THE ROLE OF BLADDER IMAGING WITH SHEAR WAVE ELASTOGRAPHY IN THE DIAGNOSIS OF OVERACTIVE BLADDER IN WOMEN

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Background

OAB is an increasingly common condition in women. This study investigates how SWE can identify potential biomechanical changes in the bladder wall of patients with OAB

Study design, materials and methods

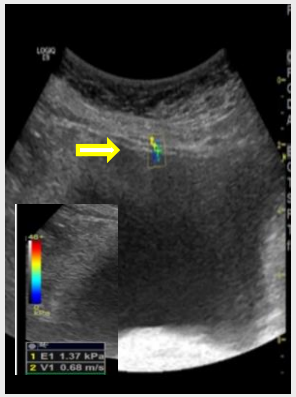
Between January 2024 and 2025, the study included:

- 22 female patients (Group 1) aged 20 to 60 years with OAB symptoms who **hadn't received any prior treatment**
- 25 healthy female control group (Group 2) without any urological complaints

- Age distribution
- US parameters,
- ICIQ-SF,OAB-V8 scores
- Bladder diaries
- PVR volumes
- Uroflowmetry
- Urinalysis results were recorded

The correlation between biomechanical parameters measured using sonoelastographic techniques and clinical diagnosis was analyzed.

SWE was conducted by an experienced radiologist using a Logiq E9 device with a 9L MHz probe, in the B-mode plane, and ARFI-based elastography with a 1×1 cm circular ROI. Bladder wall measurements were obtained from eight locations per case.



Parameter	Group 1	Group 2	p-value
Mean Age (years)	41.86±12.19	32.44±6.58	0.003
BMI (kg/m²)	27.20±5.65	24.52±4.17	0.068
Parity	1.86±1.64	0.64±0.95	0.003
Number of Smokers	2	8	-
Mean Symptom Duration (months)	30.82±23.86	-	-

Results

The mean symptom duration was 30 months. Also 45.5% of patients presented with wet-type OAB. Both groups were analyzed based on demographic data, which are presented in table.

BMI and parity were higher in the patient group; ICIQ-SF, OAB-V8 scores, Nocturia, Voiding frequency ⇧ Voided volume (286 cc) ⇩ **(p < 0.001)**

Uroflowmetric analysis in Group 1 showed Qmax of 28 mL/s, Qave of 14 mL/s, with no significant difference in PVR volumes. SWE measurements revealed similar velocity and stiffness values between groups (Group 1: 1.11 ± 0.18 m/s and 3.98 ± 0.99 kPa; Group 2: 1.13 ± 0.19 m/s and 4.20 ± 1.35 kPa; p=0.71 for both).

❖ **Negative correlations were observed between;**
- ✓ **Anterior stiffness and Qmax (p<0.001)**
- ✓ **Anterior velocity and Qmax (p=0.016)**
- ✓ **Posterior velocity and Qmax (p=0.017)**

❖ **Positive correlations were observed between;**
- ✓ **Left lateral velocity and Qmax (p=0.045)**
- ✓ **Left lateral stiffness and both Qave (p=0.026) and Qmax (p=0.018)**

		Qave (mL/s)	Qmax (mL/s)	Voided
Anterior Velocity	r	0.522*	-0.574	-0.191
(m/s)	p	**0.032***	**0.016***	0.464
Anterior Stiffness	r	-0.681	-0.768	-0.264
(kPa)	p	**0.003***	**<0.001***	0.306
Posterior Velocity	r	-0.409	-0.569	-0.151
(m/s)	p	0.103	**0.017***	0.563
Left Lateral Velocity	r	0.433	0.492	0.072
(m/s)	p	0.082	**0.045***	0.783
Left Lateral Stiffness	r	0.538	0.566	0.048
(kPa)	p	**0.026***	**0.018***	0.855
Posterior Stiffness (kPa)	r	-0.428	-0.480	-0.171
	p	0.087	0.051	0.513
Right Lateral Velocity (m/s)	r	0.365	0.411	0.446
	p	0.150	0.101	0.073
Right Lateral Stiffness (kPa)	r	0.408	0.469	0.381
	p	0.104	0.057	0.131

Interpretation of results

SWE is a promising tool for evaluating tissue elasticity and may be useful in assessing bladder dysfunction.

In our study, no significant difference measurements were observed between groups. However, significant correlations with Qmax and Qave suggest that SWE may help identify biomechanical changes related to disease severity.

Clinical implications

SWE has the potential to contribute to treatment strategies and monitoring of therapeutic outcomes in patients with OAB.

Further trials with larger populations are needed to assess its clinical utility in patients with OAB.