INTRODUCTION

Lead is a pervasive metal with unique properties such as softness, high malleability, ductility, low melting point, and resistance to corrosion which has been used by mankind for many years [1]. The hazard to public health from lead continues to be a matter of concern. It is one of the most serious environmental poisons among the toxic heavy metals all over the world. People are using lead for many years because of its wide variety of applications as building materials, pigments, pipes and in the manufacture of kitchen utensils, trays, and other decorative articles. Human exposure to lead is from innumerable sources, and the major sources are contaminated air, food, dust, soil, and water; use of certain products containing lead such as lead-soldered cans, traditional practices such as herbal or folk remedies, lead bullets, jewelry, cosmetics, artisan ceramics, environmental emissions containing lead production; through occupations such as motor vehicle assembling, lead smelting, refining, alloying and casting, battery manufacturing and recycling, lead paint, jewelry, welding and pottery [4,5]. Lead poisoning is seen in all age groups, especially in adults working in lead-based industries. We report the case of a 28-year-old man working in an unorganized lead-based manufacturing unit admitted with the complaints of giddiness, excessive tiredness, pain in the upper abdomen, decreased appetite, excessive body pains, increased sweating, and oliguria. Investigations carried out during the admission showed hemoglobin levels of 8.5 g/dl and blood lead level (BLL) of 115 μg/dl. The patient was subjected to chelation therapy. After repeated course of chelation therapy, he has shown the signs of improvement. The paucity of a safe workplace and awareness among workers results in high BLLs. Therefore, education and awareness related to lead hazards is considered necessary.

Case Report

A 28-year-old male admitted to the hospital with complaints of giddiness, excessive tiredness, pain in the upper abdomen, decreased appetite, excessive body pains, increased sweating, and oliguria. He is a smoker, occasional alcoholic, married, and no significant allergic history was found. Occupational history revealed that he had been working in an unorganized lead-based manufacturing unit for 4 years. On examination, his pulse rate was 82/minute and blood pressure was 124/60 mmHg. Results of various laboratory investigations were normal except hemoglobin - 8.5 g/dl (normal range: 14-16 g/dl), blood urea-62 mg/dl (10 μg/dl), serum creatinine - 1.7 mg/dl (0.6-1.2 mg/dl), zinc protoporphyrin (ZPP) - 126 μg/dl (up to 40 μg/dl), and blood lead level (BLL) - 115 μg/dl (acceptable range 10 μg/dl). Peripheral smear revealed microcytichypochromic anemia. On the basis of these findings, the diagnosis of chronic lead poisoning was made.

The patient was advised to change his occupation and treated with three courses of chelation therapy using the chelator D-penicillamine (25-35 mg/kg/days) in divided doses along with supplemental measures. After repeated course of chelation therapy, he showed some signs of improvement. He responded with an improvement in hemoglobin to 12.8 g/dl. The blood level of lead and ZPP before and after chelation therapy was shown in Table 1.

DISCUSSION

In the present study, the patient was unaware of the ill effects of lead and was handling lead without taking any precautions even though they have provided protective equipment, resulted in chronic lead poisoning. Elevation of serum creatinine and blood urea level indicated kidney damage as a result of chronic lead exposure. Several studies explained various effects on the body based on serum lead level which includes teratogenicity when the maternal BLLs are at a concentration of 10-15 μg/dl reduced prostate and seminal function at BLLs of 40-50 μg/dl, neurological symptoms, anemia at a concentration of 40-70 and 50-80 μg/dl respectively, brain and renal damage at serum concentration of 100 μg/dl in adults and 80 μg/dl in pediatrics. Death due to lead poisoning is seen at serum concentration of 125 μg/dl in pediatrics [7,8]. Lead in the body comprises 2% in the blood (1/2=35 days) and 95% in bone and dentine (1/2=20-30 years). Blood lead may remain elevated for years after cessation from long exposure, due to redistribution from bone. Blood lead concentration is the most widely used marker for inorganic lead exposure. ZPP concentration in blood usefully reflects lead exposure over the prior 3 months [9,10]. The toxic effects of lead are majorly due to higher affinity to thiol- and phosphate-containing ligands thereby inhibiting biosynthesis of heme and affecting membrane permeability of major organs such as kidney, liver, and brain resulting in altered functioning and degradation of these tissues. Lead also acts by inhibiting aminolevulinic acid dehydratase thereby blocking the conversion of aminolevulinic acid to porphobilinogen which leads to elevated levels of aminolevulinic acid results in decreased gamma-aminobutyric acid release [11]. The clinical manifestations of lead poisoning; Nervous system include headache, fatigue, ataxia, myalgia, seizures, hallucinations, loss of memory, mental retardation, encephalopathic syndrome; gastrointestinal system are nausea, vomiting, constipation, and metallic taste; reproductive system.
include abnormal spermatogenesis, sterility in males, and miscarriage in pregnant women; hematopoietic system are anemia, elevation in protoporphyrin is usually observed; renal effects include glycosuria, proteinuria, nephropathy whereas systemic and renal hypertension is commonly observed cardiovascular manifestations. Other acute toxicity manifestations include limb, joint pain, and deposition of lead in teeth and bones on chronic exposure [12-14]. Although chelation therapy removes lead from the blood and soft tissues, on discontinuation of treatment, it is redistributed from the bony compartment to the blood [15]. This evidently suggests that the chronic lead exposure requires repeated courses of treatment. The patients undergoing chelation therapy require intensive monitoring throughout the treatment period and BLLs should be estimated at the end of each course, and the subsequent therapy should be based on this determination.

**CONCLUSION**

The paucity of a safe workplace and awareness among workers results in high BLLs. Therefore, education and awareness related to lead hazards is considered necessary. The regulatory bodies should make it mandatory to evaluate and create awareness among public as well as workers in lead-based industries about the ill effects of lead and should insist on regular health checkup to prevent adverse health effects. Furthermore, pharmacy professionals should assist in providing patient education, psychological support, and conducting campaign against lead hazards.

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**REFERENCES**


