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A Critical Review of Tamra and Its Toxicity

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ABSTRACT

Tamra is one of the dhatuja visha, we get ample of references regarding its therapeutic aspects in our ayurvedic literature. It is mainly used in the form of bhasma, if bhasma are not prepared by correct methodology, then it becomes toxic. Copper deficiency can result in the expression of an inherited defect such as Mckusick syndrome. Acquired deficiency is mainly pathology of infants; however, it has been diagnosed also in children and adults. Most cases of copper deficiency have been described in malnourished children. Animal and human studies have shown that copper is involved in the function of several enzymes. Studies have also shown that copper is required for infant growth, host defense mechanisms, bone strength, red and white cell maturation, iron transport, cholesterol and glucose metabolism, myocardial contractility, and brain development. The most constant clinical manifestations of acquired copper deficiency are anemia, neutropenia, and bone abnormalities. Other, less frequent manifestations are hypopigmentation of hairs, hypotonicity, impaired growth, increased incidence of infections, and alterations of phagocytic capacity of the neutrophils, abnormalities of cholesterol and glucose metabolism, and cardiovascular alterations. Acute copper poisoning is well described in animals (especially in cows and sheep). Cases of acute poisoning occur frequently in India.

KEYWORDS

Tamra, Dhatuja, Visha



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INTRODUCTION

Copper toxicity is a much over looked cause of many important health conditions today including fatigue, premenstrual syndrome, anorexia depression, anxiety, migraine headaches, allergies and many other.

Storage of toxic metals in the brain also contributes to mental illness. When the liver becomes over burdened with deposits of various metals and can not safely store any more of these metals. In the case of copper, manganese and iron the secondary storage area is the brain. Excessive levels of copper in the brain are associated with symptoms ranging from depression, anxiety and mood swings to schizophrenia.

VARIETIES¹ – Ayurvedic texts have maintained two varieties of copper

1. Nepaliya
2. Mlechchha

Nepaliya - Variety of copper is found or obtained from Nepal. It is unctuous looking, soft, reddish, in color easily malleable without breaking and does not corrode easily.

Mlechchha – Variety of copper possesses a blackish tinge and is less ductile. The utensils of this type of copper when used, cause ill effects like vomiting etc. and it stains the hands black.

Approval – Nepaliya variety of copper is acceptable one. The copper metal which is

heavy, smooth to erating hard strokes and heavy color like that of China rose is commendable.

For Good Variety⁸- That copper is considered good which is deep red or red like a beak of parrot (suka cancunibha or “Atyanta Sonita” or red like “Japapuspa”, which looks red on cutting or fracture, heavy (Guru), Smooth (Snigdha), Mridu (Soft), malleable and ductile and which could be made into thin sheets, wires, should not turn black on heating. Free from impurities like iron, lead etc. and that which is obtained from the mines of ‘Nepal’ is considered the best and recommended for use.

Inferior variety⁸- That which is grey/pale (pandura), blackish red in colour, hard, light in weight, breakable or brittle, with scales, associated with impurities, remains black even after washing, may cause vomiting sensation and purgation when used internally and which is obtained from the mines other than ‘Nepal’ is known as Mleccha - Tamar and considered inferior and not recommended for use.

It is also mentioned that if copper obtained from ‘Nepal’ is not available then the copper obtained from Tuttha as its Satva is also considered good and may be used.

Ashta Dosh¹ – eight ill effects, like loss of consciousness, giddiness, burning



sensation, sweating, nausea, vomiting, anorexia and restlessness.

Need of purification of Copper (Tamra)⁸-

Intake of unpure copper can reduce longevity of life, lusture, potency & immunity (Bala). can cause vomiting, syncope, lightheadedness, skin disorders & pain. Other deleterious Conditions are Nausea, loose motion, Mania, Burning sensation & delirium etc. But after purification all these effects vanished and its qualities become like nectar. so it is must to perform purification procedure of copper.

Management of the conditions which occurs due to intake of Tamra bhasma⁹-

-coriander juice or decoction with suger (Mishri) for 3 days.

-Manuvrihi (a kind of grain) with suger (Mishri).

SALTS OF COPPER²

1. Copper acetoarsenite
2. Copper arsenite
3. Copper subacetate
4. Copper sulphate (blue vitriol)

PROPERTIES OF TAMRA BHASMA

Tamrabhasma (incinerated copper) is bitter and astringent in the taste, sweet in post-digestive effect and hot in potency. It alleviates Kapha dosha and exerts a potent cholagogue activity.

Absorption and excretion -Copper is a normal constituent of the body. Copper content of the body is 150mg. The safe daily intake of dietary copper is 1.0 to 1.6 mg, it is absorbed through the lungs, mucous membranes and raw surfaces. It is excreted more in bowels than by the kidneys and traces in saliva, bile and milk.

PURIFICATION -

*ताम्रनिर्मलपत्राणि लिप्त्वा निम्बम्बुसिन्धुना |
ध्मात्वा*

सौवीरकक्षपाद्विषुद्वयत्यष्टवारत : || (र.र.स. 5:50)

The copper sheets are coated with the paste of lemon juice and rock salty and heated on fire and dipped into the sour gruel. This procedure is repeated for 8 times.

Test for Copper bhasma – When copper bhasma is not properly formed, it causes 8 types of untoward effects (Ashta dosha), which are maintained earlier.

The optimum quality of incinerated copper shows following properties

वमनं च विरेकं च भ्रमं क्लममथारुचिम् |

विदाहं स्वेदमुत्क्लेशं न करोति

कदाचन || (आ.प्र. 3128)

When properly purified Tamra bhasma ingested then it does not cause vomiting, loose motion, malaise, distaste, burning sensation, sweating and nausea¹.

Uses- Tamra bhasma is useful in liver disorders like hepatitis, gallstones, cirrhosis



and hepatosplenomegally. It stimulates the appetite and helps digestion. It works well in anaemia, anasarca, abdominal pain, ascites, hyperacidity, colitis etc.

DEFICIENCY³ - The main age groups susceptible to its deficiency are low birth weight infants and infants having malnourishment after birth. Deficiency is manifested clinically by hypochromic microcytic anaemia refractory to iron. Biomarkers of copper deficiency include ceruloplasmin and serum copper levels, levels of low- density lipoproteins and cytochrome oxidase activity.

CAUTION – Tamra bhasma should be used sparingly, as it may cause untoward effects. Many a times it is used with other medicines as an adjuvant. When used alone it should be taken under medical supervision. Contraindications of Tamra bhasma should not be used in pregnancy post-partum period, severe debility, tuberculosis, infants, old age and bleeding piles.

DOSAGES – 60 to 120 mg with honey or ghee.

FORMULATIONS – Tamra bhasma is one of ingredients in the preparation like Arogyavardhini Vati, Ekangavir Rasa, Chandrakala Rasa, Talisadi Churna, Tamra Parpati, Panchamrita Parpati, Naracha Rasa, Mahavatavidhvansa Rasa etc.

ACUTE POISONING⁷ – Features appear within 45 minutes of ingestion

1. GIT

i Intense metallic taste in mouth, salivation, thirst, nausea, pain in abdomen and eructation.

ii Repeated vomiting and vomited matter is blue or green in colour (turns deep blue on the addition of ammonia hydroxide, this is not seen with bilious vomiting).

iii Diarrhoea with much straining, stools are liquid and brown (rarely bloody).

iv Jaundice- a common finding (in severe cases).

2. Kidneys- oliguria, haematuria, albuminuria and uraemia.

3. The cramps of legs or spasm and convulsions may occur.

4. Large doses cause- circulatory collapse, shock, complete paralysis of limbs, drowsiness, insensibility and irreversible coma and eventual death.

CHRONIC POISONING⁷–

1. It occur due to the inhalation of copper dust/fumes, such as in welders.

2. Food contaminated with copper green rust obtained from dirty copper vessels.

MODE OF ACTION⁷- Inactivates sulphhydryl enzymes, thus interferes with the cellular metabolism and functions.

DIAGNOSIS –

Complete blood count, prothrombin time, blood copper level, serum ceruloplasmin



levels, tissue metallothionein levels, G6PD activity, and plain abdominal x-ray.

Differential diagnosis - Other clinical conditions like hemolytic diseases, hepatitis and poisoning by other hemolytic agents. The levels of copper in tissues must be determined to rule out other causes of hemolytic diseases.

FATAL DOSE⁵ – 0.15-0.3g/kg (CuSo₄)
i.e., about 20g or a 70kg man.

Antidotes – Mouktika bhasma is used as an antidote of tamra bhasma and fatal period– 1-3 days

MANAGEMENT – Gastric lavage, Antiemetic therapy, Activated charcoal, Most critical steps, Chelation therapy-

(i) BAL- The dose is 3mg /kg every 4 hours for 48 hours and the twice daily for 10days.

(ii) EDTA-I.V. infusion in a concentration of 0.5% over 24 hours.

1. Hemodialysis
2. Liver transplantation

POSTMORTEM APPEARANCE (PMA)⁷ –

1. Skin- yellow (due to jaundice).
2. GIT-
 - i. Greenish blue, frothing at the mouth and nostrils.
 - ii. Mucous membrane- congested, swollen, inflamed and eroded with haemorrhage.
 - iii. Stomach contents- green or blue.

iv. Colon and rectum- ulceration and perforation may be found.

3. Liver- Enlarged and soft with fatty changes.

4. Kidneys-

i. Degenerative changes in proximal tubules with the deposition of copper and the congestion of glomeruli.

ii. Haemoglobin casts may appear in urine. (Liver and kidney changes are also seen in chronic poisoning.)

MEDICO-LEGAL ASPECTS –⁷

1. Homicidal poisoning-rare, due to its physical properties and because only high dose is fatal.

2. Suicidal poisoning- common.

3. Accidental Poisoning-Less common

- i. Swallowing by mistake.
- ii. The formation of copper rust on copper cooking vessel.
- iii. The application of copper salt on broken skin or from its introduction for inducing abortion.

TESTS² – sample + NH₄OH- Greenish blue ppt, if copper is present

Add excess NH₄OH- ppt dissolves giving a blue solution.

CONCLUSION

Copper toxicity is an important contributor to at least one hundred different symptoms and disease conditions. By understanding how copper imbalance comes about and



how it causes metabolic dysfunctions, we can gain many meaningful insights into the correction and prevention of some of today's most prevalent health problems.



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