

Review of Gastrointestinal Disorders after Prolonged Arduous Labor and Hunger

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Abstract

This review describes some abnormalities of gastrointestinal system observed in a labor camp and poor villagers. closely related to malnutrition, especially thiamin deficiency. The oral pigmentation keratosis was curious and strange but benign, while the fully bloated abdomen might be very troublesome or even fatal. In severe malnutrition, the GI tract might become very irritable, a meal of gruel could pass through the tract within one hour without any change as if passing through a long test tube. Massive watery diarrhea was often fatal but could be promptly cured with parenteral thiamin although niacin also played a role. Prolonged malnutrition might cause gastrointestinal ptosis and abdomen sarcopenia in the aged and couldn't recovered. Severe thiamin deficiency might cause direct hernia and surgical therapy of refractory anal diseases should be updated with megadose of parenteral thiamin and other B vitamins, which could promote natural healing of multiple fistulas and other anal diseases.

Keywords: Anal diseases; Buccomembrane Keratosis Pigmentation; Ysaunomia; Flatulence; Gastrointestinal Ptosis; Thiamin Deficiency Sarcopenia

Introduction

Reports about gastrointestinal disorders in malnutrition are quite numerous. However, the following phenomena from a huge labor farm have rarely been described due to the severe living condition, prolonged daily terribly hard labor and inadequate food, especially observed six decades ago. Regular poor peasants were also studied but their clinical situation was much mild. and nothing special was found.

Clinical studies

Transient enlargement of parotid gland

Salivary gland enlargement is very common in malnutrition especially parotid glands. Once it became enlarged, its large size persisted if no nutrition improve or therapy. However, paroxysmal or transient enlargement of the parotid gland had been observed once and only once.

It was a summer day in 1959, the slavery laborer was 20 year old. His parotids were only just palpable, not enlarged. In an occasion during a regular dinner, his right parotid became progressively enlarged toward to facial side. Within 2 hours after dinner, the frontal

edge of the swollen mass reached the facial zygomatic bone. The right face looked as if attached with a regular cake. The consistence of the mass indicated parotid gland. There was slight congestion and local uncomfortable feeling but no pain and tenderness including the surrounding area. The orifice of parotid duct in the oral cavity was normal without edema or discharge. The right angular lymph node was not enlarged. He felt local sore, swelling and warm. It was under observation without medication or local manipulation overnight. The next morning, mild congestion and swelling subsided and the edge of parotid retreated to its midway and the soreness disappeared. There was no recurrence during 3 meals in that day and thereafter. It returned to the previous size in the second morning and no recurrence within 3 years and no second case had ever been observed. The mechanism of its drastic enlargement and spontaneous recovery in size was unknown.

Oral cavity

Pigmentation keratosis of bucomembrane

After slavery exhaustion and semi-hunger for 5 years, about 25% of individuals developed keratotic greenish-brown pigmentation over the buccal membrane on both sides. It was very impressive. Petechiae of the oral commissure occurred only occasional when there was overt riboflavin deficiency. The initial manifestation of the keratosis area was dental impression on the tongue edge and the buccal mucosa, forming whitish ridges of dental outline. Dryness and keratosis of buccal membrane ensued as malnutrition progressed. It started at the oral commissure and then involved the whole surface of the buccal membrane of the chin beyond the parotid salivary duct orifice, forming a pigmented keratotic triangle. Greenish brown pigmentation of the keratotic membrane was so curious and strange that could never be overlooked or forgotten. The keratotic and pigmented surface was divided into small areas by the intersecting straight and crescent lines of the underlying textures. They were irregular squares in the rear portion and wedge or crescent shaped ones near the mouth corner. The only accompanying symptom was dryness of the mouth chiefly in advanced cases. Although it looked very severe, however, it was reversible and spontaneously vanished when thiamin was applied or food became enough and well-balanced. Its mechanism of generation was unknown (Figure 1).

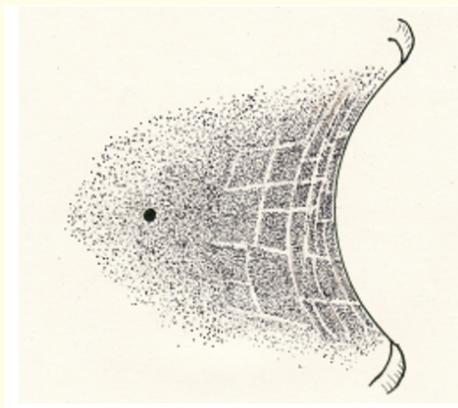


Figure 1: Diagram of keratosis and pigmentation of buccal membrane. The black spot indicates the orifice of the left parotid duct.

Palatine hematoma or erosion

Singular hematoma beneath oral membrane was found in about 5% of patients with chronic fatigue, mouth dryness and tastelessness. It was an elongated or oval bulb filled with blood, 1 - 2 X 2 - 4 cm in size, something like a date or a large peanut with clear border bulged

over the rear part of the hard palatine and occasionally on the buccal surface. There was local soreness, however, no edema or inflammation. Local therapy was difficult and unnecessary. In early cases, prompt intramuscular injection of 2 - 4 ampules of vitamin B complex (each containing VB1 10 mg, VB2 2 mg, niacinamide 30 mg, VB6 2 mg, pantothenic acid 1 mg) or 100 mg of thiamin a day could reduce the size of hematoma and relieve local soreness. It could be completely absorbed after 4 - 6 injections. Oral tablets of thiamin or vitamin B complex gave no obvious response. If not treated, the hematoma would be ruptured and left an area of erosion with small amount of exudates and very sensitiveness to salty or acidic food. It healed after injecting vitamin B complex 2 ampules for twice a day within 3 - 5 days while thiamin was essential and more effective. It was refractory to ascorbic acid, either oral or injection in large dose. Therefore ascorbic acid was abandoned.

Flatulence

Flatulence here refers to extensive bloating of the whole abdomen with or without flatus or belching. It might be a single abnormality or a fulminating syndrome involving multiple systems causing difficulty in diagnosis. And also often a fatal sign especially in pediatric cases. Actually, it might be intestinal paralysis due to neuropathy of Auerbach's plexus. Reduction of intra-abdominal pressure became liable for air sucking through the esophageal sphincter [1]. The abdomen became fully bloated, sounded as a drum when percussed and noiseless when auscultated. Each meal made it worse. Patients laid in supine. Sitting and standing were difficult while squatting and bending became impossible. It might cause breath difficulty, mild tachycardia and hypotension in severe cases. The acute form was usually severe or life threatening while the chronic form was milder and often with frequent flatus and belching.

A case with profound flatulence and precipitant urination

In a neighbor clinic, a patient's abdomen became fully bloated following successive exhaustive labor for one week. He had short but rapid breathes, rapid but feeble pulses, hypotension and frequent precipitant urinations. Intravenous glucose dripping gave only advancement. Thiamin HCl 200 mg was then added into the dripping glucose solution, his bloated abdomen became flattened the next day. Precipitant urination disappeared; breaths, heartbeats and blood pressure returned normal at the same day with intravenous thiamin. He was fully recovered. Yeast and thiamin tablets were then used. The diagnosis should be a mild form of dysautonomia syndrome, which was usually found in severe thiamin deficiency with high fever [2].

Dysfunction of gastrointestinal tract is essential for multiple flatus

In the labor farm and among the poor villagers, gastric bloating, excessive belching and flatus were very common. The primary or major contributory factor should be malnutrition induced dysfunction of gastrointestinal tract, which became irritable and intolerable to gas retention. If large doses of thiamin, niacin or yeast were given, especially injected, gas trouble would be significantly reduced. Actually, multiple flatuses might be one of the earliest signs of thiamin deficiency or pellagra as observed.

Ingested food is responsible to the pathogenesis of gas trouble [3]. However, it might be secondarily important. In an occasion, daily corn food supply for a team of 200 inmate pioneers was interrupted for 2 days when working in the wildness. Their corn diet was replaced totally with fully soaked and boiled soybeans, the well-known bowel gas producer, in all of the 6 meals. Approximately, each laborer consumed 1 kg of soaked soybeans a day. No one developed excessive flatuses or bloating required clinical care when the doctor living with them. This proved that food factor might be less important in gas problem while malfunction of the gastrointestinal tract itself might play a primary role.

Pediatric bloating and constipation

Full bloating in the toddlers or younger was a fatal sign especially after pneumonia. Death was inevitable following full paralysis of gastrointestinal with highly bloated abdomen. Prompt injection of thiamin 100 mg was life saving immediately and also prevented sudden child death several days later.

Another commonly neglected problem was pediatric constipation, resulted from intestinal peristaltic failure due to thiamin deficiency. Feces could stay inside for one week or more and relieved quickly after thiamin injection.

Excretion

Diarrhea: Diarrhea is a universal sign in malnutrition. In thiamin deficiency it might manifest as massive red-brown watery stool. It looked like beef-washing water in terminal cases with or without profound flatulence perhaps due to associated disseminated intra-vascular coagulation. Death was inevitable if thiamin was not promptly intramuscular or intravenously injected. It was often associated with niacin deficiency and parenteral niacinamide was also essential.

Highly peristaltic bowel: In a case of 35 years old, his bowel became so irritable and very noisy after ingesting corn grue, which passed out without observable change in color and constitute within an hour after meal. This was an extreme case of irritable bowel syndrome [4]. However, thiamin deficiency has been rarely considered as one of its etiology and therapy [5] although it was cured with parenteral thiamin promptly.

Feces: In some cases, the excreted was not feces but multiple opaque, milky, jelly-like “feces” of small amount. They were not real feces but small amounts of the intestinal mucous secretions. Therapeutic response to thiamin was excellent. This might be one of the clinical differences of diarrhea in thiamin deficiency with that from pellagra.

Ulcerative colitis: A few cases with fresh blood on their stool surface were treated with intramuscular liver extract. It was curable. One ml of liver extract could keep the stools blood-free for about 5 - 7 days. Because they had no hemorrhoid and digital and anal scope examinations were normal, ulcerative colitis was suspected. However, no radiological film or image could be provided.

Gastrointestinal ptosis

This was essentially sarcopenia of abdominal muscles. About 30% of inmates aged over 55 years and imprisoned over 3 years presented very feeble and thin body build. The upper portion of their abdomen concaved down and the lower portion protruded forming a round dome as if carrying a watermelon inside. That was the drooped gastrointestinal tract pocketed by the feeble abdominal wall. The bottom of the round protrusion hid the groin and genital parts. When this round protrusion was held upward, the right and left inferior epigastric veins were clearly visible. Immediately medial to each vein and just above the pubic bone, typical direct inguinal hernia was seen on both sides. They were button-shaped bulges, about 2.5 cm in diameter and were the typical direct hernias, which were formed in malnutrition due to the muscular weakness in the Hesselbach’s triangle. This direct observation demonstrated that nutritional deficiency not only may cause direct inguinal hernia but also may be a major contributor for hernia recurrence after repair operation.

Refractory anal disorders

In a laborer with prolapsed and engorged edematous hemorrhoids, 1959, subcutaneous deep injection of thiamin 50 mg beside the anus relieved local edema and protrusion. This became an example for vitamin therapy of the complicated anal disorders in civil cases. Four cases with congested and protruded hemorrhoids, anal fistula and/or anal fissure were treated with intramuscular vitamins, thiamin one ampule (100 mg) and vitamin B complex two ampules daily for 2 - 5 weeks. Hemorrhoids regressed, fistula and fissures healed and pigmentation around the anus and gluteal regions disappeared without recurrence. Anal fissure is known to be a part of riboflavin deficiency while anal fistula secondary to local vitamin B deficiency has seldom been described.

In 2018, a man of 61 years old suffered from unidentified infection of lower part of the body and anal hemorrhoid with a painful dilated portion like a date. Benfotiamine 300 mg at the morning and parenteral thiamin 300 mg in the afternoon for one month. Infection and painful hemorrhoid were both cured [8]. Although these were preliminary results, however, it indicated that anus surgery should be updated with vitamins.

Discussion

Alimentary tract was vulnerable to the deficiency of various B vitamins

Clinically, gastrointestinal signs or symptoms of vitamin B deficiency might be the early abnormalities of the depletion. Riboflavin deficiency attacked chiefly both ends of the tract, the mouth and anus, while beriberi and pellagra involved the entire tract, such as epigastric pain, diarrhea, flatulence, irritable bowel syndrome and constipation especially in the aged. It was very difficult, impossible, or unnecessary to identify whether beriberi or pellagra to be the exact cause of diarrhea in some cases because both thiamin and niacin should be used. It is also important to keep in mind that gastrointestinal paralysis in pediatric cases is a fatal sign following severe infection such as pneumonia. Prompt intravenous thiamin must be injected promptly to save life.

Nutraceutical intervention of surgical disorders

Since malnutrition induced hernia formation had been clinically observed with the naked eye, nutritional intervention becomes a reasonable approach to prevent hernia recurrence after its repair surgery.

Pathology of anal disease complex is very complicated, involving at least endothelial dysfunction, vascular smooth muscle cell lesion and tissue inflammation. Therapeutic effect of parenteral vitamin B complex might be due to their anti-oxidant activity against reactive oxygen species [6]. And perhaps, riboflavin and niacin supplementation might improved generation of nitric oxide, an important anti-inflammation factor [7].

Conclusion

1. Multiple disorders other than in current literature can occur in gastrointestinal tract.
2. Large dose of parenteral thiamin may be suitable for updating surgical intervention of anal disease complex including fistula.

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Conflicts of Interest

No conflicts of interests to anybody in any aspect.

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