ABSTRACT

A subset of patients who had Lyme disease experience postinfectious signs or symptoms called post-treatment Lyme disease syndrome (PTLDS). PTLDS is a chronic condition including pain in joints and muscles, neurological symptoms including demyelinating diseases, peripheral neuropathy, headaches, sleep disturbances, fatigue, and cardiac conditions. We report a case of difficult acute pain management in a patient with PTLDS who underwent dental extractions and required admission to an intensive care unit for pain control.

Key words: Acute pain; dental; Lyme disease

Introduction

Lyme disease is a tick-borne illness caused by spirochete bacteria *Borrelia burgdorferi* and is the most common vector-borne infectious disease in North America. Lyme disease was first described in 1977 and it was initially thought to be arthritis or juvenile rheumatoid arthritis. According to the Centers for Disease Control and Prevention, approximately 30,000 cases of Lyme disease are reported every year.[1] Antibiotic therapy is the gold standard treatment for Lyme disease; however, despite antibiotic therapy, some patients experience postinfectious signs or symptoms called post-treatment Lyme disease syndrome (PTLDS) or chronic Lyme disease. PTLDS refers to chronic pain in joints and muscles, neurological symptoms including demyelinating diseases, peripheral neuropathy, headaches, sleep disturbances, and cardiac conditions such as conduction delays and cardiomyopathy, neurocognitive or fatigue syndrome after antibiotic therapy, which can last months to years. The symptoms can be very similar to other disease states such as systemic lupus erythematosus, rheumatoid arthritis, and fibromyalgia. We describe a difficult case of acute pain management for a patient with PTLDS who underwent dental extractions. To date, very little information on acute pain management for PTLDS is available in the literature, and there are currently no published recommendations for appropriate acute postoperative pain management in PTLDS.

Case Report

A 23-year-old female acquired Lyme disease 9 years ago (serology positive) and developed chronic pain due to PTLDS. Her functionality was severely affected; she was bedbound for approximately 5 years and required a wheelchair. Other past medical history includes fibromyalgia, hypothyroidism, anxiety/depression, and insomnia. The patient was scheduled for extraction of symptomatic, impacted molars under general anesthesia.

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Before surgery, her pain manifested in skin, spine, muscles, bones, and joints. Her baseline Numeric Pain Rating Scale score was 6–7/10 throughout her body, but mostly in her back. She had severe pain episodes requiring emergency department visits and admissions with notably poor response to opioids but relieved with ketamine. She had tried an extensive list of pain therapy modalities and medications and had a history of sustained use of opioid medication for her pain. Finally, she was prescribed methadone but was able to wean off of this treatment 5 months before surgery. She was on buprenorphine 2 mg tablet for breakthrough pain which she used approximately once every 3–4 weeks. Other home medications were thyroid tablets (60 mg) once a day, clonazepam (0.5 mg nightly), and quetiapine (200 mg nightly). She was referred to the preanesthesia clinic for recommendations regarding her perioperative pain management. At that time, multimodal pain management therapy was discussed.

Anesthesia was induced with propofol and maintained with sevoflurane. Four molars were extracted uneventfully. The patient received fentanyl 250 mcg intravenous (IV), ketamine 100 mg IV, acetaminophen 1000 mg IV, and ketorolac 30 mg IV for pain control. At the end of surgery, local anesthetic was administered in all four quadrants by the surgeon for postoperative pain relief.

The patient was extubated in the operating room and transferred to the recovery room. During recovery, in addition to acute oral pain, she developed an exacerbation of nonspecific musculoskeletal pain. The patient received an additional fentanyl 250 mcg IV, hydromorphone 1.2 mg IV, lorazepam 2 mg IV, gabapentin 600 mg p.o., and ketamine 50 mg p.o. Her pain was still severe and uncontrolled; therefore, a ketamine infusion was started at 5 mcg/kg/min. Opioids seemed to work poorly and at higher doses actually precipitated hypoxia. She was transferred to the Intensive Care Unit (ICU) for further pain management. A multimodal pain regimen was used for 2 days and included: ketamine infusion; acetaminophen 1 g IV four times a day; ketorolac 15 mg IV four times a day; sublingual buprenorphine 2 mg once a day; oxycodone 10–20 mg p.o. as needed; and hydromorphone 0.4–1.2 mg IV as needed. Subsequently, she was weaned off these medications and transitioned to oral medications and was discharged home on day 3.

Discharge pain medications included ibuprofen 800 mg three times a day, oxycodone-acetaminophen (5/325) two tablets four times a day, ketamine 20 mg four times a day, gabapentin 600 mg three times a day, clonazepam 0.5 mg nightly, sublingual buprenorphine 2 mg once a day, and hydromorphone 4 mg every 4 h as needed. The patient was expected to taper off medications for acute pain over a period of several days as acute pain from her dental procedure was expected to resolve over that period of time.

**Discussion**

The definition of PTLDS by the Infectious Disease Society of America in 2006 includes (1) documented episode of early or late Lyme disease with posttreatment resolution of the symptoms, (2) subsequent onset of symptoms of fatigue, widespread musculoskeletal pain with or without cognitive difficulties, (3) symptoms lasting for at least 6 months, and (4) symptoms severe enough to reduce the functional ability of the patient.[2] Symptoms of PTLDS are often nonspecific; headache, fatigue, joint and muscle pain, and neurocognitive difficulties. These may persist for months after treatment of Lyme disease.[3]

Mechanisms of chronic pain associated with Lyme disease are not clear. Lack of response to antibiotic therapy suggests that the underlying mechanism for chronic pain among a subgroup of Lyme patients is no longer persistent infection. However, inflammatory, musculoskeletal, neuropathic, and mixed conditions are suggested.[4] The persistent symptoms may be due to central sensitization, which is known as central sensitivity syndrome (CSS).[5] Many chronic pain states included under the category of CSS share the common features of augmented central nervous system pain and sensory processing systems (i.e., hyperalgiesia and allodynia). The disorders, for example, fibromyalgia, posttraumatic stress disorder, and irritable bowel syndrome are included under the umbrella category of CSS.

Suggested pharmacologic therapies for CSS include antidepressants (tricyclics, selective serotonin reuptake inhibitors, serotonin, and norepinephrine reuptake inhibitors), antiepileptics (pregabalin, gabapentin), and N-methyl-D-aspartate antagonists (ketamine, dextromethorphan).[5] Concurrent diagnosis with fibromyalgia is not uncommon as in this case. Since fibromyalgia is also categorized as CSS, symptoms overlap and are often hard to distinguish from one another. In this case, oral pain was a minor complaint while her main issue was total body pain. We treated her as a case of CSS and used a multimodal pain regimen during surgery. However, we were not able to prevent recurring PTLDS symptoms after surgery. This highlights the difficulty of pain management in patients with PTLDS.

**Conclusion**

We described a very difficult and complex acute chronic pain management case in a patient with PTLDS. Despite
our effort to provide pain relief intraoperatively, a minor ambulatory procedure provoked total body pain that required ICU admission for management. To the best of our knowledge, this is the first case report describing perioperative pain management in a patient with PTLDS. Patients with PTLDS may present with severe and disabling pain. They may benefit from an intensive pain management approach using a multimodal pain regimen during the perioperative period.

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Conflicts of interest
There are no conflicts of interest.

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