

Managing swimming pool associated Cryptosporidiosis in holiday hotels

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Synopsis

In 2000 and 2002, there were a number of large swimming pool associated outbreaks of cryptosporidiosis among British package holiday makers staying in hotels in the Balearic Islands. The management of the outbreaks was difficult for the hoteliers and the tour operators who have a responsibility under the EC Package Travel Directive. The investigation of the outbreak was made difficult as initially no public health department took responsibility for the outbreaks – the pools were under Spanish control but those affected were in the U.K. There were no published guidelines for the hotelier and the tour operators to assist them in assessing the risks to guests and in the appropriate actions to ensure that the pool was safe for bathing. The British Federation of Tour Operators (FTO) and the Spanish Confederation Española de Hoteles y Apartamentos Turísticos (CEHAT) responded by commissioning an action plan for the tourist industry. The plan covers the prevention of an outbreak, the recognition of an outbreak and subsequent management both of the pool and the bathers. The advice given has been culled from published recommendations both in Europe and the USA. The effectiveness of the plan has not been fully tested as since then there have been no reported holiday hotel swimming pool associated outbreaks of cryptosporidiosis.

Background

Outbreaks of cryptosporidiosis in package holiday makers visiting the Balearic Islands in 2001 and 2003, which were considered to be associated with the use of hotel swimming pools, revealed the lack of any official guidance for hoteliers on actions that should be taken.

The principle outbreaks were associated with hotels taking up to 2,200 guests of whom 40% were children. Some hotels only received British guests while others had guests from different northern European countries. The average length of stay was 10-14 days with guests coming and going on most days. This means that there was a continuous turnover of guests.

Guests who developed cryptosporidiosis usually had symptoms while on holiday but a definitive diagnosis was not made until their return home. This meant that public health officials in the home countries were not aware of the cases until a week or more after the guests had returned home. There was a further delay before the national surveillance systems recognised that travel to the Balearics was a common feature. The awareness of national surveillance centres of a potential outbreak varied between countries depending on a multitude of factors – the stool testing policy for cryptosporidium oocysts varied, the reporting systems also varied.

There were further delays in notification to the Spanish health authorities and the information provided was variable both in the detail and the timeliness. This all led to delays in the recognition of the outbreaks, subsequent investigations and advice on control measures. This is a different scenario to the one that occurs if the residence of those infected and the potential source of the infection are in the same administrative area.

Dealing with the 2001 and 2003 outbreaks was compounded by infected guests notifying the media with lurid details of their illnesses. This in turn led to the publication of alarming accounts together with the reporters' views on the possible source of the infection and who was to blame. This also included the production of television documentaries under the title "Holiday from Hell". At this stage, litigation was also considered by many guests resulting in some British lawyers publishing graphic accounts on web sites. Infected guests were advised to only speak through lawyers complicating any outbreak investigation.

The hoteliers concerned had little or no knowledge of cryptosporidium, relying on local public health authorities to advise them on any actions that they needed to take. This unfortunately was variable as cryptosporidium was regarded primarily as a drinking water spread infection and mainly linked to HIV infections. Any epidemiological investigation was made difficult as those infected had returned home. There were differing views on who was responsible for an investigation, who was able to undertake an investigation and on a very practical level how could the health of guests in, and arriving at the hotel, be protected.

The outbreaks were considered to be hotel swimming pool associated when guests in neighbouring hotels did not report any similar illness in the same period of time. The information on this was supplied by the tourist industry rather than the local health departments.

As the guests at the hotels had booked a package holiday, that is one comprising travel and accommodation, they are covered by the European Council Directive 90/314/EEC of 13 June 1990 on "Package travel, package holidays and package tours". In Britain this became law under "The Package Travel, Package Holidays and Package Tours Regulations 1992". Section 15 (1) states that "*The other party to the contract is liable to the consumer for the proper performance of the obligations under the contract, irrespective of whether such obligations are to be performed by that other party or by other suppliers of services...*". This means that if the acquisition of cryptosporidiosis by a guest can be shown to be due to a fault in the hotel then the tour operator has a legal liability. It has been argued that swimming pool associated cryptosporidiosis comes into this category and tour operators in the UK have been taken to court by guests who were infected with claims for damages. Class actions, where a number of guests, have joined together have run into many millions of pounds.

The tour operator wishes to solve any problem rapidly and to support the hotelier in ensuring that their product is safe for future guests. This has entailed British operators through their trade organization, the FTO, engaging consultants to undertake investigations in resorts and to provide advice to the hoteliers when necessary. Equally in Spain the hotelier's organization CEHAT has recognized the importance of providing advice to their members.

During the outbreaks in 2001 and 2003, it was apparent that there were no specific guidelines available to hoteliers on actions that they should take in the event of cases of cryptosporidiosis being reported in guests who had recently stayed in their hotel. The FTO and CEHAT joined together in commissioning guidelines for their members to use with the hoteliers. The guidelines were not intended to replace any official advice from national or local public health authorities which should always be followed by a hotelier. Unfortunately such official advice is not for the coming.

It is assumed, for the purpose of these guidelines, that a hotel associated outbreak is linked to swimming pool transmission and that a drinking water source would be a community associated outbreak. Throughout the guidelines the importance of a proper preventative strategy is stressed – action before the first case should always be taken.

The Guidelines

Introduction:

A brief description of the clinical symptoms are given. It is noted that the incubation period quoted by the English Health Protection Agency is 2 – 5 days while the U.S. Center for Disease Control states 2- 10 days. The importance to hoteliers is that many guests will become unwell on returning home and may or may not have been in the hotel at the relevant time when the infection was acquired.

The relative resistance of cryptosporidium oocysts to the level of chlorine used in swimming pool water treatment is described. Residual chlorine in pool water may neutralise bacteria and viruses released into pool water by a swimmer but will not be adequate to neutralise cryptosporidium oocysts.

Part 2 Action Plans:

Definitions - It is recognised that some basic definitions are required to ensure that hoteliers are not expected to take action on unsubstantiated claims. A **case** requires the relevant clinical picture plus laboratory confirmation of faecal oocysts. A **case associated with a tourist establishment** is a case staying in the establishment 2 – 10 days prior to the onset of symptoms. **Linked cases** are two, or more cases, associated with the same establishment, with dates of symptom onset within the same period of 4 consecutive weeks without any other obvious epidemiological relationship.

Responses: It is recognised that although a single case is unlikely to trigger a public health response, the hotelier should be aware that it may be the first case in an outbreak. The hotelier is recommended to complete a short questionnaire relating to the operation of the pool(s) and other illnesses among guests. The completed forms should be filed and made available to public health authorities if required.

In the event of linked cases a more active approach is taken. It is regarded as essential that a proper risk assessment be undertaken as soon as possible and by a suitably trained person. Whether or not the pool should be closed depends initially on the temporal relationship of the onset of symptoms in the cases. Closure of the swimming pool as a precautionary measure is only recommended if the notification of two or more cases, or if the dates of the onset of symptoms, occur within a period of one week and that week is within the past 4 weeks.

The treatment plant should continue to be operated normally while a formal risk assessment is undertaken. In hotels used by major British tour operators they will assist the hotelier in this exercise usually by arranging for a qualified consultant to visit the hotel within 24 – 48 hours. It is recommended that no specific remedial actions be undertaken until after the risk assessment has been concluded. Failure to observe this may render the risk assessment invalid and may prolong the eventual actions necessary to the detriment of the hotelier and the tour operator.

The aim of the risk assessment is to confirm the presence of oocysts in the pool water system and identify any factors that may have contributed to their inadequate removal. It should be remembered that the original source of contamination is most likely to have been a bather who was excreting oocysts.

Immediately after completing their work, the assessor should issue a preliminary report, addressed to those responsible for instigating the investigation. A full copy of this report to be given immediately to the hotelier and the contents discussed with the hotelier. This report should include their opinion on the existence or otherwise of significant risk to the health of tourists and, consequently, whether or not the urgent implementation of additional prevention and control measures are essential. On the basis of this preliminary report, the hotelier will be able to consider the functioning and use of the hotel pool(s).

If the infections were considered to be associated with the swimming pool however tenuous the link a decontamination procedure is advised. This is regarded as a prudent move and demonstrating due diligence an important point as litigation follows many cases. This advice is recommended whether or not oocysts are demonstrated on the pool water or filters, In recommending a decontamination procedure the authors were aware that the US CDC method relies on high level chlorination of 20 mg/ l for a period of 8 hours. Hyperchlorination is also recommended by authorities in Canada and Australia. The U.K. experts consulted had severe reservations on the efficacy of this procedure in a swimming pool situation. They recommend vacuuming and sweeping the pool then using good coagulation and filtering the water for six turnover cycles followed by back washing of the filters.

The hotelier looks for a procedure that is effective and requires the pool to be closed for the shortest period of time.

The recommendation in the guidelines are

1. Thoroughly clean the pool and pool surrounds
2. Clean strainers and coarse filters
3. Backwash the filter to and allow to settle
4. Chlorinate to 20 mg/L at pH 7.2 - 7.5 for 8 hours as in the CDC procedure
5. Using optimized coagulation, filter for six turnover cycles (which may mean closing the pool for a day). This assumes good hydraulics and filters that have been correctly installed and maintained.

It is stressed that this decontamination procedure should only be undertaken by a qualified and experienced pool engineer. This latter point is not always easy to follow and needs to be considered in future advisory documents.

When the investigations have been completed, the investigators should issue a final report which will, at the very least, include the results of the technical inspection, the degree of compliance with the basic general preventive measures and, as appropriate, the pertinent recommendations. At all stages the importance of liaison with public health officials is emphasised.

An important final recommendation in this section is that whenever the existence of an outbreak is recognised or suspected in a hotel, observation and monitoring is most useful in order to evaluate the efficiency of any implemented measures. If, in the following month no new associated cases appear, the event can be closed.

Part 3: General Recommendations For The Prevention Of Cryptosporidiosis Associated With Bathing Water.

This section brings together the published advice from different countries. The point is made that as cryptosporidium oocyst are most likely to be introduced into a swimming pool by a bather who is an oocyst excretor. Whereas bacteria and viruses introduced in this manner can be inactivated by chlorine in the water the same does not apply for cryptosporidium oocysts. They are removed by filtration and the process is enhanced by the use of flocculants. Although the volume of the water in a pool may pass regularly through a filter this does not mean that all the water in a pool passes through the filter. Depending on the shape of the pool and the hydrodynamics there may be dead areas with little or no circulation. Oocysts in these “dead” areas may persist for long periods of time.

The design of pools is therefore a basic consideration but with little room for change in an established hotel. The design of the filters and their operation are crucial and are frequently not or only slightly understood.

Specific recommendations include:

- The water must be re-circulated and filtered continuously.
- The swimming pool filters must be technically inspected at least once a year and preferably prior to the seasonal opening of the hotels.
- The filters must be backwashed periodically, at least once a week, and in accordance with the manufacturer’s instructions. It is preferable to carry out the backwashing operation at the end of the day, and the manufacturer’s instructions should be meticulously followed. An excessive frequency of backwashing (more than once a day, for example) could be counterproductive to the efficiency of the filters.
- Abrupt changes in the flow through the filters should be avoided as they can compromise the efficiency of the same. If backwashing one filter, while the others remain in operation, backwashing should begin and end slowly (15-20 seconds).
- Ideally, the installations should be fitted with flow meters to control filtration and backwashing rates.

The use of flocculants in installations with sand filters, the adequate use of flocculants is essential in ensuring effective filtration of the *Cryptosporidium* oocysts.

- The flocculants should be added in a continuous way via dispenser pumps, at some point on the circuit prior to the filtration (never directly into the pool itself). Ideally, the mixing time before filtration should be 10 seconds.
- For the efficiency of the coagulation process, the water pH should be maintained within the limits recommended by the manufacturer of each specific flocculant.

Experience has shown that many hoteliers and swimming pool operatives are unaware of the technical requirements for the efficient management of the water in the swimming pools. It is unfortunate that the same applies to many public health and environmental health staff who monitor the same functioning of pools. A commonly held view is that if there is a problem increase the frequency of back washing to once or twice a day. This illustrates a lack of understanding that a back washed filter needs to settle properly before effectively working again. Very few hotel pools have flow meters that give a measure of filter efficiency.

Preventing contamination and reacting to potential contamination incidents depends to a large extent on the training of swimming pool users. The bathers are the principle source of pool water contamination yet few give any thought to this and how they can prevent contamination. In the holiday hotel setting families are intent on enjoying the sun and swimming in the pool. Notices requesting that bathers shower before entering the pool and usually ignored especially by children. Never the less it is prudent for appropriate advice to be displayed in languages understood by the guests.

Hoteliers are advised to have a Faecal Accident Policy. This requires prompt notification to the hotel staff and then immediate action. Even so many bathers in the pool will have potentially been exposed to any released pathogens. The chlorine in the pool water may neutralise some bacteria and viruses but will have no action against cryptosporidium oocysts. Pool water decontamination procedures have been covered above.

The sampling of pool water for cryptosporidium oocyst is discussed, including the importance of only using laboratories recognised as competent to undertake the testing. It is stressed that whether or not oocysts are demonstrated in a sample of water from a pool no conclusions can be reached as to whether or not it is safe or dangerous to bathe in the pool. This is not understood by hoteliers, and at times public health officials, who believe that if no oocysts are demonstrated the pool is safe for bathing. Throughout the document it is recognised that the pool and it's operation must considered in it's entirety.

It must be remembered that the guests will have little or knowledge on cryptosporidium apart from the fact that it is spoiling their holiday. The useful explanatory notes published by CDC are reproduced so that hoteliers and tour operators can use them directly or modify to include them explanations in their own explanatory notes.

Conclusion

Swimming pool associated cryptosporidiosis can cause major disturbances in a holiday hotel affecting the hotelier, the guests and the tour operators. Major outbreaks in the Balearic Islands in 2000 and 2002, revealed that there was no publicised guidance for hoteliers and this situation still applies.

The hotelier will always be under considerable conflicting pressures from different groups including the hotel owners, the guests, tour operators and public health officials. The absence of published and officially ratified guidance can leave them with receiving conflicting advice much of which is not based on any credible evidence.

The British Federation of Tour Operators (FTO) and the Spanish Confederation Española de Hoteles y Apartamentos Turísticos (CEHAT), have recognised this and promoted the

production of some guidelines for hoteliers. Fortunately since their release there has not been a major outbreak of hotel swimming pool associated cryptosporidiosis and so the guidelines have not been properly tested. The guidelines will be updated at intervals and it is recognised that there are many differing views on the actions that should be taken. It is hoped, however, that the guidelines will provide a starting point for those dealing with hotel swimming pool associated outbreaks of cryptosporidiosis.

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