

IS YOUR POLYPROPYLENE TAPE BETTER THAN MINE? AN EXPERIMENTAL SEMI QUANTITATIVE AND STEREOLOGICAL ANALYSIS OF LOCAL TISSUE REACTION

Hypothesis / aims of study

The poor quality of pelvic floor tissues is one of the factors involved with stress urinary incontinence (SIU). Minimally invasive polypropylene slings are presently used for the management of this condition, seeking the improvement of tissues, through ligament reinforcement. There are many different commercially available polypropylene slings, basically monofilament and multifilament meshes. Some authors claim the superiority of monofilament meshes despite no prospective randomized clinical trial been carried out. This experimental study aims to compare the local tissue reaction elicited by the four most frequent used polypropylene meshes.

Study design, materials and methods

Thirty female Wistar rats, eight weeks old were used for the study. They were divided in 3 groups of 10 according its sacrifice period. Each rat underwent implantation in the subcutaneous abdominal area, of four 8x4 mm polypropylene mesh coming of the following polypropylene meshes: Tension-Free Vaginal Tape (Gynecare), Sparc Sling System (American Medical Systems, EUA), SLING PLUS (PROMEDON) and Intravaginal Slingplasty – IVS (Tyco Healthcare). The control was accomplished in the self-control form, through the insert of surgical knots equally to the used in the fixation of the fragments of the polypropylene meshes. The rats were sacrificed at 7 (Group 1), 60 (Group 2) and 120 days (group 3) after the implant, and the abdominal wall was resected for histology. The same pathologist classified the inflammatory reaction as discrete, moderate or intense, depending on the severity of the process. The M-42 stereological grid system was used to analyze the collagen fibers, stained by Picro-sirius. Differences of the histological findings of the groups were tested with the Kruskal-Wallis test and Friedman test was used for comparisons among meshes in the same animal. A probability of $p < 0,05$ was taken as the criterion of significance.

Results

Regarding the inflammatory response, there was no significant difference among the meshes at Group 1 ($p=1,000$) and Group 2 ($p=0,892$). At 120m days there were significant more granulomatous reaction in the multifilament group. As far as fibrosis intensity, the samples evaluated at the 7 days (group 1) presenting no significant difference among the different tapes ($p=0,139$), the same was observed in group 2 ($p = 0,406$). After 120 days (group 3), there were significant differences among the materials ($p=0,001$). The control presented less fibrosis, when compared to the tapes. Sparc tape induced less fibrosis. There was no difference in fibrosis intensity, between TVT, IVS and PLUS ($p=0,001$ and $p=0,038$). There was no difference among the groups regarding the presence of necrosis. The stereological analysis showed significant differences between mono and multifilament meshes at 120 days, being the monofilament meshes the ones that induces greater collagen fibers volumetric density ($p=0,001$).

Interpretation of results

There was a significant difference among the tapes regarding inflammatory response. At 120 days, the multifilament meshes group showed greater granulomatous reaction. On the other hand, collagen density was greater in the monofilament meshes.

Concluding message

The clinical differences eventually observed between these two meshes (1) can be partially attributed to its composition.

References

1. A randomized comparinon between monofilament and multifilament tapes for stress incontinence surgery. Int Urogynecol J 2003, 14:432-436.