Impact Factor (SJIF): 5.158 E-ISSN: 2583-7206, P-ISSN: 3049-2432

International Journal of All Subject Research

Received: 03/June/2025 IJASR: 2025; 4(4):06-10 Accepted: 19/July/2025

Concept of Mandagni with Special Reference to Hypochlorhydria

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Abstract

Jatharagni is responsible for proper digestion and metabolism of food. Mandagni, is an abnormal state of Jatharagni. According to Ayurveda, Mandagni is considered a root cause of various diseases in the body. This work explores the aetiological factors of Mandagni from both Ayurvedic and Modern medical literature perspectives drawing a parallel with hypochlorhydria, a condition characterized by low gastric acid secretion. The study categorizes causes of Mandagni under diet, lifestyle, disease states, psychological factors, seasonal variation, age, and body constitution as per Ayurvedic texts. Similarly, modern causes such as chronic gastritis, gastric surgeries, acid-suppressing drugs (e.g., proton pump inhibitors), and psychological stress are examined in relation to hypochlorhydria. The pathogenesis (samprapti) of Mandagni reveals disruption in Agni leading to formation of Ama, impaired metabolism, and a wide range of disorders including gastrointestinal and nutritional diseases. The findings establish a strong interrelationship between Mandagni and hypochlorhydria, highlighting the clinical relevance of this Ayurvedic concept in the management of digestive and systemic illnesses in both traditional and modern contexts.

Keywords: Mandagni, Jatharagni, Hypochlorhydria etc.

Introduction

Mandagni itself is not a disease, it is an abnormal state of Jatharagni (Pachakagni). The qualitative and quantitative deficiency state of Jatharagni is designated as Mandagni. According to Ayurveda this Mandagni is the root cause of various diseases rather almost all the diseases in the body [1]. In Madhavnidana Madhavkar also describes Mandagni as a state of Jatharagni which produce by aggravation of Kapha. The state Mandagni, in general, is seen among the Kapha prakriti purusha. It is to be mentioned that this state may arise in persons other than kapha prakriti, i.e. vatik, paittik etc., due to faulty administration of diets along with some gastric antisecretory dugs like-omeprazole that produced Hypochlorhydria [2] which is equivalent to Mandagni.

Materials and Methods

This conceptual study was performed based on a critical analysis of both ancient Ayurvedic literature and contemporary medical literature. Ayurvedic references were mostly taken from authoritative texts like Charaka Samhita, Sushruta Samhita, Ashtanga Hridaya, and Madhava Nidana. These works were studied to identify the etiology and pathogenesis of Mandagni. Concurrently, appropriate contemporary medical textbooks were reviewed to examine the pathophysiology of hypochlorhydria and it's clinical features. A comparative analytical method was used to correlate Mandagni with hypochlorhydria, with an emphasis on common etiological and pathological features.

Aetiology

Diet Related Aetiology: Faulty adaptation of food habit like samashana, visamashana and adhyasana leads to the suppression of the power of agni, and produced Mandagni. Samasana means if the person Consumes "pathya" and "apathya" Food at a time. This leads to disturbances in the digestive mechanism, Visamashan means excessive intake of food or less intake of food and untimely food which diminished the digestive fire (pachakagni). Untimely food leads to the disturbances in the normal function of the agni. Due to the excess intake of water dravaguna of the water suppress the normal function of agni (dravaguyna of pitta increase), this leads to mandagni. If the person is not taking the food this leads to vitiation of vatadosa especially samanavata which leads to Mandagni. If the person takes the food in a improper time and quantity by this Agni is unable to maintain its normal functions because of irregularity in the food habits leads to Mandagni. Excess intake of food leads to the kapha vriddhi, which leads to the Mandagni. Food which is heavy for the digestion is called guru bhojan, by this Kapha vriddhi exists in the body and this leads to Mandagni. Excess intake of the cold things leads to the vriddhi in the kapha and also kshaya of pitta, leads to Mandagni. Excess intake of dry food leads to vata prokapa or vata vriddhi which disturbed the function of agni and manifest Mandagni vikara. Intake of

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contaminated food leads to the disturbance in the dosas which leads to Mandagni.

Life Style Related Aetiology: Sleep during day time leads to kapha vriddhi on the contrary which nullifies the functions of the Agni and Manifest the Mandagni. Disturbances in the sleep leads to the vitiation of Vatadosa, this leads to the disturbance in the function of Agni and Manifest the Mandagni. Due to the Suppression of the natural urges vatadosa is vitiated & aggravated and leads to Mandagni.

Aetiology Related to Panchakarma Procedure: Due to the faulty administration of pancha karma therapy leads to the vitiation in the dosas, by this agni functions will become dull and leads to the Mandagni.

Disease Related Aetiology: Those who are suffering from any diseases for a prolonged peried produced derangement of dosas, dhatus, Malas, sense organ, mind as well as the disturbances of the metabolism of the body and manifest Mandagni.

Mental State Related Aetiology: Due to kama (lust), kroda (anger), soka (grief), lobha (greed), Bhaya (fear) vatadosa is vitiated and aggravated and disturbs the functions of the Agni and manifest Mandagni.

Season Related Aetiology: Due to sanchaya of kaphadosa in shishira ritu, due to prokapa of vatadosa and sanchaya of pitta dosa in varsa ritu, and prokopa of kapha dosa in vasanta ritu are responsible for the disturbance of the functions of the agni because of dosic imbalance in the consequent ritus leads to the Mandagni related diseases.

Age Related Aetiology: Mandagni manifests in the vriddhavasta due to the predominance of vata in vriddhavastha and the dhatu kshaya of the vriddhavastha also increases vatadosa which leads to vata prokopa and manitest Mandagni. In the child age group kaphadosa is predominant, which suppress the functions of agni and manifest Mandagni.

Constituency Related Aetiology: In kapha prakriti persons kapha is dominating and which always suppress the agni and mandagni exists in the body. In vata prakriti persons vatadosa is dominating so the vata vardhak ahara easily vitiated vata which leads to mandagni. Abnormal samana vata sometimes stimulates and sometimes suppress the agni and produced mandagni.

Modern Drugs Related Aetiology: Acid secretion may be reduced either by blocking the interaction of histamine or acetylcholine with their receptors on parietal cells (histamine H_2-receptor antagonists or antimuscarine drugs) or by interfering the machinery of the parietal cells (prostaglandins or substituted benzimidazole. H_2-receptor antagonist [3]– H_2 receptors are located on parietal cell of stomach and the uterus. H_2 receptors are blocked by specific H_2 receptor antagonist, which effectively lower both fasting and food stimulated gastric acid secretion. There are many commercially available H_2 receptors. Such as Cimitidine, Ranitidine, Famotidine, Nizatidine etc. The classic antimuscarinic drug [3], reduce fasting and food stimulated acid secretion by about 50 percent and 30 percent respectively. However these drugs also block other muscarine receptors and produce unwanted side effects such as drowsiness, blurred vision, and urinary hesitancy. Several methylated analogues of Prostaglandin [3] E_1 and E_2 have been developed which when given in a high doses, reduce gastric acid secretion by interfering with the generation of cyclic adenosin monophosphate (CAMP) in the parietal cell. Proton pump inhibitors are extremely potent inhibitor of gastric acid secretion. These drugs inhibit H^+ - K^+ adenosine triphosphatase (ATPase), an enzyme found at the acid secretory surface of parietal cells that mediates final transport of hydrogen ions (via exchange with potassium ions) into gastric lumen. There is a prolonged duration of action even when the blood level of drug are undetectable. Omeprazole in doses 20mg once daily produces hypochlorhydria. The sustained hypochlorhydria produced by omeprazole results in hypergastrinemia. Antacids [3] react with hydrochloric acid to form a salt and water, thereby reducing gastric acidity. In Atropic gastritis destruction of parietal cell occurs, so the secretion of the parietal cell is less than the normal subjects.

Table 1: Showing the aetiology of Mandagni/Hypochlorhydria

In Classics	In Recent Era
In classics, the aetiology of Mandagni (hypochlorhydria) is multifactorial and can be categorized under different headings. One of the major causes is Ahara sambandhi [4] (errors related to diet and drinks). These include Atayambu pan (excessive intake of water); Abhojan (starvation); and Visamasan (irregular diet intake). Furthermore, Atibhojan (excessive eating beyond one's digestive capacity), Atisitala dravya bhojan (overconsumption of cold foods and beverages), Atiguru dravya bhojan (excessive heavy food intake), Atisuskha dravya bhojan (intake of excessive dryfood), and Paryusita dravya bhojan (intake of contaminated food) are also considered detrimental to the digestive fire.	In the recent era, various modern factors have been identified as contributors to Mandagni or Hypochlorhydria. One of the primary causes is the improper administration of certain drugs, these include proton pump inhibitors (omeprazole and lansoprazoleetc), H_2 receptor blockers (ranitidine, famotidine, and nizatidineetc), along with frequent use of antacids. Other medications like prostaglandin and antimuscarinicdrugs contribute to Mandagni.
Another important category is Vihara sambandhi (errors in practices), this includes Diva Nidra (day sleep), Swapnaviparyaya (insomnia), and Vegodharan [4] (suppression of natural urges). Pancha karma sambandhi [4], which refers to the faulty administration of Panchakarma therapies i.e. ayoga and atiyoga of snehan, vaman and virechan.	In addition to pharmaceuticals, improper administration of food and drinks, fried food, bakery food, excessive intake of tea, coffee, alcohol, freezed food, cold drinks for prolong time.
Roga sambandhi [4] (chronic diseases) e.g. Jeerna jwara, Prameha, and Grahani.	Surgical conditions, such as partial gastrectomy [6] with vagotomy, can also impair gastric secretion and digestive capacity.
Manasika karana [5] (psychological factors) play a crucial role in Agni disturbance. Emotional imbalances such as Kama (lust), Krodha (anger), Soka (grief), Lobha (greed), and Bhaya (fear) are known to impact the mind–body connection and disturb digestive function.	Pathological conditions like chronic atrophic [6]gastritis, gastric ulcer [6], gastric polyp [6], and gastric carcinoma [6] directly damage the stomach lining and its ability to function properly. Moreover, an imbalance in certain endogenous peptides-such as somatostatin, glucagon, secretin, and gastric inhibitory peptides-can suppress acid secretion, thereby weakening digestion. Mental depression, severe hypocalcimia and old age are also cause of Mandagni.

Kala sambandhi (season and climate or stages of life) includes time related factors such as Ritu, (especially during Varsha, and Vasanta), and Baya (age), where both Vriddha (old age) and Bala (childhood) are naturally vulnerable periods for Agni due to underdevelopment or decline in strength.	
Vega dharan (suppression of natural bodily urges): i.e. Mala (faeces) or Mutra (urine) etc., cause of Mandagni.	
Prakriti (temperament of person) [7] Kapha Prakriti person Vata Prakriti person sometimes.	

Pathogenesis of Mandagni

Due to above mentioned various aetiology there is kapha vriddhi (mainly). Besides there may be pitta kshya or there is increase of vata which over powered the pitta (vata vritta pitta) [8] these contaminates the diets, rasa & rakta too, leads to sanga of Annavaha-srota. Digestive-juices not properly secreted from amasaya, agnasaya, yakrit etc, giving rise to different types of amasyottha and pakyasoyattha vyadhi (Gastrointestinal diseases) and also produces different types nutritional and metabolic disorder. Mandagni or decreased condition of Agni in respect of pramana (quantity), Guna (qualities) and karma (functions). This agni is unable to digest the food properly as a result plenty of amadrabyas (improperly processed materials) remain in the ahara rasa. The rasa dhatu that gets formed from it shall also have ama in it. This sama rasa (rasa containing amadravyas) goes for circulation and finds itself unable enter into the minute srotas (pores) of the dhatus, Causes, srotorodha (obstruction) and accumulates outside the dhatu is the most common type of abnormality found in majority of diseases.

Samprapti Ghataka

- **Dosa:** Kapha vriddhi (Main)/pittoshmakashyay/vata vritta Pitta.
- **Dushya:** Rasa (sometimes Rakta also)
- **Srotas:** Annavaha srotas
- **Srotodusti:** Sanga (Digestive juice not properly secreted from amasaya, agnasaya, yakrit, etc.)
- **Adhisthan:** Amashaya & Pakvasaya.
- **Udbhav Sthan:** Amasaya.

Kapha dosa is the main factor to produce Mandagni and kapha prakriti Persons develops Mandagni easily. But pitta dosa and vata dosa also Produces Mandagni as follows.

- **Vata produces mandagni as follows**

Aggravated vata superimpose or cover the Agni (pitta) and produces Mandagni. [9]Vatik and slishmik jwara are produces due to Mandagni. [10]

- **Pitta produces mandagni as follows**

If the "draba" Guna of pitta is aggravated it suppress the "usna'' guna of pitta and produces Mandagni leads to disease like Poittik Grahani etc. Excess intake of katu, vidahi, amla and kshara rasa in Ajerna roga also produces Mandagni [11].

Role of Jatharagni and Dhatvagni in Digestion and Metabolism

Manda state of Jatharagni cannot digest the food properly and produce "Ama" which is harmful to the body. Jatharagni in equilibrium state (samagni) digest the normal quantity of food properly and produced aharara rasa (Upadana rasa). This "Ahara rasa'' under goes different stages of transformation by bhutagni and dhatwagni (depends on Jathairagni) and maintain nutrition to the body in normal state of these agni and if they are "manda'' and "tikshna'' produces diseases as follows

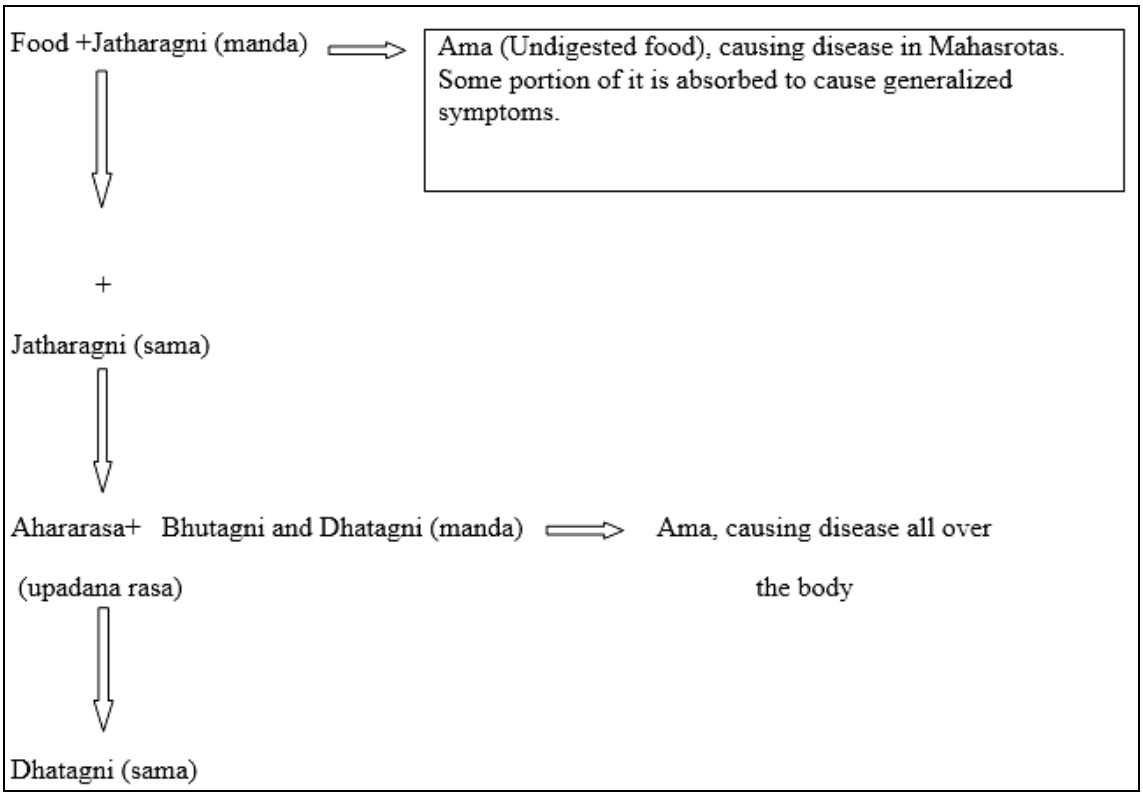

Fig 1: Occurrence of diseases due to imbalance e of agni

i). Asthayi-dhatu+ Pachakamsha (manda) →Vriddhi of the Specific dhatu
ii). Asthayi-dhatu+ pachakamsha (tikshna) →Ksaya of the specific dhatu [12]

Role of Mandagni to Produce Different Types of Diseases

Most of the internal diseases according to ayurveda are due to Mandagni. Such as Udararoga, Grahani, Amlapitta, Ajeerna, Atisara, Agnimandya, Amavata, etc. Udararoga [13] is manifested specially by Mandagni. By consuming the nidana the dosas are collected in the udara, which leads to obstruction in the swedavaha and jalavaha srotas and also it vitiated the pranavayu, jatharagni, apanavayu. All these factors combined together and manifest the udararoga. Vitiated jatharagni unable to digest the liquid food properly. Undigested food is converted into the vidagdha-vastha and produced Grahani roga [14]. By the indulgence of atisara roga nidana, aggravated of vata dosha disturbed jatharagni. So the absorption mechanism is hindered leads to increase mutra and sweda in the body. Vayu brings the excess mutra & sweda into the malashaya thus Atisara [15] manifested. By consuming an atisara roga nidana the dosa become vitiated and leads to agnimandya so the food is not digest properly and manifest Ajeerna roga. By consuming faulty food and activities leads to aggravation of the dosas mainly kapha dosa by this food is not digested properly and manifest the Agnimandya. By the indulgence of amavata nidana the dosas mainly vata and kapha dosa are aggravated and suppress the jatharagni leads to impair digestion and produce "Ama" in the body and spread to kapha sthana and sandhi, ura, sira and kantha with help of vatadosa which obstruct the rasavaha srotas and it takes ashray in the sandhis and manifest Amavata [16].

Pathological Condition in Hypochlorhydria [17]

Decreased acid and pepsin secretion commonly are observed in patient with gastric ulcer, atrophic gastritis and gastric polyp and gastric carcinoma. Many patients with gastric atrophy and histamine fast or pentagastrin fast achlorhydria have reduced or absent intrinsic factor secretion and are therefore, at risk for developing vit B_{12} deficiency. Other causes of reduced acid secretion include previous partial gastric resection or vagotomy and on rare occasions, islets cell tumours that produces hormones that inhibit acid secretion (e.g. somatostatin) patients with severe hypocalcemia often are achlorhydria. When serum calcium concentrations are restored to normal parietal cells again secrete acid. Gastric acid hyposecretion also has been demonstrated in patients with AIDS. This is clinically important may result in a reduced absorptian of acid soluble drugs such as ketoconazole. Studies starting at the beginning of this century claimed that gastric acid secretion decreased with age.

Disorder of Gastric Acid Hyposecretion

The most common hyposecretory disorder is chronic atrophic gastritis [18]. This conditioned is accompanied by hypochlorhydria or achlorhydria. Because the absence of gastric acid the negative feedback control of gastrin release is interrupted, and this patients have elevated serum gastrin, frequently as high as 1000pg/ml or more [19]. Chronic atrophic gastritis is often accompanied by an absence of intrinsic factor secretion [19]. This deficiency leads to pernicious anemia, a disease characterised by cobalamin absorption in the terminal ileum and megaloblastic anemia. Reduced acid and pepsin secretion often occurs in patient with gastric ulcer, gastric polyp, gastric carcinoma [20]. An important consequence of hypergastrinemia (Produced by omeprazole) is a trophic effect of specific endocrine cell the ECL Cell, which is present only the acid secreting Oxyntic mucosa. Prolonged treatment with omeprazole or the H_2 blocker loratadine produced hyperplasia of ECL Cells and at the end of the rat's life the formation of ECL carcinoid tumor occurs [21]. Larson and Coworker, Studying the effects of omeprazole and ranitidine, provided strong evidence for a causal association with sustained, profound inhibition of acid secretion inducing hypergastrinemia, which in turn caused hyperplasia of ECL Cells [22]. Evidence indicates that ECL Cell hyperplasia occurs in human oxyntic mucosa with extreme prolonged hypergastrinemia; hyperplasia of ECL Cells and occasional carcinoid tumour have been found in pernicious anemia and in gastrinoma [23].

Bacterial Overgrowth and Anti-Secretory Drugs

Gastric acid markedly decreases the bacterial count in the stomach and sterilizes food and reduces bacterial counts in the small intestine [24]. pH values below 4 are usually bactericidal but with hypochlorhydria mouth flora and occasionally fecal flora flourish [25, 26]. Vitamin B_{12} deficiency can develop because of poor acid/peptic mediated digestion of protein B_{12} complexes and bacteria overgrowth [27]. Due to hypochlorhydria bacterial overgrowth and pernicious anemia occurs such type of patients have a tendency to develop chronic intermittent diarrhoea and malabsorption. [23]With hypochlorhydria, there is also and increased risk of infection with enteropathogenic organisms, such as mono typhoid salmonellosis [23]. The risk of acquiring cholera is increased as well as the risk of parasitic infections, including Giardiasis, Strongyloidiasis and *Entamoeba histolytica*. Brucellosis and Pseudomembranous enterocolitis have also been reported to be increased in hypochlorhydria persons [23]. Hypochlorhydria leads to bacterial overgrowth as a result atrophic gastritis developed. Hypothetical consequence of hypochlorhydria is that the gastric bacterial flora may convert dietary nitrate to nitrits, which can lead to formation of N-nitroso compounds, known carcinogens in animal models. Hypochlorhydric patient prone to develop Helicobacter pylori infection and leads to antralgastritís. Helicobacter pylori has been incriminated as a disposing factor in the development of gastric adenocarcinoma. [28] Due to loss of defence mechanism of hypochlorhydric stomach bacteria enter the small intestine and duodenitis, enteritis developed, B. Coli ascend to the gall bladder leading to cholecystitis, proclivity to colon infection chance cholera and amoebic dysentery. Toxaemia dermatitis s leading to rheumatoid arthritis dermatites, asthma, allergy. [29] Hyposecretion of gastric acid hamper iron and calcium absorption as a result iron [30] and calcium [31] deficiency occur.

Conclusion

So many causes described in the Ayurvedic text to produced Mandagni and many causes of Hypochlorhydria (similar to mandagni) also described in modern medical literature. Mandagni and hypochlorhydria produces different types of pathological condition. In recent era introduction proton pump inhibitors (Substituted benzimidazole derivatives) are potent inhibitor of gastric acid secretion by blocking the proton pump (H^+, K^+ ATPase) which located in the stomach as a result acid secretion reduced to below normal. Omeprazole is a such type of drug which markedly inhibit gastric acid secretion and as a result different types of disorder manifest in human being.

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