

## CASE REPORT

# Hibiscus Tea, Hormone Balance, and Thrombosis: A Case Report

Deirdre Campbell, MS; Samara Bates, MS; Alnessa Hickmon, DC, MS, CPT

### Abstract

An otherwise healthy and active 42-year-old woman, undergoing In-Vitro Fertilization (IVF), developed a deep vein thrombus (a potential side effect of IVF) in her right lower leg after discontinuing the consumption of hibiscus tea. Hibiscus tea contains phytoestrogens which

may affect hormone balance - on the one hand reducing the risk of deep vein thrombosis (DVT) and on the other, interfering with the potential success of IVF-related hormone treatments.

**Deirdre Campbell, MS; Samara Bates, MS; Alnessa Hickmon, DC, MS, CPT;** Department of Nutrition, Maryland University of Integrative Health (MUIH), Laurel, Maryland.

Corresponding author: Deirdre Campbell  
E-mail address: [dcampbell@muih.edu](mailto:dcampbell@muih.edu)

### Introduction

Hibiscus sabdariffa (*H. sabdariffa*), often prepared as a tea, contains phytoestrogens which may create hormone imbalances.<sup>1</sup> This hormone imbalance may inhibit coagulation<sup>2</sup> and may lower the risk of Deep Vein Thrombosis (DVT). The same phytoestrogens which may inhibit DVT may also interfere with the hormone therapy required for In-Vitro Fertilization (IVF). Hormones play an integral role in conception, whether occurring naturally or as a part of Assisted Reproductive Technologies (ART). At every step of IVF, (from usurping control of the menstrual cycle, ovarian stimulation, uterine lining thickening, egg retrieval and implantation), a delicate hormonal balance must be maintained.

A registry of patients with venous thromboembolism (RIETE) found that there was a higher risk of thrombosis in women who were unsuccessful in their ART attempts compared with those who were successful.<sup>3</sup> There are many inherited and/or acquired risk factors for DVT development including, but not limited to: past history of DVT, injury, obesity, smoking, iatrogenics, immobilization, hypertension and hypercoagulability.<sup>4</sup> Hormone therapy associated with IVF, including the estrogen surges required for ovarian stimulation, can increase coagulability thus increasing the risk of DVT.<sup>5</sup>

Clinical research has revealed the ability of hibiscus tea to lower blood pressure.<sup>6</sup> In a review of both animal

and human studies, *H. sabdariffa* tea was found to be 'as effective at lowering blood pressure as the commonly used blood pressure medication Captopril'.<sup>7,8</sup> In vivo studies have shown that *H. sabdariffa* consumption on a regular basis can significantly reduce systolic and diastolic blood pressures, cause vasodilation and decrease heart rate. Remarkably, it has also shown 'antiplatelet but no thrombolytic activity in-vitro'.<sup>9</sup> In this case report, a 42-year-old woman developed a DVT after discontinuing the consumption of hibiscus tea during IVF.

This case report was prepared following the CARE guidelines (Riley, 2017).<sup>10</sup>

### Timeline

#### 2018-01-21

Began IVF oral hormones. Patient began drinking 20 oz of hibiscus tea daily.

#### 2018-03-03

Began IVF injectable hormones. Patient continued drinking 20 oz of hibiscus tea daily.

#### 2018-03-18

IVF cycle halted due to large cyst development. Ovarian cyst draining. Patient stopped hibiscus tea.

#### 2018-04-14

Began IVF oral hormones without resuming hibiscus tea consumption.

#### 2018-05-10

Suspected DVT. Calf pain. Placed on crutches and sent to the ER which diagnosed a right calf thrombus in the peroneal vein with no extension into the popliteal vein. (Rx: Lovenox)

#### 2018-05-15

Final Visit: Acute embolism and thrombosis of other deep vein of right lower extremity. Stopped IVF hormones. (Rx: Xarelto replaced Lovenox)

## Narrative

In 2016 a forty-year-old female began trying to conceive. This involved five rounds of intracervical insemination (ICI) followed by four rounds of intrauterine insemination (IUI), augmented by Clomiphene - an oral, ovarian stimulatory medication. None of these attempts resulted in pregnancy. The patient's reproductive endocrinologist, noting the patient's risk factors (age, travel, anxiety, blood pressure, weight gain), recommended IVF and a plan was developed.

In January 2018, the patient began IVF (cycle one) taking oral hormones to regulate her menstrual cycle and prepare her body for ovarian stimulation. The patient also began drinking 20 oz. of hibiscus tea daily as self-treatment. Injectable hormones began in March 2018 and were halted when a large left ovarian cyst was discovered. This cyst was subsequently drained, and the patient discontinued drinking hibiscus tea at this time. IVF oral hormone therapy (cycle two) began without hibiscus tea resumption.

Approximately 1.5 weeks after resuming hormone therapy, the patient noticed continuous cramping in her right calf, which was initially thought to be related to travel and dehydration. Two weeks later the patient completed a half marathon and noticed a 'pins and needles' feeling in her right foot that progressed to complete numbness, below the knee, by the end of the race. The following week, the patient noticed hyperhidrosis, increased heart rate and increased pain in her right lower leg. When she began having difficulty walking due to unbearable leg pain, she went to the emergency room (ER). The ER confirmed that there was a right peroneal DVT with no extension into the popliteal vein and she was given a subcutaneous dose of Lovenox (a 'pregnancy-friendly' anti-coagulant). As a subsequent hematology evaluation found no intrinsic clotting disorders or prior DVT diagnosis, the current DVT was attributed to the exogenous IVF hormones. IVF was discontinued and she was switched to the anti-coagulant Xarelto.

## Discussion

There are over three hundred species of hibiscus. *H. sabdariffa*, commonly known as Roselle, has medical applications and contains minerals, carotene, vitamin C, organic acids, and amino acids.<sup>11</sup> *Hibiscus sabdariffa* is generally regarded as safe, particularly when consumed as a tea. Research suggests that it may decrease proinflammatory cytokines and be useful as an adjunctive therapy for the management of inflammation and related conditions: cardiovascular disease, wound healing, and possibly cancer.<sup>12</sup> A double-blind, randomized control trial showed that *H. sabdariffa* could significantly decrease blood pressure.<sup>13</sup> It might be helpful to conduct a study using the Well's criteria and D-Dimer biomarker prior to and after *H. sabdariffa* use during IVF cycles would provide further insight.

This case study points to a possible connection between this patient's hibiscus tea consumption and DVTs associated with IVF therapy. Whereas there may be a connection between the DVT prevention (via decreased blood pressure and coagulability), there may also be a connection to the ineffective IVF hormone treatment. Research shows that *H. sabdariffa*'s phytoestrogens have an efficient estrogen-binding capability.<sup>14</sup> (Laskar, 2023) These phytoestrogens compete with estrogen therapy, nullifying the intended effects of IVF's ovarian stimulation. In addition to this competitive binding, the phytoestrogens can also function as an 'emmenagogue', and this is inhibitory to the goals of IVF.<sup>15</sup>

## Conclusion

Hibiscus sabdariffa, often consumed as a tea, has medical effects. This case report highlights the potential benefits (decrease in risk of DVTs) and risks (interference with IVF-related hormone therapy) associated with consuming hibiscus tea. The authors recommend that more research is needed to properly identify mechanisms of action for prevention and biomarkers for predisposition. This case report has limitations which includes the lack of specific information regarding the correlation between hibiscus tea consumption and the risk of DVTs. Specific research from basic science to clinical, would better clarify the role of *Hibiscus sabdariffa* prepared as a tea, DVTs, and hormone therapy, particularly during IVF.

## Patient Perspective

I've always wanted to be a mother and Assisted Reproductive Technology (ART) seemed better than living with the regret of not having tried to conceive. Even though I had some of the risk factors associated with ART, I considered myself relatively healthy and active. It gave me peace of mind to drink hibiscus tea while undergoing IVF, but I did not know that it could affect my hormone levels.

I felt devastated when I was told that my first cycle of IVF had to be stopped one day before egg retrieval, especially after finding out that hibiscus tea may have played a role. I decided I would do only what I was instructed to do for the second IVF cycle. Unfortunately, this cycle also ended abruptly. This time it was due to a DVT.

Even though I live with the fear of DVT recurrence and the disappointment that IVF is no longer an option, I'm grateful for the medical monitoring and medications that helped save my life.

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