Outbreak of scurvy among prisoners in South Ethiopia

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Abstract

Background: Scurvy is caused by a deficiency of ascorbic acid. Hence, ascorbic acid has to be regularly supplemented through diet or with tablets.

Objective: To describe the clinical feature of scurvy among prisoners admitted to Yirgalem Hospital.

Methods: An observational study done on a total of 38 male prisoner patients over one month. Data were collected using structured questionnaire and analysis was done using SPSS 16.0.

Results: All 38 patients had limb swelling and 35 of them had distal limb numbness, tingling and burning sensation. After five days of vitamin C administration patients' leg swelling, hematuria, cough and gum bleeding subsided completely, and the value of hemoglobin was also raised from (10.3±3.31) to (12.7±2.26) with treatment. Nutritional history revealed that there were no vegetables, fruits or animal products in their diet. Their imprisonments ranged from eight to forty nine months with an average of 19.3 months.

Conclusions: Symptomatic scurvy is common in male prisoners imprisoned more than eight months. Unilateral limb swelling, bilateral distal neuropathic pain and bleeding diathesis are common presentation of scurvy. [*Ethiop. J. Health Dev.* 2012;26(1):60-62]

Introduction

Humans cannot synthesize ascorbic acid because of a lack of an enzyme gulonolactone oxidase. Hence, ascorbic acid has to be supplemented mainly through fruits, vegetables and tablets (1). A deficiency of ascorbic acid leads to scurvy, which is characterized by spongy swollen bleeding gums, dry skin, sores on the skin, fatigue, impaired wound healing and depression (2).

Scurvy is a rare occurrence nowadays because of adequate intake of ascorbic acid. The average daily intake level that is sufficient to meet the nutritional requirement of ascorbic acid for adults is 90 mg/day for men and 75 mg/day for women (3).

Ascorbic acid plays an important role in the maintenance of collagen, which constitutes the principal protein of skin, bones, teeth, cartilage, tendons, blood vessels, heart valves, inter vertebral discs, cornea and eye lens. It also enhances the availability and absorption of iron from non-heme iron sources (4).

Methods

This is an observational study done in Yirgalem Regional Hospital between May and June, 2010 over a one month period among prisoners. The Hospital is situated in Yirgalem Town located 310km south of Addis Ababa.

The prisoners came from nearby prison, where more than 2000 were confined. Data concerning socio-demography, duration of imprisonment, dietary history were collected from each study participant using a structured questionnaire. Meticulous physical examinations were done and findings recorded. Complete blood count, urinalysis, liver and renal function tests, and chest X-rays were done for all patients. Pleural fluid analysis and cytology were also done for two patients, who came with hemorrhagic pleural fluid. We used a 'before-after' design to examine and compare changes in clinical and biochemical parameters before and after supplementation of vitamin C. All cases were followed as cohort cases with unique code.

Data were cleaned, entered and analyzed using SPSS version 16.0. The analysis consisted of basic summaries of patients conditions.

Ethical Considerations

The research was conducted after getting ethical clearance from the Hawassa University College of health sciences institutional review board and permission from the Yirgalem Hospital Administration. Informed consent was also obtained from each study participant. All cases were treated with vitamin C. All patients were given diclofenac to relieve their leg and knee pain. Three patients were given transfusion of two units of whole blood for severe anemia.

Result

A total of 38 prisoner patients with musculoskeletal complaints were admitted from 17/05/2010 to 17/06/2010 to Yirgalem Hospital for a one month period. All were male and nineteen (50%) of them were single. Their imprisonments ranged from eight to forty nine months with an average of 19.3 months and 26 (68%) of them had been imprisoned for more than a year. The mean age was 25.36±8.53 years ranging from 18 to 60 years old and 30 (79%) of them were below the age of thirty. Out of all 27 (71%) had unilateral hot, tender leg swelling and 22 (58%) of them limped. The musculoskeletal status is given in Table1.

Table 1: **Musculoskeletal presentation of scurvy among prisoners admitted to Yirgalem Hospital from May to June 2010 (n=38`**

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Musculoskeletal presentation	Number (%)
Unilateral leg swelling	27(71%)
Bilateral leg swelling	8(21%)
Unilateral thigh swelling	3(8%)
Knee arthritis	22(58%)*

*: Knee arthritis associated with limb swelling

Before the administration of vitamin C, 35 (92%) patients had distal limb numbness, tingling and burning sensations; hematuria, 26 (68%); cough, 25 (66%); gum bleeding, 24 (63%); and only 12 (32%) of had gum hypertrophy. After five days of vitamin C the patients' leg swelling, hematuria, cough and gum bleeding disappeared completely (Table 2). The value of hemoglobin was raised from (10.3±3.31) to (12.7±2.26) with treatment.

The dietary history from patients and prison officers revealed that there were no vegetables, fruits or animal products consumed in the prison.

Table 2: **Clinical presentation of scurvy among prisoners admitted to Yirgalem Hospital from May to June 2010 before and after vitamin C treatment**

Clinical presentation	Before treatment Number (%)	After treatment Number (%)	Proportion[a]
Leg swelling	38 (100)	0	100
Numbness/tingling[b]	35 (92.1)	1(2.6)	97
Hematuria[c]	26 (68.4)	0	100
Cough	25 (65.8)	0	100
Gum bleeding	24 (63.2)	0	100
Hyperpigmentation[d]	22 (57.9)	9(23.7)	59
Anemia	13 (34.2)	4(10.8)	69
Gum hypertrophy	12 (31.6)	8(21.6)	33
Chest pain	3 (8.0)	0	100
Hemorrhagic pleural effusion	2 (5.4)	0	100
Palpitation	2 (5.4)	0	100
Bloody diarrhea	1 (2.6)	0	100
Systolic murmur	1 (2.6)	0	100

[a]: Proportion of improvement in presentation after 500 mg vitamin C once daily for five days
[b]:Either numbness or tingling sensation of distal lower limb
[c]:Tea or cola colored urine
[d]:Darkening of swollen limb

Discussion

Patients had been imprisoned for eight to forty nine months before they developed scurvy symptoms. The depletion of ascorbic acid pools leading to the development of severe symptoms may require at least eight months and is predominant among those who did not consume vegetables or fruits (5).

The main symptom of the admitted scurvy cases was unilateral leg swelling and knee arthritis, which is in concordance with previous case reports of scurvy (6, 7). Neurogenic pain, which was prevalent among our patients, is not well described in other case reports. This symptom may be related to the need for vitamin C in the biosynthesis of neurotransmitters (8).

Bleeding diathesis was found in most patients including tea colored urine, gum bleeding, hemorrhagic pleural effusion and bloody diarrhea. Severe hematuria, which was seen in this study, is a peculiar and common condition. One study done in Afghanistan found a hemorrhagic fever epidemic because of vitamin C deficiency (9). Scurvy could lead to bleeding from any mucosal surface since it is essential for cartilage biosynthesis. Gum hypertrophy was observed in twelve of the twenty four patients with gum bleeding. Gum hypertrophy and bleeding are also reported in other studies (10).

A dry cough was found in more than half of the cases in our study which we did not find reported in literature reviewed. The cough may be due to micro-bleeding in the airway, lung parenchyma or in the pleural cavity.

Unlike in other studies, our study found anemia in more than two-third of the patients, which improved markedly with vitamin C intake (11, 12).

The main limitation of this study was not able to measure serum ascorbic acid level. The strength of this study is able to identify peculiar symptom of scurvy, which is not commonly mentioned in other studies.

In conclusion, symptomatic scurvy was common in prisoners imprisoned more than eight months. Unilateral limb swelling, bilateral distal neuropathic pain and bleeding diathesis are common presentation of scurvy. Thus, it is good to consider vitamin C supplementation of prisoners' diet with fruits, vegetables or tablets. Further

studies should aim to determine the serum level of ascorbic acid.

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