

CASE REPORTS

Case Series: Adhesive Capsulitis and the Musculoskeletal Syndrome of Menopause

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The musculoskeletal syndrome of menopause is a novel term that describes the constellation of musculoskeletal conditions associated with estrogen decline in women going through menopause. Adhesive capsulitis, which disproportionately affects women, may be related to these hormonal changes. We present two cases of adhesive capsulitis in women who were simultaneously going through the menopausal transition. The first patient is a 50-year-old woman with bilateral shoulder pain and restricted range of motion who was also experiencing irregular menstrual cycles. She was treated with corticosteroid injections and symptoms improved at 6 month follow up. The second patient is a 51-year-old woman with menopausal symptoms including hot flashes and weight gain who developed right shoulder pain and stiffness. She was diagnosed with adhesive capsulitis by an orthopedic surgeon and was treated by physical therapy. This case series strengthens the association between adhesive capsulitis and the musculoskeletal syndrome of menopause.

Introduction

The musculoskeletal syndrome of menopause is a novel nomenclature, first labeled as such in 2024¹ to describe the common musculoskeletal symptoms related to loss of estrogen levels, including joint pain, inflammation, sarcopenia, osteoporosis and cartilage damage.

Approximately 70-80 million women in the United States are ages 45 or older, which are the ages of perimenopause, menopause, and postmenopause.² More than 70% of perimenopausal and menopausal women will experience musculoskeletal symptoms and 25% will be disabled by them through the transition from perimenopause to postmenopause.³ This often-unrecognized collective of musculoskeletal symptoms, largely influenced by estrogen flux, includes arthralgia, loss of muscle mass, loss of bone density and progression of osteoarthritis, among others.

Here we present two cases of shoulder pain thought to be compatible with one of the manifestations of the musculoskeletal syndrome of menopause—adhesive capsulitis.

Case Series

Patient 1: The patient is a 50-year-old female presenting with pain and restriction of range of motion of both shoulders for 3-4 months. Symptoms began with sharp shooting pain beneath both shoulders, with the right side being more severe. Acupuncture and Pilates had given no relief.

Past medical history included attention deficit disorder (ADD), anxiety, allergic rhinitis, and weight gain. Medication included amphetamine/dextroamphetamine, cetirizine, montelukast, and semaglutide. The patient was a nonsmoker and drank 3 alcoholic drinks/week.

The patient also complains of irregular menstrual cycles for the last year, consistent with perimenopause.

Physical examination revealed bilateral restriction and range of motion in internal rotation, external rotation, flexion and abduction of both shoulders.

Differential diagnosis included adhesive capsulitis as the most likely cause over other conditions like osteoarthritis, gout, psoriatic arthritis, rheumatoid arthritis, acromioclavicular (AC) joint arthritis, labral tear, biceps tear, rotator cuff syndrome, other inflammatory conditions such as polymyalgia rheumatica (PMR), myopathies, and metabolic or neoplastic bone disease.

X-rays of both shoulders were normal. The patient received 20mg corticosteroid injections with 1 cc of lidocaine in both shoulders via the posterior approach to the subacromial bursa.

On follow-up 6 months after the injections, the patient reported considerable improvement.

Patient 2: The patient is a 51-year-old female presenting for management of menopausal symptoms and medication refills.

Past medical history includes pancreatitis and migraines. Medications include escitalopram, sumatriptan, and tirzepatide which she takes for weight loss.

She reported amenorrhea for the last year and associated symptoms including short-term memory problems, hot flashes, bladder incontinence, decreased libido, vaginal dryness, and muscle soreness. She was being followed by gynecology for perimenopause with her last visit approximately one year ago.

Pt also reported bilateral knee pain, difficulty sleeping, and more general aches and pains in the past year.

She reported that she saw an outside provider for right shoulder pain 4 months ago who referred her to an orthopedic surgeon. There was no associated trauma. Pain was located diffusely around the shoulder and occurred mainly with reaching movements. It sometimes radiated into the

upper arm. She also complained of associated stiffness. She was diagnosed with adhesive capsulitis by the orthopedic surgeon and has been undergoing physical therapy.

Discussion

Adhesive capsulitis, otherwise known as “frozen shoulder”, affects 3-5% of the population in their lifetime.⁴ Patients typically experience several months of pain before their range of motion becomes limited.⁵ Adhesive capsulitis is attributed to inflammation that leads to fibrosis and contracture of the glenohumeral capsule.⁶ Past research has compared this process to Dupuytren’s, another fibrotic disease which has similar histology, including primarily fibroblasts mixed with Type I and Type III collagen.⁷ Women are at a higher risk for adhesive capsulitis when compared to men, making up approximately 64% of cases in population-based data.⁸ There are three distinct stages of adhesive capsulitis: the freezing stage, the frozen stage, and the thawing stage. The freezing stage is characterized by moderate to severe pain and mildly restricted range of motion, lasting 2-6 months. The frozen stage is characterized by both pain and restriction in range of motion and lasts 4-12 months. Finally, the thawing stage is when symptoms gradually wane over a period of 6-26 months.⁹ While adhesive capsulitis is a self-limiting condition, there is evidence for the use of physical therapy, NSAIDs, and intra-articular injections for the first two phases.⁵ The evidence for various physical therapy protocols has not shown one protocol as consistently superior to others.¹⁰ Surgical options for refractory adhesive capsulitis include manipulation under anesthesia, arthroscopic capsulotomy, and open capsulotomy.⁶

70% of women in menopause will experience musculoskeletal symptoms related to changes in estrogen levels, such as joint pain, inflammation, sarcopenia, osteoporosis, and cartilage damage. Recent research, led by Wright et al, have labeled this transition as the musculoskeletal syndrome of menopause.^{1,3} While estrogen has been studied as an important modulator of pain, the specific cellular mechanisms by which estrogen may relieve or aggravate pain are still being explored.¹¹ Overall, it appears that the estrogen decline during menopause causes a persistent inflammatory state with increased cytokine activity and changes in cellular immunity.¹² Muscle and bone are also impacted by the fall in estrogen levels, leading to sarcopenia and osteoporosis.^{1,13} The fact that the incidence of osteoarthritis is higher in older women than in older men points to the possible role of estrogen deprivation in arthritic cartilage damage.¹⁴ Interestingly, in a study of middle-aged Japanese women there was a high prevalence (83.5%) and perceived severity of shoulder pain when compared to other symptoms common in menopause.¹⁵ However, when considering the many studies on muscle and

joint pain associated with menopause, few have identified specific orthopedic pathologies associated with menopause (i.e. tendinopathies, synovitis, bursitis, adhesive capsulitis).¹⁶

A recent pilot study investigated the possible relationship between menopause and adhesive capsulitis, by comparing the incidence of adhesive capsulitis in women who received hormone replacement therapy with those who did not receive hormone replacement therapy. While there were no significant findings, their research paves the way for future larger studies investigating the connection between estrogen levels and adhesive capsulitis.¹⁷

Conclusion

This pair of cases adds to the growing body of knowledge on the possible association between menopause and adhesive capsulitis. However, as a small case series, causality cannot be established. Physicians working in primary care, gynecology, orthopedics, physical medicine and rehabilitation (PM&R), and rheumatology should consider estrogen decline as a potential factor in musculoskeletal symptoms that accompany perimenopause. Counseling women who are going through menopause should include information on common musculoskeletal symptoms. Further research is needed to answer many related questions, such as whether hormone replacement therapy can treat manifestations of the musculoskeletal syndrome of menopause, whether estrogen decline is mistaken for other rheumatologic conditions such as fibromyalgia, and what other specific orthopedic pathologies are associated with the menopausal transition.

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AI Disclosure

Authors utilized artificial intelligence in some of the search for reference material. Artificial intelligence was not used in any part of writing the text of the manuscript. All references were reviewed for content. No artificial intelligence content summary was used.

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