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microwave for sterilization is to save time. In this study, we verified whether microwave energy is able to disinfect gauze pieces colonized with *Pseudomonas aeruginosa* ATCC 27853, *Escherichia coli* ATCC 25922, *Staphylococcus aureus* ATCC 25923 or *Candida albicans* ATCC 10231 and compared this method to autoclave.

The microorganism concentration was adjusted to 0.5 in McFarland opacity scale. This solution was added to gauze pieces and submitted to microwave oven treatment at 1000 W from 10 to 60 seconds. Control samples were not submitted to this treatment. The gauze pieces were then inoculated in blood agar or brain heart infusion medium and incubated at 37 °C for 24 hours. Our results showed that exposure to microwave energy for 30 seconds was able to inhibit the growth of microorganisms (Figure). When compared to humid heat sterilizer (temperature of 121 °C at 1.1 atmospheric pressure for a minimum of 20-30 minutes), similar results were found (data not shown).

In this work, we demonstrated that a domestic microwave oven could disinfect gauze pieces colonized with microorganisms. The material may be disinfected with exposure to microwave energy at 1000 W for 30 seconds.

References


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**Endoscope Reprocessing: Stand up and Take Notice!**

Dear Editor,

Endoscopy is a very frequently performed diagnostic and therapeutic interventional modality. Recently, it has been reported that up to 270,000 infections (in 2.7% of procedures) are transmitted annually by flexible endoscopes in the USA. There have been >500 reports of infections due to use of contaminated endoscopes, commonly by *Pseudomonas aeruginosa*, *Salmonella* spp., *Mycobacterium tuberculosis* and atypical mycobacteria. Recommendations for reprocessing of endoscopes have been established worldwide, but lack of compliance is rampant in 20-70% of centres in Europe, Australia and Asia.\(^1\)\(^2\)\(^3\) Compliance is also very poor in Japan, India (only 1/3 of 133 centres practiced minimum disinfection), Western Europe (inadequate disinfection in ≥30% centres) and USA (inadequate disinfection of 23.9% of endoscopes).\(^4\)

International recommendations for endoscope reprocessing is a stepwise process; pre-cleaning, leak testing, cleaning, rinsing, high level disinfection (HLD)/sterilization, rinsing, drying and storage. Cleaning is extremely important, resulting in 2-6 \(\log_{10}\) (mean 3 \(\log_{10}\)) reduction in bacterial load and...
almost complete removal of viruses. Cleaning should be done with mildly alkaline/neutral enzyme cleaners and household detergents. Those containing aldehydes should not be used. The most widely used disinfectants are: glutaraldehyde (GA) orthophthalaldehyde (OPA), hydrogen peroxide (H$_2$O$_2$) and per acetic acid (PAA). Although use of GA is banned in a few European countries (skin and respiratory irritant), it is still frequently used worldwide. Several newer disinfectants are available and material compatibility and efficacy should be validated before use (Table). OPA requires lesser time for HLD (12 min at 20 °C), does not require activation, has better mycobactericidal activity than GA, but is costlier. PAA is a better biocide, less irritant and has ability to remove hardened material, but is corrosive and less stable. Endoscope and valves should be immersed in a high-level disinfectant or liquid chemical sterilant (LCS) solution with good material compatibility; all channels should be irrigated; and manufacturer’s recommendation for the pH, temperature and time of exposure to the disinfectant/LCS followed. The concentration of disinfectant solution should be tested at least daily. Final rinsing should be done under running sterile water. Drying should be done between patients by pressurized air (1.4 atm) and before storage, using 70% alcohol flush, followed by pressurized air. The endoscope should be disassembled in a well-ventilated storage cupboard. Accessories that penetrate the mucosal barrier should be single use or cleaned and then sterilized between each patient use. The automatic flexible endoscope reprocessor (AFER) should be operated by trained personnel. Manual cleaning of the endoscope is necessary prior to AFER use. Endoscope reprocessors need to be regularly cleaned to prevent formation of biofilms. Strict microbiological monitoring is essential. Regular cultures are recommended in several countries for quality assurance, but in the United States, sampling is advised if clustering of infections following endoscopy is suspected.5

The practical problem of handling patient load with lesser number of endoscopes and hence shorter time period to practice reprocessing, can be frustrating. The cost of maintaining AFER, multiple endoscopes, newer/powerful disinfectants, enzymic cleaners, sterile water for rinsing may not be financially sustainable in the government sector and small private endeavours, which provide health care to the majority of the Indian population. Trained nursing and technical staff for manual/automated reprocessing are also not easily available.

In our institute, endoscope reprocessing is done once by an AFER at the end of the day and the nursing personnel have been trained by the manufacturers in its use. Reprocessing between patients is done just by immersing in GA (as per manufacturer’s instructions) and drying of the endoscopes between patients is not always followed. PGIMER, Chandigarh has an infection control committee with requisite infection control guidelines and an ongoing education and training programme (infection control practices, sterilization/disinfection in CSSD, operating room nurses) for all health care personnel. There is no established consensus or awareness about the requirement for microbiological monitoring and quality assurance during AFER use.

Use of 2.5% GA for 5 min at 35 °C (Table) can be cost-effective, since this temperature is easily achieved in our climate and the duration is shortened by 75%. The usual practice of simply rinsing the endoscopes and immersing in 2% GA for 20 min is ineffective. Thorough cleaning to remove organic matter is essential; therefore, shortening the disinfection time and utilizing the left-over time for manual cleaning, rinsing and drying between patients is a reasonable option. Rinsing may be done with filtered or sterile water, but not tap water. Detergent solution should be renewed each time and disinfectant concentration should be checked daily with test strips. It is important to remember that use of AFERs does not circumvent manual cleaning. Microbiologists and physicians need to formulate local guidelines for environmental sampling, frequency of monitoring, interpretation of positive cultures and possible remedial action, which are customized according to the patient load and set-up. The common practice of performing endoscopy on infectious patients at the end of the day will not eliminate the risk of encountering patients with latent or

<table>
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<tr>
<th>Disinfectant</th>
<th>Concentration</th>
<th>Temperature (°C)</th>
<th>Duration (min)</th>
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<tr>
<td>Glutaraldehyde</td>
<td>2%</td>
<td>25</td>
<td>20</td>
</tr>
<tr>
<td>Ortho-phthalaldehyde</td>
<td>0.55%</td>
<td>20</td>
<td>12</td>
</tr>
<tr>
<td>Hydrogen peroxide*</td>
<td>7.5%</td>
<td>RT</td>
<td>20-30</td>
</tr>
<tr>
<td>Hydrogen peroxide and per acetic acid*</td>
<td>1.0%/0.08%</td>
<td>RT</td>
<td>30</td>
</tr>
<tr>
<td>Hydrogen peroxide and per acetic acid*</td>
<td>7.5%/0.23%</td>
<td>RT</td>
<td>15</td>
</tr>
<tr>
<td>Hypochlorite (free chlorine)*</td>
<td>650-675 ppm</td>
<td>RT</td>
<td>15-20</td>
</tr>
<tr>
<td>GA and phenol/phenate**</td>
<td>1.21%/1.93%</td>
<td>25</td>
<td>20</td>
</tr>
<tr>
<td>Glutaraldehyde</td>
<td>2.5%</td>
<td>35</td>
<td>5</td>
</tr>
<tr>
<td>Accelerated hydrogen peroxide</td>
<td>2%</td>
<td>RT</td>
<td>5</td>
</tr>
<tr>
<td>Electrolysed acid water/super oxidized water</td>
<td>-</td>
<td>RT</td>
<td>5-10</td>
</tr>
</tbody>
</table>

RT - Room temperature; *May cause cosmetic and functional damage; **Efficacy not verified

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sub-clinical infections. Regular CMEs, training programmes and lectures should be conducted by societies (e.g., IAMM, HISI) for doctors, nurses and technicians for increasing awareness.

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1. Infections from endoscopes inadequately reprocessed by an automated endoscope reprocessing system. FDA and CDD Public Health Advisory: September 1999.


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Prevalence of Toxoplasma gondii Infection amongst Pregnant Women in Assam, India

Dear Editor,

Toxoplasma gondii infection during pregnancy is a causative factor for foetal loss and congenital infection of the newborn.\(^1\) Reports of prevalence of this parasitic infection among pregnant women from northeast India are scanty. Therefore, a seroprevalence study covering 180 pregnant women attending Department of Obstetrics and Gynaecology, Assam Medical College and Hospital (AMCH), Dibrugarh, was conducted during 2003-2004. After written informed consent and approval from the Institutions ethical committee, 180 antenatal cases (17-40 years with a median age of 24.5 years) were enrolled with or without history of pregnancy wastage and screened for IgG and IgM antibody against T. gondii using EIA kits (Pathozyme Toxo IgG and IgM kits).

The seroprevalence of T. gondii infection was 44.6 and 36.8% among the pregnant women with (n=112) and without (n=68) history of pregnancy wastage, respectively, which was statistically insignificant (\(P = 0.37, 95\%\) CI: 0.7-2.5). In addition, the IgM seroprevalence was also statistically insignificant (\(P = 0.65, 95\%\) CI: 0.47-5.2) with (8.9%) and without (5.9%) pregnancy wastage group, respectively. It was observed that higher prevalence of T. gondii infection was associated with increase in age (\(P = 0.012\)) shown in (Figure), subjects residing in rural areas (\(P = 0.047, 95\%\) CI: 1.01-3.4) and low socioeconomic status (\(P = 0.014, 95\%\) CI: 1.2-4.0). Increasing numbers of pregnancy wastage also did not had any significant association (\(P = 0.28\)) with T. gondii infection. No significant difference in prevalence was observed among vegetarians and non-vegetarians as also with contact with cats.

The prevalence of this infection from India shows a wide variation and one study has reported as high as 77% in women of reproductive age group.\(^2\) Our study reported similar prevalence rate with one recent study from New Delhi, which found an overall anti-toxoplasma IgG seroprevalence of 45% among pregnant women.\(^3\) Despite the favourable climatic condition of the Northeast, the study did not detect the highest prevalence rate. However, other important factors like consumption of raw or undercooked meat which are regarded as important risk factors,\(^4\) is not rampant in the study region; otherwise there was a probability that we might have observed an even higher prevalence of T. gondii infection in this region. Although, Toxoplasma infection does not cause repeated foetal losses, this is the most common indication for investigation of toxoplasmosis in India.\(^5\) In our study, we also did not find significantly higher prevalence of T. gondii infection with increase in pregnancy losses.

In conclusion, we detected a moderately high prevalence of T. gondii infection among pregnant women...