Annotation

Salmonellas and eggs

Epidemiology

Salmonella food poisoning is a common cause of human illness in the United Kingdom, and in the last two years the incidence has increased appreciably. Much of the increase can be attributed to a particular subtype of one of the many serotypes, *Salmonella enteritidis* phage type 4 (PT4). This is predominantly a poultry serotype, but the current epidemic has been attributed not only to poultry meat but also to a more unusual source, hens' eggs.¹ Furthermore *S enteritidis* PT4 is not the only strain that has recently been responsible for egg associated outbreaks. Other phage types of *S enteritidis* have caused egg associated outbreaks in hotels in 1988 (Communicable Disease Surveillance Centre (CDSC), unpublished observations), and *S typhimurium* PT49 was responsible for a widely publicised incident associated with eggs used to make mayonnaise at the House of Lords.²

The number of cases of human salmonellosis reported to the Public Health Laboratory Service (PHLS) CDSC in 1978 was 9042, and only 661 (7.3%) of these were *S enteritidis*. In 1987, 16 991 cases of salmonella were reported and 5653 (33.3%) of these were *S enteritidis* (CDSC, unpublished observations) and for 1988, the provisional estimates are that 12 500 of 23 000 salmonella infections (54.3%) were *S enteritidis*. At present, about 35% of the *S enteritidis* isolates reported are in those under 15 years of age. Although children and infants are more likely than older people to have stool samples cultured, there is undoubtedly considerable under-ascertainment of salmonella infection in all age groups.¹

Salmonella infection can lead to serious complications especially in children. In the 10 years to 1987, 1655 salmonella bacteraemias were reported to the PHLS CDSC, and of these 312 (19%) were in patients under 15 years old, and 124 (7%) in those under 1 year (CDSC, unpublished observations). The corresponding figures for salmonella meningitis were 40 in total, 31 (78%) in patients under 15 years old and 27 (68%) in those under 1 year old. Although the proportion of salmonella infections progressing to bacteraemia does not appear to be

increasing, the total annual number of salmonella bacteraemia has risen from 131 to 226 during this 10 year period.

Causes

Outside the hospital setting, where person to person spread of salmonella occurs more commonly than in the community, the main risk factor in the acquisition of salmonella infection is consumption of contaminated food. In the unweaned child, contaminated milk is clearly the most likely source, and community outbreaks have been caused by dried infant milk formulas,³ by unpasteurised cows' milk, and by failed pasteurisation of bottled milk.⁴ In the weaned and older child, the popularity of egg and egg based foods is considerable, and the widespread contamination of eggs poses a serious problem. Children have been particularly affected in other recent foodborne salmonella outbreaks including outbreaks caused by *S napoli* in contaminated chocolate⁵ and *S typhimurium* in salami sticks.⁶ These outbreaks were curtailed, however, by the simple expedient of withdrawing the branded food product until the manufacturing processes were modified. With eggs, however, where the daily consumption is 30 million eggs a day from 45 000 producers, the nature and size of the problem are on another scale and a different approach is required.

Prevention

Although salmonellas of certain serotypes have long been known to be capable of infecting hens' ovaries and their egg contents⁷ these serotypes rarely cause human illness. The fact that the strain now most commonly associated with human illness is capable of contaminating the inside of an egg¹ means that merely adhering to the simple hygienic practices that prevent the contamination of the egg contents from the shell is no longer adequate.

A simple but effective policy would be to recommend avoidance of all raw or lightly cooked egg dishes. In those for whom any risk is unacceptable, this is indeed the only solution. In formulating guidance it is important to consider the consumer,

and the fact that eggs are a nourishing, cheap, and convenient food. In infants and children the no risk policy is advisable. Eggs should be boiled for at least six minutes and can be mashed or liquidised with milk for infants who are being weaned. In the healthy child, the probability of a single lightly boiled, scrambled, or fried egg causing a serious salmonella infection is very small,¹ but a mother who provides this type of food on one occasion is likely to repeat the hazard daily. Any procedure that increases the chances of using an infected egg—such as mixing a large number of fresh eggs—should be avoided, so that consumption of portions of scrambled eggs or omelettes made in bulk for catering purposes is inadvisable. The elementary rules of food hygiene should be strictly followed with all egg dishes. This means that the egg should be stored for as short a time as possible, it should be stored in a refrigerator, then allowed a few minutes to reach room temperature before cooking, and eaten immediately after cooking. Raw eggs and all dishes containing raw eggs should be avoided altogether, and this advice has the advantage of being somewhat easier to follow. Liquid pasteurised egg is occasionally available in domestic sized cartons from supermarkets, and its use should be considered if recipes specify raw egg.

However careful the consumer is, control of the epidemic of *S enteritidis* PT4 in babies, children, and

adults requires the eradication of the organism from layer and broiler chicken flocks, and so is ultimately dependent upon the work of veterinarians and the poultry industry.

References

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