Britain: new findings point to larger outbreaks of vCJD “mad cow disease”

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UK scientists are upwardly revising their estimates of the number of people likely to die from new variant CJD (vCJD, also known as “mad cow disease”). It follows the death of a second patient, who contracted the disease after a blood transfusion [1].

The patient, who had received a blood transfusion from a donor diagnosed with vCJD in 1999, died five years later of a ruptured artery. An autopsy revealed that the patient was infected with vCJD in the spleen and lymph nodes.

The first case of a person being diagnosed with vCJD after a blood transfusion occurred last year, prompting an investigation that revealed another 17 people had received blood components from donors later diagnosed as carrying vCJD.

New variant CJD affects the functioning of the brain, causing personality change, loss of body function, and eventually death. It is believed to have arisen due to people eating meat infected with bovine spongiform encephalopathy (BSE). The BSE epidemic amongst cattle in the UK reached its peak incidence in January 1993 at almost 1,000 new cases per week.

BSE and vCJD are thought to be caused by a rogue form of proteins called prions. All previous cases of the disease have been in people with a particular set of markers on their prion proteins. People with this genetic make-up comprise one third of the UK population. However, prions in the latest case of the disease have a different set of markers, and more than half the population shares these.

In Britain itself, 147 mainly young people have died of vCJD. It was previously expected that this would rise to as many as 3,800. This estimate was derived from examinations of appendix and tonsil tissues removed from 12,674 people during routine surgery, of which three were found to contain abnormal prion proteins. However, this estimate assumed that only those with the less common set of markers were susceptible. The latest case has proven that a larger proportion of the population are susceptible to the disease than had previously been acknowledged.

Scientists expect that people with any of the three possible sets of markers will eventually prove susceptible to vCJD, but the incubation periods (the time during which the symptoms are not visible) are likely to be different for each set.

The Conservative government at the time of the BSE epidemic, and the Labour government that followed it, both limited their response to the danger of vCJD to ordering the removal of the brain and spinal cord from slaughtered cattle, rather than removing all UK beef from the food chain. They did this on the grounds that consuming the blood and muscle of infected animals could not transfer the disease.

There is now strong evidence that this assumption was also false. Although the amount of infective agent in the blood is much smaller than in other parts of the body, it cannot be regarded as safe.

The Blair government has been forced to acknowledge this by banning people who have received blood transfusions from donating blood themselves, so as to reduce the risk of vCJD being spread by this route. This latest measure is in addition to the removal of white blood cells from all blood used for transfusions, and the importing of blood products such as clotting agents and plasma. At present, there is no blood test to determine whether someone has the disease.

Professor Ironside, head of the CJD surveillance unit in Edinburgh that researched this latest case of vCJD said, “This finding had major implications for future estimations of numbers of vCJD cases in the UK.... A

very lengthy incubation period might explain why no clinical cases of vCJD have yet been observed in this subgroup."

He said that there could be other people in the subgroup (i.e. the group of people with the same set of markers on their prions) carrying the disease without being aware of it. They could still infect others with vCJD, via blood transfusions, organ donations or reused surgical instruments. He added, "It's absolutely possible that there may be a new epidemic, because the cases we've seen so far may only be those who are unusually susceptible or have the shortest incubation periods. I'm not in the business of scaremongering, but quite clearly the idea that this problem is on the way out is unfortunately not the case at all."

A group of researchers led by John Collinge at the Medical Research Council's prion unit in London believe their research with mice strengthens the evidence that eating BSE-infected beef gives rise to several types of brain disease, and that these include another kind of CJD known as sporadic CJD, which had not previously been associated with BSE.

The factors affecting one's susceptibility to these infections are complex, and involve other genetically determined characteristics besides prion markers. The research indicates that there are at least seven genes affecting the susceptibility of mice, and Collinge said that it would be "pretty surprising" if it were not also the case in humans.

Frances Hall, secretary of the Human BSE Foundation, whose son Peter died from vCJD in 1996, commented, "The hope was that only those of an unusual genetic type would develop vCJD. Unfortunately it now looks like more people could be susceptible. It's still too early in the day to know how many people will eventually end up with this disease."

Note:

[1] "Preclinical vCJD after blood transfusion in a *PRNP* codon 129 heterozygous patient" (Lancet 2004; 264: 527-29) by Alexander H Peden, Mark W Head, Diane L Ritchie, Jeanne E Bell, James W Ironside.