

LEAD POISONING AS AN OCCUPATIONAL HAZARD IN CHINESE OPERA ACTORS—A CASE REPORT

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SYNOPSIS

Although industrial lead poisoning is well known, poisoning from cosmetics containing lead is less frequently encountered. Even so, these were usually the result of domestic use of cosmetics, and not the result of occupational exposure. The case of lead poisoning in a Chinese opera actor who used lead-containing facial make-up powders in the course of his occupation is therefore of interest. It serves to point to the possibility of lead poisoning as an occupational hazard in Chinese opera actors and actresses.

Lead is one of the earliest metals used by man. It has been widely used in industry, and industrial lead poisoning is well known.

It is perhaps less widely known that lead has been used also as a constituent of cosmetics. This was recorded as early as 400 B.C. by Xenophon. In 15 B.C., Vitruvius stated that red lead, which he referred to as sandaraca, had been discovered by accident in a cosmetic jar of white lead in a burning house at the Piraeus. In spite of such early use of lead as a cosmetic, there have been few reports of poisoning from the use of these cosmetics. One of the earliest of such reports was from Holland (1881) who recorded two cases of encephalopathy in sisters who had used a fine white cosmetic powder sold under the name of "Flake White". Barron and Habein (1921) reported on four fatal cases of encephalopathia saturnina occurring in the female members of one family who had also used "Flake White" as a cosmetic. Hawes (1930) wrote on lead poisoning in Chinese girls in Singapore who had used face powders which were apparently made in China and contained varying amounts of lead carbonate. Subsequent to Hawes' publication, the Singapore Municipal Health Department analysed samples of Chinese face-powder. In 1931 out of 144 samples examined 57 contained lead carbonate ranging from 1.2 to 46.1%; in 1935 lead was detected in only 2 out of 61 samples tested; and in 1939 it was reported that lead face-powders had almost disappeared from Singapore (Danaraj, 1954). All these cases were the result of domestic

use of lead cosmetics, and not of any occupational exposure.

The following case of lead poisoning resulting from the occupational use by a Chinese opera actor of face powders containing lead is therefore of interest. It serves to draw attention to the fact that the possibility of lead poisoning as an occupational hazard should be considered in Chinese opera actors and actresses who may present with unusual symptoms.

CASE REPORT

L.C.H., a 55 year old Chinese male, was admitted to hospital in February 1970, because of diarrhoea. He was an opium addict of about 5 years' duration, taking opium orally four times a day. He was frequently constipated, and in an attempt to relieve a rather prolonged period of constipation during which he had not opened his bowels for up to eight days, he took some Chinese medicine. The nature of this Chinese medicine was not determined. Soon after, he had diarrhoea and two days after taking the Chinese medicine was referred to hospital with the provisional diagnosis of acute gastroenteritis.

He looked ill and had a dry tongue. His temperature was normal, pulse 90 per minute, and blood pressure 110/70. The heart and lungs were normal. The abdomen felt tense but not tender, and no visceromegaly was detected. He was drowsy, although responding slowly to commands, but remained very passive and mute. The pupils were moderately dilated, equal, and reactive to light, and the fundi appeared normal. There was no neck rigidity. Muscle tone was increased bilaterally with exaggerated tendon reflexes, absent superficial abdominal reflexes and bilaterally extensor plantar responses. There was no paralysis, but a tremor was noted in the outstretched hands.

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Treatment was started with sulphathalazole and kaolin and opium mixture, while investigations were carried out. His haemoglobin was 9.6 gm.% and the total white cell count 10,200 per c.mm., (78% polymorph, 19% lymphocytes, 2% monocytes and 1% eosinophils). A few punctate basophils were noted, the count being less than 1%. The reticulocyte count was 3.5%. The sedimentation rate was 13 mm. in the first hour. Urinalysis showed one plus albuminuria, no casts, and a few pus cells. The serum iron was 86 mcg.% and total iron binding capacity 266 mcg.%. Serum calcium was 9.8 mgm.% and blood urea 27 mgm.%. The serum bilirubin was 0.4 mgm.% serum alkaline phosphatase 2.8 king Armstrong units, SGPT 45 units (normal 135 units) serum albumin 4.4 gm.% and serum globulin 2.4 gm.%. The cerebrospinal fluid was clear, contained no cells, 740 mgm.% chlorides, 55 mgm.% glucose, and 50 mgm.% total protein. Unfortunately the cerebrospinal fluid pressure was not recorded. The blood VDRL was negative. The chest and skull X-rays were both normal. The stools contained no occult blood, ova nor cysts, and stool culture did not grow salmonella nor shigella groups of organisms.

In the meantime he improved, regaining full consciousness and normal muscle tone and reflexes. The diarrhoea also stopped.

With the improvement in his condition it was possible to go into the history in more detail. He came from China when he was 15 years old, and since then, has been a Teochew opera actor with an itinerant opera troupe. He was one of the major characters in the opera, acting two shows daily almost every day in the year, either in Singapore or Malaysia. Since he played the role of a relatively elderly man, it was his practice to paint his face white with a Chinese face powder (Fig. 1).

With this history, evidence of lead absorption was looked for, and indeed he had a clearly visible blue line along the gingival margins of his gums. Urine corprophyrin was positive. The 24-hour urinary excretion of lead was estimated on two occasions and these revealed values of 0.36 mg./litre and 0.85 mg./litre respectively. X-rays of both the wrists and knees showed no dense lines to suggest chronic lead poisoning.

Treatment with intravenous EDTA, 10 ml. given twice daily in a pint of 5% dextrose was then started. He was given a five-day course of this regime. During treatment with EDTA, his 24-hour urinary excretion of lead was monitored. On the first day of therapy, 2,430 ml. of urine was collected and the specimen contained 7.96 mg. of lead (3.28 mg./litre); on the second day, 2,780 ml. of urine was collected and this specimen contained 10.12 mg. of lead (3.64 mg./litre); on the third



Fig. 1.

day, 1,650 ml. of urine was collected and this specimen contained 4.76 mg. of lead (2.88 mg./litre).

When reviewed a month after therapy with EDTA, he remained well and was acting again, although he had stopped using those particular types of facial make-up. The lead line, although reduced in intensity, was still visible.

Three specimens of facial make-up powders were obtained from the patient for chemical analysis. The first, a white creamy powder, contained no lead. The second, another white powder, was found to be essentially lead carbonate; and the third, a red powder, was found to contain 100 parts per million lead.

DISCUSSION

There is little doubt that this patient suffered from lead poisoning. He had anaemia with punctate basophilia, a prominent lead line, constipation (although this might well be due to his opium addiction), and features of an acute encephalopathy. Corprophyrin was qualitatively detected in his urine, and his 24-hour urinary lead excretion (0.36 mg./litre and 0.85 mg./litre on two separate occasions) was well above the "dangerous level" of 0.25 mg./litre set by Lane *et al* (1968). There was also a clear history of occupational exposure

to facial powders which on analysis were found to contain lead in two of the three samples.

This patient's illness appeared to have commenced acutely after he took Chinese medicine to relieve constipation. Although it is not known what the Chinese medicine was, the possibility remains that the medicine might have contained lead. Danaraj (1954) reported on six cases of lead poisoning caused by Chinese medicine powders. Two of her patients had taken "chu sa"—mercuric sulphide or cinnabar—which had been adulterated with red lead oxide, and an analysis of 13 samples of "chu sa" bought randomly at various Chinese medicine shops showed that 11 of these samples contained lead ranging from 0.2% to 14.2%. After further analysis of various other Chinese medicines she concluded that adulteration with lead was not confined to "chu sa" but could also be present in other Chinese medicine powders.

In this particular case however, poisoning by lead in the Chinese medicine he had taken appears unlikely. He was admitted to hospital two days after taking the Chinese medicine, and by then he had already developed an easily recognisable lead line. The intensity and size of the lead line are related to the duration and severity of lead exposure (Hunter, 1969). It seems improbable that the lead line which this patient exhibited could have developed over the short period of two days after ingestion of the Chinese medicine, when it had taken more than a month to disappear after therapy with the chelating agent. During the first three days of treatment with EDTA, he excreted a total of 22.84 mgm. of lead, which seems too excessive an amount to have been ingested with the Chinese medicine.

This Chinese opera actor therefore had been poisoned from occupational exposure to lead-containing facial make-up powders. These powders originated from China, and were provided by the proprietor of the itinerant opera troupe to the cast for make-up. Such powders were relatively cheap compared to other cosmetics from Europe, and it was not surprising that the proprietor of the opera troupe, attempting to reduce cost, should make use of such powders from China.

Traditionally, opera actors and actresses may be divided into two grades. The successful and popular ones, the prima donnas so to speak, used their own personal make-up cosmetics and costumes, which usually were more expensive and of finest quality, and these actors need not necessarily confine their careers to one particular opera group. The less successful ones were engaged by a proprietor of a particular troupe, and they relied on this proprietor to provide them with costumes and cosmetics. The patient who is the subject of this report, belonged to the latter category.

CONCLUSION

Itinerant Chinese opera troupes are still a common sight in Singapore, especially during festivals. It can be expected that some of these make use of cosmetics from China, and that lead may be present in such cosmetics, thereby making plumbism an occupational hazard among Chinese opera actors and actresses. Lead poisoning should therefore be suspected in Chinese opera actors presenting with complaints not responding to treatment by other means.

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