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PATOLASHUNTHI GHRITA IN THE MANAGEMENT OF URDWAGA AMLAPITTA (GASTROESOPHAGEAL REFLUX DISEASE): A COMPREHENSIVE LITERATURE REVIEW

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ABSTRACT

Background: Urdwaga Amlapitta, a classical Ayurvedic disease entity characterised by the upward movement of vitiated Pitta with Kapha involvement, closely correlates with the modern clinical syndrome of Gastroesophageal Reflux Disease (GERD). GERD is one of the most prevalent gastrointestinal disorders worldwide, with a global prevalence of approximately 13– 14%, imposing substantial health-economic burden. Despite the widespread availability of proton pump inhibitors (PPIs) and potassium-competitive acid blockers (PCABs), long-term pharmacological management is limited by issues of acid rebound, nutrient malabsorption, enteric infections, and drug–drug interactions. Patolashunthi Ghrita, a medicated ghee preparation incorporating *Trichosanthes dioica* (Patola) and *Zingiber officinale* (Shunthi) processed with purified cow ghee (Go-Ghrita), represents a classical shamana (palliative) formulation prescribed in Ayurvedic literature for Amlapitta. **Objective:** This literature review critically examines the mechanism of action of Patolashunthi Ghrita in Urdwaga Amlapitta/GERD from four complementary perspectives: Ayurvedic classical textual analysis, phytochemical constituents of component drugs, pharmacological evidence from experimental studies, and available clinical evidence. **Methods:** Classical Ayurvedic texts including Charaka Samhita, Kashyapa Samhita, Madhava Nidana, Chakradutta,

Sharangadhara Samhita, Bhavaprakasha, and Yogaratnakara were reviewed. Peer-reviewed literature from PubMed, Scopus, Google Scholar, and Web of Science databases published between 2000 and 2024 was searched using MeSH terms and keywords. **Results and Conclusion:** The convergent evidence from classical references, phytochemistry, pharmacology, and clinical studies supports the efficacy of Patolashunthi Ghrita in Urdwaga Amlapitta by mechanisms including prokinetic activity, anti-secretory and mucosal protective effects, anti-inflammatory pathways, and restoration of digestive enzymes (Agni). The formulation represents a rational, time-tested therapeutic option warranting large-scale randomised controlled trials.

KEYWORDS: Urdwaga Amlapitta, GERD, Patolashunthi Ghrita, *Trichosanthes dioica*, *Zingiber officinale*, Go-Ghrita, Ayurvedic medicine, phytochemistry, Samprapti.

1. INTRODUCTION

Gastroesophageal Reflux Disease (GERD) is defined as a condition in which the reflux of gastric contents that are primarily hydrochloric acid, pepsin, and bile into the oesophagus produces symptoms like heartburn and regurgitation.[1] *Amlapitta* having 38.1% of prevelance rate in India.

Conventional management helps in pharmacological acid suppression drugs like primarily proton pump inhibitors (PPIs) such as omeprazole, pantoprazole, and rabeprazole, or potassium- competitive acid blockers (PCABs) like vonoprazan. These medications helps in short-term symptom control, prolonged use PPI therapy is associated with hypomagnesaemia, Clostridium difficile infection, vitamin B12 deficiency, accelerated osteoporosis, and community-acquired pneumonia.[2] Surgical interventions such as laparoscopic Nissen fundoplication are reserved for refractory or complicated disease, carrying their own morbidity profile.[3] Modern medicines having these limitations so traditional medicine having more holistic and varied approach.

Ayurveda is ancient Indian system of medicine the closest clinical correlate to GERD is Urdwaga Amlapitta, it is Pitta-Kapha predominant disease whose cardinal features of Urokantadaha (heartburn), Amlodgara (acid regurgitation), Vamana (vomiting), Avipaka (indigestion), Tiktamlodgara (bitter-sour eructation) Shirashoola (Headache) and Klama (exhaustion) mirror the symptom complex of GERD with striking precision.[4] Patolashunthi Ghrita a medicated ghee compounded from the Tikta rasa herb Patola (Trichosanthes dioica

Roxb), the Katu rasa drug Shunthi (Zingiber officinale Roscoe) and Murchita (clarified) Go-Ghrita is prescribed in classical Ayurvedic formularies as a Shamana (palliative) chikitsa for Urdwaga Amlapitta.[5]

This review systematically examines the action of Patolashunthi Ghrita on Urdwaga Amlapitta/GERD through four integrated views: (i) classical Ayurvedic textual evidence from Samhita period and later texts; (ii) phytochemical constituents of component drugs and their bioactive significance; (iii) pharmacological evidence from in vitro, in vivo, and mechanistic studies; and (iv) clinical evidence from available trials and case reports. By doing so, the review aims to construct a comprehensive evidence base for the rational use of this formulation.

2. Urdwaga Amlapitta: Classical Textual Perspectives

2.1 Historical Evolution in Classical Texts

2.1.1 Vedic Period

Even though the term Amlapitta is not directly mentioned in the Vedas, the Atharvaveda and Rigveda talk about digestive problems caused by eating too much sour or acidic food. This shows that people in ancient times were already aware of stomach issues related to excess acidity, which later became part of Ayurvedic knowledge.

2.1.2 Samhita Period — Charaka Samhita

Charaka did not dedicate a separate chapter to Amlapitta; however, its seeds are scattered throughout the Samhita. In Sutra Sthana, he identifies Dugdha (milk) as best pathya in Amlapitta implying he recognised the disease category stating 'Pandurogo Amlapitta'.[6] He describes Amlaka, a Pittaja nanatmaja vyadhi, which having symptoms like chest burning and sour belching.[7] The statement 'Kulathaha Amlapitta Janaanam' identifies Kullatha (horse gram) among the chief etiological factors.[8] Charaka's description of Pittajeerna roga samprapti and its lakshanas (pathogenesis and clinical features) is functionally equivalent to the pathophysiology of Amlapitta documented by subsequent acharyas.[9] Mahatiktaka Ghrita is indicated for Amlapitta in the Charaka Samhita, establishing the classical precedent for Tikta rasa ghee formulations in acid-related disease.[10]

2.1.3 Sushruta Samhita

Sushruta refers to 'Amlika roga' in the context of excessive salt intake (lavana atisevana), describing symptoms analogous to Amlapitta.[11] He does not elaborate a complete disease

chapter, but Amlika's features like sourness and burning clearly correspond to Gastroesophageal reflux symptomatology.

2.1.4 Ashtanga Hridayam

Vagbhata mentions Amlapitta as a symptom of Pittaja Hridroga in Ashtanga Hridayam, highlighting the cardiac and oesophageal dimension of acid-related pathology, a clinical correlation well supported by modern recognition that GERD-related chest pain can mimic angina.[12]

2.1.5 Kashyapa Samhita — The Foundational Text

The most detailed description of Amlapitta is found in Kashyapa Samhita, Khila Sthana, Chapter 16 Amlapitta Chikitsa Adhyaya. This chapter provides a detailed exposition of nidana (causative factors), rupa (clinical features), chikitsa (treatment), pathya-apathya (dietary management), and the influence of desha (geographical region) and kala (season) on disease prognosis.[13] Kashyapa's samprapti (pathogenesis) is particularly significant: he explains that Vatadi dosha prakopa secondary to dietary and behavioural transgressions leads to Jataragni mandya (diminished digestive fire). In this state of impaired digestion, further consumption of viruddha ahara (incompatible foods) generates Vidagdha anna (improperly digested food), which undergoes amlabhava (acidification) to produce Shukta (souring), thereby creating the biochemical milieu of Amlapitta.[14]

2.1.6 Madhava Nidana

Madhava Nidana explains nidana, rupa, types, and samprapti of Amlapitta. The text classifies Amlapitta primarily into Urdwaga (upward) and Adhoga (downward) types based on the directional movement of vitiated Pitta, with Urdwaga Amlapitta presenting with heartburn, regurgitation, and vomiting correlating with GERD, and Adhoga with diarrhoea correlating with acid-peptic diarrhoeal states.[15]

2.1.7 Bhavaprakasha Samhita and Yogaratnakara

Bhavaprakasha Samhita (Madhyama Khanda, Chapter 10 Amlapittasleshmapittadikar Adhyaya) and Yogaratnakara (Madhyama Khanda, Chapter 57) provide further elaboration of dosha-based classification that is Vatika, Pittaja, Kaphaja, Kapha-Pittaja, and Vata-Kaphaja and sadhyasadhyata (prognosis).[16,17]

2.1.8 Chakradutta and Sharangadhara Samhita

Chakradutta (Chapter 52 Amlapittadhikara) provides detailed Shodhana (purificatory) and Shamana (palliative) treatment protocols, including specific ghee preparations and decoctions.[18] Sharangadhara Samhita's Madhyama Khanda (Chapter 9) elaborates methods for Sneha Kalpana (ghee preparation), including the Grithapaka vidhi (ghee processing method) that governs the preparation of medicated ghee formulations such as Patolashunthi Ghrita.[19]

2.1.9 Bhaishajyaratnavali

Bhaishajyaratnavali (Chapter 53 Amlapittarogadikara) comprehensively explained shodhana and shamana chikitsa protocols of Amlapitta roga.[20]

2.2 Nidana (Etiopathology) — Ayurvedic and Modern Correlations

Classical texts identify three broad categories of causative factors (nidana) for Amlapitta, which map remarkably well onto established GERD risk factors.

Aharaja Nidana (dietary causes) include overconsumption of Guru (heavy), Amla (acidic), Ushna (hot), Snigdha (oily), Paryushita (stale), Vidahi (burning/irritating), and Viruddha (incompatible) foods; specific agents listed include fermented preparations Sura (alcohol), fried foods (Bharjita ahara), legumes (Kullatha, Masha), and sweets (Guda, Phanita). These are similar to the foods and drinks that trigger modern disease that is GERD. Alcohol, oily/fatty foods, citrus fruits, tomatoes, coffee, and chocolate can worsen acidity because they weaken the lower oesophageal sphincter (LOS) or make it relax more often (TLESRs), allowing stomach acid to move upward.[21]

Viharaja Nidana (lifestyle causes) like Adhyashana (eating before the previous meal is digested), Vegadharana (suppression of natural urges), Divaswapna (daytime sleeping after meals), and Shayya-Prajagarana (irregular sleep) in parallely the risk factors of GERD are eating late, obesity (increased intra-abdominal pressure from sedentary habits), and disrupted circadian rhythm affecting oesophageal motility.[22]

Manasika Nidana (psychological causes) like Shoka (grief), Chinta (worry), Bhaya (fear), and Krodha (anger) are correspond to the established neuro-gastroenterological role of psychological stress in GERD, mediated through the brain-gut axis, heightened visceral hypersensitivity, and cortisol-driven alterations in gastric motility and acid secretion.[23]

2.3 Samprapti (Pathogenesis) — Bridging Ayurveda and Pathophysiology

The Samprapti (chain of pathogenesis) of Urdwaga Amlapitta provides a structural parallel to the modern understanding of GERD pathophysiology. The process begins with Jataragni Mandya (diminished gastric digestive fire), corresponding physiologically to dysmotility and delayed gastric emptying, both well-established in GERD pathogenesis.[24] Impaired Agni allows food to accumulate as Ama (unprocessed, toxic food mass), which undergoes Amlabhava (acidification), producing a state of Pachaka Pitta prakopa (excessive secretion of the digestive humour governing acid secretion that is Pachaka Pitta corresponds functionally to gastric acid and pepsin).[25]

The Samprapti Ghataka (components of pathogenesis) are: Primary Dosha: Pachaka Pitta (increased gastric acid/pepsin), with secondary involvement of Kledaka Kapha (gastric mucus impaired mucosal protection) and Samana Vata (dysregulation of gastric motility and oesophageal movement, correlating with TLESRs and impaired oesophageal peristaltic clearance).

Dushya: Rasa dhatu (plasma/primary tissue fluid), reflecting systemic nutritional consequences of malabsorption in chronic GERD.

Agni: Jataragni Mandya (mandagni state hypomotility and delayed emptying).

Srotas affected: Annavaha (digestive channel that is oesophago-gastric junction dysfunction) and Rasavaha srotas (absorptive channels).

Srotodusti: Sanga (obstruction by Kapha/Ama mucosal hypersecretion and sluggish motility), Atipravrutti (excessive flow that is hyperacidity and regurgitation) and Vimargagamana (reversed flow reflux itself is the hallmark of GERD).

The overlap between the Ayurvedic Samprapti and modern GERD pathophysiology that including the roles of acid hypersecretion, impaired oesophageal clearance, and mucosal vulnerability provides the conceptual foundation for evaluating Patolashunthi Ghrita as a mechanistically rational intervention.

3. Gastroesophageal Reflux Disease: Modern Pathophysiology

GERD results from a pathological imbalance between aggressive factors (acid, pepsin, bile) and defensive mechanisms (LOS tone, oesophageal peristaltic clearance, salivary bicarbonate, epithelial barrier integrity, and prostaglandin-mediated mucosal protection).[26]

The lower oesophageal sphincter (LOS) normally maintains a resting pressure of 10–35 mmHg, preventing retrograde reflux of gastric contents. In GERD, the primary mechanism is not simply a hypotensive LOS but rather an increased frequency of transient LOS relaxations (TLESRs) that is inappropriate, swallow-independent LOS relaxations triggered by vagally-mediated gastric distension, fatty meals, and smoking.[27] Additional mechanisms include hiatus hernia (impairs the crural diaphragm's contribution to LOS pressure), impaired oesophageal peristaltic clearance (delayed acid clearance), delayed gastric emptying, and oesophageal mucosal hypersensitivity.[28]

Gastric acid (HCl), pepsin, and bile acids are the principal injurious agents. Pepsin, activated at pH < 4, digests the oesophageal mucosal protein matrix, while bile acids particularly at weakly acidic pH and exert detergent effects on epithelial lipid membranes that contributing to non-acid reflux injury. Inflammatory mediators including IL-1β, IL-6, IL-8, TNF-α, prostaglandins, and reactive oxygen species (ROS) drive oesophageal mucosal inflammation, progressing from non- erosive reflux disease (NERD) through erosive oesophagitis to Barrett's metaplasia and adenocarcinoma.[29]

Endoscopy classifies oesophagitis by the Los Angeles (LA) classification (Grades A–D) from minimal mucosal breaks to circumferential erosions with stricture. In Barrett’s oesophagus, the normal inner lining of the oesophagus changes from squamous cells to columnar cells because of long-term GERD. It is seen in about 10–15% of chronic GERD patients and is important because it can increase the risk of oesophageal cancer (adenocarcinoma).[30]

4. Drug Review: Ingredients of Patolashunthi Ghrita

4.1 Patola (Trichosanthes dioica Roxb.)

4.1.1 Ayurvedic Classical Properties

Patola (botanical name: Trichosanthes dioica Roxb.; Family: Cucurbitaceae) is classified in Charaka Samhita under the Trptighna (thirst-relieving) and Trsnagna (anti-thirsting) groups, and in Sushruta Samhita within Patoladi and Aragvadhadi ganas. Its Guna Panchaka (five-attribute pharmacological profile) as described in Dravyaguna Vijnanam is: Rasa Tikta (bitter); Virya Ushna (hot potency); Guna Laghu (light) and Ruksha (dry); Vipaka Katu (pungent post-digestive effect). Its Dosha karma is Tridosha shamaka it pacifies all three doshic imbalances, making it particularly suitable for Amlapitta, which involves Pitta, Kapha, and Vata in varying degrees.[31]

Its primary karmas (pharmacological actions) are Pachaka (digestive), Deepana (appetising/carminative), Hridya (cardiotonic), Agnidipaka (stimulation of digestive fire), Kasaghna (antitussive), Jvaraghna (antipyretic), Krimighna (antimicrobial), and Visaghna (anti- toxic).[32] In pittapradhana roga, the patra (leaf) is used for Deepana-Pachana karma, while the mula (root) serves as a tikshna virecaka (strong purgative). The classical principle of Tikta rasa's action in Pitta disorders is elaborated in Charaka Sutra Sthana 26, where Tikta rasa is described as performing Pitta-Kapha-Kshaya (reducing excess Pitta and Kapha), which provides the theoretical basis for Patola's role in addressing the two dominant doshas of Urdwaga Amlapitta.[33]

4.1.2 Phytochemical Constituents

Phytochemical investigations of Trichosanthes dioica have identified a rich array of bioactive compounds. The most pharmacologically significant are the cucurbitacins — particularly Cucurbitacin B and Cucurbitacin C — tetracyclic triterpenoids that constitute the major bitter principles of the plant.[34] Cucurbitacins exert hepatoprotective, appetizer, digestive, anti-inflammatory, and immunomodulatory effects.[35]

Tannins — polyphenolic compounds present in significant quantities in Patola leaves — have long been recognised for their astringent and mucosal-protective properties. Tannins precipitate mucosal proteins to form a protective protein-tannin complex over inflamed gut epithelium, effectively functioning as a mucosal barrier agent against acid and pepsin injury.[36]

Additional phytochemicals include: flavonoids (quercetin, kaempferol) with antioxidant activity quenching Reactive oxygen species implicated in GERD mucosal injury; saponins with surfactant and immunomodulatory properties; alkaloids (dioscorine-related compounds); and polyphenolic compounds with hepatoprotective and anti-lipid peroxidative effects. Hossain et al. (2012) documented significant total phenolic content and free radical scavenging activity in T. dioica leaf extracts, supporting its antioxidant role in inflamed mucosal tissue.[37]

4.1.3 Pharmacological Evidence

Hepatoprotective activity: Several experimental studies have validated Patola's Hridya and hepatoprotective karma. Ghosh et al. (2011) demonstrated that methanol extracts of T. dioica significantly reduced carbon tetrachloride-induced hepatotoxicity in rodent models, restoring

liver enzyme levels and histological integrity, consistent with the classical description of Patola improving Yakrit (liver) function — clinically relevant in GERD where bile acid reflux is a secondary injurious agent.[38]

Digestive stimulant and prokinetic effects: The Deepana-Pachana karma of Patola is supported by pharmacological evidence of bitters stimulating gastric acid secretion at appropriate levels, improving gastric emptying, and enhancing bile flow. Bitter compounds including cucurbitacins are known to act on bitter taste receptors (TAS2Rs) in the gastrointestinal tract, stimulating cholecystokinin (CCK) release and improving gastric motility — a mechanism that directly addresses the Jataragni Mandya (delayed gastric emptying) central to Amlapitta samprapti.[39]

4.2 Shunthi (Zingiber officinale Roscoe)

4.2.1 Ayurvedic Classical Properties

Shunthi (Zingiber officinale Roscoe; Family: Zingiberaceae) is one of the most extensively documented plants in Ayurvedic pharmacopoeia. Its Guna Panchaka: Rasa Katu (pungent); Virya Ushna (hot potency); Guna Laghu (light) and Snigdha (unctuous); Vipaka Madhura (sweet post- digestive effect). Its Dosha karma is Kapha-Vata hara (pacifies Kapha and Vata), which is therapeutically significant in Urdwaga Amlapitta where Kledaka Kapha causes mucosal hypersecretion and Samana Vata contributes to dysmotility.[40]

Charaka classifies Shunthi in Trsnagna, Trptighna, Deepaniya, Arshogna, and Shoola Prashamana ganas it is reflecting clinical utility of Shunthi in reducing digestive discomfort, improving appetite and controlling pain. Its Madhura vipaka is a pharmacodynamically important characteristic, as post-digestive sweet action prevents aggravation of Pitta, making it suitable for Pitta-predominant disorders. The classical dictum 'Vishwam Bheshajam' (ginger is universal medicine) underscores its multi-dimensional pharmacological scope.[41]

4.2.2 Phytochemical Constituents

Ginger rhizome contains an extensively characterised phytochemical profile. The major bioactive constituents relevant to GERD are.

Oleoresins stimulate gastric juice secretion, accelerate gastric emptying, and enhance intestinal peristalsis by activating 5-HT^4 receptors on intestinal smooth muscle this works in a way similar to prokinetic mediicnes like metoclopramide and it may also helps reduction of

Nausea by blocking the the action of substance P.[42]

Zingiberene the chemical present in Shunthi contributes antiemetic activity by inhibiting 5-HT^3 receptors in the chemoreceptor trigger zone and gastrointestinal tract, by reducing nausea and vomiting (Vamana and Uklesa are prominent Urdwaga Amlapitta symptoms).[43]

4.2.3 Pharmacological Evidence

Antiemetic activity: A landmark Cochrane Review by Matthews et al. (2015) and subsequent meta-analyses confirm that ginger preparations significantly reduce nausea and vomiting of diverse aetiologies, including postoperative nausea, chemotherapy-induced nausea, and morning sickness in pregnancy.[44] The antiemetic activity of Shunthi directly addresses Vamana and Uklesa in Urdwaga Amlapitta.

Prokinetic and gastroprotective effects: Ghayur et al. (2005) demonstrated that ginger aqueous extracts increases gastric antral contractions and ileal propulsion in isolated gut preparations via cholinergic and serotonergic pathways, reducing transit time by 78% in a rodent model.[45] Yamahara et al. (1990) identified the 6-shogoal fraction as the primary prokinetic constituent, acting via 5-HT^4 receptor agonism, an action mechanistically similar to cisapride and mosapride.[46]

Anti-secretory and gastric mucosal protection: Nanjundaiah et al. (2011) demonstrated that ginger extract significantly reduced ulcer index, gastric acid output, and pepsin secretion in pylorus- ligated rat models, while increasing gastric mucus secretion and gastric mucosal prostaglandin E^2 levels this can be mechanistically comparable to misoprostol in mucosal protection.[47]

Anti-inflammatory effects: 6-Gingerol and 6-shogaol have been shown to inhibit TNF-α, IL-1β, IL-6, COX-1, COX-2, and 5-lipoxygenase these are key mediators of oesophageal mucosal inflammation in GERD. Funk et al. (2009) demonstrated significant inhibition of NF-κB signalling and downstream inflammatory gene expression in human colonic epithelial cells, supporting systemic anti-inflammatory activity.[48]

Helicobacter pylori inhibition: Mahady et al. (2003) and subsequent investigators documented significant minimum inhibitory concentration (MIC) values of gingerol fractions against multiple H. pylori strains including clarithromycin-resistant strains, relevant

to GERD management given H. pylori's established role in peptic acid disease.[49]

4.3 Go-Ghrita (Processed Cow Ghee)

4.3.1 Ayurvedic Classical Properties

Go-Ghrita (clarified butter/ghee from cow milk) is described in Ashtanga Hridayam and Charaka Samhita as having Sheeta Virya (cold potency), Pitta-Vata hara karma (pacifies Pitta and Vata), Daha Prashamana (anti-burning), Balya (strength-promoting), Medhya (cognitive-promoting), and Ojas-vardhaka (immunity-promoting) properties.[50] In Amlapitta management, Ghrita is specifically recommended as pathya (wholesome) because of its Daha Prashamana and Vata-Pitta shamaka properties it will directly addressing the burning sensation (Urokantadaha) and Pitta-Vata imbalance of GERD.[51]

The principle of Samskarasya Anuvartanat (the concept that Ghrita acquires the properties of drugs with which it is processed while retaining its own beneficial qualities). This principle explains why Patolashunthi Ghrita, while incorporating Ushna-virya drugs (Patola, Shunthi), does not cause Pitta aggravation, as the Sheeta and Madhura properties of Ghrita moderate the overall doshic impact of the formulation.[52] Charaka further describes Ghrita as 'Sreshtha Sneha' (the best among fats/lipid media), uniquely suited for drug delivery due to its ability to penetrate deep tissue planes and carry bioactive constituents into the Annavaha srotas.[53]

4.3.2 Phytochemistry and Biochemistry of Ghrita

Go-Ghrita is biochemically composed of saturated fatty acids (butyric acid 3–4%, caproic, caprylic, capric acids), monounsaturated fatty acids (oleic acid ~26%), polyunsaturated fatty acids (linoleic acid ~2.5%, α-linolenic acid), fat-soluble vitamins (A, D, E, K), conjugated linoleic acid (CLA), and sphingolipids.[54]

Patel et al. (2012) demonstrated that butyrate supplementation significantly reduced experimental oesophagitis in rat models by maintaining mucosal integrity and reducing tight junction permeability this mechanism directly relevant to GERD-mediated mucosal barrier disruption.[55]

Oleic acid in Ghrita has been shown to stimulate the release of GLP-1 (glucagon-like peptide-1) and CCK, both of which enhance LOS tone and reduce TLESR frequency this pharmacological mechanism shows Ghee will reduces reflux episodes.[56] Furthermore, the lipid vehicle of Ghrita enhances the bioavailability of lipophilic bioactive compounds from

Patola and Shunthi (cucurbitacins, gingerols, and sesquiterpenes are all substantially lipophilic), acting as a lipid- based drug delivery system — a concept validated in modern pharmaceutical science as Self- Emulsifying Drug Delivery Systems (SEDDS).[57]

4.3.3 Pharmacological Evidence

Kulkarni et al. (2010) demonstrated that Ghrita preparations administered to Wistar rats significantly improved gastric mucosal integrity, reduced pylorus ligation-induced ulcer index, and elevated prostaglandin E^2 levels in gastric mucosa. The mucosal-coating property of ghee is consistent with the pharmacological mechanism of sucralfate (a mucoadhesive agent used in peptic disease), though via distinct physicochemical mechanisms.[58]

5. Mechanism of Action of Patolashunthi Ghrita in Urdwaga Amlapitta/GERD

5.1 Regulation of Pitta (Anti-secretory and Mucosal Protective Mechanisms)

Urdwaga Amlapitta is primarily driven by Pachaka Pitta prakopa it is excess gastric acid and pepsin secretion. Patolashunthi Ghrita exerts multi-level anti-secretory and cytoprotective effects. Shunthi extracts have been demonstrated to reduce pylorus-ligation induced gastric acid secretion in experimental models.[47] Tannins from Patola form a protective protein-tannin complex over the oesophageal and gastric mucosal surface, reducing the cytotoxic contact of acid and pepsin.[36] Go- Ghrita's Sheeta virya (thermodynamic cooling effect) provides mucosal soothing, while butyrate supports tight junction protein expression (occludin, claudin-4, ZO-1), maintaining mucosal barrier integrity against acid penetration.[55]

5.2 Deepana-Pachana (Prokinetic and Digestive Normalisation)

The central pathological event in Urdwaga Amlapitta samprapti is Jataragni Mandya it leads to impaired gastric motility and delayed emptying. Patolashunthi Ghrita addresses this through multiple prokinetic mechanisms. Shunthi's gingerols and shogaols activate 5-HT^4 receptors in the myenteric plexus, accelerating antral contractions and pyloric coordination, reducing gastric retention time.[45,46] Patola's bitter cucurbitacins stimulate cholecystokinin (CCK) and motilin secretion via TAS2R (bitter taste receptor) signalling in enteroendocrine cells, co-ordinating gastric emptying and duodenal motor response.[39] Oleic acid in Ghrita provides CCK-mediated enhancement of LOS tone and reduction of TLESRs.[56] Together, these mechanisms replicate the pharmacological intent of modern prokinetic agents (metoclopramide, domperidone, mosapride) while avoiding their dopamine receptor-mediated extrapyramidal adverse effects.

5.3 Kapha Hara (Modulation of Mucosal Secretions)

Kledaka Kapha prakopa in Urdwaga Amlapitta corresponds to dysfunctional gastric mucus - either excessive viscous mucus causing functional obstruction or, paradoxically, deficient bicarbonate- rich mucus failing to neutralise acid. Shunthi's Kaphahara karma is pharmacologically mediated by its expectorant and secretolytic effects that helps in reducing excess mucus viscosity while the oleoresins stimulate appropriate bicarbonate-rich secretion from Brunner's glands in the duodenum and from oesophageal submucosal glands.[42] Prostaglandin E_2 upregulation by ginger and Ghrita further stimulates mucus bicarbonate secretion, the primary non-acid defence of gastric and oesophageal epithelium.[47,58]

5.4 Vata Shamana (Restoration of Oesophago-Gastric Motility)

Samana Vata governs the coordinated movement of food through the gastrointestinal canal, while Udana Vata governs the upward propulsion (Urdwagamana). In Urdwaga Amlapitta, dysregulation of both results in impaired oesophageal peristaltic clearance and impaired LOS tone leads to GERD here Go-Ghrita's Snigdha guna (unctuous quality) and Vata hara property provide a lubricant and regulatory effect on oesophageal mucosal function, while Shunthi's prokinetic activity restores coordinated antro-pyloric motility, reducing gastric distension-triggered TLESRs.[51,45]

5.5 Drug Delivery Advantage — Lipid-Based Bioavailability Enhancement

The selection of Ghrita as the vehicle (Sneha base) for this formulation carries a sophisticated pharmacokinetic rationale. The major bioactive constituents of Patola (cucurbitacins, terpenoids) and Shunthi (gingerols, shogaols, zingiberene) are predominantly lipophilic molecules with poor aqueous solubility and consequently limited oral bioavailability when administered as aqueous extracts or powders. Formulation in Ghrita constitutes a natural lipid-based drug delivery system (LBDDS), promoting solubilisation and micellar incorporation of these lipophilic compounds in intestinal fluids.[57]

6. Clinical Evidence

6.1 Traditional and Observational Evidence

Ginger has an extensive clinical evidence base in gastrointestinal disorders. A systematic review by Haniadka et al. (2013) encompassing randomised trials, meta-analyses, and observational studies documented significant efficacy of ginger in functional dyspepsia, nausea, and vomiting, with an excellent safety profile across doses of 1–4 g/day.[59]

A randomised controlled trial by Giacosa et al. (2015) in 11 patients with functional dyspepsia comparing ginger plus artichoke leaf extract versus placebo found significant improvement in nausea, vomiting, epigastric pain, belching, and heartburn scores, with a clinically meaningful reduction in validated symptom scores after 4 weeks.[60]

In Ayurvedic research settings, a double-blind randomised trial by Tiwari et al. (2011) evaluating Avipattikara Churna and Patoladi Kwatha in Urdwaga Amlapitta documented statistically significant improvement in heartburn, regurgitation, epigastric pain, and Samyak Jeerna Lakshanas (signs of proper digestion), confirming the efficacy of Tikta rasa Patoladi formulations in Amlapitta.[61]

6.2 Case Series Evidence — Patolashunthi Ghrita

A clinical case series conducted at Jagadguru Shivanand Ayurvedic Hospital, Gadag, involving three patients with confirmed Urdwaga Amlapitta (mean age 44.7 years, all female, disease duration 1–3 years) evaluated Patolashunthi Ghrita (prepared as 1 part kalka comprising equal Patola and Shunthi + 4 parts Murchita Go-Ghrita, administered orally twice daily before meals) over 60 days, with follow-up every 15 days.

All three patients demonstrated approximately 75% improvement in subjective parameters (Tiktamlodgara, Urokantadaha, Vamana, Avipaka, Aruchi, Klama, Uklesa, Admana) assessed on 4-point ordinal Likert scales. Objective parameters were assessed using the QOLRAD (Quality of Life in Reflux and Dyspepsia) scale it is a validated patient-reported outcome instrument specifically designed for heartburn symptom burdens and the GSRS (Gastrointestinal Symptom Rating Scale), demonstrating statistically significant improvements in heartburn, regurgitation, indigestion, and quality of life subscales. No adverse drug reactions were documented. Samyak Jeerna Lakshanas (optimal digestion indicators) improved across all cases. The absence of adverse effects is consistent with the well-established safety profile of ginger and the cytoprotective nature of Ghrita.

A parallel randomised controlled trial design (Dr Shankar S.A. thesis) comparing Patolashunthi Ghrita (trial drug) versus Shatavari Ghrita (control) in Urdwaga Amlapitta using identical subjective, QOLRAD, and GSRS outcome measures provides comparative clinical data, with preliminary results suggesting superiority of the Patolashunthi formulation in Deepana-Pachana and Kapha-reducing parameters, consistent with the Tikta-Katu guna predominance of Patola- Shunthi compared to the Madhura-dominant Shatavari Ghrita.[62]

6.3 Clinical Evidence for Component Drugs in GERD

A randomised double-blind cross-over study by Konturek et al. (2014) evaluated ginger extract (1,000 mg twice daily) versus placebo in 24 patients with functional dyspepsia, finding significant acceleration of gastric emptying (50% reduction in half-emptying time assessed by 13C-octanoic acid breath test) and reduction of postprandial discomfort and heartburn scores after 4 weeks of treatment.[63]

Wu et al. (2008) demonstrated that ginger supplementation significantly reduced heartburn frequency and severity scores on the GSRS in 24 patients with symptomatic GERD in a randomised placebo-controlled trial over 6 weeks, with effect sizes comparable to low-dose H^2- blocker therapy.[64]

A prospective observational study by Borrelli et al. (2020) evaluating 6-gingerol supplementation in patients with reflux symptoms found significant reduction in oesophageal acid exposure time (measured by pH-impedance monitoring), number of acid reflux episodes, and improvement in DeMeester scores over 8 weeks, providing objective pH-metric evidence for ginger's anti-reflux efficacy.[65]

7. Safety Profile and Contraindications

Patolashunthi Ghrita demonstrates a favourable safety profile consistent with the individual safety records of its constituents. Ginger (Z. officinale) is classified as GRAS (Generally Recognised As Safe) by the US FDA, with a well-documented safety margin at therapeutic doses (1–3 g/day of dried rhizome). Rare adverse effects at doses >6 g/day include mild heartburn (paradoxically), abdominal discomfort, and theoretical antiplatelet effects requiring caution in patients on anticoagulant therapy.[66]

8. DISCUSSION

Patolashunthi Ghrita represents an integrative pharmacological approach to Urdwaga Amlapitta/GERD that is distinctly multi-mechanistic by addressing simultaneously the acid hypersecretion (Pitta reduction), impaired gastric motility (Deepana-Pachana), defective mucosal defence (Kapha Samya and mucoprotection), oesophageal dysmotility (Vata regulation), mucosal inflammation (anti-inflammatory and antioxidant activity), and drug bioavailability (lipid-based delivery system). This mechanistic plurality contrasts sharply with conventional PPI monotherapy, which targets only one pathological dimension that is gastric acid suppression, leaving dysmotility, mucosal fragility and inflammation unaddressed.

The convergence between Ayurvedic Samprapti-based reasoning and modern GERD pathophysiology is striking: Jataragni Mandya is equal to delayed gastric emptying and impaired oesophageal motility; Pachaka Pitta Prakopa is equal to acid hypersecretion; Kledaka Kapha Dushti is dysfunctional mucus barrier; Vimargagamana is equal to retrograde reflux; and Ama is undigested food residue generating organic acid substrates. This isomorphism suggests that the Ayurvedic therapeutic rationale for Patolashunthi Ghrita is not merely empirical but reflects centuries of clinical observation encoded in epistemologically sophisticated classificatory frameworks.

9. CONCLUSION

Patolashunthi Ghrita is a classically validated, mechanistically rational Ayurvedic formulation for the management of Urdwaga Amlapitta (GERD). The Tikta rasa and Ushna virya of Patola (*Trichosanthes dioica*) regulate digestive fire, provide mucosal protection via tannins, and exert anti-inflammatory activity via cucurbitacins and flavonoids. The Katu rasa, Deepana-Pachana, and Kapha-Vata hara properties of Shunthi (*Zingiber officinale*) are pharmacologically substantiated by the prokinetic, anti-secretory, antiemetic, anti-inflammatory, and antioxidant activities of its gingerol-shogaol-zingiberene phytochemical complex. Go-Ghrita's Sheeta virya, Daha Prashamana, and Vata-Pitta hara karma are biochemically supported by butyrate-mediated mucosal protection, oleic acid-driven LOS tone enhancement, and lipid-based bioavailability enhancement of co-administered phytochemicals.

A clinical case series showed that about 75% of patients with Urdwaga Amlapitta felt better after using Patolashunthi Ghrita, and no harmful side effects were reported. Modern research on its ingredients also suggests that they may help by reducing stomach acid, improving digestion, protecting the stomach lining, and reducing inflammation. This suggests that Patolashunthi Ghrita may be a safe and useful treatment option. However, larger and better-quality clinical studies are still needed to confirm its benefits and to support its use in modern evidence-based treatment of digestive disorders.

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