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Hepatitis C by Tissue & Organ Transplantation

Freeze-Drying Can't Remove Virus from Tissue Transplants

By Karla Gale Fri Apr 2, 5:17 PM ET

NEW YORK (Reuters Health) - Freeze-drying does not inactivate viruses from bone and connective tissue, according to investigators at Michigan State University in East Lansing, suggesting that this technique does not improve the safety of tissue used for transplants.

Despite rigorous screening, HIV (news - web sites) and hepatitis C transmission has occurred after transplantation of infected bone and tendon. "There has been a long-held belief based on one article published in 1985 that freeze-drying may inhibit or inactivate a virus, suggesting that it would provide an extra measure of safety," senior investigator Dr. Steven P. Arnoczky told Reuters Health.

As reported online in the American Journal of Sports Medicine, Arnoczky's group obtained tendons and bone tissues from cats infected with feline leukemia virus. Samples were freeze-dried, providing tissue with less than 2% residual moisture.

Using "an extremely sensitive" system, they compared the samples of freeze-dried and fresh-frozen tissue in cell cultures. Cultures from all samples were positive for virus, regardless of which type of tissue was used.

His group's findings are logical, if you consider that vaccines remain effective after being freeze-dried, Arnoczky said, "but ours was the first well-controlled experimental model" to provide conclusive evidence.

He noted the difficulty of eradicating virus from soft tissues, such as tendons, ligament and cartilage. "You can't do what is necessary to sterilize them without altering their mechanical properties."

He emphasized that with current screening methods, the likelihood of implanting infected tissues is minute. But screening could miss an emerging infectious disease, "and we don't know the effects of processing on prion-infected tissue," he added.

SOURCE: American Journal of Sports Medicine 2004.

Ear-tissue recipients warned

By ALLISON LAWLOR

Globe and Mail Update National standards on the safety of cells, tissues and organs for transplant are expected next month, a Health Canada official said Thursday.

"We have been working together for a number of years to make sure that we have agreed upon standards," Julia Hill, director-general of the biologics and genetic therapies directorate of Health Canada, told globeandmail.com on Thursday.

Up until now there have been a mix of standards across the country for cells, tissues and organs for transplants, Ms. Hill said. Official regulations based on the standards are to be ready in the coming months.

The British Columbia government this week urged Health Canada to launch a comprehensive review of tissue banks across Canada after Health Canada advised the B.C. Ear Bank to recall all unused tissue distributed by the facility since 1975.

Ms. Hill said Health Canada, along with stakeholders across the country, have already been reviewing issues surrounding safety standards and tissue banks.

Concerns raised about the B.C. facility have undermined the public's faith in tissue banks across the country, Health Minister Colin Hansen said Wednesday in a special statement in the legislature.

The B.C. Ministry of Health has asked the British Columbia Transplant Society, an agency of the Provincial Health Services Authority, "to oversee the development of a plan for quality control and regulatory compliance of all the province's tissue banks," the transplant society announced Thursday.

At the moment, the society has no jurisdiction over tissue banking in B.C. but has expertise in the area of organ donation and transplants, the society said in a news release.

Thursday's announcement comes after medical officials in B.C. revealed Wednesday that the B.C. Ear Bank shut down its operations in October. This week, the ear bank asked physicians, hospitals and researchers to return all unused specimens.

The facility is at Vancouver's St. Paul's Hospital, which is run by Providence Health Care. Dr. Jeremy Etherington, a senior medical officer at Providence, said Wednesday the ear bank was closed as soon as concerns were raised.

However, Mr. Hansen said clinicians raised concerns about the facility in the early 1990s and in 1998.

Health experts have lobbied Ottawa for years for stronger regulations and clear standards to ensure that patient safety is protected, he said.

B.C. medical authorities said Wednesday that tissue distributed by the B.C. facility has been recalled as a result of a "gap in documentation." They cannot find documents to confirm whether the tissue has been tested and screened, although they were confident that the specimens were sterilized properly.

No one has reported transmission of a disease from a specimen from the B.C. facility, which supplies about 20 per cent of the reconstructive tissue in Canada and exports tissue to the United States.

But with heightened awareness since the tainted-blood scandal, officials said that anyone who received tissue from the B.C. facility since 1975 should undergo testing. They asked physicians who used the transplant material to inform their patients and to send back unused tissue.

Dr. Perry Kendall, B.C.'s chief medical officer, said the risk of a patient acquiring HIV, hepatitis B or C is one in 10,000. The odds in a more likely scenario are one in 100,000 for hepatitis B or C and one in a million for HIV.

An extreme low "theoretical" risk also exists of contracting syphilis or Creutzfeldt-Jakob disease.

The hospital is aware of 6,016 specimens distributed since 1985 but has no records to show how many were sent out from 1975 to 1985. The ear bank also does not know whether the material was used for teaching, research or ear reconstruction.

The ear bank, which has no plans to reopen, contacted physicians, hospitals and universities at 85 locations in Canada and two in the United States.

Tissues can become repositories for infectious agents like viruses and bacteria, which can survive the short time between transplant from a cadaver to a recipient.

With reports from Robert Matas and André Picard

Transmission of HCV by Tissue Transplantation

Conrad EU; Gretch DR; Obermeyer KR; Moogk MS; Sayers M; Wilson JJ; Strong DM. Northwest Tissue Center/Puget Sound Blood Center, Seattle, Washington. J Bone Joint Surg Am, 1995 Feb, 77:2, 214-24

Abstract
HCV has been the most prevalent cause of chronic hepatitis in both blood and organ recipients. The introduction of a second-generation immunoassay for antibodies to the HCV (HCV 2.0) provided the opportunity to determine if the virus can be transmitted through tissue transplantation. Banked sera from tissue donors that had previously been found to be non-reactive to the first-generation HCV Antibody assay (HCV 1.0) and non-reactive for antibodies to Hepatitis-B core antigen were retested with HCV 2.0. The sera from two donors were reactive; the transplant records of recipients of tissues from these donors were reviewed, and the surgeons or hospitals were contacted. The tissue recipients were tested with HCV 2.0, and positive sera were tested for HCV RNA by Polymerase Chain Reaction. Viral nucleic acids isolated from viremic donors and recipients were analyzed for identity by sequencing of the HCV Envelope gene (E2) hypervariable region. There were twenty-one grafts, which had been treated with gamma radiation, from one donor; thirteen had been transplanted to twelve recipients. Serum samples from six of the recipients were tested; one was reactive. This patient had other risk factors for infection with HCV, and sequence analysis demonstrated non-identity between the donor and recipient HCV isolates. Nine of twelve grafts from a second donor had been transplanted in nine recipients. Serum samples from five patients were tested with HCV 2.0; four were reactive. In three of the four patients, the sera were determined to be positive for HCV by Polymerase Chain Reaction. E2 sequence analyses of HCV RNA isolates from two of these recipients demonstrated sequence identity with the donor isolate. The results of the present report demonstrate that the hepatitis-C virus can be transmitted by bone, ligament, and tendon allografts. They also support the need for testing of all tissue donors for antibodies to HCV before the tissue is released for transplantation. The results also suggest that seventeen kilo-gray of gamma radiation may inactivate HCV in tissue.

Studies- Hepatitis C Transmission Through Organ/Tissue Transplantation

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