Case Report:
Kwashiorkor Uncovered by Chickenpox

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Abstract

Objective: To report a case of kwashiorkor among a 2-year old child that has been uncovered by chickenpox infection.

Case Report: A 2-year old girl presented to the Emergency Department of Abha Maternity and Child Hospital, Abha City, Saudi Arabia, with progressive generalized pitting edema, mouth and lip ulceration, decreased activity and appetite, generalized hair loss with change in the color from black to fair and thin texture. The condition started about 2 months earlier after she developed chickenpox. On examination, there was miserable expression, apathy, angular stomatitis, fissured lips with oozing blood, puffy eyelids and face, generalized body swelling, bilateral pitting edema, hyper-pigmented lesions over the extensor surface of both forearm and legs, hypo-pigmented diaper area, sparse thin hair, and light in color. The liver was 3cm below the costal margin. The child was admitted to the Pediatrics Department, with kwashiorkor as highly suspected. Laboratory investigations revealed low serum total proteins and albumin levels, high aspartate aminotransferase and alkaline phosphatase enzymes. The child was started on intravenous fluids, then on the next day she was started on nasogastric tube feeding. When the edema subsided, all mouth and lip lesions healed, and the mother was well-trained about handling nasogastric tube feeding and formula preparation, the child was discharged from the hospital facility to home-based care.

Conclusions: Kwashiorkor among children is mainly due to improper weaning. Infections may precipitate and aggravate malnutrition among children. Health education of parents regarding proper nutrition and weaning for their infants is essential for its prevention. Physicians should be aware of its signs for early diagnosis and management.

Key Words: Kwashiorkor – Chickenpox – Children – Protein energy malnutrition – Weaning.

Introduction

MALNUTRITION is the most important risk factor for the burden of disease in developing countries. It is the direct cause of about 300,000 deaths per year and is indirectly responsible for about half of all deaths in young children. The risk of death is directly correlated with the degree of malnutrition [1].

Severe malnutrition, manifested by wasting, edema or both, occurs almost exclusively in children. "Marasmus" is defined as severe wasting; marasmic kwashiorkor, as severe wasting in the presence of edema; and kwashiorkor, as malnutrition with edema. The word kwashiorkor originated from a local language in Ghana; which implies “the disease that the young child developed when displaced from his mother by another child or pregnancy.” [2].

Malnutrition is still a major public health problem throughout the developing world. Diets that are frequently deficient in macronutrients (i.e., protein, carbohydrates and fat) may lead to protein-energy malnutrition (PEM) [3].

PEM is caused primarily by inadequate dietary intake of protein and energy, either because the dietary intakes of these nutrients are less than the required for normal growth or because the needs for growth are greater than can be supplied by what otherwise would be adequate intake. PEM is almost always accompanied by deficiencies of other nutrients [4].

We aim to report a case of kwashiorkor among a 2-year old child due to improper weaning that has been uncovered and aggravated after chickenpox infection.

Case Report

On January 19th, 2015, a 2 years old girl presented to the Emergency Department of Abha Maternity and Child Hospital, Abha City, Kingdom of Saudi Arabia, with progressive generalized...
pitting edema, mouth and lip ulceration, decreased activity and appetite, generalized hair loss with change in the color from black to fair and thin texture, hypo-pigmentation of diaper area and hyper-pigmentation of extensor surfaces of both forearm and legs.

The condition started about 2 months prior to the current presentation when she developed chickenpox that resolved later on. Very shortly afterwards, she started to develop xerosis and hyper-pigmented and hypo-pigmented lesions over the extensor surfaces of both forearm and legs. So, she was seen by a dermatologist who diagnosed her condition as post-inflammatory atopic dermatitis. She was given several topical medications, but her condition did not improve.

Child delivery was at home which was normal and at full-term. Since she was delivered at home, her birth weight was not known. The child had no past history of hospitalization. Her parents were illiterate and poor. The father was 32 years old, casually employed as a school gatekeeper, while the mother was 28 years old, housewife. The child had three other normal older siblings.

The child has been mainly on breastfeeding with occasional level 3 artificial formula (for children aged 1-3 years). At the age of 6 months, the mother tried to step up with the same formula (level 1) to the next level, (level 2). However, because the child refused to take level-2 formula, the mother continued on both breastfeeding and level 1 formula. Moreover, the formula given was almost half dilution. The child was weaned from breastfeeding at the age of 18 months. Afterwards, till the age of 20 months the child was continued on both bottle feeding with juices instead of formula milk and was served from the family usual diet, which contained mainly fruits and vegetables.

At the age of 20 months, the child developed chickenpox. During her illness she was refusing family diet and was continued on bottle feeding with artificially colored and sweetened juices till the time of presentation.

On examination, the child had normal growth and development parameters. Vital signs were normal. There was no clinical sign of dehydration, no dysmorphic features, miserable expression, apathy, angular stomatitis, fissured lips with oozing blood, puffy eyelids and face Fig. (1), no obvious corneal changes, generalized body swelling, bilateral pitting edema, hyper-pigmented lesions over the extensor surface of both forearm and legs Fig. (2), there were hypo-pigmented diaper area Fig. (3), sparse thin hair, and light in color Fig. (4). Findings of chest and heart examinations were normal. The abdomen was not tender with the liver 3cm below the costal margin.

The child was admitted to the Pediatrics Department, with kwashiorkor as highly suspected. Laboratory investigations revealed normal blood picture, low serum total proteins and albumin levels, high aspartate aminotransferase and alkaline phosphatase enzymes.

The child was started on intravenous fluids, then on the next day she was started on nasogastric tube feeding with ready to use special formula for which one spoon of powdered milk rich in proteins, minerals, sugar and vitamins were added to each feeding. The formula calorie intake was initially 80kcal/kg/day after which it was increased gradually up to 120kcal/kg/day. Initially, the frequency of nasogastric tube feeding was 12 feedings per 24 hour. Over time, the frequency was reduced to 8 feedings per 24 hours and the volume was increased up to 100ml/kg/day.

There were limited facility to have biochemical evidence of vitamins and trace elements (e.g., zinc) deficiencies because of unavailability of laboratory services to measure their levels. Yet there were some clinical evidence of their deficiencies (e.g., skin ulceration) substantiated by the clear history of inadequate diet. Therefore, vitamins and minerals supplementation in the form of syrup were provided to correct for suspected deficiencies. In addition, the child was allowed to eat from other food served in the hospital as tolerated.

Special attention was given to the re-feeding syndrome which may complicate the acute nutritional rehabilitation. Phosphate levels were monitored during re-feeding period with a plan to administer phosphate in case hypophosphatemia develops. The special formula used during re-feeding contained phosphate.

All monitored phosphate levels during the re-feeding period were within normal limits (2.5-4.9mg/dl) and other repeated laboratory studies were also within normal limits without changing any line in the management. No diarrheal events were reported during re-feeding rehabilitation period.

When the edema subsided, all mouth and lip lesions healed, and the mother was well-trained
about handling nasogastric tube feeding and formula preparation, the child was discharged on January 27th, 2015 from the hospital facility to home-based care.

Because of the far distance between the treating hospital and the family living area, the pediatrician followed-up the child by scheduled phone calls. Monitoring phosphates levels occurred at a local hospital and management instructions were offered to the mother as needed.

On February 2nd, 2015 the mother informed the pediatrician that she removed the nasogastric tube because her child started to resist the tube and she refused to accept the special formula because she did not like its taste. However, as the child's appetite improved, she started to look happy and interested in playing with other children. Ad libitum feedings were allowed with parental education about the importance of offering properly selected as nutritious food servings as possible for continued effective treatment as well as preventing additional episode.

On March 3rd 2015, the child came to our outpatient pediatrics clinic for follow-up. The child’s presentation was really rewarding, happy and playful, her hair texture improved and became darker Fig. (5). There was no more facial edema, miserable expression, mouth ulceration or lip fissures Fig. (6). All hyper-pigmented lesions on the extensor surfaces of upper and lower limbs subsided with normal skin texture Fig. (7), and the hypo-pigmented lesions in diaper area completely disappeared Fig. (8).

Fig. (1): Child’s face showing miserable expression, angular stomatitis, fissured lips with oozing blood, puffy eyelids.

Fig. (2): Hyper-pigmented lesions over the extensor surface of legs.

Fig. (3): Hypo-pigmented diaper area.

Fig. (4): Sparse thin hair and light in color.
Discussion

Kwashiorkor is a syndrome of severe protein malnutrition, which manifests itself in hypoalbuminemia, diarrhea, dermatitis, and edema. It can be life-threatening due to associated immune deficiency and an increased susceptibility to infections. Kwashiorkor should be treated early with nutritional support and the control of infection [5].

Our 2-year old child presented with manifestations suggestive of kwashiorkor, with progressive generalized edema, mouth and lip ulceration, miserable expression, generalized hair loss with change in its color, hypo-pigmentation of diaper area and hyper-pigmentation of extensor surfaces of both forearm and legs. Clinically, kwashiorkor was strongly suspected. The condition followed improper weaning. Lack of maternal knowledge about proper weaning practice and time constraints for the mother were the main reasons for the above preventable case presentation.

Preschool-aged children in developing countries are often at risk for malnutrition because of their dependence on other for food [6], immature immune systems causing a greater susceptibility to infection [7] and exposure to un-hygienic conditions [8].

Nagle et al., [9] stated that kwashiorkor is a weaning disease. It refers to a condition caused by severe protein deficiency in individuals with an adequate or a marginally inadequate energy intake. Children with kwashiorkor may have growth failure, wasting of muscles and preservation of subcutaneous fat, edema (pitting type), Fatty liver (hepatomegaly), skin changes (ulceration, and hyper-pigmentation), loss of appetite, lack of interest in the surrounding (apathy) and irritability.

Causes of protein energy malnutrition are multifactorial having a number of interwoven factors operating simultaneously. At the level of the individual child, one factor or more may operate. Lack of knowledge, as parents may not understand the nutritional nature of their child and related health problems. Poverty leads to the lack of means to obtain and provide food to their child Odebode and Odebode [10].
Muller and Krawinkel [11] added that the degree and distribution of PEM and micronutrient deficiencies in a given population depends on the political and economic situation, the level of education and sanitation, the season and climate conditions, food production, cultural and religious food customs, breast-feeding habits, prevalence of infectious diseases, the existence and effectiveness of nutrition programs and the availability and quality of health services.

Khalid et al., [12] stressed that the focus should be more on prevention of malnutrition, rather than trying to deal with the health consequence. Illiteracy, ignorance and parental neglect of children are blamed as some of the main causes of malnutrition. Awareness is still lacking about how long to breastfeed the child and when to start giving supplementary food. Lack of knowledge is a dangerous threat in itself.

It seems that lack of knowledge was not limited to the parents. In our case, kwashiorkor was triggered and aggravated by a preceding chickenpox infection. Since skin manifestations were the first to appear, i.e., xerosis with hyper-pigmented and hypo-pigmented lesions, a dermatologist was consulted. However, the dermatologist's focus of attention was directed only toward the child's skin manifestations and overlooked the other non-dermatological manifestations, e.g., the generalized edema and the enlarged liver. The child received several topical medications, but her condition did not improve, and her malnutrition condition was neglected.

Kuhl et al., [13] noted that, in cases of PEM, dermatologic findings appear more significant and occur more frequently among darker-skinned peoples. Also, hair becomes dry, lusterless, sparse and brittle; they can be pulled out easily.

The relation between infections and PEM has been argued by Muller and Krawinkel [11], who noted that the high prevalence of infectious diseases in developing countries contributes greatly to malnutrition there. Similarly, malnutrition increases one's susceptibility to and severity of infections, and is thus a major component of illness and death from disease.

Management of our case was mainly through hospitalization and nutritional rehabilitation for regaining an adequate nutritional status, followed by home-based management and an outpatient follow-up.

Prada et al., [14] stated that management of patients with severe, chronic malnutrition represents something of a challenge, since this condition is often associated with complications, which worsen the prognosis. Once patients with chronic malnutrition are hospitalized, the main aim of treatment is to stabilize hemodynamic function, address accompanying pathologies, and work toward the recovery of adequate nutritional status. Nutritional recovery may take a long time, depending on the severity of malnutrition.

In our case, there were some clinical evidence of accompanying vitamin and minerals deficiencies. Akhtar et al., [15] stated that PEM is not a single disease but a range of clinical disorders, which involves an inadequate intake of many essential nutrients. Low serum levels of zinc have been implicated as the cause of skin ulceration in many patients [13]. Serum levels of zinc correlate closely with the presence of edema, stunting of growth and severe wasting. The classic “mosaic skin” and “flaky paint” dermatosis of kwashiorkor bears considerable resemblance to the skin changes of acrodermatitis enteropathica, the dermatosis of zinc deficiency [12].

The first step for treatment of PEM is to correct fluid and electrolyte abnormalities. The second step in the treatment of PEM is to supply macronutrients by dietary therapy [8]. A daily multivitamin should also be added [16].

During hospital management of our case, a special attention was given to the re-feeding syndrome. Ferreras et al., [17] noted that this potentially lethal condition is a clinical complex, which includes electrolytic changes associated with metabolic abnormalities that can occur as a result of nutritional support (oral, enteral or parenteral), in severely malnourished patients. It is clinically characterized by neurological and respiratory symptoms, arrhythmias and heart failure, few days after re-feeding. Its cause is due to overload in caloric intake and reduced capacity of the cardiovascular system [18].

In conclusion, kwashiorkor among children is mainly due to improper weaning practices. Infections may precipitate and aggravate malnutrition among children. Health education of parents regarding proper nutrition and weaning practices for their infants is essential to prevent it. Physicians should be aware of its signs for early diagnosis and management.
References


