

should be recommended to have bed rest with the head raised for seven days after the precipitating event. This period allows time for investigation of other causes of acute auditory or vestibular failure. If symptoms persist the next step is a tympanotomy, which allows direct inspection of the oval and round windows. Fistulas of the oval window are the most common, but lesions may occur in both the oval and round windows.³ If a leak is apparent it should be sealed with either fatty tissue or a patch of perichondrium. Sealing of these leaks controls the vestibular symptoms effectively and often improves tinnitus, but it only rarely improves hearing.⁴ Whether or not to explore a particular ear in a patient with the appropriate symptoms and signs but without a history of trauma is a difficult clinical decision. About a quarter of such patients are found to have a perilymph leak.⁶

The importance of perilymph fistulas lies in the fact that they may produce troublesome disequilibrium which may be relieved by a relatively simple surgical procedure. So doctors should be aware of the condition because otherwise many of these cases will remain undiagnosed.

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AIDS and swimming pools

There is much public anxiety that the virus causing the acquired immune deficiency syndrome (AIDS) may be spread in swimming and hydrotherapy pools. The virus, now called the human immunodeficiency virus (HIV), can be transmitted by sexual intercourse, by transfusion or inoculation of blood and blood products, and by sharing contaminated syringes and needles. There is no evidence, however, that it is spread by social contact; by sharing of washing, eating, and drinking utensils, and other articles commonly used; or by sharing toilet facilities.¹ Nor is the infection transmissible by airborne droplets resulting from coughing or sneezing.

The World Health Organisation and other international agencies are paying great attention to contamination of water and soil by viruses. Though much is known about monitoring and treating bacterial contamination of water, less is known about viral contamination, which is mainly with enteroviruses. Human viruses that may be found in polluted water (often far from the source of contamination) include most enteroviruses, hepatitis A, Norwalk type of gastroenteritis viruses, rotavirus, adenovirus, and parvovirus (adeno associated virus),² and the most important sources

of viral contamination are human faeces and urine. But swimmers may shed genital and respiratory viruses into water.³ Less well studied and even unknown viruses (perhaps papovaviruses, certain slow viruses, and possibly human tumour viruses) may also be spread through water.³

Swimming in recreational pools, whirlpools, and hydrotherapy pools (especially if the head is immersed) may thus be hazardous if the water is polluted. Specific infections due to *Pseudomonas aeruginosa*,⁴ mycobacteria, legionella, and amoebae are described. There is less information on viruses, but water may be swallowed during bathing, and viruses may enter exposed mucous membranes and through breaks in the skin (fresh wounds and abrasions). Pools without free residual chlorine allow viruses to accumulate and survive and may become a source of infection—for example, acute pharyngoconjunctivitis caused by adenoviruses, meningitis due to enteroviruses, and infection with polioviruses. Viral infection might thus be contracted in poorly maintained pools but not, it seems, from properly maintained and disinfected swimming pools.

HIV has been isolated from blood, semen, saliva, tears, and breast milk. It may be present in other body fluids including urine, but there are no reports of its isolation from faeces. Several factors thus make it extremely unlikely that AIDS could be spread by water. Firstly, the most important sources of contamination of water are human faeces and urine. Secondly, dilution greatly reduces the risk of infection—for example, with hepatitis B virus. Thirdly, properly maintained and supervised swimming pools, whirlpools, and hydrotherapy pools pose little risk, but factors such as the bathing load, personal hygiene, type of disinfectant used, amount of residual organic material filtration, pH of the water, and water temperature and circulation are most important (McDougall SM, unpublished observations).

Particular attention should be paid to the disinfectant used. Sodium hypochlorite and chlorinated isocyanurate have been used effectively for many years. Chlorine destroys microbes and removes organic material, and whatever the source of chlorine the active agent is hypochlorous acid. Chlorine remains the disinfectant of choice, the amount of free residual chlorine recommended being 1.5-2.0 mg/l (0.02-0.03 mmol/l), which should be attained constantly and uniformly.

Finally, although the survival of HIV in water has not been investigated, studies on the effect of chemical disinfectants on the virus have shown an inactivation pattern similar to that of other enveloped viruses.⁵

In summary, spread of AIDS by water in properly maintained pools is exceedingly unlikely. But it may be prudent for individuals with open cuts, fresh abrasions, and other open skin lesions not to be treated in hydrotherapy pools and to avoid recreational bathing since it is conceivable that the virus might enter through an open lesion.

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