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EPIDEMIOLOGY OF SPONGIFORM ENCEPHALOPATHIES – AEEMA Meeting, Alfort, may 29th 1991

Epidemiology of human transmissible spongiform encephalopathies

Court (L)

The epidemiology of human subacute spongiform encephalopathies (HSASE) or human transmissible spongiform encephalopathies, starts with the work of Gajdusek and Gibbs. At the national Institute of Health, they succeed, from the 1960's in describing the jigsaw which led them to prove for the first time the transmissible characteristic of a central nervous system degenerative disease. These diseases are two in man: kuru and Creutzfeldt-Jakob disease (CJD) or Gerstmann, Straussler, Scheinker (GSS) Syndrome, closely linked to it. Hadlow saw the similarities between scrapie in sheep and kuru, described in 1957 by Gajdusek and Zigas in the Fore from Papua-New Guinea. To the clinical and anatomopathological signs, the evolution most of the time quick and always inexorable after a long incubation time, with localisation to the grey matter, linking a loss of neurons, gliosis, spongiosis without inflammatory reaction, was added transmissibility to primates, rodents and carnivores. This transmission is easily obtained through intracerebral or intraocular routes, but it is also possible through subcutaneous, intramuscular, intraperitoneal, intravenous and oral routes. The kuru with an important occurrence rate of 1% in 1960, more frequent in women, is now disappearing, with the end of ritual cannibalism habits. The epidemiological study of the disease and the ethnographic researches on the Fore showed that no other factor except endo-cannibalism could be used to explain it. CJD, whose endemic is only known with precision from USA, Western and Centrale Europe, Chile and Israel is a rare disease of the second half of lifetime (occurrence rate equal to 1/106 on average), appears, like its variant, GSS syndrome, as sporadic or family cases. It is possible to identify CJD cases with an iatrogenic origin (cornea transplant, meninx transplant, intracerebral inoculation with contaminated electroencephalographic electrodes or any neuro-chirurgical material, the use of growth hormone coming from pooled pituitary glands), but there is no bi-univocal relationship of transmission between scrapie and human disease, no alimentation, professional or proximity epidemiological factor leading to any evidence of the smallest relationship between the two diseases. As in natural or experimental animal diseases, sheep and goat scrapie, mink encephalopathy or bovine spongiform encephalopathy (BSE), genetic predispositions exist. The existence of outbreaks in special ethnical groups (Jew from Libya...) like family cases or GSS syndrome are the most typical examples. The physical, chemical and biological properties of the atypical infectious agents, except strong hypochlorites and oxidizers. They are closely linked to a normal protein found in the brain, PrP, described by Prusiner, at first from a hamster and then found in the whole animal kingdom. This association, described by Merz as scrapie associated fibrils (SAF), by Prusiner as rods, especially in experimental scrapie, is the proof of a protein dysregulation, whose mechanism is unknown. It is linked to different kind of mutations on the PrP gene allele, as seen in some experimental CJD and scrapie. The introduction in the genome of a normal mouse of this code anomaly gives the disease, but it is still impossible to explain the transmissible character of these diseases and to invalidate the presence of a specific genetic information. It is possible that these affections belong to a larger nosological frame and that this protein dysregulation and the existence of the linked abnormal coding could be induced by a mutation or by an atypical infectious agent. The apparition of BSE through an oral contamination route (repeated ingestions of proteins with a high level of infectious elements) through proteins enriched food stuff and, in the same time, with infectious elements, its spread to domestic cats asks the question, now, in similar conditions, of its possible passage to primates.

Epidemiology of spongiform encephalopathies in Great Britain

Bradley (R) & Wilesmith (J-W)

Bovine spongiform encephalopathy (BSE) is a new disease of adult cattle first seen clinically in the United Kingdom in April 1985. Confirmation of the disease is by brain histology (first case November 1986) which reveals spongiform change in grey matter neuropil astrogliosis and neuronal vacuolation. The epidemic is an extended common source epidemic. It resulted from increased exposure of cattle to a scrapie-like agent commencing in 1981-1982. This increase in exposure was due to changes in the source of ruminant waste and particularly the rendering systems used to render the waste to produce meat and bone meal. Cessation of hydrocarbon solvent lipid extraction systems were particularly incriminated. There are at 17 May 1991, 28,499 confirmed cases in Britain the greater majority of which occur in dairy cows. Northern Ireland and sporadic cases have occurred in France and Switzerland. A small number of cases of spongiform encephalopathy have been confirmed in Bovidae of exotic species held in zoological gardens in Britain which have been exposed to the same food source as cattle. A few cats in Britain also have confirmed spongiform encephalopathy the source of which is unknown. Controls have been put in place in Britain and some other countries which aim to eliminate or reduce exposure to a level at which there is no risk to animal or human health. In regard to the former in Britain ruminant protein was from July 1988 prohibited from inclusion in ruminant rations. It is predicted that if there is no cattle to cattle transmission the incidence of BSE will decline during 1992 and become virtually extinct by 1996. There has been one animal out of nearly 29,000 that might have been a case of maternal transmission. However, in a detailed study of 316 offspring of confirmed cases and 316 controls no case of BSE has yet occurred. Should maternal *in utero* transmission occur in all offspring of confirmed cases (a most unlikely event on present evidence) the incidence of BSE will still decline but the trail of the epidemic may last into the early years of the next century.

The BSE monitoring network in France

Savey (M), Belli (P) & Coudert (M)

From the experience following the evolution of BSE in Great-Britain, and in the other countries where the disease had been identified, the authors have made an estimation of the risks, specific of French situation. Outside inputs (meat and bone meal and animals coming from Great Britain) represent the major, maybe the only potential inputs of the disease in France. Though it is possible to foresee that the disease will occur in France as sporadic cases, with a very low annual incidence, like in Ireland. The epidemiological surveillance network, started as soon as the end of December 1990, leads to the identification of the first case of BSE in February 1991. At the end of May 1991, 4 cases had been identified. All were dairy cows, between 4.5 and 6 years old, with a classical clinical evolution.

Epidemiological analysis of the first case of BSE in France

Gouelleo (L)

Presentation of the first clinical case of BSE and of the analysis of the epidemiological hypothesis.

PAPERS OF EPIDEMIOLOGY

Discovery of surface antigens variations of A H3N2 influenza in swine in France with monoclonal antibodies

Kaiser (C), Valette (M), Million-Jolly (J), Lambert (S), Labie (J), Madec (F), Gourreau (J-M) & Aymard (M)
The antigenic identification of A H3N2 influenza virus isolated from swine, in France, since 1984, showed the existence of variations on both surface antigens: the hemagglutinin and the neuraminidase. The variations show that these viruses, like in human beings, went under mutations and an immunological pressure leading to a modification of their envelop antigens.

Dairy cattle farming systems and their constraints in ecopathological surveys

Faye (B), Philipot (J-M) & Rosner (G)

Cows in dairy production have a high economic value, their life is long and they have different heredity, age, physiological stage and milk yield level at each moment. Moreover, the influence of the farmer on his herd is well marked, in particular through forage production, individual diet, reproduction and milk production management. There are two levels for analysis in eco-pathological survey: the cow and the herd. The choice of the statistical individual includes particular methodological constraints. Dairy cattle system is characterised by a complex interaction space/time which general several constraints: in space, it is the duality of the place of life (grassland/animal housing) with a cowshed which is more and more open to external environment and built for free walking: in time, it is the entanglement of seasonal and physiological cycles of the cow and cycles of activity of the farmer. These space/time characteristics have an effect on the cow and on the herd, and can present some different schemes according to farming systems and diseases. These characteristics generate some methodological constraints, specific for dairy cattle production.

Atypical reactions in bovine brucellosis surveillance tests: results of a questionnaire survey in affected area

Bénet (J-J), Massard (C), Garin- Bastuji (B), Moutou (F), Dufour (B), Zygmunt (M), Schaeffer (S) & Coton (T)

During winter of 1990-1991, unexpectedly high rates of positive serological results to screening test of bovine brucellosis were observed in the central part of France (14 departments). Since they were not associated with commonly known risks of brucellosis, nor with any clinical signs of brucellosis, they have been called "atypical reactions". A questionnaire-survey has been conducted on the basis of data collected until March 15th 1991 by local Veterinary Services. 2163 herds were affected for 100 000 exposed, 2.08% herds (0.5% to 6% according to departments) and 3.62% cattle (1.7% to 4.8%) in these affected herds, or 0.10% cattle (0.02% to 0.27%) over three and a half million cattle in these departments. Results do not show any association with age, sex, or production. In 65% of cases of these false positive reactions, both Rose Bengal Plate and Complement Fixation Test gave positive results. 60% of cattle had reactions one month later (59% of herds) and 84 % of cattle two months later (78% of herds). These observations are not consistent with the hypothesis of true infection by Brucella. At the opposite, they are consistent with the hypothesis of cross-infection. A special surveillance will be implemented during next winter.

INFORMATIONS

Veterinary epidemiology in American higher education: the example of California

Chomel (B) & Riemann (H)

The authors are giving an overview of veterinary epidemiology training programs in California. After a brief description of higher Education in California undergraduate and graduate programs at the University of California Davis, School of veterinary medicine are presented, with a more particular focus on the Master of Preventive Veterinary Medicine (MPVM). In the field of Public Health, several Masters of Public Health (MPH) and Master of Science, PhD or Public Health Doctorate are available.