Technical Note

Creutzfeldt-Jakob “Mad Cow” Disease (CJD)

Transonic® offers single-use disposable Flowprobes for neurosurgery in order to protect against the possibility of inadvertent transmission of sterilization-resistant Creutzfeldt-Jakob Disease (CJD). Why does CJD present such a critical concern for neurosurgeons and what is the rationale behind Transonic’s single-use disposable Flowprobe offering for neurosurgeons?

What is Creutzfeldt-Jakob Disease?
Creutzfeldt Jakob Disease (CJD) is a fatal neurologic disorder. Symptoms, similar to those of Alzheimer’s Disease, typically begin to appear about age 60, but progression of the disease is then rapid and most patients die within one year. Initial symptoms include memory lapses, behavioral changes, lack of coordination and visual disturbances. As the disease progresses, mental deterioration continues and involuntary movements, blindness, weakness of extremities, and coma may occur. There is no treatment or cure for CJD.

Human CJD includes: sporadic CJD in which the person has no known risk factors and symptoms appear spontaneously; acquired CJD in which the disease is transmitted by exposure to infected brain or nervous system tissue, usually through certain medical procedure involving the brain, spinal cord or eyes; and hereditary CJD.

Pathogenesis
CJD belongs to the transmissible spongiform encephalopathies (TSE) disease family. Its name refers to the sponge-like appearance of infected brain cells under the microscope. It is thought to be caused by protein isomer (prion) which is very infectious when inoculated directly into nervous tissue. CJD’s virulence, combined with its remarkable resistance to conventional sterilizing procedures,¹,²,³ has resulted in transmission between neurosurgical patients.⁴

Other TSEs are found in animals such as cows (bovine spongiform encephalopathy [BSE] or “Mad Cow Disease”) or scrapie, which affects sheep and goats; mink encephalopathy; and feline encephalopathy. Similar disease are endemic in elk, deer (Chronic Wasting Disease) and zoo animals.

Resistance to Sterilization
TSE prions are resistant to steam sterilization, dry heat, ethylene oxide gas and chemical disinfection. No consensus exists on sterilization methods for surgical instruments adequate to prevent the spread of CJD, but autoclaving at 134-138°C for 60 min is inadequate.¹ Steam autoclaving and even ashing at 360°C is not effective.³ Solutions of sodium hypochloride¹ and quanidine thiocyanate⁵ offer promise to disrupt the infectious agent.

Preventing CJD Transmission during Neurosurgery
It is recommended that “all instruments used for patients with CJD must be destroyed” and re-use of surgical instruments in neurological cases is also not advised.⁶ The virulence of TSE demands that medical professionals adopt the same prophylactic philosophy used for rabies after an animal bite, and HIV when there is a risk of blood exposure: WHEN IN DOUBT, PROCEED AS IF THE AGENT IS PRESENT.

Sensitive to this need, Transonic® is pleased to offer single-use disposable Flowprobes for neurosurgery.
Creutzfeldt-Jakob “Mad Cow” Disease (CJD) Cont.

References


