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RESEARCH ARTICLE

AN INTERESTING CASE OF LEAD ENCEPHALOPATHY SECONDARY TO USE OF AYURVEDIC MEDICINE

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Abstract

Ayurvedic medicine consists of herbs that may be intentionally combined with metals, such as lead, mercury, iron, and zinc. ⁽¹⁾These types of medicine are assumed by patients to be safe but unsupervised use can lead to serious health complications. This case illustrates how lead toxicity, which often presents with vague, nonspecific symptoms, can be missed and difficult to diagnose if the exposure to herbal supplements is not recognised. Here authors describe one case of lead encephalopathy as a result of long-term ayurvedic medication intake. This case illustrates a 72-year old female presented with altered sensorium, seizure, weight loss and abdominal pain. Her MRI brain was normal and EEG was suggestive of mild diffuse encephalopathy; She was found to be anemic; her peripheral smear demonstrated basophilic stippling hence blood lead levels were sent; they were found to be very high. Her Ayurvedic medicine sent for analysis found it contained potentially harmful levels of lead. She responded to chelation therapy with oral succimer with complete resolution of clinical symptoms and anemia.

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Introduction:-

Case Presentation

A 72-year-old female known case of diabetes mellitus for 8 years came to the emergency department with decreased responsiveness, altered sensorium for three to four days with history of generalized weakness, loss of appetite, weight loss, diffuse intermittent abdominal pain for approximately four months.

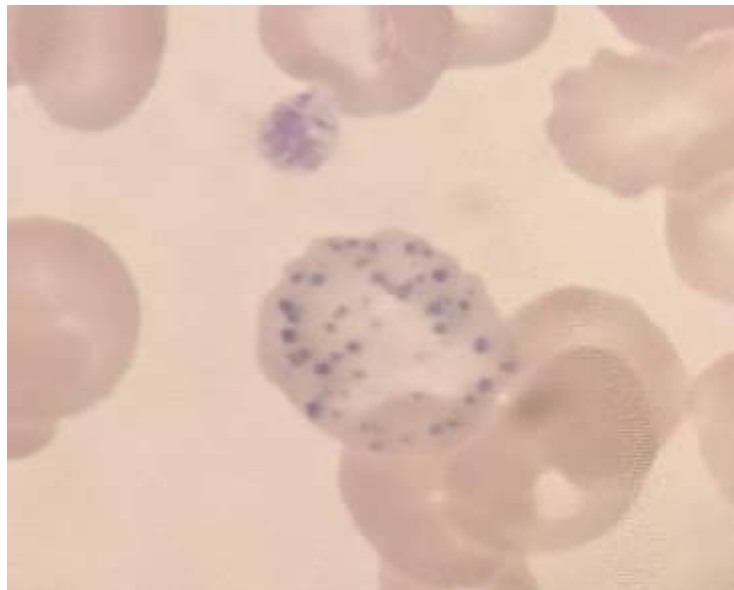
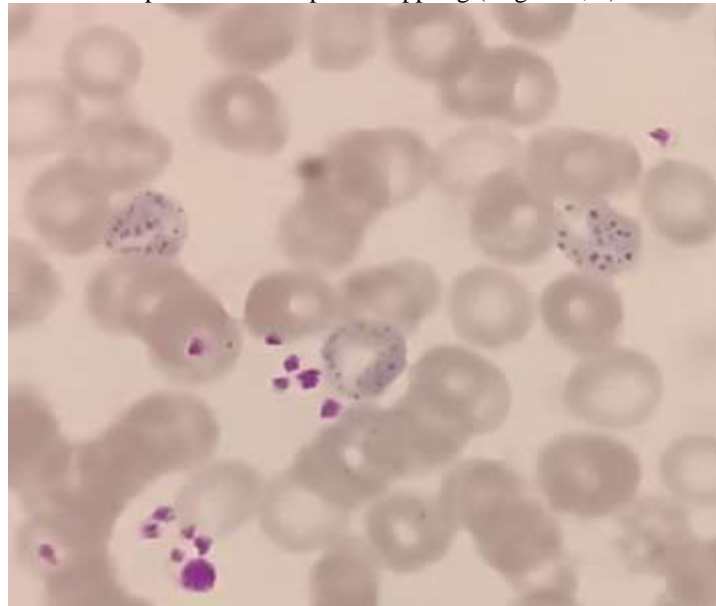
She gave a history of COVID infection four months back, did not require hospitalization and was treated symptomatically. Her vitals were stable and lab parameters were normal except for anemia. She has been on allopathic medication for diabetes for the last eight years but for the last three years she has stopped allopathic medicine and was taking only Ayurvedic medicines. On general examination she had pallor her complete hemogram revealed hemoglobin of 7.3 g/dl, MCV 75.8 fl, MCH 23.2 pg, MCHC 30.7 g/dl ESR was 15, reticulocyte count was 12.8%, her serum iron was 64.5 micrigram/dl with microcytic hypochromic picture. Her serum osmolality, haptoglobin and renal parameters were in normal range. Her MRI with contrast examination was normal with no restricted diffusion, no evidence of acute infarct and leptomeningeal enhancement. Her CSF study

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was normal. EEG was suggestive of mild diffuse encephalopathy .Scan Report was suggestive of minimal thickening of GE junction hence endoscopy done which was suggestive of mild antral gastritis .

Peripheral blood smear demonstrated prominent basophilic stippling (Figure 1, 2)



Within the erythrocytes, which prompted measurement of a blood toxin analysis which revealed 105 $\mu\text{g/dL}$ lead levels in blood. All her ayurvedic medications were stopped and sent for analysis .In analysed sample lead were found in significant quantity (20.73mg/kg) patient was instructed to complete a nineteen day course of oral chelation with dimercaptosuccinic acid (DMSA), 10 mg/kg three times daily for five days, then 10 mg/kg twice daily for fourteen days.

After the completion of the nineteen day course, she was advised to follow up with CBC, SGOT , SGPT and repeat lead levels in blood. Her serum lead level was declined to 73mcg/dl , she was advised to take another course of Succimer.

Patient reviewed after the completion of second course she improved significantly and her Hb had gone up to 11.5 g/dL

Discussion:-

Rasashastra is a subdivision that deals with the study of metal and mineral. Metals are used as adjuvants to the primary herbal therapy and it is estimated that roughly 35–40% of the ~6000 medicines in the Ayurvedic formulary intentionally contain at least one metal.⁽²⁾ Saper et al concluded that 20% of Ayurvedic herbal medicine products produced in South Asia had potentially toxic levels of lead, mercury and or arsenic. Using X-ray fluorescence spectroscopy, the authors estimated a median concentration of 40 µg/g of lead.⁽³⁾ Excess levels of lead leads to production of free radicals which subsequently causes oxidative damage of cellular components including DNA and cell membranes⁽⁴⁾. Lead results in denaturation of enzymes such as delta amino levulinic acid dehydratase (ALA-D) and ferrochelatase which are important for heme synthesis. Inhibition of pyrimidine 5'-nucleotidase can prevent the degradation of ribosomal RNA in red blood cells leading to basophilic stippling on a peripheral smear, a classic finding which can be apparent at BLLs of ~50 µg/dl.⁽⁵⁾

In 1991 the Centers for Disease Control and Prevention lowered the definition of a safe blood lead level to <10 mcg/dl of whole blood which was 25 mcg/dl before, though lead intoxication without occupational exposure is rare, accounting for <5% in the USA.⁽⁶⁾ Complementary and alternative medications, in particular Ayurvedic herbal medications, have been implicated in multiple cases of lead poisoning in India and internationally.⁽⁷⁾ The symptoms of lead toxicity usually appear at a BLLs of 40-60 µg/dL in adults⁽⁸⁾. To date, there are no clinical trials that define the optimal management although it is generally accepted that the first step is to identify and remove the source of the exposure. Chelation therapy should be initiated when the BLL is > 80 µ g/dL in asymptomatic and > 50 µ g/dL in symptomatic adults and should be continued until the BLL is < 50 µ g/dL.⁽⁹⁾ BLL is the most convenient and readily interpretable of available lead biomarkers. However it is a good estimate of recent lead exposure, BLL may be in equilibrium with lead stored in bone and as such underestimate body burden. As the BLL falls as a result of chelation, it may rise again weeks later as lead is mobilized from bone. As such, it is important to measure BLL after seemingly effective treatment.

Conclusion:-

It is axiomatic that effective management of lead toxicity requires identification and mitigation of the exposure. An important lesson learned from this case is that prevention, recognition, and treatment of lead toxicity requires a high index of suspicion. No therapeutic agent ingested by humans can be considered completely safe and both risks and benefits should be considered. Enhancing public awareness about the harmful effects of the seemingly innocuous herbal supplements is essential for the prevention of heavy metal poisoning.

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