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Comprehensive Multimodal Rehabilitation for Chronic Musculoskeletal Problems in Geriatric Patient: A Case Study

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ABSTRACT

Introduction: Musculoskeletal problems are a major cause of morbidity in the geriatric population. These issues can decrease independence, increase functional decline and mortality, and negatively affect the psychological well-being and overall quality of life of elderly individuals. Returning to full function in such cases is highly challenging and requires comprehensive management.

Case: A 67-year-old married female housewife presented with sharp, localized chronic pain in her left wrist for one year. The pain was non-radiating, without any tingling sensation, and aggravated by movements such as ulnar deviation and lifting objects (pain scale: 8/10). Tenderness was observed in the lateral anatomical snuffbox of the left wrist, with a positive Finkelstein test. The patient also experienced sharp, localized pain in her left shoulder for seven months following a coronary artery bypass graft (CABG) surgery for coronary artery disease. The shoulder pain worsened with overhead activities (pain scale: 6/10) and improved with rest (pain scale: 3/10). The patient exhibited limited active range of motion (ROM) in flexion, extension, abduction, and external rotation, with positive Neer and Hawkins tests. Her metabolic equivalent of task (METs) score was 3.46, and she scored 5 on the Geriatric Depression Scale. The Barthel Index was 75, and she was diagnosed with several geriatric syndromes: instability (standing balance), impaired vision (cataract), isolation (depression), iatrogenesis (polypharmacy), and impotence (menopause). The patient had difficulties performing daily activities and participating in the community. A multimodal rehabilitation program was implemented, including therapeutic exercise, pharmacotherapy, kinesiotaping, thumb splint, physical modalities, and consultations with an internist and psychiatrist. After several sessions, the patient's pain decreased significantly to 1/10 (wrist) and 0/10 (shoulder). Active ROM improved to near normal, METs increased to 5.27, and she regained full independence in daily activities (Barthel Index 100).

Discussion: Chronic musculoskeletal problems, especially when coupled with geriatric syndromes, are particularly challenging to manage. A comprehensive geriatric assessment, combined with a thorough multimodal rehabilitation approach, is key to successful outcomes. Improvements in pain, ROM, depression, and METs can lead to better functional performance, thereby reducing disability and enhancing the patient's quality of life. A supportive caregiver also plays a crucial role in achieving satisfactory results.

Conclusions: This case highlights that comprehensive multimodal rehabilitation is crucial for the successful management of chronic musculoskeletal problems in the geriatric population.

Introduction

Musculoskeletal problems are one of the major causes of morbidity in geriatric. As increasing number of elderly and geriatric population, the prevalence of musculoskeletal problems is also increasing (Gheno et al, 2012). Musculoskeletal problems are the most common cause of disabilities in elderly and geriatric. Approximately one-third Canadian will have pain caused by chronic musculoskeletal problems more than 6 months (Health Canada, 2019). It may decrease the independence and increasing functional and morality. It also may affect the phycological conditions and overall well-being of elderly and geriatrics. Thus, it may impact the economical and increasing the demand of health care systems (Reynold, 2022). However, to overcome the chronic musculoskeletal problem, comprehensive multimodal rehabilitation maybe the most beneficial management that can be given.

Case Report

A female 67 years old, married housewife, came to the physical medicine and rehabilitation outpatient clinic with the chief complaint left wrist pain. It was felt for 1 year ago, and became more severe in last 2 months. The pain was sharp, and not radiating, no tingling sensation, numbness nor weakness of the hand. It was aggravated by moving hand to little finger side, especially like lifting or holding something (WBS 8), and reduced when taking a rest (WBS 3).

She also had limited movement when she lifted her left arm forward and to the side with sharp localized pain at shoulder for 7 months ago after having CABG surgery. No tingling sensation, numbness nor weakness of upper extremity. The pain was aggravated by activity like lifting or drying clothes (WBS 6) and reduced by taking a rest (WBS 3).

The history of medication shown on Figure 1. She got medication from neurology OPC: Mecobalamin, Natrium Diclofenac, and Gabapentin. The history of past illness was:

1. Diabetes mellitus for 10 years. Internal medicine OPC gave metformin, Tuzalos tab, Insulin.
2. Hypertension for 10 years. Cardiology OPC gave Clopidogrel, Hidroclorotiazide, Candesartan.
3. Cardiac ring / stent 3 times and last in 2017
4. Coronary Artery Bypass Graft surgery 7 months ago
5. Trigger finger release surgery 3 months ago

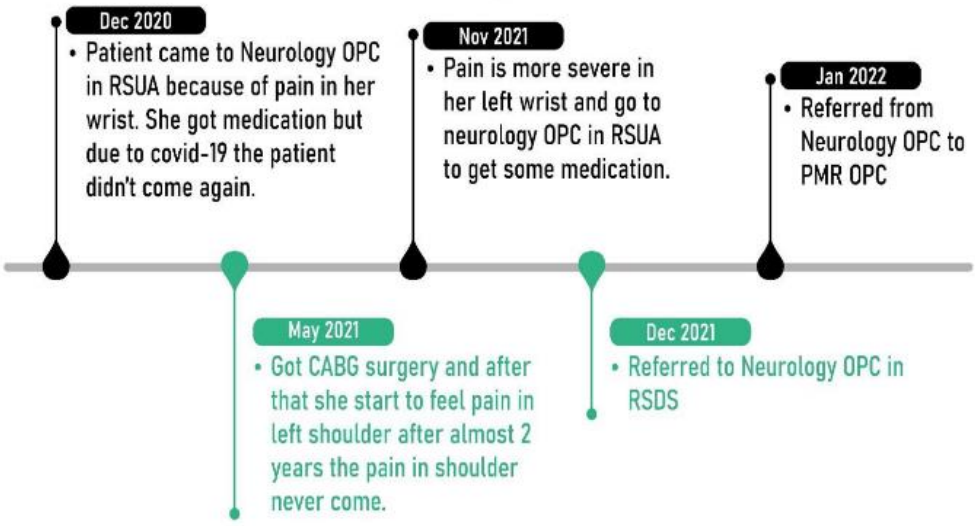

Figure 1. Timeline of the illness

There was tender point in anatomical snuffbox wrist sinistra with Finklestein test positive. The physical examination also showed ROM limitation in shoulder sinistra for abduction and flexion due to pain. The apprehension test of left shoulder: 1200 of abduction, Neer sign and Hawkin test were positive, with Appley Scratch Test results were Abduction-ext.rotation : C7 and Adduction-int. rotation : sacrum. The wrist X-ray found no abnormality as shown on Figure 2. The METS was 3.46 with geriatric depression scale scored 5. The Barthel Index was 75 with geriatric syndrome: Instability (standing balance), Impairment of Vision (cataract), Isolation (depression), Iatrogenesis (multi pharmacy), and Impotence (Menopause). She had difficulties in daily activities and participating in the community.

Figure 2. Wrist X-Ray

The initial assessment was Left Wrist Pain ec De Quervain's Tenosynovitis + Left Shoulder Pain et ROM Limitation ec Suspect Supraspinatus Impingement + Diabetes Melitus Type II + Hypertension (Uncontrolled) + Geriatric Giant Syndrome + History of CABG (7 Months) + Trigger Finger Digiti II Left Hand Post Release (3 Years). The goals set were divided into short-term (establish diagnose, decrease pain, improve range of motion, and posture correction) and long-term goal (improve cardiopulmonary endurance, giving

psychological support, maintain joint flexibility, and increase quality of life).

We planned to do planning diagnostic Shoulder Radiological examination and Consult to Geriatric OPC. The radiological shoulder result was Narrowing of acromioclavicular joint space and coracoclavicular space. The psychiatrist at the Geriatric OPC had performed motivation and psychoeducation.

The modality given were Laser 4 Joule / cm2 on tender point area in left hand (anatomical snuffbox) and Hi-TENS 100Hz on left shoulder for 20 minutes. We also gave therapeutic exercise:

1. Posture correction
2. Breathing exercise active with deep breathing and pursed lip breathing
3. AROM exercise AGA D / AGB S
4. Wrist Stretching Exercise for De Quervain's
5. Shoulder : gentle stretching shoulder S to abduction and flexion direction by Finger Ladder exercise, overhead pulley
6. Endurance exc : F : 3-5x/weeks, I : Borg Scale 11-12, T : 30 minutes, T: walking

The pharmacotherapy given for the pain-killer was paracetamol, considered her elderly age, and also continue the medicine from Neurology, internal medicine, and cardiology OPC. Gabapentin was also used to overcome the neuropathic pain that occur. We also performed kinesiotaping and thumb splint.

After several months of follow up, the pain reduced to WBS 1 (wrist) and 0 (shoulder). Active ROM increased to almost normal, METS increased to 5.27, and could do activities independently (Barthel index 100). The progression chart shown on Figure 3.

Discussion

Chronic musculoskeletal problems are common in geriatrics. Pain is among the factors that can cause disability and adverse effects on health, such as reduced physical activity, mobility limitations, frailty, depression, cognitive impairment, high risk of falls, and sleep disturbances. The combination of musculoskeletal pain with other pain conditions is commonly experienced by the elderly, and the number of pain sites is a contributing factor to the level of disability experienced (Hasan et al., 2021).

Musculoskeletal pain poses both diagnostic and therapeutic challenges. There is growing evidence that muscle hyperalgesia, referred pain, and widespread hyperalgesia play important roles in chronic musculoskeletal pain. Besides the sensory consequences, musculoskeletal pain also affects the motor control system and related biomechanics (El-Tallawy et al., 2021).

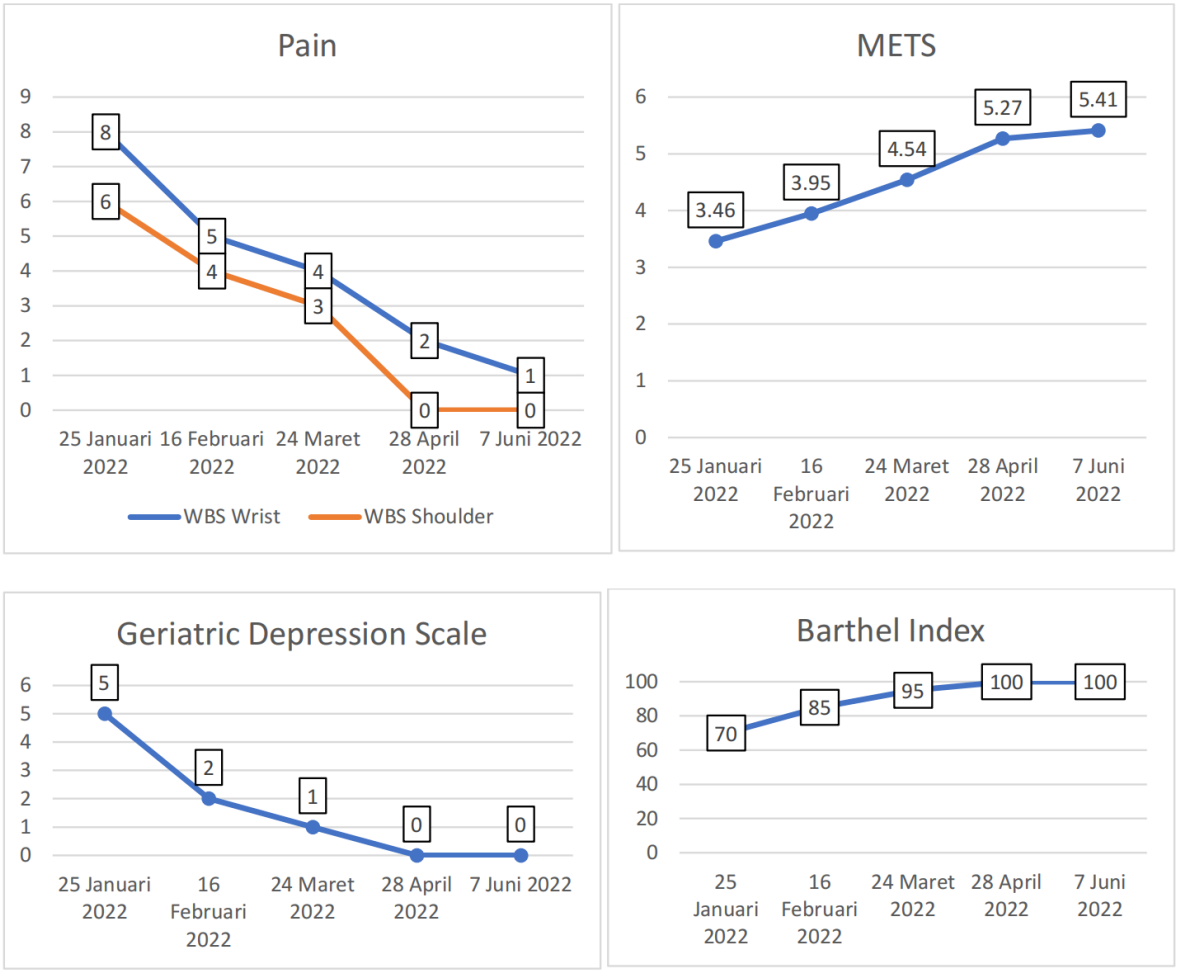

Figure 3. Pain, METS, Geriatric Depression Scale, and Barthel Index Progression Chart

A multimodal approach, including rehabilitation exercises, has been shown to have a positive effect on pain and disability in older adults with chronic musculoskeletal pain, compared to usual medical care. However, the effect size is generally small to moderate, particularly regarding disability. Since a prolonged duration of symptoms is a risk factor for a poor prognosis, even modest improvements in symptom severity especially in pain intensity can positively impact the well-being of this population (Kechichian et al., 2020).

Pharmacotherapy to manage pain must be carefully selected, with risk-benefit considerations tailored to the patient's condition. In this case, the initial pain scale ranged from 6 to 8 during activity. Kinesiotaping and a thumb splint were used to limit activities that aggravated pain. Additionally, physical modalities were included as part of the comprehensive rehabilitation strategy. It is also important to consider the possibility of mixed pain, as

chronic pain may involve both nociceptive and neuropathic pathways.

Paracetamol is preferred over opioids as an analgesic. Studies show that long-term opioid use for chronic noncancer pain, compared to anticonvulsants or cyclic antidepressants, is associated with a significantly increased risk of all-cause mortality, including deaths from non-overdose causes, with a modest absolute risk difference (Ray et al., 2016). Comparisons between opioids and non-opioid alternatives have suggested that the benefits for pain and functioning are similar (Busse et al., 2018). Paracetamol is well-tolerated and, due to its greater safety compared to traditional NSAIDs, is recommended as first-line therapy for pain management in the elderly (American Geriatric Society, 2009).

Clinicians must carefully monitor how much acetaminophen a patient is taking before deciding to switch to stronger pain medications. Often, increasing the acetaminophen dose to 1,000 mg can provide sufficient pain relief, eliminating the need for stronger medications. Patients should be educated on the maximum safe dose of acetaminophen (<4 g/24 hours) from all sources (Milani et al, 2024).

Conclusion

Chronic musculoskeletal problems in geriatric patients often coexist with multiple comorbidities. A comprehensive multimodal rehabilitation approach, which may include therapeutic exercises, pharmacotherapy, kinesiotaping, thumb splints, physical modalities, and consultations with internists and psychiatrists, can be beneficial. This case highlights the effectiveness of such an approach for managing chronic musculoskeletal issues in geriatric patients. Further research, particularly involving larger groups of patients, is necessary to validate these findings and optimize interventions.

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