Acute hypervitaminosis A in an adult

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Acute hypervitaminosis A is rarely encountered in adults. The syndrome has been described in Arctic explorers and fisherman following ingestion of livers of polar bears, seals, sharks, kingfish, swordfish, Greenland foxes, and Eskimo huskies (1-3). Typically, nausea, vomiting, and diarrhea develop, followed by central nervous system symptoms of intense headache, vertigo, irritability, drowsiness, and occasionally fits and coma. Generally, peeling of the skin commences after 24 hr. A similar syndrome has been described in infants after they have accidentally ingested single large doses of fish liver concentrates, and in whom, due to increased cerebrospinal fluid pressure, bulging of the fontanelles had occurred (4, 5). Although there are quite a number of reports in the literature of iatrogenic chronic hypervitaminosis A in adults, we have been unable to find any describing acute intoxication following intentional intake of vitamin A for therapeutic purposes. It is believed that this is the first report of such a case.

A widely advertised and popular remedy sold in South Africa for prevention and relief of sunburn is a proprietary preparation containing 25,000 IU vitamin A acetate plus 5 mg os sepia (colloidal calcium carbonate) per tablet (Sylvasun, Sylvachem Pty, Ltd.). As the efficacy of this drug for sunburn has not been proved, a clinical trial was undertaken. The results were negative and have been reported elsewhere (6). During the planning stages of the trial, a few members of the departmental staff, believing the preparation to be harmless, undertook personal “pre-trials.” One of these subjects developed untoward symptoms, which could be ascribed to vitamin A.

Case report

JS, a 28-year-old female, had red hair, a fair skin, and was known to be sun sensitive. In all other respects she was symptom-free and in good health. She was given a bottle of the tablets with the following instructions: “Take two tablets (50,000 IU vitamin A) daily for 3 days prior to and on the day of test sun-exposure. In the event of suffering any symptoms of sunburn, take two tablets every 30 min until the sunburnt skin can be slapped gently with the open hand without discomfort.” This was in accordance with the recommendations of the promoters of the tablet.

The preinsolation tablets were taken as directed with no ill effects. She was exposed to the midday sun for 1 hr (12:00 to 1:00 PM) while wearing a brief bikini-type costume and lying face downward on the roof of the Medical School. Immediately after the exposure she was symptom-free, and on examination there was only slight erythema present in the sun-exposed skin. Four hours later she began to suffer from the effects of sunburn and complained of burning pain in the skin. By now a well-marked erythema was noted on the back of the trunk, shoulders, and thighs. She commenced taking the tablets at the rate of two every 30 min. The burning pain in the skin increased and prevented her from sleeping that night. By the following morning she was anorexic, nauseated, and had developed an intense headache. Despite her discomfort, she persisted in taking the tablets at regular 30-min intervals up to 3:00 PM, i.e., 27 hr after the onset of sun exposure, and by which time she had ingested a total of 1,300,000 IU vitamin A. Her husband brought her by car to the Medical School and she was examined.

The patient complained of intense headache and blurred vision. She was unable to stand or sit because of dizziness and vertigo. Temperature 37 C, pulse 56/min, blood pressure 130/70 mm Hg. The skin on the back of her trunk and thighs was markedly reddened and edematous, peau d’orange effect. The heart, lungs, and abdomen were clinically normal. There was early papilledema of the fundal disc and retinal veins were congested, but no hemorrhages or exudates were present. Nystagmus was noted on lateral gaze only. In all other respects the cranial nerves were intact. Limb movements were slightly ataxic. Reflexes and cutaneous sensation were normal.

Acute vitamin A intoxication was considered to be the likely diagnosis. The vitamin A containing tablets were discontinued. Aspirin (300 mg) three times a day, and promethazine (10 mg) twice daily were continued.
were prescribed instead. Her symptoms gradually subsided and she improved rapidly over the next 3 days. On the 4th day she started to exfoliate. The superficial skin peeled off in sheets from limbs and trunk including areas that had not been exposed to the sun. There was some loss of hair on her head during the next 2 weeks. Fortunately, this was only slight.

Serum vitamin A had been estimated at various stages as follows: At onset before taking any tablets, 203 IU/100 ml; immediately prior to insolation, 430 IU/100 ml; and the following day when seen in the acute toxic state, 1,860 IU/100 ml.

Discussion

A self-limiting acute illness with spontaneous recovery occurring in an otherwise healthy individual who had ingested a large amount of vitamin A over a short period is characteristic of acute hypervitaminosis A. In this case, the symptoms of nausea, vomiting, headache, visual disturbances, and vertigo associated with papilledema and followed by exfoliation of skin is similar to that described by the Arctic explorers and others following ingestion of arctic and marine animal livers.

The therapeutic index of vitamin A is high and it is difficult to state with certainty that the dose of vitamin A is liable to give rise to the acute intoxication syndrome. It has been estimated that acute poisoning in adults may be expected with doses over 1,000,000 IU (7,8). The rarity of the syndrome and the apparent poor correlation between blood vitamin A levels and symptoms (9) suggest that individual hyperreactivity may be a factor. Many patients have taken daily doses much greater than that taken by the subject in this report for prolonged periods without apparent ill effect. However, absence of symptoms may be misleading, as subclinical toxic reactions may be present. With chronic hypervitaminosis A, Jowsey and Riggs (10) were able to demonstrate bony changes and increased bone turnover in a patient who had no symptoms referable to the skeletal system. Feldman and Schlezinger (11) noted papilledema without the patient having been conscious of any visual disturbance.

The distinction between acute and chronic hypervitaminosis A is in all probability artificial and necessarily arbitrary in some instances. Hillman (9), in experimental production of hypervitaminosis A in a human adult, was able to induce acute symptoms of anorexia, nausea, and severe headache that lasted 10 days, followed by gradual development of pruritis, skin changes, pain, and tenderness over long bones characteristic of the chronic syndrome.

Clinical investigation of infants with the acute syndrome has shown increased CSF pressure to be the dominant underlying pathological feature. Although not measured, the papilledema and symptoms in our case are indications of a raised pressure. The mechanism of this increase in CSF pressure is unknown. Animal experiments have not been helpful, particularly because the reactions observed in a number of species are quite different from that observed in man. In dogs and calves, increased CSF pressure occurs when vitamin A is withdrawn from the animal feed, and a fall in pressure occurs with hypervitaminosis A (12).

High dosage vitamin A is often prescribed for a number of gynecological, dermatological, and other ailments, as well as for so-called "tonic" purposes. In the majority of instances this is done with little justification. The occurrence of acute and chronic toxic syndromes underlines the need for control and dose restriction of preparations containing vitamin A.

Summary

Acute vitamin A intoxication occurred in a 28-year-old female following the ingestion of tablets containing a total of 1,300,000 IU vitamin A acetate, taken as a remedy for sunburn. Symptoms included nausea, vomiting, intense headache, and blurring of vision associated with papilledema. Subsidence of the acute symptoms was followed by exfoliation of the superficial skin.

References

3. Cleland, J. B. Illnesses following the eating of