Colonisation of point of use water filters by silver resistant non-tuberculous mycobacteria

Point of use water treatment devices are often employed to eliminate the disagreeable taste that results from the use of chlorine to disinfect drinking water. These devices generally rely on granular activated carbon to remove chlorine and they contain silver as a bactericidal agent. This improves the taste of the water, so the consumer may perceive an improved water quality. However, previous studies have shown that bacteria present in tap water, including both innocuous and disease causing species, are able to multiply in carbon filters impregnated with silver and are released into the water passing through the filter. The simplest devices available for home use are the “pour through” units: tap water is poured into the top of the unit, passes through the filter by gravity, and is stored in the bottom of the unit for use.

To date no one has reported the ability of non-tuberculous mycobacteria (NTM), including M avium, to colonise carbon filters. M avium often infects AIDS patients and there is evidence of waterborne transmission of M avium in such patients. Accordingly we conducted several experiments to determine if NTM are able to colonise a commercial pour through device. Three NTM species, M fortuitum, M mucogenicum, and M mitsumurae, were tested in separate experiments. Filters were prepared as recommended by the manufacturer and placed in the filter container/storage unit. Suspensions of each mycobacterial species were diluted in 2 litres of tap water to a final concentration of 9 colony forming units (CFU)/ml for M fortuitum, 24 CFU/ml for M mucogenicum, and 145 CFU/ml for M avium. No attempt was made to remove indigenous mycobacteria from the tap water. The tap water/mycobacteria suspension was passed through the filter and the entire filter/container/ storage unit was stored at room temperature overnight. The filtered water was then removed and 2 litres of fresh un inoculated tap water were filtered and the unit stored at room temperature.

One week, and each week thereafter for eight consecutive weeks, the filtered water was removed, analysed for mycobacteria, 2 litres of fresh un inoculated tap water were filtered, and the unit again stored at room temperature.

No mycobacteria were recovered at weeks 1 and 2 (< 1 CFU/ ml). M avium were detected at week 3 at 22 000 CFU/ml, peaked at week 5 at 47 000 CFU/ml, and then decreased to 3 CFU/ml at week 8. All M avium isolates recovered had identical 16S rRNA gene sequences. M fortuitum and M mucogenicum were never detected in the filtered water (< 1 CFU/ ml, fig 1).

The three mycobacterial species evaluated were found to differ in sensitivity to silver by a disk diffusion assay. M avium was able to grow in the presence of 1000 µg/ml silver, whereas M fortuitum and M mucogenicum were inhibited at 50 µg/ml. A survey of 45 NTM drinking water isolates, representing 11 different species, revealed 26 isolates (57%) that were resistant to 1000 µg/ml silver, including all 20 M avium isolates tested.

These results suggest that drinking water containing silver resistant NTM, treated by point of use filtration that relies on the bactericidal effect of silver, could pose a health risk for immunocompromised consumers. For such consumers, boiling the filtered water might be the prudent option.

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References

Laboratory diagnosis of vaginal discharge (ACP Broadsheet No 153)

This ACP Broadsheet (known as Best Practice—vag) is a useful document, which is likely to become the gold standard for the laboratory investigation of patients presenting with vaginal discharge. However, the authors also attempt to deal with clinical situations in which vaginal discharge is unlikely to be the presenting complaint and here their advice is contentious. They recommend that vaginal swabs submitted from patients with pelvic inflammatory disease (PID) should undergo “full culture” with special media for the isolation of coliforms and anaerobes in addition to routine investigation of N gonorrhoeae, bacterial vaginosis, Trichomonas vaginalis, and Candida spp. Coliforms and anaerobes are indeed implicated in PID, possibly as secondary invaders from the vagina, but the temporal association and pathogenesis are unclear. Culture of a vaginal swab from a patient with PID is analogous to culture of a throat swab from a patient with pneumonia. Full culture of a vaginal specimen is not generally recommended in the investigation of PID as it does not aid in diagnosis or determine the choice of therapeutic antimicrobial agents.

“Full culture” is also recommended when a vaginal swab is submitted in clinical situations such as “premature labour, prolonged rupture of membranes, spontaneous rupture of membranes, antepartum haemorrhage, and threatened abortion.” In these circumstances, the diagnosis of infection (amnionitis) and the timing of the delivery are based on pre-agreed clinical criteria and empiric antimicrobial therapy is directed at a range of organisms implicated in the condition. Gram stain and culture of amniotic fluid have been recommended but even these are of limited value in individual patients. In PID and the other clinical situations mentioned full culture of vaginal specimens for coliforms and anaerobes is unwarranted and therefore an unnecessary expense.

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Figure 1 Non-tuberculous mycobacteria colonisation of point of use filter systems.
Bethesda terminology. The illustrations are of very high quality throughout and the use of colour is helpful.

The book, while overall of high quality, does have two major limitations. There are very few illustrations of Giemsa stained material. The author makes this clear from the beginning, stating a strong preference for Papanicolaou stained slides, but this does limit the usefulness of the images for those of us who use Giemsa stained material extensively in routine practice. The other major limitation is the manner of presentation of the illustrations at the end of each chapter. This makes flicking back and forward from text to illustrations necessary, although after a while this ceases to be a major irritation.

Overall, I would recommend this book to practising cytopathologists as there are many useful lessons presented, although I think that most general trainees would find this text quite heavy going.

NEIL ANDERSON


Dr Poller has produced, on behalf of the World Health Organisation, a monograph on the prothrombin time (used synonymously with thromboplastin time or Quick test). This is a technical document and does not intrude on clinical or therapeutic grounds nor does it concern itself with any aspect of oral anticoagulation other than monitoring.

This brief publication (32 pages in all) provides all the information on the prothrombin time (historical, manufacturing, technical, and scientific) that one could possibly need—and probably a lot more than most require. For the latter, interested only in a particular issue, the index is clear and thorough.

The author has had a long and distinguished association with this coagulation test and its technical ramifications. This shows in the loving and exquisite detail of the practical instructions. Although not a rollicking good read it is written clearly and is easy to understand. These views apply equally to the higher mathematical hieroglyphics of ISI calibration and the cookery class homeliness of tissue thromboplastin extract preparation.

If you need to know anything about the prothrombin time you should read this monograph.

P KEISTEVEN


This is a timely, detailed, up to date reference work on the key roles played by T cells in different compartments of the mucosal immune system. From a potentially vast subject, the editor has been sensible in selecting the more pertinent topics on which to focus. The book is well produced and helpfully illustrated by line diagrams and monochrome prints, with occasional colour illustrations, the references are up to date as is reasonable, and the index is helpful. It is self-recommending for those working on diseases involving the central nervous system, but should also be considered as a library purchase for those interested in the general field of cell death.

J W RONSIDE


It is now likely that many diagnostic histopathologists will regularly encounter specimens derived from transplant patients. A good overview of the relevant pathology, which is very wide ranging, is therefore highly desirable and represents a stated aim of this book on transplantation pathology. The first two chapters set the scene with overviews of transplantation immunology and infection. Thereafter chapters on renal, liver, bone marrow, heart, and lung transplant pathology form the core of the book, with a final chapter on CNS pathology acting to illustrate potential ways forward. Each chapter is a detailed distillation of knowledge, with a laudable lack of typographical errors, the most obvious being the inversion of figures 8 and 9 in the liver chapter. Variability in the writing style and use of diagrams, tables, and photomicrographs is a result of the multi-author nature of the book. In general, it does not attempt to be a diagnostic bench book but provides a solid theoretical background to the areas covered. However, the chapters on liver transplantation and, to a lesser extent, heart and lung transplantation provide a greater degree of diagnostic guidance.

Overall, this volume succeeds in its aim to be a useful reference source for the specialist and it will inform the generalist. Its price may be slightly high for some budgets, considering its relatively slim profile.

A R McPHADEN


This multiauthor textbook presents a comprehensive overview of mechanisms of cell death in the brain. The book is divided into four general sections which cover the cellular and molecular mechanisms of cell death, animal models, nerve cell death in human diseases, and approaches to treatment. The authors cover a wide range of disciplines from basic and applied neuroscience to pathology, neurology, and therapeutics. Both apoptotic and non-apoptotic mechanisms of cell death are considered for neurones and glial cells, and this appears to be the first book which concentrates on these mechanisms in diseases of the nervous system. As a neuropathologist I was particularly interested in the large central section on nerve cell death in human disease, which covers a wide range of topics from mitochondrial disorders to infectious and transmissible diseases, hypoxia/stroke, trauma, and neurodegenerative diseases including Alzheimer’s disease, Huntington’s disease, Parkinson’s disease, and motor neurone disease.

I found this an interesting work which, because of its focus on the central nervous system, would be of particular interest to neuropathologists and both clinical and applied neuroscientists. However, there is much here to interest others who are working in the area of cell death, since there are few if any competitors.

The book is well produced and helpfully illustrated by line diagrams and monochrome prints, with occasional colour illustrations, the references are up to date as is reasonable, and the index is helpful. It is self-recommending for those working on diseases involving the central nervous system, but should also be considered as a library purchase for those interested in the general field of cell death.

D J UNSWORTH

McManus ‘99

Brighton Conference Centre, Brighton, UK 29 and 30 September 1999

The McManus Study Group and the Association of Clinical Pathologists announce the fourth Brighton Melanoma Conference, McManus ’99, which is being held jointly with the annual national scientific meeting of the Association of Clinical Pathologists. Speakers include Lorenzo Cerroni, Alan Hart, Sabine Kuhler, and Kerry Crotty. Further details from: Mrs C Harris, Association of Clinical Pathologists, 189 Dyke Road, Hove, East Sussex BN3 1TL, UK; tel +44 (0)1273 775700; fax +44 (0)1273 773303; email: melanom99@pathologists.org.uk

Correction

We are informed that in the paper entitled "How many lymph nodes to stages colorectal carcinoma?" (February 1998, vol 51, pages 165-6), the author list should have included H Kulacoglu as second author.
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