

## Herbal Teas and Thrombocytopenia: A Curious Case of Yellow Dock and Burdock-Induced Thrombocytopenia

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### ABSTRACT

Immune thrombocytopenia (ITP) is a bleeding disorder characterized by a decreased number of platelets. It is an immune system-mediated condition, with formation of antibodies against a structural platelet antigen. Although the pathogenesis remains elusive, primary disease is idiopathic and comprises 80% of cases. However, quite a few secondary causes have been established including *Helicobacter pylori*, varicella-zoster virus and cytomegalovirus. A few cases with an incidental association with herbal medications have been reported, but this causality has not been studied in detail.

Here we present the case of 38-year-old African-American woman who presented with symptomatic thrombocytopenia, with a platelet count of 5 K/ $\mu$ l 1 week after she had consumed herbal tea containing *Rumex crispus* (yellow dock) and *Arctium lappa* (burdock). The association between unstudied herbs and ITP needs further research, given the widespread use of these substances and ongoing public uncertainty about their benefits.

### LEARNING POINTS

- Over-the-counter herbal products marketed as having beneficial effects are not always harmless and can have clinically significant side effects.
- When investigating the causes of thrombocytopenia, physicians should be aware of and search for this rare cause.
- Treatment for herbal tea-induced thrombocytopenia is the same as for immune thrombocytopenia (i.e., steroids and platelet transfusion if there is actively bleeding).

### KEYWORDS

Herbal tea, thrombocytopenia, yellow dock, burdock

### INTRODUCTION

Herbal teas are popular in Asia, particularly in China. They are generally associated with beneficial health effects because of their antioxidant properties. However, little is known about the composition and side effects of various herbal teas. We present the case of a 38-year-old African-American woman who consumed a cleansing tea containing burdock and yellow dock. *Rumex crispus* (yellow dock) is a flowering plant belonging to the Polygonaceae family. Its roots contain iron so it is frequently used in Western herbal medicine as a cure for anaemia, while the leaves have laxative as well as antitussive properties. Burdock is a popular constituent of traditional Chinese medicine (TCM)

and is believed to have antioxidant and detoxification properties<sup>[1]</sup>. Our patient presented to us with a platelet count of 5 K/ $\mu$ l. All apparent causes of thrombocytopenia were ruled out. We attributed the low platelet count to the consumption of the herbal tea. The only reasonable diagnosis for our patient was immune thrombocytopenia (ITP). With this case report we emphasize that health professionals should consider over-the-counter, seemingly harmless products intended for daily use while investigating such cases.

## CASE DESCRIPTION

Our patient was a 41-year-old obese African-American woman with no past medical history who was sent to the emergency department after her primary medical physician noted a platelet count of 5 K/ $\mu$ l. The patient had been in her usual state of health 10 days prior to presentation when she consumed a 'cleansing herbal tea' bought online from an unknown website. The tea contained the herbs yellow dock and burdock. Two to three days later she noticed some skin changes which she described as red marks on her arms followed by similar marks on her legs and chest. The day after she noticed this, she attended her dentist who saw tiny pinpoint haemorrhages on her oral mucosa and advised her to consult her primary medical doctor who ordered blood work and found a platelet count of 5 K/ $\mu$ l, which was associated with mild weakness and fatigue. The patient denied smoking, alcohol intake, illicit drug use, any manifest bleeding from mucosal surfaces or gingivae, shortness of breath, generalized malaise, unprotected sex, any new medications, recent travel or any new lumps on her body. She endorsed heavy menstrual bleeding but that was not unusual as it had been occurring for the past few months.

On physical examination, she was noted to have some healing bruises over the anterior surfaces of both legs and some petechiae over all four extremities. She had a BMI of 39.9.

The initial complete blood count showed a white blood cell (WBC) count of 2.5 K/ $\mu$ l, platelets 5 K/ $\mu$ l, and haemoglobin 11.8 g/dl with MCV 85.5 fl and RDW 13.5%. A urine drug screen, HIV, hepatitis panel, anti-C3d and COVID-19 were all negative. Bilirubin and liver function tests were normal. Peripheral smear showed large platelets but no schistocytes. ANA was negative.

The patient was given 1 unit of platelets which improved the count to 49 K/ $\mu$ l and was started on 40 mg of dexamethasone. On day 3, the platelet count had improved to 143 K/ $\mu$ l, and WBC count to 7.2 K/ $\mu$ l. She was followed up at our cancer centre after discharge. She remained asymptomatic, maintained a normal platelet count thereafter and had unremarkable blood work.

## DISCUSSION

Immune thrombocytopenia is an acquired autoimmune haemorrhagic disorder. It may account for about one-third of all haemorrhagic diseases. Severe complications include intra-cranial and visceral bleeding, especially in elderly patients<sup>[2]</sup>.

Primary thrombocytopenia is defined as isolated thrombocytopenia (platelet count < 100 K/ $\mu$ l) in the absence of possible causative agents<sup>[1]</sup>. When a known agent causes symptoms, it is defined as secondary thrombocytopenia, with hepatitis C virus, cytomegalovirus, Epstein-Barr virus, HIV, varicella-zoster virus, *Helicobacter pylori*, various vaccines, and some drugs commonly implicated<sup>[3,4,5]</sup>.

Herbal medications are freely available on the market and increasingly used worldwide. Although perceived to be harmless, severe adverse events such as hepatic injury, renal injury, allergic skin reactions, hypertension and bleeding have been reported<sup>[6]</sup>.

Although drug-induced thrombocytopenia is a well-known entity and many articles on it have been published, thrombocytopenia associated with dietary supplements and herbal remedies, other than that associated with quinine-containing substances, has not been well documented in the literature<sup>[7]</sup>. The paucity of reports on the adverse effects of herbal medicines can be attributed to the lack of awareness of these events, and hence physicians do not routinely ask relevant questions during history taking and patients not feel the need to report herbal medicine consumption.

In a study from Royer et al., cow's milk, cranberry juice, Jui (a Chinese herbal tea), *Lupinus termis* (a North African bean) and tahini (pulped sesame seeds) were reported to have a definitive casual association with thrombocytopenia, while bajiaoian (a potentially lethal Chinese herbal tea known better in Western medicine as podophyllum), mourning cypress, cow's milk (again) and vitamin A were considered to have a probable causal association. In addition complete thymic formula, chromium picolinate, *Echinacea pallida*, St. John's wort and nicotinamide were thought to have a possible association<sup>[8]</sup>. A case report of a drink containing green tea, ginseng and guarana causing ITP has also been published<sup>[1]</sup>.

*R. crispus*, commonly known as yellow dock, is a perennial herb belonging to the Polygonaceae family of plants. It contains anthraquinone glycosides, tannins, oxalates, iron and other minerals. It is known to have laxative, cholagogue and tonic properties. Animal studies have also shown it has anti-cancer and bone protective effects. The anti-cancer properties are due to free radical scavenging, and DNA and protein protective properties, while the bone protective effects are secondary to inhibition of osteoclastogenesis and induction of osteoblast mineralization<sup>[9]</sup>. Some known side effects of yellow dock are diarrhoea, nausea, stomach cramps, excessive urination, skin irritation, low blood levels of potassium and calcium, and an increased incidence of blood clots.

*Arctium lappa*, commonly known as burdock, is a plant native to Japan. It is used in Chinese medicine as a blood purifier. No clear indication has been identified for its use, but it is believed to have anti-bacterial, anti-oxidant, anti-inflammatory and diuretic properties. The only known side effects are contact dermatitis when applied topically.

Immune thrombocytopenia is treated with glucocorticoids, and if unresponsive, intravenous immunoglobulin, anti-D immunoglobulin and splenectomy. Our patient's platelet count improved after a course of glucocorticoids and the discontinuation of suspected agents.

As per our literature review, no cases of immune thrombocytopenia caused by burdock and yellow dock have been previously published, and hence our case report is the first to describe this possible association.

## CONCLUSION

Herbal medications are commonly used worldwide, yet the adverse effects are under-reported or under-recognized. Healthcare professionals should enquire about the use of these substances during patient interview and consider them in the differential diagnosis when appropriate. Adverse effects associated with these medications should be reported to increase awareness among physicians and the general public.

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