

ELASTIN IN HUMAN PROLAPSED ANTERIOR VAGINAL WALL OF POST-MENOPAUSAL WOMEN

Hypothesis / aims of study

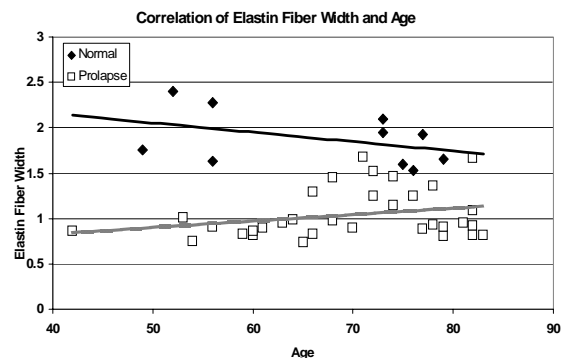
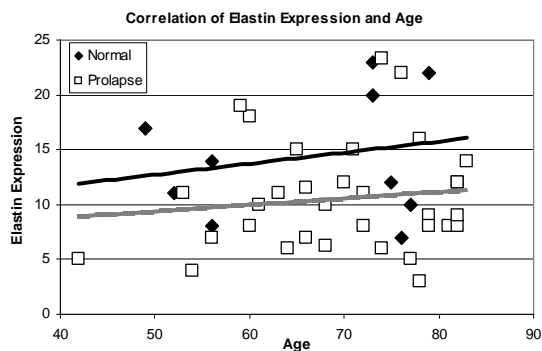
To characterize changes in elastin expression and fiber width in the anterior vaginal wall of caucasian post-menopausal women with bladder prolapse (cystocele) compared to post-menopausal women with no prolapse. Since elastin participates in the mechanical properties of pelvic floor tissues, we hypothesized that tissue weakening in prolapse patients will be related to a decrease in both elastin expression and fiber width, and to increase with age.

Study design, materials and methods

Following IRB approval, full-thickness specimens were obtained from the upper lateral anterior vaginal wall of women undergoing large cystocele repair (stage III or IV) (prolapse group or (P)) and the same location in patients with no prolapse undergoing radical cystectomy (control group or (C)). Histology and tissue thickness measurements were obtained from all samples. The percentage of elastin positive-tissue was measured by immunohistochemistry (elastin antibody staining E-4013, Sigma), on 6 micron thin tissue sections and from an averaging of 10 random field reading per sample using MetaMorph version 4.5 (Universal Imaging Corp., West Chester, PA). Elastin fiber width was also assessed using the same computer assisted color image analysis system [1]. The examiner was blinded to the subject age and clinical history. Relationship with age was also investigated. Results are expressed as mean \pm SEM, and group comparisons were conducted with non-parametric Mann-Whitney rank-sum test. $P < .05$ was considered significant.

Results

1. Over the last 20 months, vaginal wall tissue samples were obtained from 33 (P) and 10 (C) patients.
2. Age distribution was comparable with (P): 42-83, mean 70 ± 10 , and (C) : 49-77, mean 67 ± 12 (p not significant)
3. Mean \pm SD for tissue thickness was 2.70 ± 1.06 mm for (P) versus 3.06 ± 1.01 mm for (C) (p not significant).
4. Immunohistochemical staining and morphometric analysis results indicate that the elastin expression in the (P) group was 10.6 ± 5.0 compared to 14.4 ± 5.8 in the (C) group ($p < 0.05$).
5. Elastin fiber width was 1.04 ± 0.27 in the (P) group compared to 1.88 ± 0.30 in the (C) group ($p < 0.001$).
6. Tables indicating the effect of age on both elastin expression and fiber width for both groups are shown below.



Interpretation of results

Elastin changes (expression and fiber width) are significantly altered in prolapse patients with large cystocele compared to age-matched controls. Elastin expression appears to be stable with increasing age whereas elastic fiber width exhibited a slightly increasing trend with age in prolapse patients.

Concluding message

To our knowledge, this is the first controlled study on human elastin changes in prolapsed post-menopausal patients. Our hypothesis regarding tissue weakening was correct for decrease in elastin expression and fiber width in the anterior vaginal wall of prolapsed patients compared to controls. However, despite a decrease in overall fiber width compared to controls, aging appears to increase elastin fiber width changes indicating some time-dependent irreversible changes with elastic recoil. Since elastin fibers follow the direction of stretch in tissues, these observed disruptions in elastin fibers may contribute to the loss of support ultimately resulting in prolapse.