

AUTOLOGOUS PLASMA COATING LEADING TO IMPROVED BIOCOMPATIBILITY OF MESHES USED FOR HERNIA, INCONTINENCE AND ORGAN PROLAPSE REPAIR – RESULTS OF IN-VITRO AND IN-VIVO STUDIES.

Hypothesis / aims of study

Severe adverse events may be caused by the application of alloplastic materials for surgical treatment of female incontinence, hernia and prolapse. Aim of this project was to optimize alloplastic materials regarding improved biocompatibility establishing an in-vitro and animal model.

Study design, materials and methods

On the basis of the different cellular components representing the pelvic floor and abdominal wall an experimental in-vitro approach has been developed. Human tissue culture consisting of muscle, endothelial and fascia tissue/cells were separately cultivated and adhesion ability of the respective cultures was tested on different mesh types. Same was done with sheep tissue culture consisting of muscle, endothelial and fascia tissue/cells. Autologous plasma was used to modify the alloplastic materials and to improve tissue compatibility. Currently established mesh types were assessed regarding the specificity of cell adhesion. Meshes with demonstrated in-vitro biocompatibility were then transferred into an animal model (sheep, n=14). Coated and uncoated versions of every mesh type were implanted into the animals allowing an intra-individual comparison. Criteria for assessment were foreign body reaction, scar formation and inflammatory reaction. Meshes were explanted and assessed after 3 and 6 months.

Results

In the in-vitro approach meshes coated with autologous plasma showed an improved cell adhesion for all three investigated cell types. Biological behaviour of human cells is comparable to cells in the sheep model. When evaluating the different meshes regarding the intensity of cell adhesion we established a ranking order for meshes. We implanted coated and uncoated versions of three different mesh types with the following in vitro ranking order:

1. Dynamesh CICAT®
2. Ultrapro®
3. TVTo®

into 14 animals allowing an intra-individual comparison. We demonstrated significant less foreign body reaction, scar formation and inflammatory reaction for the plasma coated material in each type of mesh after 3 month with the following ranking order:

1. Dynamesh-CICAT®
2. Ultrapro®
3. TVTo®

We revealed the same ranking 6 months after implantation.

Interestingly, the in-vitro and in-vivo rankings are equal.

Interpretation of results

Early and intermediate results from animal experiments support the hypothesis that autologous modification of alloplastic materials by coating with autologous plasma leads to improvement (clinically as histopathologically) of early integration of the respective material into the different locations.

Concluding message

Autologous coating of alloplastic materials improves biocompatibility.

Disclosures

Funding: The experimental study is supported by the German Academic exchange Service (DAAD). **Clinical Trial:** No

Subjects: ANIMAL **Species:** sheep **Ethics Committee:** Hungarian Board of Ethics