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Topic : Surgical Meshes

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Comparison of modified collagen matrix versus standard polypropylene in abdominal wall model for fascial reconstruction, two years rabbit study

We performed an follow-up study to investigate two implant materials currently used in different systems for treatment of incontinence and pelvic organ prolapse. Long-term host response and fate of the implant strength up to a two years period were compared in a rabbit model for fascial reconstruction. Monofilament Large Pore Polypropylene (Intepro LPP) is macroporous monofilament material while Intexen LP is novel modification of standard Intexen, not cross-linked porcine collagen acellular matrix.

Full-thickness abdominal wall defects were reconstructed, using “overlay” technique. Adult male New Zealand White Rabbits were used and randomly divided in two treatment groups of 18 rabbits each, according to the nature of the implant. Three implants of the same material per animal and fifty four implants in total per group were used. The fourth defect in each animal was repaired with continuous polypropylene suture, serving as internal control group. Three animals per group were sacrificed on day 30, 60, 90, 180, 365 and 730 days to evaluate morphologic and biomechanical properties of explants.

Two animals did not survive until the time of euthanasia: 1 from Intexen LP group with herniation and bowel incarceration and 1 from Intepro LPP group with unknown cause of death. In Intepro LPP group no reherniations, no seroma's, no infections were observed. Real herniations were found in total 7 out of 54 implanted Intexen LP constructs. Adhesions were comparable between groups. Tensile strength of the explants was significantly different at 90 and 365 days. Stronger foreign body reaction was observed against synthetic material, tempering over the time and initial strong inflammation around collagen matrix disappeared after 90 days.

One sixth of Intexen LP implanted meshes were herniated in in vivo abdominal rabbit model. Critical was a period of 90 days when most of the herniations occurred; at the same time point the material itself was a tearing point for more than two thirds of the explants (< 6 N/cm) and implants of Intexen LP were reaching barely 4 N/cm. Intepro LPP was integrated by an increasingly organised fibrotic scar within 60 days while Intexen LP was slowly replaced by thin collagen layer from 180 days on. After 2 years discrete leftovers of Intexen LP could be identified and at the same time no differences in tensile strength between materials were found.