Cecilia Pascual-Garrido, MD
University of Colorado, Denver, CO, USA

What is "PEEK"?

PEEK (Polyetheretherketone) is a strong thermoplastic polymer (plastic). The properties of PEEK make it an ideal material for use in orthopedic implants. It closely matches the mechanical properties of the bone (tensile yield strength, shear strength and modulus). Clinically, is highly biocompatible (no cytotoxicity has been observed when implanted) and stays as a permanent implant with ability to be revised easily.

PEEK material was initially used in Orthopedics for Spine implants. Lately, its application has widely spread in the field of Sports Medicine in the form of Suture anchors and screws. Compared to bioabsorbable suture anchors such as: PLAA and PGA, PEEK is non-absorbable. It offers the advantage of excellent postoperative imaging (similar to bioabsorbable anchors) with stable fixation without the complication associated with the degradation of the polymer. No published data to date have been reported on complications or failures with implants manufactured with PEEK

What is "sensitivity to latex"?

Latex allergy is defined as a previous reaction to latex. If rash or other symptoms after contact with latex were developed, that will be considered as a latex sensitivity. Latex allergies or sensitivity may cause reactions ranging in severity from skin redness or a rash to sneezing or even anaphylaxis, a potentially life-threatening condition.

It is estimated that 6% of the general population suffers from latex allergy and 15% of health-care workers. Patients with spina bifida (myelomeningocele) are at the highest risk of latex allergy because of repeated exposure of mucous membranes to latex during surgeries and procedures. The prevalence of latex allergy in these patients range from 20 to 67% and their risk of anaphylaxis in the operating room is 500 times higher than rest of the population. The prevalence of anaphylactic reactions during the perioperative period and during medical procedures overall has been defined poorly. Different reports have suggested an incidence between 1 in 10.000 to 1 in 20.000.

Between 1988 and 1992, the FDA received more than 1000 reports of latex allergic reactions. Most of the cases were associated with use of gloves or latex balloon-tipped barium enema catheters. Fifteen deaths occurred, all of which were related to the use of the latex balloon-tipped catheter. The deaths prompted the CDC and the FDA to issue a medical alert and recall these products.

The hospital, especially the OR staff, should be prepared to deal with a patient who suffers from latex sensitivity. Latex-sensitive patients undergoing surgery should be scheduled as the first case of the day, when aerosolized latex particles are at a low. If unmanaged, latex allergies can have a profound and unnecessary impact on hospital resources due to post-operative complications or operating room teardown costs. If latex gloves are worn even during the set-up of the O.R., a last minute discovery of a patient's latex allergy will require a teardown of the O.R. set up which would result in significant cost implications. Many hospitals are now implementing latex-free environment in order to avoid these unpredictable issues.

What is "the process of allograft irradiation"?

Allograft irradiation is part of the secondary sterilization normally used during allograft tissue processing.

Sterilization has been defined as the process or act of inactivating or killing all forms of life, especially microorganisms. Sterilization by gamma irradiation is normally used in order to minimize the risk of blood-borne diseases transmission such as hepatitis, bacterial or fungal infection, and HIV. The virucidal and bactericidal effects of gamma irradiation are created by two mechanisms. The primary mechanism is direct alteration of nucleic acids leading to genome dysfunction and destruction. A secondary mechanism is the generation of free radicals, primarily from liquid water.

Initially, human tissue allografts were irradiated with 2.5 to 5 Mrad (25-50kGy), considered as "high dose radiation", which compromised graft structural integrity and resulted in high failures rate. More recent secondary sterilization protocols have employed lower irradiation doses, typically from 1 to 1.8 Mrad (10-18kGy), and are frequently termed "low dose radiation".. Studies conducted on low-dose irradiated allograft suggest that the pre-implantation biomechanical properties are not altered when allografts are irradiated at these lower levels.

Gamma irradiation is very effective against bacteria at doses of 1.5 to 2.5 Mrad.

However, gamma irradiation is much less effective against viruses. Some studies, have estimated that more than 3.6 Mrad may be needed to inactivate all but 1 in 1,000,000 HIV-infected cells.

Gamma radiation, together with aseptic harvesting, antibiotic soaks, multiple cultures, and low-dose gamma irradiation (<3.0 Mrad), has become the most commonly used process for producing a sterile graft. Despite the risk of HIV infection from allogeneic grafts, there has been only one reported case in which HIV was proved to be transferred from an infected donor.

Any surgeon using allografts should make a point of being familiar with the exact techniques and standards used by the bank supplying the grafts. Surgeons should feel comfortable that everything reasonable has been done to ensure that the grafts they use are of the highest quality available.