EXPERIMENTAL BIOCOMPATIBILITY AND BIOMECHANICAL EVALUATION OF SILK PROTEIN–COATED LOW-WEIGHT POLYPROPYLENE MESHE

Hypothesis / aims of study
To determine the biocompatibility and biomechanical characteristic of silk protein coated polypropylene meshes in abdominal hernia rabbit model.

Study design, materials and methods
12Gynemesh® and 12 Aspide® polypropylene meshes (6 silk protein coated and 6 noncoated) were surgically implanted in 6 adult female New Zealand hernia rabbit model. Every two animals were killed at 30 days, 60 days and 90 days after transplant surgery respectively. Full-thickness sections of abdominal wall included transplant meshes were evaluated in inflammation, neovascularization, fibroblastic proliferation and collagen formation by transmission electron microscope (TEM), HE staining and Masson staining. These sample were tested biomechanical parameters in the same time.

Results
No mesh erosion was observed. Silk protein–coated low-weight polypropylene meshes showed a mild inflammatory response with minimal fibrosis and good host tissue incorporation within the grafts. Few apoptotic and necrotizing cell were found in noncoated meshes. The deformation and Young’s elastic modulus of silk protein coated mesh implantation are better than non coated mesh. The biomechanical parameters were getting strong with time.

Interpretation of results
Mesh erosion was a common phenomenon in modern pelvic floor reconstructive surgery. Modification of mesh will increase the biocompatibility and biomechanical characteristic of implanted material, and decrease the ratio of erosion.

Concluding message
Silk protein coated meshes elicit a mild foreign body reaction, minimal fibrotic response and good host tissue incorporation within the grafts. The biomechanical parameters of silk protein coated meshes were better than noncoated mesh.

Specify source of funding or grant
Shanghai Municipal Health Bureau Foundation, 2006057;

Is this a clinical trial?
No

What were the subjects in the study?
ANIMAL

Were guidelines for care and use of laboratory animals followed or ethical committee approval obtained?
Yes

Name of ethics committee
Independent Ethics Committee OF Hospital