

Is adhesive capsulitis of the shoulder a form of complex regional pain syndrome type I?

*Georges El Hasbani, MD,
Imad Utbman, MD, MPH,
Ali S. Jawad, MD.*

Codman initially used the term “frozen shoulder” in 1934 to describe a variety of conditions which cause spasm of the short rotator muscles located around the shoulder joint or bursae.¹ Adhesive capsulitis, referred to as frozen shoulder, involves a chronic inflammation of the sub-synovial layer of the shoulder’s capsule which leads to capsular thickening, fibrosis, and adherence to the surrounding anatomic structures.²

Despite that the condition was described more than 100 years ago, the term complex regional pain syndrome (CRPS) was adopted in 1995 by the International Association for the Study of Pain (IASP).³ Complex regional pain syndrome can be subdivided further into type I and type II depending on the absence or presence of peripheral nerve damage, respectively.³

This narrative review aims at describing the shared clinical, diagnostic, and therapeutic modalities of adhesive capsulitis and CRPS I trying to show that adhesive capsulitis of the shoulder is a form of CRPS type I.

The clinical presentation of adhesive capsulitis evolves with the progression of the disease. For this purpose, 4 stages have been identified based on the arthroscopic appearance of the joint capsule. At later stages, shoulder pain begins to mildly subside with progressive loss of glenohumeral flexion, abduction, internal rotation, and external rotation.⁴ Eventually, the patient experiences a gradual return of range of motion which takes about 5 to 26 months to complete.⁵

Complex regional pain syndrome type I was previously termed reflex sympathetic dystrophy, algodystrophy, or shoulder-hand syndrome. The symptoms of CRPS type I may develop within days to months after injury, often being minor.⁶ Similar to adhesive capsulitis, pain is the first sign of the disease which appears initially in the area of the injury or event

and may then spread throughout the extremity.⁷ Being included in the Budapest clinical diagnostic criteria for CRPS, evidence of decreased range of motion is an indicator of the presence of CRPS I and is assessed regularly as a sign of clinical improvement.⁸ Notably, most of CRPS I symptoms have the tendency to decrease gradually over the course of 6 to 12 months, similar to adhesive capsulitis.⁹

As a tool performed to exclude other differential diagnoses such as calcific tendinitis or shoulder dislocation, radiographs are performed in the work-up of adhesive capsulitis. Most radiographs are classically normal.¹⁰ Magnetic resonance imaging (MRI) often reveals useful diagnostic criteria such as capsular and coracohumeral ligament thickening, poor capsular distension, extracapsular contrast leakage, and synovial hypertrophy.¹⁰ In addition, adhesive capsulitis is characterized by an increased activity on radioisotope bone scan (99 mTc diphosphonate). Walburger et al¹¹ showed that 96% of 50 scases with frozen shoulder had increased activity on radioisotope bone scan regardless of the aetiology.¹¹

Although diagnostic procedures such as 3-phase bone scintigraphy (TPBS), MRI, and X-ray, were not included in the revised criteria of CRPS, they could provide additional information for diagnosis. During the early stages of the disease (0-3 months), plain radiographs are usually normal, while in later stages (3-12 months) osteopenia appears.¹² Conventional MRI usually indicates muscle atrophy, fibrosis, or fatty infiltration in the chronic phase.¹³ As the case of adhesive capsulitis, abnormal scintigraphy may be seen in patients with CRPS when Tc-labeled diphosphonate or polyphosphates are used.¹⁴

The main treatment for adhesive capsulitis involves a trial of conservative therapies, including analgesia, exercise, physiotherapy, oral nonsteroidal anti-inflammation drugs (NSAIDs), and intra-articular corticosteroid injections.

A major drawback of the multi-faceted pathophysiology of CRPS is that there is no single specific treatment. Additionally, high-quality randomized controlled multicenter trials are still missing. The various treatment methods include physiotherapy, psychotherapy, sympathetic block, intravenous regional blockade, chemical sympathectomy, surgical sympathectomy, and pharmacologic interventions.¹⁵

On clinical basis, adhesive capsulitis and CRPS I involve self-limiting pain and reduced ROM that progress in stages, although swelling is more specific to CRPS I. Despite that there is no gold standard imaging test for diagnosis, several studies

Disclosure. Authors have no conflict of interests, and the work was not supported or funded by any drug company.

showed increased activity on radionuclide scans. Because both conditions are self-limiting, most cases are managed conservatively with physiotherapy and anti-inflammatory pharmacotherapy. Intra-articular and systemic steroids are commonly beneficial.

We propose that adhesive capsulitis of the shoulder is a form of CRPS I.

Received 26th May 2020. Accepted 16th September 2020.

From the Division of Rheumatology, Department of Internal Medicine (El Hasbani, Uthman), American University of Beirut Medical Center, Beirut, Lebanon, and from the Department of Rheumatology (Jawad), Royal London Hospital, London, United Kingdom.

Addressed correspondence to: Dr. Georges El Hasbani, Department of Internal Medicine, American University of Beirut Medical Center, Beirut, Lebanon. E-mail: george.hasbany@lau.edu

References

1. Gainty C. The autobiographical shoulder of Ernest Amory Codman: crafting medical meaning in the twentieth century. *Bull Hist Med* 2016; 90: 394-423.
2. Neviasser AS, Neviasser RJ. Adhesive capsulitis of the shoulder. *J Am Acad Orthop Surg* 2011; 19: 536-542.
3. Stanton-Hicks M, Jänig W, Hassenbusch S, Haddox JD, Boas R, Wilson P. Reflex sympathetic dystrophy: changing concepts and taxonomy. *Pain* 1995; 63: 127-133.
4. Chan HBY, Pua PY, How CH. Physical therapy in the management of frozen shoulder. *Singapore Med J* 2017; 58: 685-689.
5. Cho CH, Bae KC, Kim DH. Treatment strategy for frozen shoulder. *Clin Orthop Surg* 2019; 11: 249-257.
6. Saedi E, Gheini MR, Faiz F, Arami MA. Diabetes mellitus and cognitive impairments. *World J Diabetes* 2016; 7: 412-422.
7. Bruehl S, Harden RN, Galer BS, Saltz S, Backonja M, Stanton-Hicks M. Complex regional pain syndrome: are there distinct subtypes and sequential stages of the syndrome? *Pain* 2002; 95: 119-124.
8. Barnhoorn KJ, van de Meent H, van Dongen RTM, Klomp FP, Groenewoud H, Samwel H, et al. Pain exposure physical therapy (PEPT) compared to conventional treatment in complex regional pain syndrome type 1: a randomised controlled trial. *BMJ Open* 2015; 5: e008283.
9. Smart KM, Wand BM, O'Connell NE. Physiotherapy for pain and disability in adults with complex regional pain syndrome (CRPS) types I and II. *Cochrane Database Syst Rev* 2016; 2: CD010853.
10. Zappia M, Di Pietto F, Aliprandi A, Pozza S, De Petro P, Muda A, et al. Multi-modal imaging of adhesive capsulitis of the shoulder. *Insights Imaging* 2016; 7: 365-371.
11. Waldburger M, Meier JL, Gobelet C. The frozen shoulder: diagnosis and treatment. Prospective study of 50 cases of adhesive capsulitis. *Clin Rheumatol* 1992; 11: 364-368.
12. Borchers AT, Gershwin ME. The clinical relevance of complex regional pain syndrome type I: The Emperor's new clothes. *Autoimmun Rev* 2017; 16: 22-33.
13. Lascombes P, Mamie C. Complex regional pain syndrome type I in children: What is new? *Orthop Traumatol Surg Res OTSR* 2017; 103: S135-S142.
14. Wang L, Guo TZ, Hou S, Wei T, Li WW, Shi X, et al. Bisphosphonates inhibit pain, bone loss, and inflammation in a rat tibia fracture model of complex regional pain syndrome. *Anesth Analg* 2016; 123: 1033-1045.
15. Lee JW, Lee SK, Choy WS. Complex regional pain syndrome type 1: diagnosis and management. *J Hand Surg Asian-Pac* 2018; 23: 1-10.