TO THE ROOTS OF ANTIBIOTIC RESISTANCE

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Abstract:
Disease is a condition effecting both mind and body, and its nomenclature states various approach to understand the condition like Papma, Jwara, Yakshma, Aadanga, Gada etc. To understand this condition and to bring back the diseased to health is the first and foremost duty of the Vaidya for which there is inevitable requirements of four factors via, Bhishak, Dravya, Upastha and Rogi, which is the last and most important, without which the science will cease to exist. As previously mentioned the term Gada is synonymous to Vyadhi or Roga. So anything antagonistic to a Gada is termed as Agada. A Vyadhi or Gada is tackled with effective and judicious use of Oushadha or Agada. Here even a poison is considered as an effective Oushada if used rationally. Whereas a potent Oushadha can be fatal if used irrationally. In recent past in 20th century there was invention of a revolutionary mode of medication called, antibiotics*which strictly based its theory on action of medicines on living entities. Body acts effectively against the disease causing agents when the antibiotics are introduced in to it. Like everything, this also comes with its own drawbacks which seems strikingly similar to the concept in Ayurveda about use of Oushadha and knowledge of Visha. Antibiotic resistance occurs when bacteria change in response to the use of these medicines. Antibiotic resistance is rising to dangerously high levels in all parts of the world. Understanding the pathophysiology behind the antibiotic resistance via Ayurveda gives better scope against the adverse effect of antibiotic resistance.

Keywords: Antibiotic Resistance, Visha, Visha gara vairodhika prasamana, Janapadodhwamkara vyadhis, Rasayana

Introduction

Ayurveda is resurfacing, what once was considered bizarre and outdated is now a trend and innovation. Dr. Marc Mitchell and Dr. David Wartinger1 were awarded Nobel Prize for a technic of treatment mentioned years before in
samhitas. Ayurveda did always look upon the health of a person in a broad aspect considering personal social physical and mental levels. Treatment by giving medicine to a disease was merely a part of treatment modality explained in science of Ayurveda. It greatly understood and emphasized on understanding oneself and the world around. Starting from the day to day activities mentioned as in Dinacharya which dictates the regimens to be followed to therapies like Rasayana which rejuvenates the body and mind. Disease is a condition effecting both mind and body, and its nomenclature states various approach to understand the condition like Papma, Jwara, Yakshma, Aadanga, Gada etc. To understand this condition and to bring back the diseased to health is the first and foremost duty of the Vaidya for which there is inevitable requirements of four factors via, Bhishak, Dravya, Upastha and Rogi. Rogi is the last and most important, without which the science will cease to exist. Hence proper understanding of Catushpaada and its essence is required.

According to Acarya the excellence of all the aspects of Catushpaada shows its effect on treatment which he states as a Bhashaja. And Oushadha mentioned in the Catushpaada is only an aspect to be considered in treatment of a diseased condition. Whereas, Bhashaja encompasses all the potential effect of the Catushpaada. As previously mentioned the term Gada is synonymous to Vyadhi or Roga. So anything antagonistic to a Gada is termed as Agada. A Vyadhi or Gada is tackled with effective and judicious use of Oushadha or Agada. Here even a poison is considered as an effective Oushadha if used rationally. Whereas a potent Oushadha can be fatal if used irrationally.

Human body is an ingenious machine made of intricate parts and system which are always intertwined. And a slight derangement can cause the system to go haywire. Any factor which can cause this derangement has to be managed. Ayurveda has been doing this for ages and still holds strong. In recent past in 20th century there was invention of a revolutionary mode of medication called,
antibiotics which strictly based its theory on action of medicines on living entities. Body acts effectively against the disease causing agents when the antibiotics are introduced in to it. Hence bringing about normalcy. As it is used in array of disease its acceptability has drastically increased from the day of its genesis. Like everything, this also comes with its own drawbacks which seems strikingly similar to the concept in Ayurveda about use of Oushadha and knowledge of Visha. The presentation of similar anomaly is termed as antibiotic resistance according to recent science of medicine. Antibiotic resistance occurs when bacteria change in response to the use of antibiotics. Bacteria, not humans or animals, become antibiotic-resistant. These bacteria may infect humans and animals, and the infections they cause are harder to treat than those caused by non-resistant bacteria. Antibiotic resistance leads to higher medical costs, prolonged hospital stays, and increased mortality. The world urgently needs to change the way it prescribes and uses antibiotics. Even if new medicines are developed, without behavior change, antibiotic resistance will remain a major threat.

PRECAUTIONS

- Irrational use of antibiotics without the prescription of a certified health professional.
- Always follow your health worker’s advice when using antibiotics.
- Never share or use leftover antibiotics.
- Prevent infections by regularly washing hands, preparing food hygienically, avoiding close contact with sick people, practicing safer sex, and keeping vaccinations up to date.
- Prepare food hygienically, following the WHO Five Keys to Safer Food (keep clean, separate raw and cooked, cook thoroughly, keep food at safe temperatures, use safe water and raw materials) and choose foods that have been produced without the use of antibiotics for growth promotion or disease prevention in healthy animals.
- Cleanliness of surroundings.

Antibiotic is the biggest discovery of modern medical science and the irrational use of it makes the threat to the life. Similar concept is being told
when *Visha* and its use is mentioned. *Visha* is a broader term used according to context. Here the signs and symptoms of *Visha* described in the classical texts of Ayurveda are similar to signs and symptoms of Antibiotic resistance\(^\text{11}\).

<table>
<thead>
<tr>
<th>Signs and symptoms of Antibiotic resistance</th>
<th><em>Visha Lakshana</em></th>
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<tbody>
<tr>
<td>Fever</td>
<td><em>Jwara</em></td>
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<tr>
<td>Pneumonia</td>
<td><em>Phena</em></td>
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<tr>
<td>Upper respiratory tract infection</td>
<td><em>Swasa</em></td>
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<tr>
<td>Respiratory failure</td>
<td><em>Swasa</em></td>
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<td>Pulmonary hemorrhage</td>
<td><em>Dusyati shonitam</em></td>
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<td>Bronchitis</td>
<td><em>Hrudi vedanam</em></td>
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<td>Vomiting</td>
<td><em>Chardhi</em></td>
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Poison is given its due importance in causing any disease by the triads of Ayurveda via *Caraka samhitha*, *Susrutha samhitha* and *Ashtanga hrudaya*, wherein treatment in condition of affliction of poison is coined as *Agada tantra* by Acharya Susrutha\(^\text{12}\), *Damshtra chiktsa* by Acharya Vaghbata\(^\text{13}\) and *Visha gara vairodhika prashamana chikitsa*\(^\text{14}\) by Acharya Caraka. Here emphasizing on *Visha gara vairodhika prashamana* by Carakaacarya gives us an insight on the extent of application of knowledge of *Visha* and its treatment.

Antibiotics is a medicine that inhibits the growth or destroys microorganisms and it is commonly known that the use of antibiotics in any treatment has a structured protocol to be followed. Any disturbance to follow the protocol can generate its harmful effect on the body. Duration of use of antibiotics in any treatment is commonly not less than 7 days according to NIH\(^\text{18}\). In

In the context of explaining *Ashtangas* of Ayurveda\(^\text{15}\), the commentator *Cakrapani* explains the meaning of *Gara* as *Kalantara prakopi visham*\(^\text{16}\), which means *Gara* is the one which act as a *Visha* on prolonged use. Similarly according to commentator according to commentator Arunadutta\(^\text{17}\) of *Ashtanga hrudaya*, *Damshtra* is having similar presentations to that of poisoning. Hence *Gara* can be considered to be the one which can fabricate the genesis of disease irrespective of its source of origin.
India 15.7% of overall antibiotic use have antibiotic resistance due to its prolonged irrational use. Prolonged use in any condition can cause habituation. Habituation diminishes the innate response to any frequently repeated stimulus irrespective of its positive or negative effect. Similar to habituation Acharya Caraka mentions the term Satmya\textsuperscript{19}. Gara visha lakshana as previously mentioned is generated because of causes strikingly similar to prolonged irrational use of antibiotics. Production of any antibiotic drug requires prolonged observation and systematic approach to have its effective positive outcome in its use. Though it is seen that there are innumerable antibiotics in the market for various kinds in diseases and which positively shows its effect on the health sector, it comes with a major drawback when considered on the aspect of the production and its waste management\textsuperscript{20}. A report says that pharmaceuticals companies are the contributing factors to spread of drug resistant microbes and infections caused by them through unhygienic production processes and dumping of inadequately treated antibiotic waste. This can be considered as the underlying cause for the difficulty for management of antibiotic resistant microbes and the diseases caused by them, as these microbes are habituated or Satmya to the effluents or byproducts of improper or irrational waste management by pharmaceutical companies. These microbes which produce diseases are the cause for Janapadhodhwamsa vyadhis.\textsuperscript{21}
In the same chapter there is the first reference of use of Rasayana for management of Janapadhodhwamsakara vyadhis where Acarya mentions Rasayana chikitsa as one of the most efficient mode of management when people suffer from Janapadhodhwamsakara vyadhi caused due to pollution or vitiation of Vayu, Udaka, Desa and Kala which effects a large number of population. In the same chapter there is a mentioning of effect of Rakshasa which can be correlated to microorganisms in this context of Antibiotic Resistant micro-organisms. Acarya also mentiones the importance of maintenance of proper Agni for better results when the treatment of Rasyana is used. To bring out the maximum potential effect of Rasayana chikitsa maintaining the Agni to its highest can be done by judicious use of Samshodhana chikitsa and proper paschat karma. This briefs about the management of Janapadhodhwamsakara vyadhis caused due to Antibiotic Resistant microbes where the resistance is caused due to irrational and inappropriate waste management.

Also in antibiotic resistance in human body as previously mentioned presents itself with numerous diseases for which the line of management to be followed, according to Acarya is Visha gara vairodhika prashamanam. Here the meticulous use of Vishagna dasheman has to be done. Keeping in mind that antibiotic resistance shows similar lakshanas like that of Visha lakshanas seen in the body. It includes Haridra, Manjishta, Suvaha, Suksham ela, Paalindi, Candana, Kathaka, Sireesha, Sindhuvara and Sleshmaataka. The infection is the crucial symptom seeing in the Antibiotic resistance and which leads to the fatality of a person. Many studies proved that Haridra is one of the best anti-inflammatory, antimicrobial and anti-bacterial drug. One of the active principle in Haridra, Curcumin has shown to inhibit a number of different molecules involved in inflammation including phospholipase, lipoxygenase, COX-2, leukotrienes, thromboxane, prostaglandins, nitric oxide,
collagenase, elastase, hyaluronidase, interferon-inducible protein, tumor necrosis factor, and interleukin-12. For effective management of antibiotic resistance proper screening of causative factor and understanding the depth of its effect is of prime importance. The ultimate one suffering this antibiotic resistance is the human body whether it is caused due to improper waste management or irrational use of antibiotics. Hence understanding antibiotic resistance in the light of maintenance of health of oneself and the health of the society is inevitable in field of heath science.

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Source of Support: NIL
Conflict of Interest : None declared