ST7 = specialist training registrar 7th year; ST8 = specialist training registrar 8th year; ST5 = specialist training registrar 5th year; ST6 = specialist training registrar 6th year; ST3 = specialist training registrar 3rd year; ST4 = specialist training registrar 4th year; SHO = senior house officer; CCT = certificate of completion of training; SPR = specialist registrar

otolaryngologists in the UK (Appendix 1). The questionnaire was distributed via SurveyMonkey using national subspecialist otology, rhinology and laryngology online groups in October 2022. Clinicians were asked what technique of tonsillectomy they most commonly used, if they wore a sterile surgical gown for tonsillectomies and if so why, if they think it is essential to wear a sterile surgical gown during tonsillectomy, if they would consider wearing a reusable fabric gown for tonsillectomy, what their preferred choice of protective clothing would be for tonsillectomy (sterile gloves only vs reusable sterile gown + sterile gloves vs single-use sterile gown + sterile gloves), their concerns about the threat of climate change, their current career level, their gender and if they had any additional comments.

Results

The survey was completed by a total of 63 ENT specialists (Figure 1). Overall, 47 (74.6 per cent) of the clinicians who took part in the survey wore sterile surgical gowns whilst performing tonsillectomy surgery.

When asked about the reasons for gowning during tonsillectomy, of the 47 clinicians who wore surgical gowns, 16 (34.0 per cent) were worried about protection from blood or blood splatters, 13 (27.7 per cent) were worried about infection risk or transfer of potential infection to themselves or other patients, 8 (17.0 per cent) mentioned that it was because of local rules or local common practice and 3 (6.38 per cent) wore gowns because of historical reasons or traditional teaching methods.

In total, 52 clinicians (82.5 per cent) thought that it was not essential to wear a sterile gown at all when performing tonsillectomy surgery. Moreover, 52 clinicians (82.54 per cent) said they would consider wearing a reusable gown that was sterilised between procedures (Figure 2).

When asked their specific preference of what to wear for tonsillectomy, 22 clinicians (34.92 per cent) said that they would prefer to use sterile gloves only, 34 (53.97 per cent) said that they would prefer to use a reusable gown with sterile gloves and 9 (14.29 per cent) said that they would prefer to use a single-use gown and sterile gloves (Figure 3). In all, 60 (95.24 per cent) of the clinicians were worried about climate change.

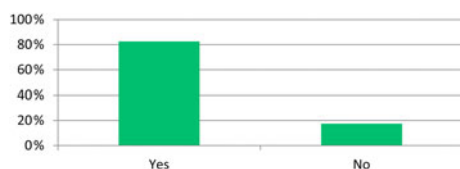


Figure 2. Responses to the question 'Would you consider wearing a reusable gown for tonsillectomy?'

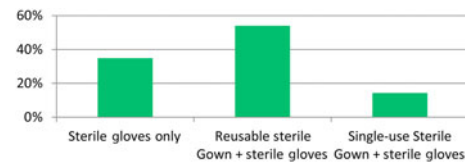


Figure 3. Responses to the question 'Which of the following would be your preferred choice to wear for a tonsillectomy?'

Some responses to the open question at the end of the survey suggested that it was 'ludicrous' to wear gowns for a dirty operation and that practice seemed to vary in the UK. There were two responses which suggested that a plastic single apron might be a potential option. In total, four clinicians mentioned the environmental impact of using disposable surgical gowns in theatre, highlighting the need for change. A final comment highlighted that clinicians would ideally require 'clean' protection for the procedure regardless to prevent mucus and blood splatter on their scrubs.

Discussion

Our survey showed that the majority (74.6 per cent) of clinicians wear sterile surgical gowns when performing tonsillectomy, but there are three key reasons why clinicians choose to wear sterile surgical gowns: (1) the concern about the transmission of infection, (2) the risk of blood splatter and (3) local guidance. We conclude it is important to wear a gown for the procedure, but a more environmentally friendly surgical gown can be considered. This is further supported by our finding that 82.5 per cent of ENT specialists would consider wearing a reusable gown.

Overall, 34.9 per cent of ENT specialists were happy to wear sterile gloves only to perform a tonsillectomy, but the majority (54.0 per cent) of clinicians were in favour of wearing a reusable sterile gown with sterile gloves, indicating that this would be the most widely accepted method of gowning for tonsillectomy whilst maintaining infection control and barrier protection.

The vast majority of clinicians surveyed (95.2 per cent) were concerned about the threat of climate change and thought wearing reusable gowns would represent a step in tackling that issue in otolaryngology. To make surgery more environmentally friendly, successful evaluations have already been performed on the switch from disposable scissors to reusable scissors,¹⁷ the switch from disposable laryngeal mask airways to reusable laryngeal mask airways,¹⁸ the comparison of disposable and reusable laparotomy pads,¹⁹ and the comparison of disposable laryngoscopes and reusable laryngoscopes.²⁰ We are also aware that there is variability in the use of eye protection during tonsillectomy. Although this was not specifically evaluated in our questionnaire, the use of reusable goggles as opposed to disposable visors is expected to be favoured from an environmental perspective.

When conducting an eco-efficiency analysis in terms of lifecycle assessment, it was found that the impact of disposable steel scissors exceeded that of reusable scissors by 99 per cent, indicating a benefit in the switch from disposable to reusable medical equipment.¹⁷ Even though the reusable laryngeal masks had to be washed and sterilised, Eckelman *et al.* in their study found that reusable laryngeal air masks had a better environmental profile than their disposable counterparts

because of a reduction in polymers, packaging and waste.¹⁸ Similarly, Kümmerer *et al.* found that reusable laparotomy pads are better for the environment in terms of energy consumption, water production and production of waste despite the negative effects of washing and bleaching the pads.¹⁹ These cases highlight successful switches from disposable to reusable items amongst other aspects of surgery.

- Personal protective equipment and surgical gowning practices during tonsillectomy vary widely
- The main reasons for gowning during tonsillectomy are to prevent transmission of infection and avoid blood splatter
- Overall, 82.54 per cent of clinicians said they would consider wearing a reusable gown that was sterilised between each procedure
- Studies have shown an equal or reduction in cost when using reusable gowns in comparison with their disposable counterparts
- Reusable gowns have been shown to be significantly better for the environment than disposable gowns

The Ronald Reagan UCLA Medical Centre pilot study completed a successful switch from disposable gowns to reusable polyester gowns in their liver transplantation unit.²¹ To ease transmission, the organisers informed staff through flyers and in-person meetings that the new gowns would provide equal or better protection in comparison with disposables whilst simultaneously reducing waste and costs. They did encounter a couple of problems during implementation of this change, including approximately 12 out of 1000 people having an allergic reaction to the gowns. There were also reports that healthcare professionals felt uncomfortable putting the gowns into the same hampers as patients' linen. There were initial complaints that reusable gowns were too hot for wearing for more than 10–15 minutes, but these complaints reduced over time as staff became more accustomed to the gowns. In addition, there was no method for tracking the exact number of times each gown was used on an individual basis.¹⁵

Although reusable surgical gowns are more environmentally friendly, questions remain in two key aspects determining their use: cost and comfort.^{14,22} Several peer-reviewed studies have shown there to be either no net loss or a reduction in cost when using reusable gowns in comparison with their disposable counterparts.^{14,22–25} The Ronald Reagan UCLA Medical Centre implemented a pilot project using reusable gowns and managed to save \$1.1 million dollars on purchase alone by using 3.3 million reusable gowns.¹⁵ There are some suggestions that wearing reusable gowns could lead to thermal discomfort,⁸ but studies have shown that implementation of reusable gowns does not reduce compliance or comfort once staff become accustomed to them.^{15,26,27} In addition, tonsillectomy is a relatively short procedure, thus thermal discomfort is not a major issue in our proposal.

Conclusion

Our survey suggests most ENT clinicians would consider using a more environmentally friendly surgical gown and some may even consider wearing no gown at all. Many are understandably concerned about the transmission of infection or blood splatter. We conclude that our ENT sample would consider wearing an environmentally friendly reusable surgical gown during tonsillectomy. We subsequently plan to implement the use of reusable surgical gowns during tonsillectomy at our institution in line with local governance.

Supplementary material. The supplementary material for this article can be found at <https://doi.org/10.1017/S0022215124000331>

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Competing interests. None declared

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