Cannabidiol in the Management of Comorbid Rheumatoid Arthritis, Lupus, and Raynaud's Disease

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Introduction

Rheumatoid arthritis (RA), systemic lupus erythematosus (SLE), and Raynaud's disease, are chronic inflammatory autoimmune diseases characterized by pain, inflammation, and fatigue.[1-3] Treatment presents a clinical challenge for several reasons, including the progressively degenerative nature of autoimmune diseases, the involvement of multiple pain mechanisms, and the adverse side effects of pain medications. Even pain treatments with low addiction profiles may pose an implicit risk, such as liver or kidney toxicity.

Presently, there are limited, if any, modern studies examining the effects of cannabidiol (CBD) products on pain and other outcomes in RA, SLE, or Raynaud's disease.[4] This case report describes the potential efficacy and safety of a daily, high-dose, medical grade CBD product (ie, "Hemp CBD") in the treatment of persistent pain and inflammation in a patient with multiple autoimmune disorders.

In autoimmune disorders such as RA, SLE, and Raynaud's disease, an abnormal and chronic inflammatory response occurs in various tissues that over time results in the observed degenerative features and symptoms of the conditions. For many patients with these diseases, pain and accompanying loss of mobility are the most common and debilitating daily symptoms.

Currently, use of cannabinoids in the treatment of autoimmune conditions in the United States presents both clinicians and patients with considerable challenges, including the lack of conformity between individual state and federal cannabis/hemp laws, minimal funding to support the clinical study of hemp- and cannabis-derived products, heterogeneity of patient symptomology (particularly in elderly patients), and quality inconsistency of cannabis/hemp-derived products.[4-6] Multiple substantiated sources suggest that CBD's anti-inflammatory properties are significant.[7,8] There also are anecdotal patient reports of symptom relief when using CBD products for inflammatory conditions. However, there currently is a lack of general knowledge about the effect of cannabinoids in autoimmune diseases and potential dosing regimens. The authors of a recent meta-analysis stated that, "There are no clinical trials of medical cannabis in rheumatology arthritis."[9] A few studies have investigated the effects of cannabis obtained outside of a state program (ie, illicitly) in RA, but to our knowledge, no previously published clinical data or case reports exist on the efficacy of CBD-containing products compliant with state and federal regulations outlined in the 2018 Farm Bill in patients suffering from advanced autoimmune disorders.[6,10] The aim of this article is to provide clinicians and patients with new insights on treatment and dosing applications of CBD for inflammatory disorders.

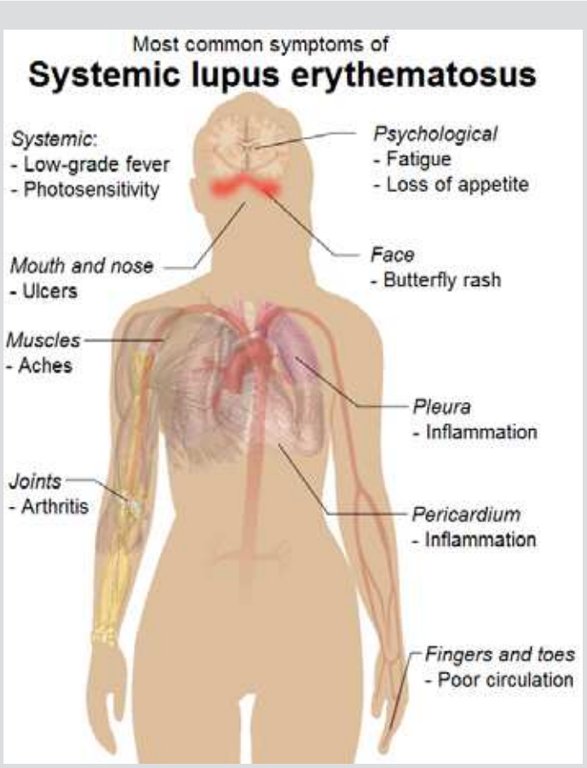

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Table 1. Medication History

Medication	Dosage	Condition	Provider	Duration, Year
Gabapentin	300 mg daily	Pain	Primary Care 1	30 days, 2015
Gabapentin	600 mg daily	Pain	Primary Care 1	60 days, 2015
Gabapentin	1200 mg daily	Pain	Primary Care 1	90 days, 2015
Prednisone	20 mg daily	Inflammation	Primary Care 2	30 days, 2016
Methocarbamol	500 mg PO, 4x daily	Pain	Primary Care 2	30 days, 2016
Potassium	1500 mg (20 mEq) daily	Muscle cramping	Primary Care 2	30 days, 2016
Tramadol	50 mg as needed, but not to exceed 150 mg daily	Pain	Primary Care 2	30 days, 2016
Prednisone	20 mg daily	Inflammation	Primary Care 2	90 days, 2017
Tizanidine	4 mg PO x 8 h	Pain	Primary Care 2	30 days, 2017
Prednisone	10 mg daily	Swelling	Rheumatologist	1 year, 2018
Leflunomide	20 mg daily	Inflammation	Rheumatologist	1 year, 2018
Amlodipine	10 mg daily	Finger ulcers	Rheumatologist	1 year, 2018
Nitro paste	25 mg nightly	Finger ulcers	Rheumatologist	1 year, 2018
CBD isolate medium-chain triacylglyceride oil tincture	600 mg daily	Pain	Preventive Medicine Physician	60 days, 2019
CBD isolate medium-chain triacylglyceride oil tincture	400 mg daily	Pain	Preventive Medicine Physician	60 days, 2019
CBD isolate medium-chain triacylglyceride oil tincture	200 mg daily	Pain	Preventive Medicine Physician	Present

Medical History

The patient is a 50-year-old woman with pain and mobility-related symptoms of multiple autoimmune disorders. She was diagnosed with Raynaud's disease in 2015, RA in 2016, and SLE as well as scleroderma in 2017. She has been managed by conventional treatments (eg, gabapentin, prednisone, tramadol, tizanidine, and leflunomide) on and off for many years, achieving only intermittent alleviation of her pain, inflammation, and joint swelling (Table 1). Moreover, prolonged use of prednisone (at doses of 10–20 mg/d) and nonsteroidal anti-inflammatory drugs resulted in significant adverse events that now prevent the patient from safely tolerating the ongoing use of these agents.

Assessment

The patient presents with subjective complaints including pain and swelling of the hands, low back, hips, right knee, and feet, with exacerbations of low back and hip pain. The patient reports that the pain limits her ability to sit or walk. She reports enduring daily pain at work and a typical pain score of 7/8 out of 10. On 2 days, when the pain reached a 10 and her "feet were so swollen she couldn't wear any shoes or walk at all," she had to call in sick. Objective assessment indicated decreased range of motion in the cervical, thoracic, and lumbar spine; decreased range of motion and strength in shoulders bilaterally; and decreased strength of the right lower limb. With the exception of bilateral pedal edema, no other significant swelling was found. Laboratory evaluation revealed significantly elevated levels of the inflammatory biomarkers C-reactive protein (CRP) and erythrocyte sedimentation rate (ESR; Westergren method).

Management

The patient discontinued all disease modifying anti-rheumatic drugs (DMARDs) 2 weeks prior to start of study

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to ensure an extended washout period occurred. She was started on a 28-day regimen of highly purified (99.9%) CBD isolate medium-chain triacylglyceride oil tincture (Figure 1 provides potency analysis). The CBD was administered sublingually at a dose of 200 mg (by 1-mL dropper), 3 times daily. The patient completed the McGill Pain Questionnaire and 36-Item Short Form Survey 1.0 (SF-36) immediately before treatment and on day 28. Confirmatory urine drug testing and blood analysis were performed on the final day of treatment by independent third-party laboratories (Quest Diagnostics and TriCore Laboratories, respectively).

> "Laboratory blood analysis demonstrated decreased inflammatory markers by day 28, further substantiating the patient's self-reported improvement from a biochemical perspective."
> *—Christian Shaw, MD, PhD*

Follow-Up

Significant improvement of pain and mobility-related symptoms was reported within 72 hours of treatment, reaching a maximum therapeutic effect by day 10. Symptoms related to mood (decreased anxiety, increased sense of well-being) continued to improve up to day 21 of treatment and remained increased until day 28. McGill Pain score decreased from 52 of 78 pretreatment to 25 of 78) on day 28 (Tables 2–4). SF-36 scores improved considerably across all 9 health domains (Table 4).

Pretreatment CRP and ESR values were 4.4 and 48 mg/dL, respectively. At day 28, these values were 2.2 and 39 mg/dL, respectively. Adverse effects of treatment were mild and transient, and were limited to esophageal and stomach irritation after swallowing the CBD tincture.

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Table 2. McGill Pain Questionnaire, Section 1: What Does Your Pain Feel Like?

Group #	Descriptor	Pre treatment	Day 28	Net difference
1	Temporal	4	1	3
2	Spatial	1	1	0
3	Punctate pressure	4	2	2
4	Incisive pressure	1	1	0
5	Constrictive pressure	4	2	2
6	Traction pressure	3	1	2
7	Thermal	2	1	1
8	Brightness	4	3	1
9	Dullness	4	1	3
10	Sensory, miscellaneous	4	1	3
11	Tension	3	1	2
12	Autonomic	1	1	0
13	Fear	2	1	1
14	Punishment	2	1	1
15	Affective-evaluative-sensory	2	1	1
16	Evaluative	3	1	2
17	Sensory, miscellaneous	3	1	2
18	Sensory, miscellaneous	2	2	0
19	Sensory	2	1	1
20	Affective-evaluative-sensory	2	1	1

Table 3. McGill Pain Questionnaire, Section 2: How Does Your Pain Change With Time?

Question	Pretreatment		Day 28	
	Response	Points	Response	Points
Which word or words would you use to describe the pattern of your pain?	Continuous, steady, constant	1	Brief, momentary, transient	3

Table 4. McGill Pain Questionnaire, Section 3: How Strong Is Your Pain?

Question	Pretreatment		Day 28	
	Response	Points	Response	Points
Which word describes pain right now?	Excruciating	5	Mild	1
Which word describes it at its worst?	Excruciating	5	Distressing	3
Which word describes it when it is least?	Discomforting	2	Mild	1

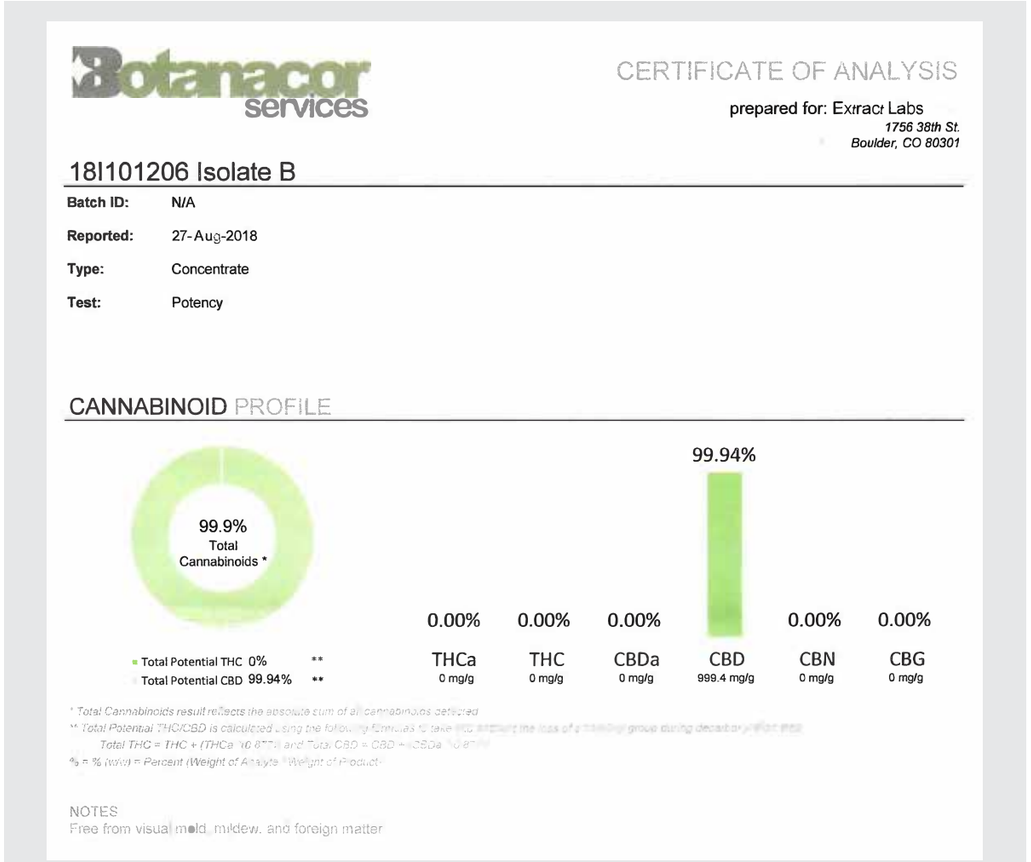

Figure 1. Laboratory testing result of the cannabidiol product.
CBD, cannabidiol; **CBG**, cannabigerol; **THC**, delta-9-tetrahydrocannabinol

Table 5. Scores on the SF-36

Scale	Pretreatment, %	Day 28, %
Physical functioning	15	50
Role limitations due to physical health	0	75
Role limitations due to emotional problems	0	67
Energy/Fatigue	0	70
Emotional well-being	36	76
Social functioning	0	88
Pain	23	90
General health	15	15
Health change	0	100

SF-36, 36-Item Short Form Survey 1.0.

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Conclusion

Since completion of the 28-day CBD trial at the end of December 2018, the patient has been using nothing but CBD for her conditions with much success. Her CBD dose was titrated from 600 mg daily for 2 months, to 400 mg daily for 2 months, and 200 mg daily thereafter. The patient discontinued DMARDs 2 weeks prior to start of study and has not resumed any prescribed medications for rheumatic diseases since that time nor does she have any interest in doing so.

She no longer feels it necessary to see her rheumatologist. Notably, prior to participating in the CBD trial, the patient's rheumatologist intended to start her on a biologic due to her lack of response with conventional DMARDs.

This case demonstrates that a highly purified (99.9%) CBD isolate tincture of 600 mg daily was well tolerated and appeared highly effective in decreasing systemic inflammation while improving quality of life and pain scores on highly validated assessment tools. CBD did not appear to affect the kinetics of existing medications or lead to significant drug–drug interactions.

Discussion

An increasing number of reports and articles on individuals with RA using cannabis to treat their symptoms is available, although systematic studies regarding efficacy in conditions such as RA, and in patients facing multiple autoimmune conditions, are lacking.[1,7-12] In this case study, the patient reported experiencing significant pain relief after 72 hours of high-dose CBD treatment. The patient reported greatly improved mobility and mood experienced by approximately day 10. Multidomain quality-of-life metrics reinforced the findings, indicating marked improvement between assessments taken pretreatment and on day 28 of treatment. Laboratory blood analysis demonstrated decreased inflammatory markers by day 28, further substantiating the patient's self-reported improvement from a biochemical perspective. Finally, confirmatory urine drug testing proved absent for any detectable tetrahydrocannabinol, a considerable finding within itself, as many patients suffering from inflammatory pain disorders are reluctant to use CBD products due to workplace drug testing concerns.[13]

Although this study is limited in its generalizability as an N=1 case report, the results are encouraging and highlight the need for future well-controlled clinical trials to investigate the efficacy of commercially available, federal and state regulatory-compliant CBD products as additional therapeutic options for inflammatory and autoimmune conditions.

Additionally, we call for the implementation of a publicly available database for cataloging clinical outcome data on commercially available and regulatory-compliant CBD products used for medical conditions. This would enable such information to be systematically mined for therapeutically relevant insights, especially in the absence of much needed evidence-based research, to guide clinical decisions on CBD and cannabinoid-based treatment options until the appropriate randomized control trials are completed.

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Dr. Shaw has no financial information to disclose.

Association Is Not Causation in Cannabis Research

By Jahan Marcu, PhD, Editor in Chief

"There is no research on cannabis" is a myth conception frequently encountered. Yet, while stating there is no research on cannabis, many sources are still willing to infer causality and contend that cannabis is both the cause of and answer to various health problems.

A search for "cannabis" on the Web of Science yields more than 100,000 articles; thus, the first part of our mythic tale is a nuanced misconception. Although it is true that cannabis research in the United States is restricted, it would take a lifetime to read all the studies published over the past 100 years. The studies that have been approved are largely observational studies and case reports (Figure). Thus, they are limited due to lack of control and the potential influence of confounding variables, and typically are not appropriate for the purposes of inferring causation.[1] However, these studies are useful as foundational information, hypothesis generation, and when enough of them exist around a particular subject, the data can be mined to shed light on potential causal relationships.

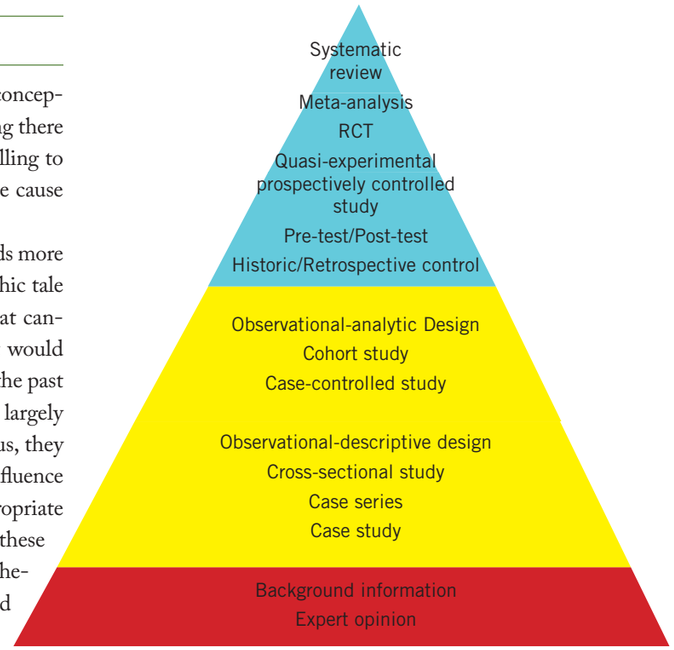

Figure. Studies on cannabis are primarily observational; limitations include lack of control and confounding variables.

> "A handy strategy for navigating cannabis and hemp claims is to mentally replace all references to causal effects with references to associations."
> —*Jahan Marcu, PhD*

Due to the nature of observational studies, much of the data presents as associations or correlations with cannabis. So, event A and event B can be linked to each other, but not causally. For example:

"*Case in point: Are you aware that there's a 95% correlation between cheese sales and the number of people who've strangled themselves by their own bed sheets in the past 10 or 20 years? There's also the classic example that links ice cream sales and drowning. These examples may demonstrate an association or link but perhaps are better explained by secondary correlations. …*

One can say that coffee causes people to be jittery if they drink too much. But no one contends that drinking a cup of coffee will give you attention-deficit hyperactivity disorder (ADHD). Similarly, too much THC, while not fatal, can trigger transitory anxiety or paranoia, but that doesn't mean THC causes mental illness. If a drug immediately triggers an experience or has an effect that mimics the symptom of a disease, it doesn't necessarily mean that the drug causes that disease."[2]

Many sources confuse association with causation when assessing the risks and benefits of cannabis. A handy strategy for navigating cannabis and hemp claims is to mentally replace all references to causal effects with references to associations. Causal questions in an observation study are difficult to formulate; hence, randomized controlled trials provide more experimental control and can infer causality. An observational study cannot prove causation unless painstakingly designed to do so.

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