Hormone Replacement Therapy is Associated with Significantly Reduced Symptom Duration in Postmenopausal Women with Adhesive Capsulitis

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INTRODUCTION: Adhesive capsulitis is known to be more prevalent in older women. Hormone levels may play a role in adhesive capsulitis, though the literature is sparse and contradictory. This retrospective cohort study investigated the effect of hormone replacement therapy (HRT) in postmenopausal women diagnosed with adhesive capsulitis.

METHODS: Patients seen in the ambulatory setting by any of 13 orthopaedic surgeons and sports medicine doctors at a single institution between January 2021 and January 2025 were selected for query. Female patients at least 45 years of age assigned a diagnosis code corresponding with adhesive capsulitis were identified (n=1,272). Among this total, 70 patients with a history of HRT prescription were isolated and screened for inclusion in the (+) HRT cohort. Patients with inaccurate diagnoses or confounding shoulder pathology, lack of documentation of the dates of symptom onset and resolution, or who were not actively on HRT for the entirety of their symptom duration were excluded. A total of 15 patients met criteria for inclusion in the (+) HRT cohort. A 4:1 cohort matching ratio was selected for formation of the No HRT cohort. The charts of the remaining 1,202 patients without a history of HRT prescription were subsequently randomized and 389 charts were individually reviewed to reach the target of 60 patients meeting criteria for inclusion in the No HRT cohort. Differences between the cohorts in symptom duration, treatment with steroid injections, and need for surgical intervention were assessed using t tests and chi square tests. Alpha was set to 0.05 a priori. Multivariable linear and logistic regressions were performed to assess the effect of HRT on outcomes while controlling for patient demographic and comorbidity characteristics.

RESULTS:

A total of 75 patients (60 patients not on HRT, 15 patients on HRT) were included in the study. No differences in demographics or comorbidities were found between groups. The number of steroid injections required and the risk for surgery were not significantly different between cohorts. Patients on HRT recovered from adhesive capsulitis in a significantly shorter period of time compared to those not on HRT (159 ± 77 days vs 370 ± 170 days, p<0.01). After controlling for potential confounders, the relationship between HRT and duration of capsulitis symptoms remained significant (β coefficient -201.99 [95% CI -297.44 to -106.54], p<0.01).

DISCUSSION AND CONCLUSION:

Hormones, and estrogen in particular, may play a role in the natural history of adhesive capsulitis. Hormone replacement therapy was associated with a greater than 50% decrease in symptom duration in a population of post-menopausal women. A randomized controlled trial to assess HRT as a treatment for adhesive capsulitis in this population is warranted.

Table I. Comparison of Patient Health Characteristics and Clinical Capsulitis Measures Between Patients on HRT (n=15) and Not on HRT (n=60) at the Time of Capsulitis Symptom Onset

Patient Characteristic	no HRT (n=60)	(+) HRT (n=15)	p-value
Female sex (%)	60 (100.0)	15 (100.0)	n/a
NIDDM (%)	6 (10.0)	0 (0.0)	0.20
IDDM (%)	5 (8.3)	1 (6.7)	0.83
Thyroid Disease (%)	13 (21.7)	2 (13.3)	0.47
Age at Capsulitis Symptom Start (Years; std dev)	55.8 ± 5.2	55.2 ± 5.3	0.71
BMI (kg/m^2; std dev)	24.4 ± 4.7	22.9 ± 4.0	0.07
Time from LMP to Symptom Onset (Days; std dev)	2,925 ± 5,784	1,903 ± 1,683	0.58
Required Surgery (%)	10 (16.7)	1 (6.7)	0.33
Number of Steroid Injections Received			
0 (%)	15 (25.0)	1 (6.7)	
1 (%)	25 (41.7)	11 (73.3)	
2 (%)	14 (23.3)	2 (13.3)	0.15
3 (%)	6 (10.0)	0 (0.0)	
≥ 1 (%)	45 (75.0)	13 (86.7)	0.33
Total Capsulitis Duration (Days; std dev)	370 ± 170	159 ± 77	**<0.01**

LMP = Last Menstrual Period

Table II. Regression Analyses Evaluating the Independent Effects of HRT on Clinical Outcomes in Post-Menopausal Women with Adhesive Capsulitis

Outcome (Continuous)	Independent Variable	Analysis Technique	Beta	95% Confidence Interval for Beta		Std. Error	p-value
				Lower Bound	Upper Bound		
Total Capsulitis Duration (Days)	(+) HRT	Linear Regression	-201.99	-297.44	-106.54	47.79	**<0.01**

Outcome (Binary)	Independent Variable	Analysis Technique	Odds Ratio	95% Confidence Interval for Odds Ratio		Std. Error	p-value
				Lower Bound	Upper Bound		
Received Steroid Injection	(+) HRT	Logistic Regression	2.25	0.41	12.35	0.87	0.35
Required Surgical Intervention	(+) HRT	Logistic Regression	0.26	0.01	6.28	1.62	0.41