

OXIDATIVE STRESS AND COLLAGEN CONTENT IN THE BLADDER OF MEN WITH LUTS SECONDARY TO BENIGN PROSTATIC ENLARGEMENT

Hypothesis / aims of study

Lower urinary tract symptoms (LUTS) in men with benign prostatic enlargement (BPE) may be related not only to bladder outlet obstruction (BOO), but also to bladder dysfunction (BD). However, to date, it is not possible to predict which BPE patients are at increased risk for deterioration of bladder contractility. This study aims to evaluate oxidative stress markers and collagen deposition in the bladder wall of men undergoing open prostate surgery.

Study design, materials and methods

Men aged 50 years or older, presenting LUTS and undergoing open prostatic surgery due to BPE or organ-confined prostate cancer with concomitant BPE were candidates for inclusion. Preoperative assessment included validated questionnaires (IPSS and OAB-V8), lower urinary tract ultrasound and urodynamics. A full-thickness fragment of the bladder wall measuring 1.0 cm² was obtained from the anterior bladder wall during prostatectomy for determination of oxidative stress markers (catalase, SOD and MDA) and collagen deposition (sirius red–picric acid stain; polarized light analysis). Statistical analyses were performed using SPSS 22.0 software (SPSS Inc., Chicago, IL, USA) and $P < 0.05$ was considered statistically significant.

Results

From July 2014 to August 2016, 38 consecutive patients were included. Mean age was 66.36 ± 6.44 years. According to the IPSS score, 14 patients (37%) had mild symptoms, 18 (47%) moderate symptoms and 6 (16%) had severe symptoms. Men diagnosed with diabetes mellitus (DM2) were found to have higher collagen content in the bladder wall when compared to non-diabetic patients ($17.71 \pm 6.82\%$ vs. $12.46 \pm 5.2\%$, respectively; $p = 0.024$). Increased oxidative stress in the bladder wall was associated with clinical characteristics (LUTS severity and obesity), ultrasound findings (bladder wall thickness ≥ 3 mm, prostate volume ≥ 80 cm³) and urodynamic parameters (BOO severity, post-void residual volume ≥ 50 ml) ($p < 0.05$). The intravesical protrusion of the medial prostate lobe (IPP ≥ 9 mm) was a predictive factor of BOO.

Figure 1. Technique to assess collagen content (HE and Sirius red–picric acid stains)

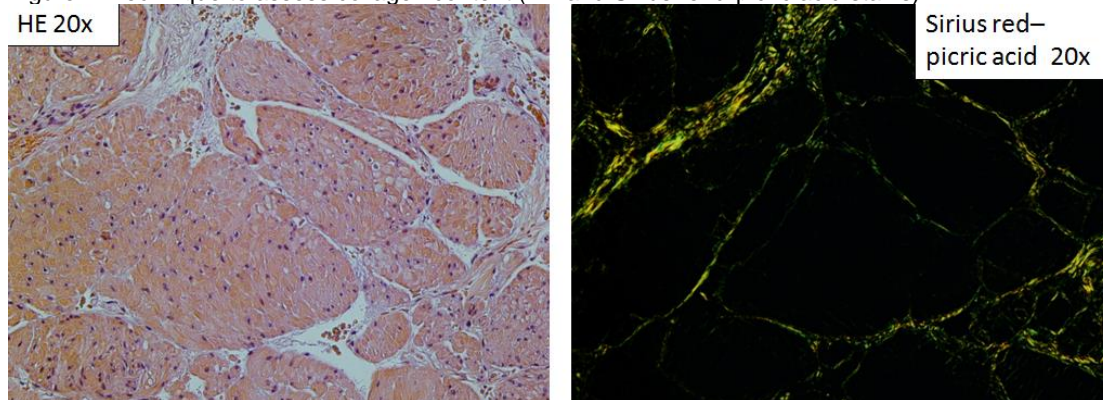


Figure 2. Collagen content into the bladder wall (diabetic vs non-diabetic patients)

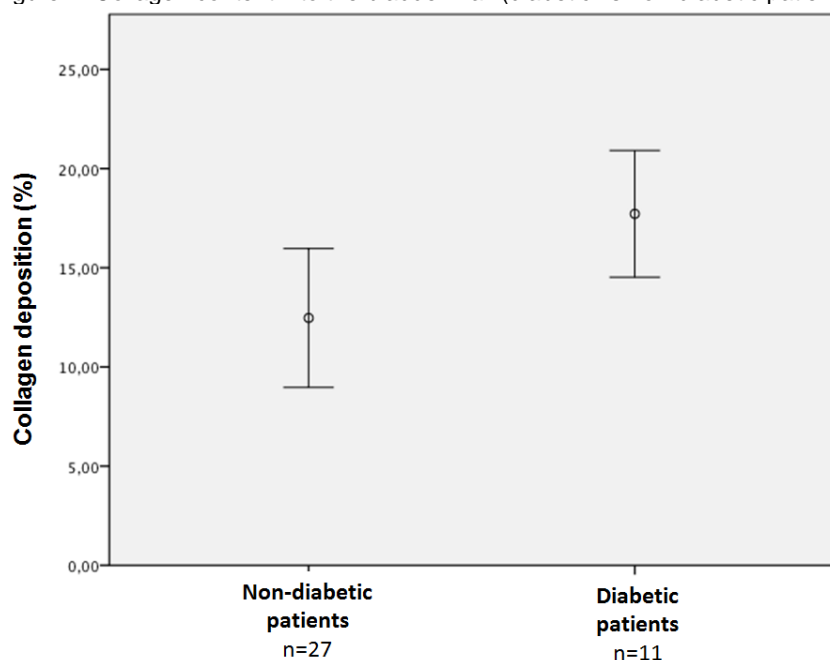
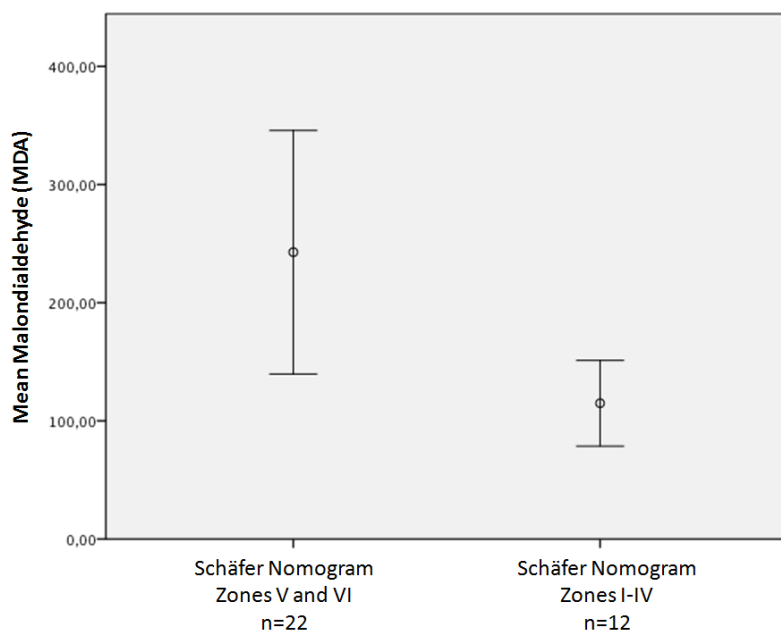


Figure 3. Oxidative stress (MDA) vs. Bladder outlet obstruction (Schäfer Nomogram)



Interpretation of results

Collagen content into the bladder wall and oxidative stress markers have been previously described as surrogate endpoints for detrusor underactivity among patients with BOO (1,2). The findings of this pilot study suggest that clinical, ultrasound and urodynamic findings are associated with higher levels of oxidative stress in the bladder wall.

Concluding message

Increased oxidative stress in the bladder wall was associated with severity of BOO. DM2 was associated with higher collagen content in the bladder wall of men with LUTS.

References

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2. Azadzoï KM, Yalla SV, Siroky MB. Human bladder smooth muscle cell damage in disturbed oxygen tension. Urology. 2011;78(4):967.e9-15.

Disclosures

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