RATIONALITY OF SWARNA PRASHAN IN PEDIATRIC PRACTICE
Dr. Mahapatra Arun Kumar\textsuperscript{a} Dr. Nisha Kumari Ojha\textsuperscript{b} Prof. Abhimanyu Kumar\textsuperscript{c}

\textsuperscript{a} (Corresponding author) Senior Research Fellow P.G. Department of Ay. Pediatrics (Kaumarbhritiya) National institute of Ayurveda, Jaipur-302002 Rajasthan, India Email – ayuarun@gmail.com

\textsuperscript{b} Lecturer, P.G. Department of Ay. Pediatrics (Kaumarbhritiya), National institute of Ayurveda Jaipur-302002, Rajasthan, India

\textsuperscript{c} Director, All India Institute of Ayurveda Director General, Central Council for Research in Ayurvedic Sciences (CCRAS) New Delhi

Abstract

Swarana (Gold) is well acclaimed for its therapeutic efficacy in Ayurveda texts. Both internal and external use of Swarna (Gold) has been prescribed. As a cultural practice, swarna prashan/lehan is very popular in India. In this samskara, swarna Bhasma with herbs like Vacha Churna (Acorus calamus), Brahmi (Bacopa Monnieri) mixed with Honey and ghee is administered to the new born baby for enhancing immunity as well as for intellectual development. All ancient Ayurvedic texts and particularly Kashyap samhita, details of swarna lehan with it therapeutic utility is described. Swarna Prashan is done by various means including raw gold, Swarna Bhasma etc. Studies shows that by classical bhasmikaran process as described in texts of Ayurveda, there is reduction in the particle size of gold to dimension of about 56-57 nm. Analysis of Various experimental studies shows that Swarna Bhasma possesses immunomodulatory, free radical scavenging activity, antistress activity and analgesic activity. Toxicity study shows that chronic administration of Swarna Bhasma is non toxic as judged by various laboratory and histological parameters. However, scientific evidences regarding the safety and efficacy of Swarna prashan in pediatric practice is lacking and hence this practice should be avoided or used with utmost caution.

Key words: Swarna, Bhasma, Ayurveda, Lehan

INTRODUCTION

Gold has been always considered to possess potential therapeutic efficacy. The use of gold in medicinal preparation can be traced back for thousands of years and it has been mentioned in medical literature
Gold is a transition metal and group 11 element of periodic table. This metal has an atomic number 79 and atomic mass 196.96655. The melting and boiling point of gold is 1104.43°C and 2807.0°C respectively. Its name origins from the old English word ‘geolo’ which means yellow. Gold is represented by symbol ‘Au’ in chemistry which is originated from the Latin word *aurum*. This metal is the least reactive chemical element known after noble gases.\(^2\)

In *Ayurvedic* literature gold is used both externally and internally for therapeutic purposes. Externally *Swarna dharana* (wearing of gold ornaments) is considered pious and mainly use in *grahabadha*. Internally it is either in the form of rubbed gold (*Vidhrisya dhoute drishadi*), incinerated gold or *Swarna Bhasma, Swarna Lavana* (Described in *Rasatarangini*) or *swarna vark* (Mostly used in *Unani system of medicine*).\(^3\)

Traditionally *Swarna Prashan* is done as cultural practice in India. Mainly after delivery raw gold is rubbed on a stone with the help of little amount of water and is administered along with honey and ghee. In some places, *Swarna Bhasma* is administered to newborn babies along with drugs like *Vacha Churna* (*Acorus calamus*), *Brahmi* (*Bacopa Monnieri*), *Madhu* (Honey) etc. It is the matter of curiosity to all that is there really any benefit of this cultural practice or just it is another mass euphoria. The research on the effects of internal administration of swarna is very less. Very few published papers are there which suggest the pharmacology of *Swarna Prashan*. Review of the papers depicting the efficacy of swarna is discussed in the present article.

**METHODS**

Classical texts of *Ayurveda* as well as PUBMED, MEDLINE database were used for the search of relevant literature and research papers. Papers published between Jan 1960 to Jan 2012 were only considered. The key words used for the search was ‘*Swarna Bhasma*, ‘*Ayurveda*’ etc. In-vitro analysis, experimental trials as well as clinical studies were included in the review to search out the reported therapeutic potential of
Swarna Bhasma. Only research articles published in English language were considered. Papers in other languages were approved when there was an English abstract containing data essential for the study.

RESULTS AND DISCUSSION

Classical procedure of Swarna Lehan

The procedure to Swarna Lehan, is described in Kashyap Samhita in much detail. It is mentioned that, keeping face towards east, gold should be rubbed on a washed stone with a little quantity of water. Then it should be churned with Honey and Ghrita and should be given to the child for licking. Kashyapa opines that feeding of gold increases intellect, digestive and metabolic power, strength, gives long life; is auspicious, virtuous, aphrodisiac, increases complexion and eliminates the evil effects of grahas. Further it has been mentioned that by feeding the gold for one month, the child becomes extremely intelligent and is not attacked by the diseases and by using for six months, is able to retain what-so-ever he/she hears. Sushruta and Vagbhat have prescribed gold along with various drugs to the newborn child immediately after birth. Sushruta has advised its use after emesis of liquor-amnii, but before massage\(^4\) and bath while Vagbhata has indicated it after massage and bath but before emesis\(^5\). The drugs prescribed by Vagbhata is advised to be given through spoon made of gold.\(^6\) The basic concept of this gold licking is entirely different as it is used only once in Jatakarma Samskara performed just after birth. Sushruta\(^7\) and Vagbhat have further prescribed four gold preparations for prolonged use.\(^8\)

Utility of Swarna Bhasmikaran process

Swarna (Gold) is one of the most non-reactive metals known to mankind till date. In this context for making the Swarna therapeutically useful, there are mainly two requisites. First is reduction in particle size of the element. Unless the particle size is not reduced, it will not be absorbed or metabolized and will not impart any of the mentioned therapeutic effects. The second most important criteria is existence of metal in human body in ionic form. Non reactive substances will not impart any effect and will lie inert.
Swarna bhasmikaran is an ancient concept of reduction of the particle size of gold and making it a little reactive, so as to enable it pharmacological properties. Recently Bhasmas are considered to be biologically produced nanoparticles. As per the classical reference in ancient text of Ayurveda, Swarna Bhasma is prepared by Putapaka method. This method involves mainly three steps i.e Shodhan (Purification of gold to haul out physical impurities), Bhavna (wet grinding for reduction of particle size) and Maran (incineration for further reduction in particle size under temperature). These procedures of Bhavna and Maran are repeated several times on the metal as the classical references. The incinerated matter is then well grinded and a brownish red powder i.e. Swarna Bhasma is obtained.

Now question arises, whether these ancient procedures really have any impact on the metal. In this context, Brown et al (2007) in their study evaluated the physico-chemical characterization of Swarna Bhasma by using atomic absorption spectrometer, FT infrared spectroscopy, transmission electron microscopy, Atomic force microscopy and x-ray diffraction analysis. Atomic absorption spectroscopy revealed that Swarna Bhasma contain 92 % gold. Cold vapor method of atomic absorption spectroscopy demonstrated absence of mercury which can considered as a marker for proper incineration. No organic compounds were found through infrared spectrum of Swarna Bhasma. Same study has shown Swarna Bhasma principally constituted to globular gold particle of 56-57 nm. These results implicate that, particle size of gold in Swarna Bhasma is in nanometer dimension. In a recent investigation, instrumental neutron activation analysis and electron microscopy was used to study the gastrointestinal uptake and subsequent distribution of 4, 10, 28 and 58 nm diameter metallic colloidal gold particles following oral administration to mice. Studies show that particle uptake occurred in small intestine by persorption through single degrading enterocytes in the process of being extruded from a villus. Swarna Bhasma principally constituted globular gold particle of 56-57 nm and thus it is possible that these particles would reach the target site of action through blood after gastrointestinal uptake.
Review of pharmacological effects of Swarna Bhasma

The research on the effect of internal administration of Swarna in form of Bhasma is really very scanty. Very few published papers are there which suggest the pharmacological activities of Swarna Lehan. Reviews of the papers depicting the efficacy of Swarna Bhasma are as follows:-

Immunomodulatory activity

In Kashyap samhita, while describing the benefits of Swarna Lehan, Acharya Kashyap opines that, by feeding the gold for one month, the child is not attacked by any disease. This classical description implicates that ingestion of Swarna modulates immune mechanism, so that morbidity is reduced. Now, it is matter of debate regarding the scope of Swarna Bhasma in modulating the immune mechanisms of the newborn, so that, the child will not get any sort of disease. Research papers on the effect of Swarna Bhasma on immunity are very few. In an experimental study, Bajaj et al (2001) evaluated the efficacy of Swarna Bhasma on non-specific immunity in mice. Male mice were administered with the incremental doses of Swarna Bhasma orally for 10 days. It was observed that, Swarna Bhasma significantly (p<0.001) increased counts of peritoneal macrophages and stimulated phagocytic index of macrophages. This demonstrates the immunostimulant activity of traditional Ayurvedic formulation ‘swarna Bhasma’ on Macrophage functions. Studies on the effects of Swarna Bhasma on specific immunity are not available. However, a gold formulation, Kustha tila kalan used in Unani-tibb was evaluated for immunomodulatory activity in male mice and parameters were used to evaluate the effect on cell mediated as well as humoral immunity. Kustha Tila Kalan was orally administered to animals at dosage of 6.25, 12.5, 25 and 50 mg/kg body weight for 10 days. Cell mediated immunity was assessed by measuring delayed type of hypersensitivity response while humoral immunity was evaluated using plaque forming cell assay. Kustha Tila Kalan augmented both the immune responses at dose level of 6.25, 12.5 and 25 mg/kg. The optimum activities were recorded at a dose of 25 mg/kg.
Free radical scavenging activity

Mitra et al. (2002) evaluated the free-radical scavenging activity of Swarna Bhasma using experimental animal model. It was observed that chronic Swarna Bhasma treated animals showed significantly increased superoxide dismutase and catalase activity. These two enzymes reduce free radical concentration in the body. Antioxidant/restorative effects of Swarna Bhasma against global and focal models of ischemia (stroke) is also reported.

While describing the indications of Lehan karma in pediatric population, Acharya Kashyap explains that, babies born to Dushprajata mothers should be administered with Lehan (Swarna Lehan). Dushprajata literally means women with bad obstetrical history or difficult labor. This term broadly includes to all mothers who present with prolonged labor, either delivering prematurely or post term, abnormal presentation, along with associated complications like preeclampsia, etc. In short, all conditions which are not normal in an obstetric case can be considered as Dushprajata.

Now, it is a matter of logical reasoning that why ancient scholars mentioned to give Lehan to babies born to these dushprajata mothers. Now days, with medical knowledge ever expanding and developing, in order to reduce morbidity and mortality, scheduled caesarean section is performed on these dushprajata mothers. It is a matter of interest to investigate regarding differences between babies born to normal mother and dushprajata mothers.

A very recent study evaluated the effects of the mode of delivery on oxidative antioxidative balance of mothers and infants. It was observed that both the mothers and neonates in scheduled caesarean section group were exposed to higher oxidative stress as compared to those in normal spontaneous vaginal deliveries patient group. It was further reported that the antioxidant mechanisms in babies are insufficient to cope with this stress during caesarean section.
Another group of indication of Lehan or Swarna Lehan as prescribed in classical text is Ashira Janani, Alpakshira, and Dusta Kshira Janani. Akshira janani refers to those mothers who don’t breastfed their infants or mother with complete lactation failure. Human milk has potent antioxidative properties. It is observed that breast fed babies have lower oxidative stress intensity and have higher anti-oxidative capacity in the blood as compared to formula fed children. This indicates that, babies who are not being breastfed are prone to free radical induced damage.

Oxidative stresses have been implicated as cause of many abnormalities in newborn. Swarna Bhasma has been found to possess anti-oxidative properties and its administration may reduce free radical induced damage in neonates. However, more research is required to validate Swarna Prashan conclusively.

**Analgesic activity**

In an experimental study, Swarna Bhasma was investigated for analgesic effects in rats and mice using four types of noxious stimuli. It was observed that, the test drugs Swarna Bahasma at a dose of 25-50 mg/kg, p.o exhibited analgesic activity against chemical (acetic acid induced writhing), electrical (Pododolorimeter), Thermal (eddy’s hot plate and analgesiometer) and mechanical test.

**Antistress effect**

Shah et al (2005) investigated the therapeutic potential of Swarna Bhasma in restraint induced stress at different time points of 01 hour, 02 hours and 04 hours using experimental rat model. Rats were pretreated with Swarna Bhasma in a dose of 25 mg/kg orally for 10 days prior to restraint stress. Brain catecholamine, serotonin and plasma corticosterone levels were determined following 01, 02 and 04 hours restraint stress, using HPLC and also plasma corticosterone using luminescence spectrophotometry. It was observed that Swarna bhasma restored restraint stress induced elevation in levels of brain catecholamines (norepinephrine, epinephrine and dopamine), 5 HT and plasma corticosterone to near normal levels.

**Toxicity studies**
In an experimental model, it was observed that, acute oral administration of Swarna Bhasma showed no mortality in mice (upto 1 ml/20 g body weight of Swarna Bhasma suspension containing 01 mg of drug). Moreover, chronic administration of Swarna Bhasma also showed no toxicity as judged by SGOT, SGPT, serum creatinine and serum urea level and histological studies.19

CONCLUSION

Use of Swarna (Gold) as therapeutic agent has a very long history. In Ayurveda, swarna (Gold) is advocated in form internal and external medication for treatment of various ailments. As a internal medication, swarna (Gold) is mainly used in form of Bhasma (Incinerated form). Swarna Prashan/Swarana Lehan as a cultural practice is very popular in India. The process of swarna prashan/Lehan is described in detail in Ayurveda. Studies show that, classical bhasmikaran process as described in ancient Ayurvedic texts reduces the particle size of gold particle in a range of nanometers. Pharmacological review of Swarna Bhasma reveals that it possesses immunomodulatory, free radical scavenging activity, analgesic activity and antistress activity. However there are insufficient scientific evidence to suggest the efficacy and safety of Swarna Prashan/ swarna lehan in pediatric population. In this context, more research studies are anticipated to ensure the safety and efficacy of this traditional cultural practice.

REFERENCES


