

# Alcoholism is still a cause of pellagra in sunny countries

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## Abstract

**Background** Primary nutritional pellagra is still an endemic problem in many developing countries but surprisingly it had not been reported in Iraq even with the endless wars and prolonged sanctions that Iraqi people had faced. All cases of pellagra that were seen since 1978 were mostly secondary to chronic alcohol intake but not nutritional and rarely to anti tuberculosis therapy.

**Objective** To report and evaluate pellagra cases in regards to their triggering factors, clinical picture and therapy.

**Methods** This case series descriptive study was conducted in Dermatology Centre, Baghdad Medical City, Baghdad, Iraq during the period from December 2013 to January 2019. All pellagra cases were collected, documented and evaluated clinically. All triggering factors were looked for like alcohol intake, nutritional problem, drug intake or any family history of the same disease. Niacin and other B vitamins were given as therapeutic and diagnostic agents.

**Results** Over the period of 6 year, a total of 11 patients with pellagra were seen. All patients were males, their ages range from 5 – 65 years with mean age of 42.5 years. Seven out of eleven cases were caused by chronic alcoholism, three cases were caused by isoniazid therapy for tuberculosis and only one case was caused by Hartnup disease. But none of the cases were primary nutritional pellagra. The main clinical picture was photosensitivity as a burn like dermatosis but not Wernicke's encephalopathy.

**Conclusion** Although living in a developing country with many wars and sanctions that lasted for decades, Iraqis rarely if ever suffered from primary nutritional pellagra, probably because the Iraqi cuisine depends on rice and wheat as a staple food as opposed to other developing countries that depend on corn which is a poor source of niacin. Thus, all cases of pellagra were secondary, mainly to chronic alcoholism in sunny climate. The florid burn like picture of photosensitivity, put pellagra as one of the main causes of burn like dermatosis but no obvious mainly neurological manifestation as seen in western countries.

## Key words

Pellagra, alcoholism, niacin, Iraq.

## Introduction

Niacin (Vit. B3, nicotinic acid) deficiency and/

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or its precursor tryptophan cause pellagra, which is exacerbated by other B vitamin deficits. Niacin converts to two key coenzymes of cellular metabolism, nicotinamide adenine dinucleotide (NAD) and NAD-phosphate, through the formation of nicotinic acid and nicotinamide.<sup>1</sup>

Niacin deficiency can result from a wide range of clinical disorders; reduced food intake, impaired conversion of tryptophan to niacin, medications, metabolic steal (carcinoid syndrome), and congenital deficiency of tryptophan absorption are all risk factors (Hartnup disease).<sup>1</sup>

Alcohol can cause pellagra through a variety of mechanisms, including undernutrition, malabsorption of niacin and its precursors as well as other vitamins and nutrients, inhibition of liver tryptophan 2, 3-dioxygenase and subsequent formation of niacin precursors, induction of zinc deficiency, disruption of hemoglobin biosynthesis, which results in an accumulation of the precursor to the porphyrin 5-aminolaevulinic acid.<sup>2</sup>

Pellagra is characterized clinically by four classic symptoms often referred to as the four Ds: diarrhea, dementia, photosensitive dermatitis, and death. Early signs of pellagra include vomiting, nausea, widespread weakness, irritability, and loss of appetite. Later signs and symptoms include bright red glossitis, recurring or chronic diarrhea (watery, though occasionally bloody), and cachexia. The most frequent and distinctive cutaneous symptom of pellagra is prominent skin alterations involving exposed locations. The rash normally affects only the exposed solar exposure locations and is bilateral, symmetrical, and localized. It is well-defined and typically more noticeable on the face, radial portions of the forearms, the 'V' of the neck, the dorsum of the hands, and exposed skin on the legs and feet. These areas at first turn red and swell. At this point, the clinical characteristics closely mimic sunburn. Vesicles can appear during acute and serious pellagra bouts. In contrast to a sunburn, which normally subsides in a few days, pellagra causes the skin to darken and show severe hyperpigmentation. Reexposure to sunshine is followed by aggravations.

Neuropsychiatric symptoms include hallucinations, sadness, photophobia, asthenia, psychosis, memory loss, and even Korsakoff psychosis start to appear as pellagra worsens. The patient becomes delirious, disoriented, and bewildered; if left untreated, stupor and death occur.<sup>3,4</sup>

Uncertainty surrounds the pathogenic mechanism of photosensitivity in pellagra. Reduced production of the histidine metabolite urocanic acid, which acts as an ultraviolet radiation filter on the skin, decreased levels of zinc, decreased synthesis of the tryptophan metabolite picolinic acid, and possibly elevated levels of the haem precursor 5-aminolaevulinic acid (5-ALA) and photo-reactive porphyrins are also to blame.<sup>2</sup>

In areas of the world where malnutrition is prevalent, pellagra is still common. Iraqis rarely, if ever, experienced primary nutritional pellagra, most likely as a result of their cuisine's reliance on rice and wheat, as opposed to other developing nations' reliance on corn, which is a poor source of niacin. Therefore, every instance of pellagra was secondary, and it mostly affects alcoholics. Because Iraq experiences sunshine for the majority of the year, a florid picture of photosensitive dermatitis is frequently observed. A sufficient diet high in niacin and/ or tryptophan can help prevent pellagra. Some examples of such foods are yeast, eggs, bran, peanuts, pork, chicken, fish with red flesh, cereals (particularly fortified cereals), legumes, and seeds.<sup>1</sup>

The clinical symptoms of pellagra can typically be reversed with oral nicotinamide or niacin therapy. The delivery of B-complex vitamins and the provision of a high-protein diet are required for full healing since patients are frequently malnourished and have other vitamin deficiencies.<sup>1</sup>



**Figure 1** Alcoholic patient with acute erythematous well demarcated sunburn like rash on dorsum of hands and face.



**Figure 2** Alcoholic patient with well defined scaly hyperpigmented thickened plaques on dorsum of hands and face.



**Figure 3** A 5 year old child with Hartnup disease presented with pellagra. (A) Characteristic involvement of the face and dorsum of the hands.(B) "Casal's necklace" on the neck.

Thorough literature review shows only one previous case report of this condition in Iraq published in 1978.<sup>5</sup> Therefore we aim to record alcoholic cases of pellagra and other clinical variants encountered during clinical practice with full description of their clinical pictures and therapy.

## Materials and Methods

This case series descriptive study was conducted in Dermatology Centre, Baghdad Medical City, Baghdad, Iraq during the period from December 2013 to January 2019. All pellagra cases were documented and evaluated clinically. All triggering factors were looked for like alcohol intake, nutritional problem, drug intake or any family history of the same disease. Niacin and other B vitamins were given as therapeutic and diagnostic agents.

## Results

Over the period of 6 year; a total of 11 patients with pellagra were recorded. All patients were males, their ages range from 5-65 years (mean age of 42.5 years). Seven (63.6%) out of eleven cases were caused by chronic alcoholism, three cases (27.3%) were induced by isoniazid drug and only one case (9.1%) was Hartnup disease. All patients except the child case with Hartnup

disease were outdoor workers. Alcoholic patients were heavy drinkers for more than a year (average 3 years) with poor diet.

Clinical picture in all cases was florid photosensitive dermatitis (sunburn like picture) over exposed sites (dorsum of hands and feet, V area of neck, and face). Five out of 11 patients had mild gastrointestinal symptoms while mild neuropsychiatric manifestations like depression and memory disturbance were recorded in only three alcoholic patients but no Wernicke's encephalopathy and Korsakoff psychosis were detected (**Figures 1-3**).

All patients were treated with nicotinic acid tablet 100 mg t.d.s, multivitamins capsule t.d.s and local corticosteroid ointment for the skin. Dramatic improvement was seen within few days.

## Discussion

Iraq had witnessed many wars and had been subjected to economic sanction for more than a decade since first Gulf War 1990. Despite the fact that throughout the sanctions period there were reports of high rates of starvation, a lack of medical supplies, and illnesses caused by dirty water, there was no rise in pellagra among Iraqi people secondary to malnutrition. This possibly

related to nutritional habit of eating whole grain breads that is considered a rich source of niacin. This study confirmed that, as no nutritional pellagra case was recorded.

In this study, 11 cases of pellagra were seen during the last 6 years. Seven cases were related to chronic alcoholism while 3 cases were related to isoniazid treatment for tuberculosis and one case was associated with Hartnup disease, an autosomal recessive condition where tryptophan absorption is hampered by a malfunction of neutral amino acid transport in the colon (an endogenous precursor of niacin).<sup>1</sup>

Although tuberculosis is still endemic in Iraq, only three cases of pellagra secondary to INH therapy were recorded. This is probably related to the relatively good nutritional status of Iraqi population.

Chronic alcoholism is not a major problem in Iraq especially if the situation is compared with the western world. This is probably related to religious beliefs of the people. All recorded cases in this study were heavy drinkers for more than a year with poor diet. Pellagra was not recorded in social alcoholic drinkers, as they usually eat mezza (small dishes contain a mixture of vegetables usually served with alcohol drinks in Middle East countries) and drink coffee, both are considered a rich source of niacin and other vitamins.

All patients presented with a florid picture of photosensitive dermatitis secondary to sunny climate in Iraq most of the year. The rash usually has distinct borders, is bilaterally symmetrical, and only affects skin that has been exposed to the sun (the dorsum of the hands, the 'V' of the neck, the face, the extensor aspects of the wrists, and exposed skin on the legs and feet). The skin at first turns red and swells. At this stage, the clinical characteristics closely

mimic sunburn. Hence pellagra should be considered one of the main causes of burn like dermatitis.<sup>6</sup>. Then it becomes scaly, pigmented and thickened. Hence in sunny countries like Iraq, the main clinical presentation is a photosensitivity, then could be followed by the neuropsychiatric features while in non-sunny climates like western countries the photosensitivity could be late but the early manifestation will be obvious neurological features.

Because patients are frequently malnourished, niacin therapy together with B-complex vitamins are required for full recovery. In the present study, all patients showed dramatic improvement within few days to treatment with nicotine acid and multivitamins supplements and this rapid response to therapy does support the clinical diagnosis of pellagra.

Although this paper does not represent the actual incidence of pellagra in Iraq, it shows that this condition still exists and it mainly occurs secondary to chronic alcoholism.

## **Conclusion**

Although Iraq is running many wars and sanctions that lasted for decades, still chronic alcoholism is the main cause of pellagra rather than a primary nutritional deficiency, probably because the Iraqi cuisine depends on rice and wheat as the main meal as opposed to other developing countries that depend on corn which is a poor source of niacin. The florid burn like picture of photosensitivity, put pellagra as one of the main cause of burn like dermatosis.

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