

LEAD POSONING IN CHILDREN

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Summary:

Background: Lead is one of the first metals to have served mankind. It was among the earliest metals used by man and was known to the early Egyptians and Hebrews.

Objectives: To study the epidemiology of Lead poisoning regarding age, sex, areas of distribution, type of feeding, clinical manifestations, laboratory findings and the outcome.

Methods: Fifty patients with lead poisoning were studied in Al-Mansour (Children's welfare Teaching Hospital), Medical City, Baghdad, were included in the study.

Results: Forty five (90%) children were under one year of age. Twenty nine (58%) children were males. Forty four (88%) children were from Anbar Governorate. Thirty five (70%) were from rural areas. Six (12%) infants were solely breast fed. Forty (80%) children presented with convulsions. Twenty six (52%) children their haemoglobin levels were (5.1 – 9)g/dl. Basophilic stippling seen in (38%) and urinary delta ALA were raised >4mg/L in all children. Lead lines were seen in (54%) of the children wrist X-rays.

Conclusions: Lead poisoning is a major problem in Al-Anbar Governorate, especially Qaeem region, so infants and children in this area should be screened. Estimation of lead levels at different sites of the river and other water sources, soil, animals, agricultural products and all types of alkoohl. Lead poisoning should be suspected in any infant with unexplained encephalopathy and particularly if resident in Al-Anbar Governorate and all members of the family of the affected baby should be screened for lead poisoning.

Keywords: poisoning, lead, children, Baghdad, Iraq.

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Introduction

Food, water and air contains small amounts of lead.⁽²⁾ The probability of severe symptoms increase with the exposure to lead.⁽³⁾ Sources of lead exposure could be from dust of old houses, multiplayer chips of old paint,⁽²⁾ lead shot and jewelry swallowed and retained in the stomach.⁽⁴⁾ Fumes from burning painted wood and batteries, lead painted toys, soft drinking water conveyed in lead pipes, and Asiatic medicines and cosmetics such as azarcon, alkoohl and surma.^(2,5) Children most vulnerable are toddlers 1 to 4 years of age, pica^(4,6,7) and low socio-economic class.^(6,7)

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PATIENTS AND METHODS:

This study was based on 50 patients admitted to Al-Mansour (Children's welfare Teaching Hospital) for the period from December 1987 to December 1997 with lead poisoning. Their Medical records were studied carefully, regarding age, sex, residence, type of feeding, and the use of alkoohl, clinical presentation. Haemoglobin level, blood film, X-ray of long bones and 24 hours urine collection for the estimation of delta ALA. Apart from clinical manifestations, the diagnosis was made by elevated 24 hours urine delta ALA; anaemia with hypochromia and basophilic stippling increased density with transverse bands at the ends of the long bones on radiological examination (lead lines). Blood lead levels were not done because of technical problems due to sanctions.

RESULTS:

Fifty children with lead poisoning were involved in this study. Their ages ranged from under 3 months to 6 years. (Table 1) Forty five (90%) children were under one year of age, of whom 15 (33%) were <3 months, 12 (27%) were 3 – 6 months, 7 (16%) children were 6 – 9 months and 11 (24%) children were 9 – 12 months age.

Twenty nine (58%) children were males and 21 (42%) were females. Male to female ratio was 1.4:1.

Forty four (88%) children were from Anbar Governorate of whom 18 children were from Qaem district, 10 children were from Hadeetha, 7 from Ramadi, 5 from Heet and 4 children from Aana district.

Six (12%) children were from other Governorates, 3 (6%) children were from Baghdad, 2 (4%) from Salah Eldeen and 1 (2%) child from Babylon. Thirty five (70%) children were from rural areas, 13 (26%) children were from urban areas and 2 (4%) children were not recorded.

The highest annual incidence of lead poisoning were during the years 1993 and 1995 and were 8 and 10 patients respectively.

During the other years, the incidence range from 2 – 6 patients annually. Six (12%) infants were solely breast fed, 6 (12%) were bottle fed, 15 (30%) were bottle and breast fed, 1 child was on breast and diet, 6 (12%) children were on bottle and diet, 4 (8%) on diet only and 12 (24%) not recorded. (Table 2) The clinical presentations were seen in (Table 3).

Forty (80%) children presented with convulsions, 3 (6%) with failure to thrive, 2 (4%) children with abdominal pain and pallor respectively.

Two (4%) children admitted for chest infection and discovered accidentally by the presence of lead lines on radiological examination and 1 (2%) child with constipation.

The haemoglobin levels were <5 g/dL in 2 (4%) children, 5.1 – 9 g/dL in 26 (52%) children and 9.1 – 11 g/dL in 22 (44%) children. Basophilic stippling were seen in 19 (38%) of the children.

Twenty four hours urinary delta ALA was estimated in all children and was raised (>4mg/L) and range (8-28mg/L).

Thirty four (68%) children improved on treatment, 5 (10%) children discharged with sequelae, 4 (8%) children died and 7 (14%) children were discharged by their parents against medical advice. None of these children reported for follow up.

Table 1: Age distribution of 50 children with lead poisoning

Age (years)	No.	%
< 1	45	90
> 1 - 2	1	2
> 2 - 3	2	4
> 3 - 4	0	0
> 4 - 5	1	2
> 5 - 6	1	2
Total	50	100

Table 2: Type of feeding of 50 children with lead poisoning

Type of feeding	No.	%
Breast	6	12
Breast and bottle	15	30
Breast and diet	1	2
Bottle	6	12
Bottle and diet	6	12
Diet	4	8
Not recorded	12	24
Total	50	100

Table 3: Clinical presentation of 50 children with lead poisoning

Clinical Presentation	No.	%
Convulsion	40	80
Failure to thrive	3	6
Abdominal pain	2	4
Pallor	2	4
Accidental diagnosis	2	4
Constipation	1	2
Total	50	100

DISCUSSION:

In this study, 45 (90%) children were under 1 year, and 27 (60%) children were under 6 months of age. The group of highest risk is infants and children 6 months to 5 years of age, through hand to mouth activities and pica^(3,4). In infants under 6 months, lead has been introduced probably through milk, water⁽³⁾, through inhalation from burning batteries^(3,5) or through eye makeup (surma)⁽⁸⁾. In a study in Oman by Woolf (9) on 25 infants with lead poisoning their ages 1 to 8 months (majority less than 4 months old) the source of lead in 20 (80%) infants proved to be a local medication called "bint al dahab". In our country the sources of lead were probably from the use of eye makeup (alkohl) which contains 70% lead and from burning incense sticks (a widely used habit). In this study, the parents of 9 (18%) children were using alkohl as an eye cosmetic. As 45 (90%) children in the study were less than one year of age it is likely that the lead was introduced through inhalation, or through water or milk. Males were more affected than females in a ratio of 1.4:1, probably due to extra care males get in our community, hence more consultations, or due to males being more active and curious. Forty four (88%) children in this study were from Anbar Governorate, of whom 18 (36%) children were from Qaeem district. Thirty five (70%) children were from rural areas. This indicates that Anbar Governorate has a potentially polluted environment, which could be atmospheric, or due to contaminated water, as most of the residence use the river water (Euphrates) for drinking, cooking, and for the preparation of the milk feeds for their infants, which needs further study. There was an increase in the incidence of lead poisoning during the years 1993 and 1995 – the worst period of Sanction, but no conclusive explanation was found. Six (12%) infants were solely breast fed, their mothers were probably suffering from lead poisoning, but were asymptomatic, and needs evaluation. Their water supply (wells or nearby river) needs analysis for lead content, as these sources may be contaminated. Six (12%) infants were bottle fed. Shanon⁽¹⁰⁾ in Boston found that 18% of infants he studies, were exposed to lead through formula milk, prepared with lead contaminated water, and 2% through breast milk due to high maternal serum lead.

Other probable causes for lead poisoning in these breast and bottle-fed infants was Alkohl. Three types of Alkohl are locally used in Iraq, Hajar Mekka, Bint

Elreef and Mahoo, especially in the rural areas as local cosmetics and as a local application in the treatment of delayed healing of the umbilical stump (personal observation). Abdullah⁽¹¹⁾ IS Saudi Arabia in a study on children 10 – 30 months of age, found the major sources of lead poisoning were a locally used teething powder known as "Saoott" and cebagin prescribed by traditional healer, which contains 51% lead and "Alkohl" (eye cosmetic) with a lead content of up to 88%. Ghai⁽⁸⁾ in an Indian study on 253 children found that 72% of children with lead poisoning presented with convulsions. In this study 100% of the children were anaemic with haemoglobin level range 5 – <11 g/dL. Co-existing iron deficiency anaemia and thalassemia trait could not be excluded as no laboratory studies were done. Aronow⁽¹³⁾ in Detroit in a study on 21 patients with chronic lead poisoning found 100% of them had anaemia, out of which 40% were thalassaemia trait and 5.2% had iron deficiency anaemia. Four children died as a result of complications of encephalopathy, so the death rate was 8%. Thirty four (68%) children were discharged well from hospital after one course of treatment with D-Penicillamine (the only drug available due to Sanctions).

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