Epidemic spread of Salmonella hadar in England and Wales

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Summary and conclusions
Salmonella hadar is now the second commonest serotype isolated from cases of food poisoning in England and Wales. Turkeys are the main reservoir of the organism and there is an urgent need to eradicate it from the breeding stocks; though this would be expensive, the cost must be balanced against the cost of treating the human disease.

Introduction
During the past three years Salmonella hadar has become the second most prevalent serotype isolated from patients in England and Wales; most of the isolations have been from cases of food poisoning. This prevalence has warranted the development of a phage-typing scheme to provide more precise surveillance.

Epidemiology
Before 1971 S hadar was seldom identified: only eight strains had been isolated from man, one from a sewer swab, and none from animals. The eight human infections included a family outbreak affecting three persons; and of the remaining five cases, three were in people who had recently returned from Africa. In July 1971 the head waiter at a large London hotel was infected, and in the same month several other cases occurred in London. By the end of the year 38 strains had been identified from people in several parts of England and Wales. In subsequent years there was a progressive increase in the number of isolations until by 1975 the serotype had become one of the “top-ten” most prevalent serotypes causing infections in man. The records of our division show that in that year S hadar accounted for 3% (298) of all isolations. The figures for 1976, 1977, and 1978 were 5.5% (532), 10.9% (809), and 14.3% (1360) respectively. During 1979 this alarming trend continued (figure) and 1600 strains were identified. Our information refers to only a fraction of the infections caused by S hadar.

The table gives information on strains submitted to the reference laboratory from outbreaks that affected more than one family or household. Beginning in 1976 there was a dramatic increase in the number of outbreaks of food poisoning caused by S hadar. In about 46% of these, turkeys were incriminated as the vehicle of infection. Many of the outbreaks affected large numbers of people—over 600 in one—and occurred in catering establishments such as restaurants, hotels, and hospitals. The turkeys were usually large, and in some outbreaks there was evidence of inadequate thawing, insufficient cooking, and keeping cooked meat at ambient temperatures before eating. Although correction of such malpractices would help to reduce the number of outbreaks, it would be only an adjunct to tackling the main cause of the problem, which is persistence of a high incidence...
of infection in poultry. There is no doubt that turkeys are the main reservoir for S hadar and that the serotype is widely distributed in turkey flocks throughout England and Wales. The serotype is isolated regularly from turkeys on the premises of some of the largest producers in Britain. The Zoones Order reports for 1978 show that nearly half of all flocks submitted to the sero-type; 96 (70%) concerned turkeys and 40 (29%) fowls.

Phage-type scheme

Currently 35 different phage types are recognised. Our division receives salmonella strains from laboratories throughout England and Wales, and in a retrospective study of samples that had been referred since 1971 were phage typed.

During 1971 and 1972 five strains were received from chickens, cattle, and pigs and all belonged to phage type 2. Eighty-five strains isolated from people during those years were available for study, and 77 belonged to phage type 2. In 1973 and 1974 strains of phage type 2 were received from the premises of the largest turkey breeder in Britain, and within six months several outbreaks occurred in hotels and restaurants in the south-east of England. The figure shows that the almost exponential phase of the S hadar epidemic began at that time. In 1979, 90% of all isolations from turkeys and man belonged to phage type 2. The remaining phage types occurred in man, and also in turkeys and chickens, and to a less extent in cattle. During 1977-9 the number of different phage types in poultry and man increased. Thus four new types were identified in 1977, nine in 1978, and six in 1979. In most instances the new phage types were isolated from poultry and man. Laboratory studies suggest that this diversification of phage types results from acquiring phage-restricting plasmids or temperate phages; the details will be reported elsewhere. If these new phage types become established the epidemiological value of the scheme will be enhanced.

Comment

During the past 10 years S typhimurium has remained the predominant cause of human salmonellosis in Britain but the epidemiological pattern has been greatly influenced by the appearance of S agona and S hadar. S agona was introduced in fish meal imported from Peru and then quickly became established in pigs and poultry. The epidemiology of S hadar is different, and an association with imported animal feed has not been established. Whatever the origin there is little doubt that the most important single event in the establishment of S hadar in Britain was its appearance in the early 1970s in the stock of a large turkey breeder. Subsequently breeding stock was distributed to numerous rearing units, which led to the spread to man. Evidence suggests that particular genetic lines of turkeys are affected, more especially those producing large birds for the catering trade. It seems likely that the nucleus breeding flock of these lines is persisting as the reservoir of infection, and there is a need to investigate the mechanisms that contribute to the transmission and persistence in flocks. There is an urgent need to eradicate S hadar from these breeding flocks. This will be expensive for the poultry producers but the expense should be weighed against the health expenditure caused by S hadar infections in man.

Recycling waste products from poultry plants now helps in disseminating salmonellosis, and this is true for S hadar. The suggestions that dried poultry manure may be used as a source of protein for animal feeds is also a cause for concern unless this material can be adequately sterilised. Implementing the proposed legislation for heat treatment of protein animal feeds seems to be subject to prolonged delays but such legislation when implemented would undoubtedly help in breaking the chain of zoonotic salmonellosis.

The study of the epidemic spread of S hadar in England and Wales emphasizes several potential intervention measures. These encompass areas as diverse as husbandry practices in turkey-breding flocks, processing of recycled animal feeds, and catering practices in food-service establishments.

Reference


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