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A CRITICAL REVIEW ON CONSEQUENCES OF STARVATION

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Abstract: Starvation is an irregular or continuous deprivation of food alone or food and drinks necessary for the maintenance of normal healthy and active life of a person. The number of calories required by a person depends upon his/her ideal weight, normal work and daily activities. Appearance of starvation occurs, when the diet does not meet minimum caloric requirements of the body. Starvation is of two type's viz. acute starvation i.e., total fasting and chronic starvation i.e., malnutrition. Lack of knowledge of gross nutritional value of food stuff, particularly among uneducated population, diseased conditions like loss of appetite, deficient absorption of nutrients, deliberate improper feeding and withholding of food in case of unwanted baby, old or diseased family member, accidents like shipwreck, air crash or famine (food crisis) are some of the condition responsible for starvation. Complete lack of fat in the subcutaneous and deep fat depots e.g. omentum, mesentery etc., distended gallbladder and atrophy of all the organs except brain are some important finding of autopsy in case of starvation. The duration of a person to survive from starvation depends upon the age, gender, environment and the state of health individually. The two definite criteria for a physician to advise forced feeding are loss of weight and acidosis in starved person. The medical questions likely to arise in a case of starvation are whether death was caused by starvation and whether it was suicidal, homicidal or accidental.

Keywords: Starvation, malnutrition, gross nutrition, forced feeding, famine (food crisis), autopsy etc.



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INTRODUCTION

Starvation i.e. protein calorie deficiency is a condition caused by irregular and continuous deprivation of food alone or food and drink, necessary for the maintenance of sound health and normal active life of a person. The number of calories required by a person depends upon ideal weight, normal work, and daily activities. If a person has a desk job and lazy weekends, he will require only about 30-35 calories per kilogram of body weight. For an ideal weight of 60 kg., the caloric requirement would be about 1800 to 2100 calories per day. If one does heavy physical work and is active at weekends, his caloric requirement would be much higher. Starvation appears when the diet does not meet minimum caloric requirements of the body.¹

Types: Starvation may be of two types' viz. acute starvation i.e., total fasting and chronic starvation i.e., malnutrition.

- 1) **Acute starvation (total fasting):** Here the water and food necessary for body are suddenly and completely withheld as in mines or landslides, in entombment in pits and willful refusal to take food. If neither food, nor water is taken, death usually occurs within 10-15 days. But, if water only is taken life may be prolonged for 30-40 days, even up to 60 days or more in some cases.
- 2) **Chronic starvation (malnutrition):** There is gradual deprivation of food, which is poor, both in quantity and quality as in famines, some diseased condition or in camp condition.² Malnutrition is a state that results from taking inadequate food for some period. Nutritional Marasmus and Kwashiorkor are two extreme forms of malnutrition.

Marasmus: Here the individual is emaciated and body weight is less than 60% of the expected weight for age. The skin appears dry and inelastic, hypopigmented hairs, distended abdomen due to wasting and hypotonia of abdominal muscles.³

Kwashiorkor: It is characterized by growth retardation, psychomotor changes and edema of dependent parts. The edema starts initially at lower extremities and later involves upper limbs and face etc. The face is puffy and appears moon shaped.⁴

Causes of Starvation:

A) Failure of taking food:

- a) Ignorance: Lack of knowledge of gross nutrition value of food stuff, particularly among uneducated population.

- b) Diseased conditions like carcinoma of esophagus etc.
- c) Deliberate- Deliberate improper feeding and withholding of food in case of unwanted baby, old or diseased family member.
- d) Other condition- Accidents like shipwreck, air crash or famine etc.

B) Refusal to take food:

- a) In observance of religious rituals which is common in India.
- b) As a form of protest against some alleged injustice like hunger strike etc.
- c) Insanity and anorexia nervosa.⁵

Factors affecting death due to starvation: There are certain factors which affects outcome in starvation these are as follows-

- 1) **Age:** Old person bears the deprivation better than adults due to low requirement. Similarly, adult bear the starvation better than children.
- 2) **Gender:** Female bears starvation better than male due to higher fat store in their body.
- 3) **Condition of body:** Fatty and healthy people bear starvation better than ill and thin.
- 4) **Exposure to cold :** Person exposed to cold cannot withstand starvation because it increases the basal metabolic rate of the body.⁶

Symptoms and signs of starvation:

In acute starvation, hunger pain is felt in the stomach for about two days and it is relieved by pressure. The feeling of hunger is lost thereafter but thirst becomes intense. Apathy is pronounced and fatigue comes on easily. There is progressive loss of body weight. Emaciation, due to loss subcutaneous fat, begins to take place and bones stand out. The victim soon appears pale due to nutritional anemia, the skin is dry, wrinkled, pigmented, sometimes fissured and ulcerated due to superadded infection and drawn tight like parchment over the bony prominences; the lips are dry and cracked; cheeks hollow, eyes sunken and glistening with dilated pupils; abdomen concave, and limbs like broomsticks. The hair becomes dry, lusterless and brittle; and nails brittle and ridged; the tongue is dry and coated with thick fur, and the saliva thick and scanty. The voice becomes feeble, almost a whisper. Muscular weakness is progressing day by day. The body emits an offensive odor. The temperature may be subnormal, the pulse feeble, and blood pressure low due to cardiac atrophy. Edema occurs as a result of

hypoproteinemia. Urine is scanty and deeply coloured, and acetone (Ketone bodies) may be present. Though the bowels are constipated in the beginning, a terminal non-infective diarrhea is common. The mind is usually clear but sometimes just before death, delirium and coma may take place. In the chronic form, the symptoms are the same as in the acute form but more drawn out and the emaciation is therefore much greater.⁷

Fatal period: If both water and food are completely withdrawn, death occurs in 10-12 days. If food alone is withdrawn, death occurs in 6-8 weeks or even later. Death usually occurs when about 70-90% of body fat and 20% of the body proteins are lost. Newborn may survive for 7-10 days without food or water.⁸

Biochemistry of starvation:

When food ingestion ceases, the body enters into a state of starvation. Initially, the body's glycogen stores are used up in about 24 hours. The level of insulin in the blood remains low and the level of glucagon is very high. At this stage the main means of energy production is lipolysis. Through gluconeogenesis glycerol is converted into glucose. Two systems of energy enter into the gluconeogenesis; 1) Proteolysis provides alanine and lactate, 2) Acetylcoenzyme-A, produces dissolved nutrients (Ketone bodies), which can be detected in urine and are used by the brain as a source of energy. In terms of insulin resistance, starvation conditions make more glucose available to the brain.⁹

Autopsy findings:¹⁰

A) External findings:

- Emaciation
- Skin of face is stretched tightly across the cheek bones. Skin appears pale, lusterless and semi-translucent with loss of subcutaneous fat. Skin infection are common, there may be red infected bed sores over dependent parts.
- Eyes are deeply sunken due to loss of orbital fat, cheek bones appear prominent, cheeks are sunken with loss of fat and the lines of jaw are obvious.
- The limbs are almost skeletal due to loss of fat and muscles.
- Ribs are prominent with concavities of intercostals spaces and sunken supra-clavicular fossae, the abdomen is scaphoid or boat shaped.

- Hairs are dry, lusterless and brittle, may be hypopigmented.
- Nails are brittle and ridged.
- There may be edema of feet.

B) Internal findings –

- Loss of adipose tissue from omentum, mesentery and peri-renal fat stores etc.
- Atrophy of organs (except brain) with reduction in size.
- Gut is empty and filled with gas. The wall is contracted and translucent from stomach to colon. Fecolith are usually present and may ulcerate the intestinal mucosal linings.
- Gall bladder is distended.
- Bones may show features of demineralization.

It is always advisable to perform radiography prior to autopsy so as to exclude the physical abuse which is often associated with neglect. Photography should also be performed. In both children and adults, the major problem remains the connection between the cause and effect, especially in the presence of some disease.¹¹

Medico legal importance of starvation:

In general examination, if no criminality is involved, then isolated starvation deaths are of definite social concern. Apart from this, acute starvation deaths are mostly accidental in nature, which may occur in scores or hundreds, in circumstances of natural calamities, like flood, cyclone and earthquake etc. Other accidental starvation deaths may occur inside a mine, in a desert or in the victims of house collapse. Virtual starvation death may occur due to some obstructive pathological condition of upper GI tract, not effectively attended and treated which at times amount to negligence. Suicidal acute starvation deaths have occurred in circumstances of protest “hunger strike” against some alleged social injustice. Homicidal starvation deaths are very rare and the victims are either unwanted newborn infants or old debilitated persons or an enemy, kept confined in an untraceable place.

Chronic starvation deaths, in most circumstances are the result of social injustice, inequality and poverty. Chronic homicidal starvation deaths also occur as a result of cruelty where the victims are usually old and disabled.¹²

Article 21 of Indian constitution guarantees the citizen of India for “Right to life and liberty” and food is basic human need to live the life. Thus in broader sense, it is responsibility of state to provide food for the inhabitant. Hunger striker is a mentally competent person, who has indicated that he has decided to embark on a hunger strike and has refused to take food and/or fluids for a significant interval.¹³

In India, if the hunger striker causes the imminent danger to life as a result of deliberate starvation, such person can be taken into custody by state for forced feeding and to save the life. Provision of attempt to commit suicide may be applied in such cases.¹⁴ Forcible feeding of prisoner, against their will, is not an assault but quite lawful because the prisoners are under the care of state and state must take adequate measures to prevent the prisoner from injuring himself or taking his own life.¹⁵

The doctor treating the hunger striker is faced with dual facts. On one hand, it is his moral duty to exercise his skills to save the life and act in the best interest of the patient. On other hand, it is his duty to respect patient’s autonomy. The problem arises when a hunger striker has issued a clear instruction not to treat him against his wishes. Under such circumstances, the moral obligation urges doctor to save the life but the duty urges to respect the patient’s autonomy.

Discussion: Starvation is withholding of food or food and drink from or by an individual. It is of two types, acute i.e., complete starvation and chronic i.e., partial starvation. In starvation, first of all the reserve carbohydrate of the body, then the reserve fat and lastly the protein are gradually lost due to use. Cardiovascular failure impaired other vital function of the body and intercurrent infections are the cause of death in case of acute starvation while, intercurrent infection, general debility and different deficiency syndrome are the cause of death in chronic starvation. If no criminality is involved, then isolated starvation deaths are of definite social concern. Acute starvation deaths are mostly accidental in nature, which may occur in scores of hundreds, in circumstances of natural calamities like floods, cyclone, earthquake, famine etc. Suicidal acute starvation deaths have occurred in circumstances of protest “hunger strike” against some alleged injustice. The hunger striker must be professionally informed by the doctor of the clinical consequences of a hunger strike, and of any specific danger to his own particular case. Chronic starvation deaths, in most circumstances are the result of social injustice, inequality, poverty and cruelty.

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