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1: J Urol. 2005 Jul;174(1):344-9.

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Urinary uronate and sulfated glycosaminoglycan levels: markers for interstitial cystitis severity.

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PURPOSE: Urologists frequently rely on symptom and problem indexes to monitor patients with interstitial cystitis (IC). Uronic acid is a component of most glycosaminoglycans (GAGs), which is a protective bladder urothelium coating. We evaluated whether urinary uronate and sulfated GAG levels correlate with IC severity and we characterized urinary GAG species. **MATERIALS AND METHODS:** Urine samples, and a completed O'Leary-Sant IC symptom and problem index questionnaire were obtained from 37 patients with IC and 14 normal individuals. Patients with IC were in group 1-1 or 2 indexes less than 50% the maximum score or group 2-each index 50% or greater the maximum score. All patients fulfilled National Institute of Diabetes and Digestive and Kidney Diseases criteria except glomerulations. Urinary uronate was fractionated using cetyltrimethylammonium bromide (CETAB). Uronate and sulfated GAG levels in urine, CETAB precipitates and CETAB supernatants were measured by the Bitter and Muir, and Farndale assays, respectively, and normalized to creatinine in microg/mg creatinine. GAG species were analyzed by agarose gel electrophoresis. **RESULTS:** Mean urinary uronate levels were increased in group 2 compared with normal and group 1 values regardless of glomerulations and treatment (1,614 +/- 904.6 vs 612.4 +/- 327.2 and 593.8 +/- 422.1 microg/mg creatinine, respectively, $p < 0.001$). A small portion of urinary uronate was CETAB precipitable, representing macromolecular GAGs. Uronate levels in CETAB precipitates and CETAB supernatants were approximately 2.8-fold increased in group 2 (8.0 +/- 5.07 and 1,393 +/- 671.9 microg/mg creatinine, respectively) compared with normal and group 1 values ($p < 0.001$), and they contained fast and slow moving GAG species. Uronate and sulfated GAG had 80% and 88% sensitivity, and 92.3% and 69.2% specificity, respectively, to detect IC severity. **CONCLUSIONS:** The majority of urinary GAGs likely exist as small oligosaccharides. Urinary uronate and sulfated GAG levels are increased in patients with IC who have severe disease. They may become useful markers for monitoring IC.

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