Friend or foe(mite): contamination of stethoscopes

Pimentel JD BA, MBBS
Department of Microbiology
Royal Prince Alfred Hospital, NSW

Abstract

Contamination of stethoscopes is a common but overlooked problem. To demonstrate this fact, the stethoscopes of those present at a journal club were investigated for the presence of bacteria; 100% of the stethoscopes tested had viable bacteria present. These results highlight the fact that the stethoscope is a potential source of cross-contamination.

In order to reduce this threat, stethoscopes should undergo, at the very least, daily decontamination. This can be easily accomplished with an alcohol swab. Staff education and institution-wide policies can help increase adherence to this simple and quick infection control measure. To ensure long-term compliance, continual re-emphasis of stethoscope decontamination is required.

Introduction

As a medical student, the author can remember the kind-hearted scoffing received for using an alcohol swab to clean the diaphragm of a stethoscope. At first consideration, this scoffing might seem well founded. The most introductory and basic microbiology texts draw attention to the fact that bacteria require a warm, moist environment with available nutrients, in which to grow. So at first it might seem reasonable to conclude that, on the surface of a stethoscope’s diaphragm, a bacterium would starve to death, desiccate and be carried away by air currents. Of course, in principle this may be true, given an adequate amount of time.

However, for the purposes of infection prevention and control, a fomite need not be able to support colonial growth of bacteria, but only to transport a single or small numbers of microorganisms for a relatively brief period of time. To emphasise this fact, a demonstration of the potential of the stethoscope to act as a fomite was conducted at a journal club at the Geelong Hospital, Victoria, Australia.

Methods

In April 2004, without prior announcement, the attendees of a Thursday morning journal club meeting were requested to indicate whether they were in possession of their stethoscopes. With the permission of those present, the diaphragm of each stethoscope was pressed onto the surface of a horse blood agar plate [Oxoid]. These plates were then incubated at 35°C in 5% CO₂. After 48 hours the plates were checked for colonial growth. When growth was present, the colony count was noted. Further identification was undertaken on suspected staphylococcal isolates using a MicroScan Walkaway [Dade Behring].

Results

The 11 stethoscopes that were available from those in attendance were distributed between consultants (n=3), registrars (n=2), a resident medical officer, and medical students (n=5). Colonial growth of bacteria was found on all plates within the impressions made by the stethoscopes (n=11). Colony counts ranged from two colonies to >15 colonies. The majority had less than 15 colonies (n=10). Most plates displayed a mix of coagulase-negative Staphylococci and Micrococcus species. No Staphylococcus aureus was isolated.

Discussion

The literature is quite clear regarding the fact that microorganisms are commonly found on stethoscope diaphragms. This includes Gram-positive cocci, Gram-positive bacilli, Gram-negative bacilli and fungi. It has also been shown that bacteria are quite capable of surviving up to 18 hours on this surface. Furthermore, it has been demonstrated experimentally that stethoscopes are able to transfer bacteria to human skin.

This study and sample size were very small, limited in nature and meant only for the purpose of demonstration. Nonetheless, it is still noteworthy that every stethoscope tested was found to have viable bacteria present. Due to the existing potential for the stethoscope to act as a vehicle of bacterial transport, so too exists the possibility of the spread of pathogens. However, just as hand hygiene is often overlooked or even disregarded, the hazard risk presented by stethoscopes is frequently overlooked as well. It is therefore important to re-emphasise the practice of regular decontamination of stethoscopes.

Effective decontamination can be simply and quickly achieved with an alcohol swab. It has been demonstrated that cleaning stethoscopes with alcohol reduces colony counts by 94-100% in 2, 3, 6, 8-11. In fact, alcohol swabs are more effective than non-ionic detergents and antiseptic soap. Although many authors advocate decontamination after every use, a recent study reported similar colony count reductions from once daily cleaning. A potential benefit of once daily cleaning is the probability of increased compliance. To remain effective, decontamination must remain regular and become habitual. Both staff education and policies mandating alcohol decontamination have been found to have immediate effects on contamination rates. However, continual re-emphasis is required to ensure increased adherence.

It is probably prudent to also bear in mind other parts of the stethoscope that may represent a potential source for the spread of infection. Fabric stethoscope covers may represent a potential infection control problem due to the fact that they are used for prolonged periods, are infrequently laundered, and have been found to be frequently contaminated with bacteria. The ear tips of stethoscopes have been found to harbour multi-resistant pathogens including meticillin-resistant S. aureus (MRSA) and Acinetobacter species. Therefore the practice of sharing stethoscopes among health professionals can also present a potential cross-contamination risk.
Conclusion
The ability of the stethoscope to act as a fomite is not disputed in the literature. Moreover, the literature provides evidence for the effectiveness of alcohol (on a swab) as a decontaminant. Therefore regular decontamination of stethoscopes should be considered to be part of good infection prevention and control practice.

The following suggestions may be helpful: The diaphragm of a stethoscope should be decontaminated with an alcohol swab at least once a day, but preferably between each patient. If a fabric stethoscope cover is in use, ensure frequent laundering or consider removal. Lastly, always decontaminate the ear tips of a personal stethoscope after it has been lent out.

The history of hand hygiene has demonstrated that the acceptance of infection prevention and control practices can be slow to occur 14. Therefore, like hand hygiene, stethoscope decontamination is a simple measure that must be continually re-emphasised in order to prevent infection.

References