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DETRUSOR CONTRACTILITY IN BPH

Aims of Study

In compensated phase of BPH, the detrusor contractile strength increases to overcome the infravesical obstruction and it is reported that collagen content of bladder wall and the ratio of type III to type I collagen increase. If the obstruction is too severe to overcome and obstructive duration is long the detrusor is decompensated and contractile strength decreases showing the change of collagen content and ratio of type III to type I collagen. So far there is no report about it. Two study was performed to correlate between the contractile force and the changes of collagen content and ratio of type III to type I collagen in bladder wall in the patients with BPH

Methods

25 BPH patients who received TURP were involved in this study. Preoperatively WF was measured to measure the detrusor contractile strength. 2 biopsies of detrusor muscle were obtained at the time of TURP. To determine the total collagen content per unit dry weight of detrusor muscle samples, amino acid analysis was performed. Dried, pulverized detrusor muscle was subjected to vapor phase hydrolysis by 6N hydrochloride at 110c to 24hours under reduced pressure and a nitrogen atmosphere. 0.05% phenol was added as a free-radical scanvenger. The resulting amino acids were reacted with Edman reagent phenyl isothiocyanate, under alkaline conditions to form the respective phenylthiocarbamyl amino acid derivative. Chromatography was then performed on a reverse phase column PicoTag, Waters, Milford, MA) using high performance liquid chromatography. Amino acids were identified and quantified by comparing the observed retention times with the area generated by known amounts of standards eluting with defined retention times. The standards consisted of a commercial amino acid mix (Sigma) supplemented with hydroxyproline, extra proline and hydroxylysine. Total hydroxyproline was then multiplied by a factor of 0.46 to give the total collagen concentration. Tissue section were initially treated with 0.1N acetic amino acid, rinsed in PBS at natural pH, followed by incubation with the type I and III collagen antibody.
We divided the patients into 3 groups according to contractile strength. Decrease contractile strength (< 4WF/m^2): group 1, normal contractile strength(4-11 WF/m^2): group 2, increase contractile strength(>11 WF/m^2): group 3. We compared the total collagen content and type I, III collagen infiltration among 3 groups. ANOVA test was used for statistical analysis of the data. A statistical significance was determined as $P<0.05$.

Results

According to WF, the patients of group 1,2,3 were 5, 5, 15 respectively. The total collagen per unit dry weight of group 1, 2, 3 were 147.5±32, 284±28, 470±45mg collagen/gram dry weight, respectively and difference was statistically significant among groups ($p<0.05$). Comparing with group 2, group 1 had increased type I collagen and group 3 had increased type III collagen. In 2 patients of the group 1 WF was lesser than 1 WF/m^2 , type III collagen was scantly stained and they were unable void postoperatively.

Conclusions

Compensated detrusor in BPH had 2 fold increased collagen content and increased type III collagen comparing to the normal contractile detrusor. Decompensated detrusor in BPH had decreased collagen content and decreased type III collagen comparing to the normal contractile detrusor. In patients with WF<1 WF/m^2 detrusor change may be irreversible from the fact that type III collagen was scantly stained and they were unable to void postoperatively and could be diagnosed preoperatively by WF measurement.