Cesarean Section in a Patient with Complex Regional Pain Syndrome

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INTRODUCTION

Complex regional pain syndrome (CRPS) is a chronic disorder of the central and peripheral nervous systems that is characterized by extended periods of excessive pain in specific regions of the body. No specific treatment regimen or protocol has been standardized, because each case varies in symptom severity and duration (1, 2).

In this report, we present the perioperative management of a thirty-eight year old female, G1P0, with CRPS, presenting at 38+2 weeks pregnant for cesarean section. The patient has been receiving different treatment modalities for her CRPS since she was sixteen years old, including multiple spinal surgeries and nerve stimulators. After failing these approaches, her pain specialist suggested ketamine infusions, which the patient has been receiving every six months, until pregnancy when her CRPS went into remission. (3) The patient did not require ketamine infusions for the duration of her pregnancy; however, the management of this patient postpartum to avoid relapse became a complex discussion, involving her multiple care teams: including, pain management, obstetrics, and her anesthesiologist. The detailed management of her case is below as well as a literature review and recommendations for future patients with similar presentations.

CASE DESCRIPTION

The patient is a thirty-eight year old, G1P0 female with a past medical history significant for Complex Regional Pain Syndrome/Reflex Sympathetic Dystrophy, Neuralgia, Asthma, Plantar Fasciitis. She has an extensive surgical history including multiple ankle, spine, and pain procedures (Figure 1). Family history includes: hypothyroidism, hypertension, hyperlipidemia, acid reflux/peptic ulcer disease, coronary artery disease, cerebrovascular accident, Epstein Barr Virus.

For her CRPS, she had received multiple trials of both peripheral and central nerve stimulators, epidural and peripheral nerve blocks, and more recently in March 2011, she was started on ketamine infusions every 6 months with no relapse in between doses.

On July 18, 2019, she presented to the hospital in labor and the decision was made to proceed with cesarean section.

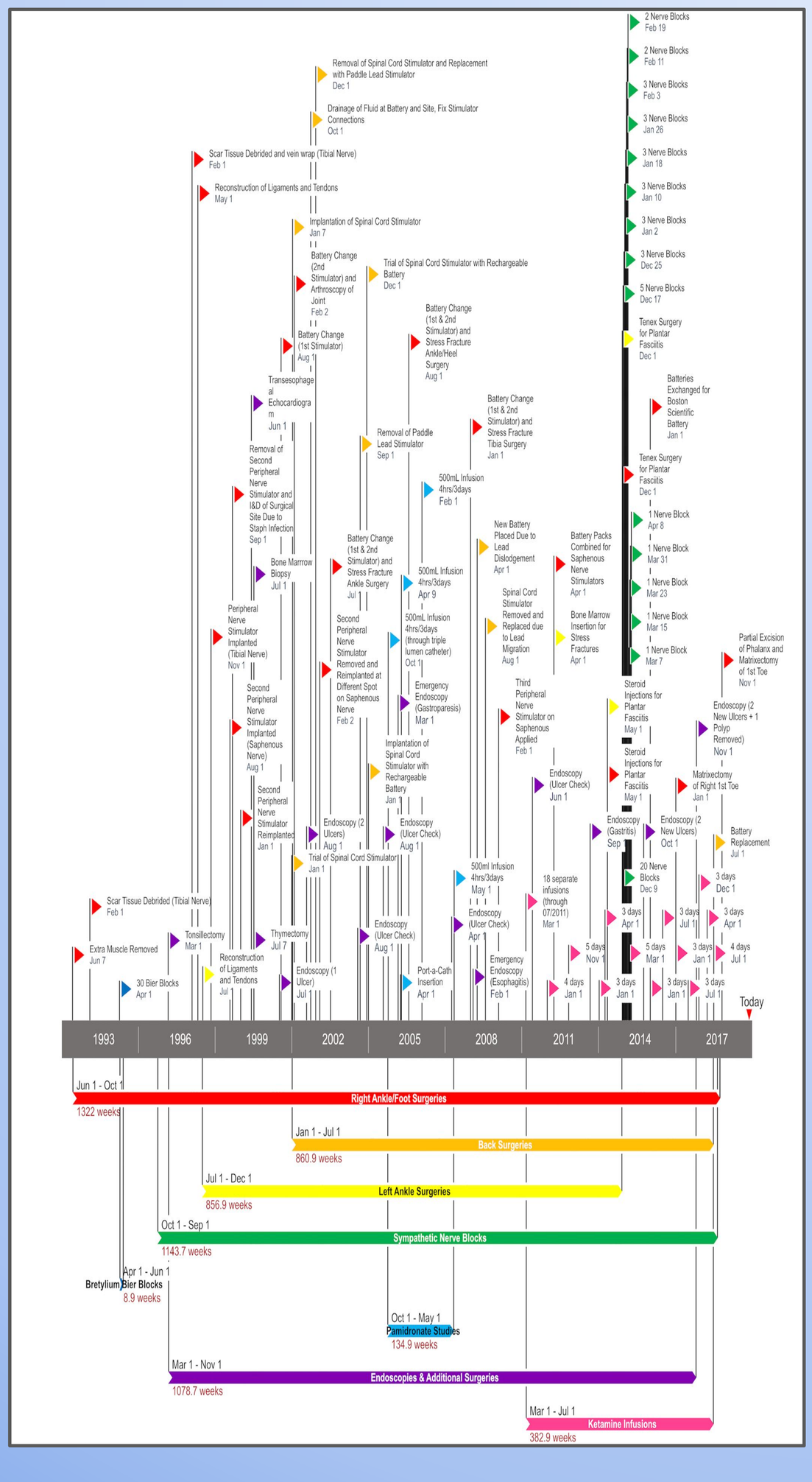
Recommendations by her pain specialist were 250mg bolus of Ketamine intraop post delivery, 200mg loading dose in PACU and Ketamine infusion 200mg every four hours two times, for 2 days. Recommendations for additional pain management included naltrexone, tylenol and ketorolac.

We managed her labor and cesarean section with a combined spinal epidural. She received 1.6mL of 0.75% bupivacaine. 0.1mg morphine and 10mcg fentanyl in her epidural catheter.

Postpartum she stayed in the ICU initially for her Ketamine infusions. Once transferred to the floor, she was managed with ketorolac and tylenol. Her hospital stay was a total of 4 days and was uneventful. She had no relapse of her CRPS during the admission.

At her 1 week visit, she remained pain free in her ankle. Still some soreness from her pfannenstiel incision.

At her 6 week visit, she still reported no relapse of her CPRS.



DISCUSSION

There are two main types of CRPS. The criteria include precipitating event, peripheral nerve involvement, physiological changes in the affected limb, and specific symptoms. (4)

Types of CRPS		
	Type I	Type II
Former name	Reflex sympathetic dystrophy	Causalgia
Precipitating event	Sometimes	No
Peripheral nerve involvement	No	Yes
Physiological change in affected limb	Yes	No
Signs/Symptoms	Swelling Change in skin temperature	Burning pain Allodynia hyperalgesia

The stages of CRPS increase in severity and symptomatology. These include stage one, the initial stages of the disease when the pain begins. Stage two includes physical changes, which normally last around three to six months. Stage three includes decreased functionality. (4)

Stages of CRPS	
Stage 1	· After an event or without inciting cause, pain develops in the limb · Distribution of pain not compatible with single peripheral nerve, trunk, root lesion · Features: burning/throbbing pain, diffuse aching, localized edema
Stage 2	· Soft tissue edema · Skin thickening · Muscle wasting
Stage 3	· Decreased range of motion · Contracture of digits · Waxy/ trophic skin changes · Brittle ridged nails

DIAGNOSIS

There is no gold standard in diagnosing CRPS. The Budapest Consensus Criteria (4) involves a patient report scale as well as evaluation criteria to help diagnose CRPS. A patient must report three of four categories in the four features involving sensory, vasomotor, sudomotor/edema and motor. A clinician must observe two of four characteristics of the same features for a diagnosis.

Budapest Consensus criteria for clinical diagnosis (no gold standard)	
Patient must *report* at least one symptom in three of four categories	1. Sensory: reports of hyperesthesia and/or allodynia 2. Vasomotor: reports of temperature asymmetry/ skin color changes 3. Sudomotor/edema: reports of edema and/or asymmetrical sweating 4. Motor/trophic: reports of decreased range of motor or dysfunction (weakness, tremor, dystonia or trophic changes (hair, nail, skin)
Patient must *display* at last one sign at the time of evaluation in two of four categories	1. Sensory: evidence of hyperalgesia (to pinprick) and or allodynia (to light tough and/or temperature sensation) 2. Vasomotor: evidence of temperature asymmetry/skin color changes 3. Sudomotor/edema: evidence of edema and/or asymmetrical sweating 4. Motor/ trophic: evidence of decreased range of motor or dysfunction (weakness, tremor, dystonia or trophic changes (hair, nail, skin)

MANAGEMENT OF CRPS

Initial management of CRPS includes physical therapy and occupational therapy, followed by psychosocial or behavioral management strategies. Pharmacological treatment of symptoms is tailored to specific patient subtype.

Pain management in CRPS includes a multimodal approach, which generally involves multiple classes of medications. The classes of medications include NSAIDs, neuropathic pain coverages, bisphosphonates, topical analgesics.

For patients with refractory pain there are numerous intervention approaches for pain management, as well as implantable devices. (4)

Approach to pain management in CRPS **PHARMACOTHERAPY APPROACH**		
Non-opioid Oral analgesics	NSAIDS	Ibuprofen Naproxen
	COX 2 inhibitors *For patients who cannot tolerate nonselective NSAIDS*	Celebrex
Neuropathic pain	Anticonvulsants	Gabapentin Pregabalin
	Antidepressants	Amitriptyline Nortriptyline
	Topical	Lidocaine Capsaicin
Bisphosphonates	*For patients with early radiographic changes*	Alendronate Neridronate Pamidronate Clodronate
Glucocorticoids	*For early CRPS, limited data to support*	Prednisone
Alpha antagonists and agonist	*For sympathetically maintained pain*	Prazosin Clonidine phenoxybenzamine
Ketamine infusions	*Limited data to support*	Subanesthetic doses
Opioid oral analgesics		

Approach to pain management in CRPS **INTERVENTIONAL APPROACH FOR REFRACTORY PAIN**	
	Trigger point injections Sympathetic nerve block Epidural Sympathectomy
Implantable devices	Nerve stimulators

KETAMINE INFUSIONS

Ketamine infusions in CRPS is not a novel treatment modality. A study published in Pain Medicine (september 2004) involved a subset of 33 patients who were treated with subanesthetic ketamine infusions. The ketamine infusions led to a significant decrease in pain. Fifty-four percent of patients were pain free for >3 months and 31% remained pain free for >6 months. Although limited data to support this, as well as the small sample size in the study, this review suggests that subanesthetic ketamine infusions provide pain relief in refractory CRPS. (5)

CRPS and PREGNANCY

Pregnancy can be a risk factor for development or relapse of CRPS. In this case, our patient went into remission, perhaps due to the increased progesterone in pregnancy and its MAC reducing effect.

A review from the Journal of obstetric anesthesia and critical care describe the incidents of CRPS and pregnancy increasing. The increasing incidence may be due to increased maternal age. The diagnostic criteria for pregnant women with CRPS is the same as non-pregnant patients. Treatment modalities are similar, but limited due to teratogenicity as well as limiting interventional approaches which could be potentially harmful for the fetus. Treatment would include a multispecialty approach, involving pain management, obstetrics, primary care and anesthesiology.(6)

CONCLUSION

CRPS presents in a highly individualized fashion for every patient. For now, each patient should continue to be treated on a case by case basis. Our case details one specific style of management for the complex postpartum patient. With the report of more cases in the future, it may be possible to come to a practice guideline.

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