

## LEADING ARTICLE

# Surgical face masks: protection of self or patient?

The surgical face mask has become an integral part of the surgeon's uniform since its introduction by von Mikulicz in 1897 (1). For nearly 100 years it has been used in an attempt to reduce the rate of wound infections, but in recent years studies of clinical wound infection rates have failed to demonstrate any benefit from its use. In a study from Colchester in 1981, Orr (2) reported that wound infection rates did not rise following abandonment of masks, indeed there was a 50% fall in wound infections. However, Orr's study was retrospective and with a historical control group. The study generated some interesting correspondence but failed to have an impact on surgical practice.

The issue has now been settled in a seminal paper by Tunevall (3). In this well-constructed prospective, randomised, controlled trial over a 2-year period involving over 3000 general surgical patients, of whom half were operated on with face masks and half without, the infection rates were not significantly different, at 4.7% and 3.5%, respectively. The bacterial species cultured did not differ in any way between the two groups, again supporting the conclusion that masks have no effect on rates of wound infection. The use of masks could make wound infection more likely, for example by increasing the shedding of facial skin squamae (4). We would tender an alternative hypothesis, namely that masks filter bacteria from the mouth and nose into aggregates of sufficient size that, when they are dislodged by speaking or coughing they fall directly into the wound under the influence of gravity. Without a mask individual particles might be more likely to atomise and remain airborne to be carried out of the operating theatre by the frequent air changes required of the ventilatory system. Carefully designed studies are needed in the specialised fields of surgery, such as cardiac, transplantation and orthopaedic joint replacement, where the 'traditional' use of masks is jealousy defended, to ensure that their use is beneficial, or at least not deleterious, to the patient. However, it is possible that surgical dogma, in the absence of hard data, will make it unlikely that such studies will be considered ethical and be undertaken. Although, Tunevall's results (3) demonstrated a trend towards more infections when masks were worn (wound infections were increased by 34% over controls) this was not statistically significant, and so this study could be used to reassure surgeons that

they can continue to wear the mask for self-protection without endangering the patient (5).

With protection of the patient as a tenuous, if not untenable, reason for wearing surgical face masks it is interesting to consider the reasons why surgeons continue to wear them. We have conducted a questionnaire-based survey concerning the patterns of and attitudes towards mask use among the consultant surgeons at a major teaching hospital (Manchester Royal Infirmary) where, in 1990, £10 000 was spent on masks for theatre use. All 28 consultant surgeons within the hospital were surveyed (gynaecology and ophthalmology not included) and 75% replied; of these 96% still wore masks, although 20% discarded masks for endoscopic work. Less than half use the mask as recommended by the MRC in their 1968 recommendations on aseptic procedure, which advise donning a new mask for each patient and changing the mask part-way through long procedures (4 h or more) (6). When the mask was found to make surgery more difficult (30% of surgeons) this was due to steaming up of glass, on spectacles, endoscopes and microscopes. About equal numbers of surgeons wore the mask to protect patient and self, with 20% admitting that tradition was the only reason.

More general acceptance of the view that the mask does not protect the patient, and increasing awareness of the dangers of hepatitis B virus and HIV, will probably cause more surgeons to adopt self-protection as a reason for wearing a mask. This begs the question that masks are *useful* in protecting the surgeon, and the available data, though limited, does not wholly support this view. Paralleling the work on masks and wound infection, studies have focused on the ability of the mask to mechanically filter inspired air (7,8). Leakage around the sides of the mask appears to circumvent its ability to screen out airborne contaminants (9). The available clinical data suggest, too, that the present generation of masks do not protect staff, either from airborne bacteria (10) or hepatitis B virus (11).

These findings perhaps reflect the fact that standard surgical masks have not been designed with staff protection in mind and imply that changes in design may be needed. These could include the development of non-porous impermeable outer facings to better protect against blood splashes and visors to protect the eyes.

Such changes could make the mask less comfortable to work with, and increase the difficulties with humidity that 30% of surgeons in our survey complained of, and lead to poor implementation. Recommended 'Universal Precautions' (12), advocating use of full barrier protection including gloves, masks, eye protection and gowns for all procedures involving possible contact with body fluids have not been universally adopted (13).

In the field of general surgery the face mask could, it seems, be discarded by all non-scrubbed staff without harm to themselves or the patient, reaping the benefits of increased comfort and ease of communication, as well as saving money. If, as seems likely, the surgical team continues to wear the mask for self-protection then they should not hide behind the 'mask' of dogma and delusion. It is important that the current generation of masks be re-evaluated and, if necessary, improved to protect theatre staff from their perceived dangers.

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