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Inflight Gastroenteritis Significance for Air Crew

Knowing the causes and sources of food poisoning can help crew members avoid the debilitating effects of digestive illness for themselves and their passengers.

by

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Available information would indicate that, worldwide, the most common causes of inflight incapacitation of air crew are the symptoms of gastroenteritis. Such symptoms may include diarrhea, vomiting, nausea, stomach cramps, chills, headache, prostration and malaise with the most serious consequence being dehydration. With cholera, which is really a form of severe gastroenteritis, this dehydration may be very rapid, hence the reason it is feared more than many other types of gastroenteritis. Symptoms may occur from two to 48 hours or longer after contracting the infection or intoxication and their cause is invariably a microorganism or its metabolic product, usually ingested along with food or water. Exceptions may be the more infective bacteria such as Shigella, and the typhoid Salmonella which can also probably be transferred person-to-person, and the enteric viruses.

The terms gastroenteritis, food poisoning, travellers diarrhea, dysentery and more graphic names are often used synonymously and may often be used to refer to the same set of symptoms. Strictly speaking, gastroenteritis is the generic term of illness which may be diagnosed more specifically once the source and causative organism have been identified.

Most gastrointestinal illnesses with short incubation periods are bacterial in origin. However, there are a number of food- and water-borne infections with longer incubation periods, not all of which have gastroenteritis as a major symptom. Enteric viruses may take three to five days to produce symptoms, amoebic dysentery one week to several months, giardiasis one to six weeks, paratyphoid one to 15 days, typhoid fever seven to 28 days and infectious hepatitis (type A) 10-50 days. Various worms, flukes and parasites which can cause severe and chronic non-gastrointestinal infections may take several weeks to months to manifest themselves.

Gastroenteritis is popularly considered to be a risk only in developing countries with poor general standards of hygiene and sanitation, and food poisoning is considered likely only from obviously dirty substandard restaurants.

Although some of the more infective and exotic ailments mentioned above are often confined to these countries,

the most common forms of food poisoning, which would seem to be the usual cause of gastroenteritis in crew members, are in fact a legacy of the modem west.

Food Poisoning

The incidence of food poisoning in Western countries (including Australia) has been increasing over the past 20 to 30 years, and the main reason for this increase has been the growth in the size and scale of the food service industry. Most food poisoning in Western countries is caused by the catering industry — in particular institutions and large-scale operations including airlines. The same problems also exist in large Asian cities.

The common food poisoning bacteria are Salmonella, Staphylococcus aureus, Bacillus cereus, Clostridium perfringens and Vibrio parahemolytius. These bacteria may be present in food as part of the natural bacterial population of that food, but in numbers too small to cause any illness. Our bodies are used to consuming millions of harmless bacteria with each mouthful of food, and a couple of hundred potentially hazardous bacteria in that mouthful will not have a chance to cause any harm. Some, such as S. aureus, are carried by most humans and readily gain access to food by human contact.

However, before they can cause illness, these bacteria must multiply in food to numbers exceeding 1 million per gram. While doing so, S. aureus produces a toxin, which is resistant to heat, i.e., not destroyed by reheating the food, as are most bacterial cells.

Foods which support the growth of food poisoning bacteria are called potentially hazardous foods. They are moist protein foods such as meats, sea foods, poultry, cream, custards and egg products. Rice and other moist cereal foods and sauces are also potentially hazardous because they are a source of naturally occurring B. cereus bacteria.

To allow bacteria to multiply, a food must be left to stand at a bacterial-incubating temperature for a sufficient period of time. The hazardous temperature range is 5-60° C (particularly 20-40° C). The time required depends on the food and the bacteria. However, rapid cooling of cooked food, subsequent good chilling and adequate cold holding facilities are the most significant aspects of modern food hygiene control. Their lack in large-scale operations is most often responsible for food poisoning outbreaks in Western style operations.

A kitchen can appear to have poor hygiene (dirty, flies, cockroaches, etc.) but have excellent time- temperature control and therefore not cause a food poisoning outbreak. However, a spotless stainless steel edifice that is equipped with poor temperature control could be hygienically more liable to experience food problems.

Airline Problems

Temperature control, therefore, is one of the most strongly emphasized aspects of hygiene control in airline catering, and the lack of it has probably contributed to most, if not all, reported food poisoning outbreaks on aircraft. In fact, even in a cholera outbreak in 1972, failure to refrigerate the implicated food (mixed cold hors d'oeuvres) after preparation seemed to be as much the cause of the outbreak as the initial contamination with the cholera bacteria. Even with cholera, large numbers of bacteria must be ingested to cause the illness.

The largest food poisoning outbreak on board a single aircraft occurred between Anchorage and Copenhagen on a Boeing 747 flight from Tokyo to Paris in 1975. One hundred ninety-six passengers and one crew member of a total of 343 on board suffered symptoms of nausea, vomiting and abdominal cramps one and one-half to five and one-half hours after eating a ham omelette breakfast supplied at Anchorage; 143 were hospitalized with 30 in a critical condition.

The cause of the infection was tracked to the ham, contaminated by a cook in the kitchen in Anchorage, who had infected cuts on his hand, a richer source of S. aureus than healthy skin. However, even this serious breach of hygiene would not have caused the outbreak had the food been quickly and properly chilled. Instead, it was held at room temperature in the kitchen for six hours, placed in a cool room at too high a temperature for 14.5 hours and then stored in the aircraft ovens (not in a chilled module) for eight hours.

It was just chance that the flight deck crew did not consume the contaminated omelets, since the airline had no rules on the composition and choice factor for crew meals.

Inflight Controls

For a number of years, within Qantas, there have been rules regarding meal choices for flight crew to minimize the risk of the entire crew being incapacitated. Certain items are considered to be low-risk foods and may be provided for all. These include cooked vegetables, bread, pastries (without cream), butter, cheese, biscuits, breakfast cereal, commercial yogurt, fresh eggs, nuts, juices, fruits and salads (chlorine sanitized), canned food and confectionery. (Rice often causes Bacillus cereus food poisoning and is a "choice" item.)

In the design of both passenger and crew meals, safety is considered in addition to nutritional and aesthetic aspects, and often is overriding. The foods which have

been involved in airline outbreaks are usually not included in crew meals, or if so, only as a "choice" item and may not be included in passenger meals unless the flight kitchen has demonstrated a consistent ability to produce such foods safely. Implicated foods have included oysters, shrimp and crab salad, crab meats, hor d'oeuvres, shrimp salad, chopped egg garnish, egg salad, chicken sandwiches, variety of cold foods, custard dessert, chocolate eclairs, roast turkey, and ham in omelettes. In the most recent and largest airline outbreak ever, involving thousands of passengers and crew members on a major European airline, the food responsible was canape items coated in a contaminated aspic.

The aim of Qantas menu design, hygiene standards and routine microbiological monitoring is to prevent passenger as well as crew food poisoning, and it is understandable why we do not recommend the consumption of leftover passenger meals by crew members, particularly canapes, hors d'oeuvres and creamy dessert components. Even with meals that have been reheated on the aircraft, the heat-resistant staphylococcus toxin could be present in any item containing a pre-cooked and possibly much handled, potentially hazardous component. The classic example here is lobster thermidor and similar items. While a slice of freshly cooked roast beef from the passenger cabin may not cause harm, and a piece of black forest gateau consumed by one crew member only, may not be disastrous for the operation of the aircraft if contaminated, it should obviously be the exception rather than the rule for air crew members to supplement their crew meals with passenger cabin items. Any food that has been out of the chilled carts for more than one hour must be considered a high risk - even if safe when consumed by the passengers -and not eaten under any circumstances. Only by this level of discipline with inflight food consumption can the level of safety required in other areas of aircraft operation be consistently maintained.

Layover Risks

Despite the obvious need of a fail-safe system to minimize the risk of inflight incapacitation of aircrew due to inflight meals, it must be emphasized that most cases of crew gastroenteritis which come to our attention can almost always be traced to food consumed on the ground. Often an inflight meal, consumed on the sector in which symptoms occur, is suspected by the crew member concerned, but investigations usually point more strongly to food consumed at the layover location.

The risks faced during layovers are far greater than on aircraft. Even in selected hotels we do not have the control that is exerted in the flight kitchens**,** so the risks are inherently greater. It therefore makes sense to exercise even greater care of food choice and consumption during layovers than in the air, even to the point of suggesting that when a group of air crew members eat together during layovers, they try to select different foods even if from the same restaurant, particularly within 24 hours before duty.

High-Risk Areas

In the Asian, Middle Eastern, Pacific and Southern European countries, the risks are greatest because of the higher incidence of gastroenteritis and other food- and water-borne infections less common in Western countries, agricultural practices leading to fecal contamination of fruits and vegetables, differing cultural habits and sanitation deficiencies in some communities.

Precautions

The Qantas Flight Operations policy and manual warns against the consumption of uncooked seafoods while overseas or within 24 hours of flight duty. The contamination risk from raw shellfish, which often grow well in polluted water, is obvious. Raw fish, particularly in Asia, can be a source of flukes and parasites because of farming techniques. Such foods should also be avoided.

Current thinking suggests that this seafood warning should go even further to include not only raw but also cooked seafood (prawns, lobsters and crab) and hot dishes containing pre-cooked seafood (fried rice with shrimp, seafood pancakes, etc.).

Some types of fish (reef feeders) may cause neurological symptoms (ciguatoxin) and other (tuna and mackerel if starting to spoil) allergic symptoms (scombroid poisoning) about an hour after being eaten. Otherwise a freshly cooked piece of fresh fish is generally safe. However, if in doubt, don't!

In fact, all well-cooked, freshly-cooked food served hot and with minimum handling after cooking should be safe. Hot food which has been pre-cooked and allowed to stand often causes Clostridium perfringens food poisoning if the holding temperature is lukewarm only. "Hot" foods from a buffet often fall into this category.

An even greater risk however is cold protein foods, particularly from unrefrigerated buffets. The nature of the foods (cold meats, poultry and seafoods, cream mayonnaises, egg dishes, cream pastries and desserts) is optimum for the growth of food poisoning bacteria. The handling required in their preparation allows for additional contamination to gain access. The absence of a heating step prevents the subsequent destruction of these foods, and their display, often at warm ambient temperatures, encourages bacterial multiplication. Remember

that such foods can become dangerous before they become inedible. In the high-risk areas, salads are a risk item because of the likely fecal contamination and the lack of consistent application of a sanitizing washing step at other than the flight kitchens. The surface of fruits can be similarly contaminated and these should be consumed only after washing well and peeling — preferably by yourself.

Precut fresh fruit is often found to contain large numbers of E. coli bacteria on their cut surfaces, and represents the main cause of travellers' diarrhea.

Commercially produced and packaged food, including yogurts, cheeses, ice creams, soft drinks and mineral water, snack foods, confectionery, etc. are usually safe, although the dairy products can be quite hazardous and are to be avoided if made at cottage industry or street level.

In an epidemic situation, water is a frequent source of large numbers of gastroenteritis organisms and therefore propagates the epidemic. If the water supply in any city is considered inconsistent or unsafe, then large hotels generally install their own treatment plants (as do the flight kitchens).

Outside the hotels, however, there is no guarantee of the safety of the water or ice. And despite rumors to the contrary, there is not sufficient alcohol in whisky to ensure sterilization.

Treatment of Food Poisoning

If, despite all reasonable precautions you find yourself afflicted with gastroenteritis, what treatment should be sought? Remember that most causes are self limiting and the main aim is to alleviate symptoms and prevent dehydration for the day or so that the illness persists. Self-medication is not recommended, and medical attention should be sought in severe or prolonged illness. Dehydration is normally the major health risk, so liquid intake should be maintained but solid foods avoided until recovery. If an attack recurs or persists for several days, it is important that it is reported to your medical officer to enable correct diagnosis and treatment. A stool test is generally desirable to assist with this. Such a report is mandatory if the symptoms have occurred in flight.

The information and advice presented here is not intended to deprive crew members of the pleasures of good eating while on duty. However I trust that you are now reminded of the risks and will be better armed to minimize their effects on yourself and related aircraft and passenger safety. ♦

About the Author

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