



A Case Report of Lead Poisoning Caused by Traditional Chinese Medicine

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Abstract

Traditional Chinese herbal medicine is widely used for health care worldwide. Chinese herbal medicine is assumed to be mostly safe, however, the potential toxicity and side effects should not be ignored. Here, we report a case of lead poisoning caused by using of homemade TCM. A 44-year-old man was admitted to our hospital for abdominal pain. Several diseases, including acute pancreatitis and mechanical intestinal obstruction, were suspected, but all were excluded due to the unremarkable laboratory tests results. Peripheral blood smear and bone marrow aspirate showed basophilic stippling of erythrocytes, high blood lead level (50.3 µg/dL (normal range <10 µg/dL), which confirmed the lead poisoning. Also, his clinical picture, such as anemia and abdominal disorders, was consistent with lead poisoning. A detailed medication history revealed the lead source was the homemade TCM which was used for herpes zoster. After treating the patient with chelating therapy, his hemoglobin was normalized and lead level in the blood decreased.

Keywords: Lead poisoning; TCM; Abdominal pain

Introduction

Traditional Chinese herbal medicine is widely used for primary health care all over the world, including skin issues, chronic diseases and so on [1]. Chinese herbal formulations are considered to be mostly safe; however, their potential toxicity and adverse side effects cannot be ignored [2]. The most common Traditional Chinese Medicine (TCM) toxicity results from homemade herbal formulations or mislabeling of plant materials [3]. In addition, the contamination of herbal ingredients with fungal toxins, microorganisms, pesticides, and heavy metals may also cause safety concerns. Particularly, lead poisoning from TCM remains a serious issue [1]. The first case of lead poisoning caused by Chinese herbal medicine Cordyceps was reported in 1996 [4]. Lead poisoning is rarely encountered in emergency departments. However, occupational and nonoccupational exposures to lead occur worldwide [5]. Patients often present with nonspecific symptoms and signs such as abdominal pain, fatigue, anorexia, constipation, headache, and insomnia [6,7]. In recent decades, there have been frequent reports of lead exposure from the storage of TCM in lead-containing bases or the addition of lead pastes to TCM. Diagnosis of TCM-related lead poisoning is still a challenge and often delayed due to the atypical manifestations of lead poisoning and the low awareness of possible TCM-related lead exposure [8]. We report here a case of 44-year-old male patient with lead poisoning caused by long-term use of homemade TCM, his recurring abdominal pain and anemia was initially misdiagnosed as nonspecific abdominal pain and acute porphyria.

Case Presentation

A 44-year-old male patient was admitted to our hospital due to abdominal pain, nausea and vomiting for 4 days and aggravated for one day. The paroxysmal pain localized around the umbilical and epigastric region. The local community hospital conducted endoscopy; the results showed chronic superficial gastritis. Therefore, the patient was given omeprazole, teprenone, cefamandole and amoxicillin. However, his abdominal pain was not significantly relieved after treatment. One day ago, the abdominal pain was paroxysmal aggravation, mainly in the whole abdomen and radiated to the lower back, accompanied with profuse sweating. The symptoms were not relieved after the treatment given by local community hospital. For further diagnosis and treatment, he was sent to our hospital. Upon physical examination, his vital signs were stable. He had slight whole abdominal tenderness and the tenderness of left lower quadrant was obvious, no rebound tenderness, Murphy's sign was negative, no tenderness at McBurney's point, no renal percussive pain.

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Table 1: The laboratory results before treatment.

Items	Results		Normal range
White blood cell count ($10^9/L$)	10.5	↑	3.5-9.5
Red blood cell count	3.04	↓	4.3-5.8
Neutrophils ($10^9/L$)	6.78		2.5-7.5
Hemoglobin (g/L)	101	↓	130-175
Hematocrit (%)	27.8	↓	40-50
MCHC (g/L)	363	↑	320-360
PLT ($10^9/L$)	242		100-300
C-reactive protein (mg/L)	<0.9		0.068-8.2

Patient denied the history of 'hepatitis, tuberculosis', 'hypertension, coronary heart disease, hyperlipidemia', 'major surgical trauma and blood transfusion', 'penicillin allergy', 'food allergy'.

The laboratory results showed he was mild anemic, with

normocytic anemia, no remarkable findings were observed in other laboratory results (Table 1). Total abdominal Computed Tomography (CT) showed multiple high-density lesions in the colon, especially in the ascending colon. The ileocecal valve was thickened, and the target sign changed slightly, suggesting there were inflammatory lesions (Figure 1). Thus, the patient was given ceftriaxone for anti-infection, phloroglucinol for antispasmodic and pain relief. However, the symptoms remained.

During hospitalization, the patient had poor appetite and slept for most of the time. The abdominal pain aggravated, but the inflammatory indicators and CT examinations were still normal, which excluded acute abdominal diseases, including peptic ulcer, mechanical intestinal obstruction, and appendicitis. The exclusion of differential diagnosis was listed as below:

(1) **Peptic ulcer:** The abdominal pain was non-chronic, non-periodic, arrhythmic epigastric pain, and no ulcer lesions were found in gastroscopy.

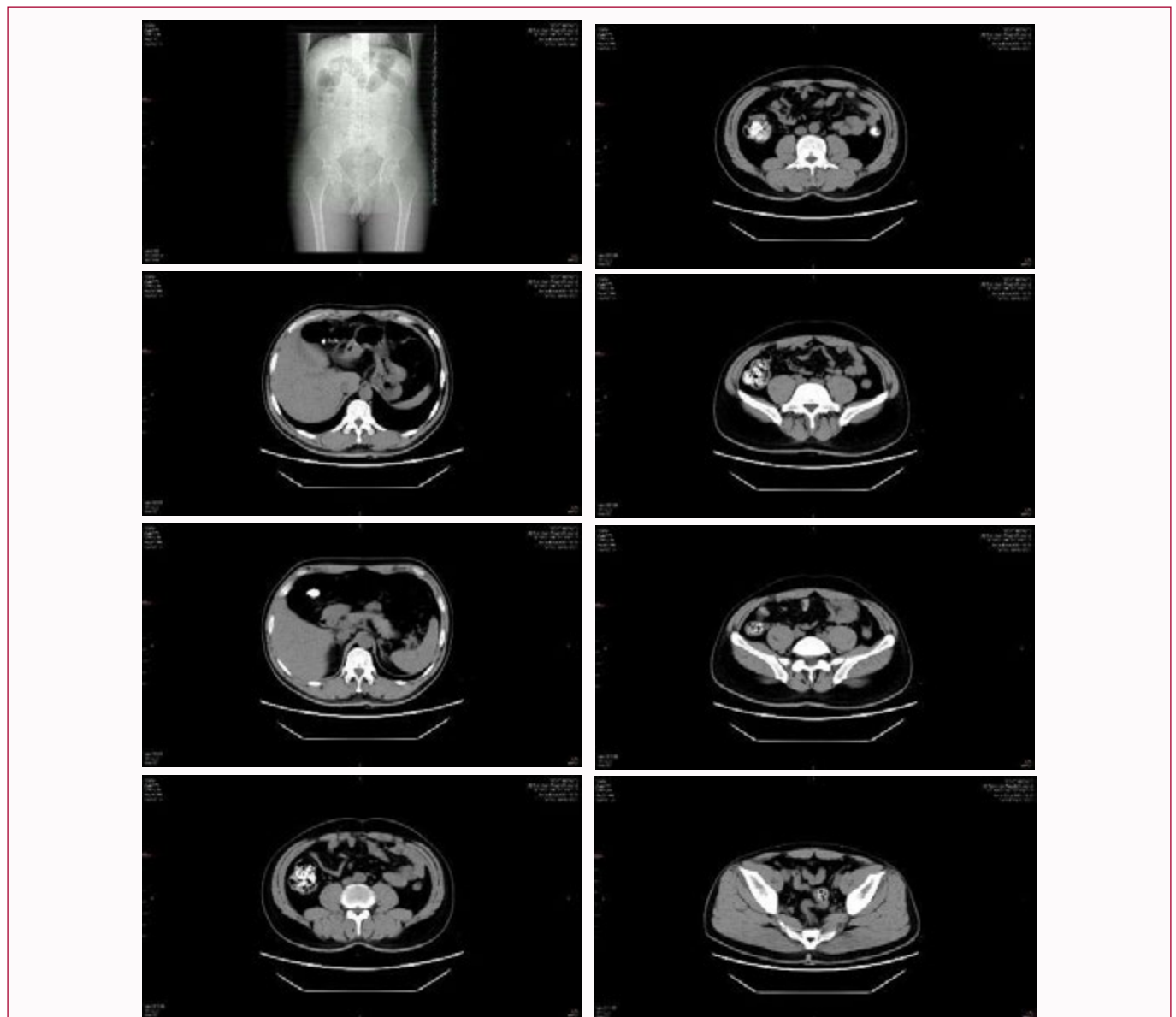
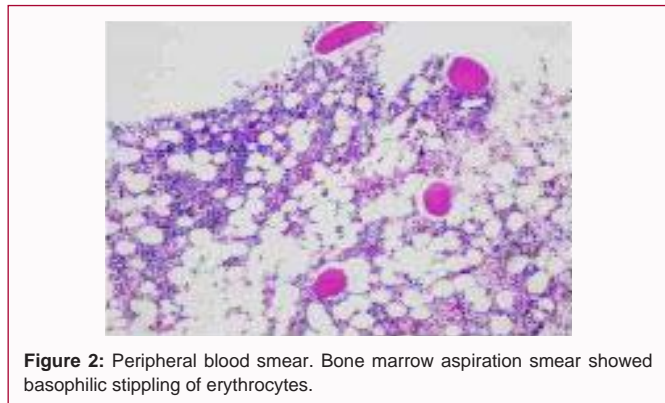


Figure 1: Total abdominal Computed Tomography (CT). CT showed multiple high-density contents in the colon, especially in the ascending colon, the ileocecal valve is thickened, and the target sign changes slightly, suggesting inflammatory lesions.

Table 2: Blood-lead level before and after treatment.

	Blood-lead level ($\mu\text{g}/\text{dL}$)
Before treatment	50.3
After treatment	8.9

**Figure 2:** Peripheral blood smear. Bone marrow aspiration smear showed basophilic stippling of erythrocytes.

(2) **Acute pancreatitis:** No finding in CT and the normal level of Amylase and lipase in serum.

(3) **Mechanical intestinal obstruction:** Empty colon was observed by colonoscopy.

(4) **Kidney stones and abdominal allergic purpura:** Not fully consistent with his symptoms.

Taken all together, the etiology remained unclear. Further medical history indicated the patient took some homemade TCM for over one month to treat herpes zoster. Bone marrow aspiration smear showed basophilic stippling of erythrocytes (Figure 2), physical examination revealed Burton's lines over the maxillary right lateral incisor and canine gingival papilla, which was the classical feature of lead poisoning. Moreover, blood examination showed his blood lead level reached $50.3 \mu\text{g}/\text{dL}$ (normal $<10 \mu\text{g}/\text{dL}$). Therefore, patient was given calcium sodium and lead etabonate treatment, supplemented with easy-to-dose calcium acid, tramadol for pain relief, good storage support and supplementation of trace calcium acid for symptomatic symptoms. His blood-lead level declined to normal range (Table 2), all signs and symptoms were clear, and all laboratory findings returned to normal.

Discussion

Abdominal pain is a common reason for patients to attend hospital. It is believed that 20% to 40% of abdominal pain etiologies remained un-known at the time of discharge [9]. Abdominal pain caused by systemic diseases is easy to ignore, such as chronic poisoning, diabetic ketoacidosis, and allergic purpura. The final correct diagnosis depends on the comprehensive analysis of a detailed medical history, physical examination and laboratory test results. In this case, lead poisoning was diagnosed due to the medical history, peripheral blood smear result and blood-lead level.

Lead poisoning has been a public health problem for a long time. Lead is mainly absorbed in the respiratory and digestive tracts [10]. Some reports demonstrated most lead poisoning was caused by traditional Chinese herbal treatments [11]. The patient in this case was also suffering from lead poisoning by self-medication with Chinese herbal medicine, and thus caused abdominal pain.

The symptoms of lead poisoning are non-specific, symptoms of lead poisoning are related to blood-lead levels. This patient's abdominal pain was paroxysmal pain, but with only slight physical signs. The normal features of lead poisoning include abdominal pain, anemia with basophilic stippling of red cells, blue-black gum deposits, and a lead line on joint radiography [3]. This case reminds us that in the face of a patient with abdominal pain, we should not only consider the usual reasons for abdominal pains, but also carefully inquire about the patient's medical history and consider some other rare etiologies, such as lead poisoning.

Conclusion

In conclusion, lead poisoning is not a common cause of abdominal pain in adults, the diagnosis of lead poisoning is often delayed. A detailed medical history taking and physical examination are crucial in early diagnosis and treatment. It is easy to diagnose once lead poisoning is suspected, this case may provide us more clinical experience for diagnosis of lead poisoning and open our minds to treat with patient's unknown abdominal pain.

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