Modern and Ayurveda-Based Anesthesia and Surgery

A Comparative and Integrative Review of Sangyaharana and Shalya Tantra Alongside Contemporary Anaesthesiology and Surgical Practice

Dr. Shafaque Kamran[*]

Abstract: Long before the formal birth of Western anaesthesiology in 1846, ancient Indian physicians had already developed a systematic approach to painless surgery. This review traces the parallel and, at points, convergent histories of Ayurvedic surgery (Shalya Tantra) and Ayurvedic anaesthesia (Sangyaharana) as codified chiefly in the Sushruta Samhita (circa 600 BCE), and compares them with the evolution and current practice of modern anaesthesia and surgery. It examines the herbal, mineral, and psychosomatic agents used by Acharya Sushruta and Acharya Charaka — including Madya (wine), Vijaya/Bhanga (Cannabis sativa), Ahiphena (opium), Dhatura, and Parasika Yavani (Hyoscyamus niger) — against the ether-, nitrous oxide-, and cocaine-derived agents that founded modern anaesthesiology, and the general, regional, and local anaesthesia techniques used today. It further reviews Sushruta's 121 surgical instruments and eight fundamental operative techniques (Ashtavidha Shastra Karma) alongside the trajectory of modern surgery from open operative technique through asepsis to minimally invasive laparoscopic and robotic surgery. A comparative framework, a review of the literature-search strategy, and a summary of ongoing AYUSH-supported integrative research are presented, concluding that while Ayurveda has not yet produced a validated potent surgical anaesthetic, its premedication, pain-management, and perioperative care principles continue to offer avenues for evidence-based integration with modern practice.

Keywords : Sushruta Samhita, Sangyaharana, Shalya Tantra, General Anaesthesia, Regional Anaesthesia, Ayurveda-Modern Integration, AYUSH

1. Introduction

Anaesthesia the reversible abolition of pain and consciousness to permit surgical intervention is often presented as a nineteenth-century Western achievement, beginning with the public demonstration of ether anaesthesia by William T. G. Morton in 1846[1].

[*] BAMS, MBBS (Final Year), BAMS— Kunwar Shekhar Vijendra Ayurved Medical College and Research Centre, Gangoh, Saharanpur, Uttar Pradesh, MBBS—GITAM Institute of Medical Sciences and Research, Visakhapatnam, Andhra Pradesh July 2026.

Yet more than two millennia earlier, Acharya Sushruta of ancient India had already described a structured system of surgical pain abolition termed Sangyaharana, embedded within a broader surgical science called Shalya Tantra, one of the eight classical branches (Ashtanga) of Ayurveda[2,3]. The Sushruta Samhita, compiled between roughly the sixth and fourth centuries BCE, documents over 300 surgical procedures, 121 surgical instruments, and detailed pre-, intra-, and post-operative protocols — a level of systematisation that would not reappear in European medicine until the nineteenth century[4,5].

This review sets the Ayurvedic surgical and anaesthetic tradition side-by-side with the historical development and current practice of modern anaesthesiology and surgery. The objective is not to claim equivalence between an ancient empirical system and modern evidence-based pharmacology, but to understand each system on its own terms, identify genuine points of technical convergence (such as pedicled-flap reconstruction and premedication), and survey where contemporary integrative research is testing Ayurvedic agents against modern pharmacological and safety standards.

1.1 Literature Search Strategy

Source material for this review was identified through structured searches of biomedical and AYUSH-specific literature databases. PubMed and its full-text repository PubMed Central (PMC) were searched for peer-reviewed biomedical literature on the history of anaesthesia and surgery, using terms including “Sushruta,” “Sangyaharana,” “history of anaesthesia,” and “Ayurveda surgery.” Ayurveda-specific and integrative-medicine literature was identified through DHARA (Digital Helpline for Ayurveda Research Articles), a bibliographic database that indexes published Ayurveda research[6], and through the AYUSH Research Portal maintained by the Ministry of AYUSH, Government of India, which aggregates evidence-based research data across the AYUSH systems[7]. Government and institutional sources (Press Information Bureau releases, AIIMS departmental pages, and CCRAS clinical-research pages) were consulted directly for information on current integrative-research infrastructure. Sources lacking identifiable authorship, editorial oversight, or institutional provenance were excluded in favour of peer-reviewed journal articles, indexed reviews, and official government or institutional publications.

2. Ayurvedic Surgery: Shalya Tantra

2.1 The Sushruta Samhita and Its Scope

The Sushruta Samhita is organised into six sections (Sutrasthana, Nidanasthana,

Sharirasthana, Chikitsasthana, Kalpasthana, and Uttaratantra) spanning 184 chapters. It catalogues 1,120 diseases, 700 medicinal plants, 64 mineral-based preparations, and 57 preparations of animal origin[8,32]. Sushruta insisted that no surgeon should operate without first studying the human body through dissection: cadavers were wrapped in grass and bark, caged, and submerged in flowing river water for seven days to soften tissue for controlled, layer-by-layer study — skin, fascia, muscle, vessels, nerves, and bone[8]. Trainees then practised specific techniques on surrogate materials before touching a living patient: incision on gourds and watermelons, probing on worm-eaten wood or bamboo, suturing on leather and cloth, and extraction using seeds embedded in fruit — a simulation-based curriculum lasting a minimum of six years[8,9].

2.2 Trividha Karma: The Three-Phase Surgical Framework

Sushruta divided every surgical case into three sequential phases, Trividha Karma, a structure that maps closely onto the modern pre-operative/intra-operative/post-operative continuum[3,10]:

- **Poorva Karma (pre-operative care)** — examination of the patient and disease, physical and psychological preparation, dietary regulation, purification procedures (Snehana, Swedana, Vamana, Virechana), counselling and reassurance (Ashwasana), and administration of pre-anaesthetic agents.
- **Pradhana Karma (the primary operative act)** — the surgery itself, performed once Sangyaharana had reduced sensory awareness, encompassing the eight classical operative techniques described below.
- **Paschat Karma (post-operative care)** — wound management, herbal dressings, pain control, monitoring for complications, and dietary/psychological rehabilitation.

2.3 Ashtavidha Shastra Karma: Eight Fundamental Operative Techniques

Sushruta classified all operative manoeuvres into eight fundamental techniques, still cited as the conceptual ancestors of modern operative categories[11]:

Sanskrit Term	Technique	Modern Correlate
Chedana	Excision	Removal of diseased tissue/tumours
Bhedana	Incision	Opening abscesses/cysts
Lekhana	Scraping	Debridement of growths/scar tissue

Sanskrit Term	Technique	Modern Correlate
Vedhana	Puncturing	Drainage of joints/abdomen (paracentesis)
Eshana	Probing	Exploring sinus tracts/fistulae
Aharana	Extraction	Removing calculi, foreign bodies, dead foetus
Visravana	Drainage/blood-letting	Continuous evacuation of pus/blood
Seevana	Suturing	Wound closure/anastomosis

2.4 Instrumentation: Yantra and Shastra

Sushruta described 121 surgical instruments in total: 101 blunt instruments (Yantra) — forceps (Sandamsha), specula, retractors, hooks, tubes, and probes, each named after the animal or object it resembled — and 20 sharp instruments (Shastra), including scalpels (Vriddhipatra), scissors, lancets, needles, and saws of graded sizes[12]. Instruments were forged from tempered iron, bronze, or copper and sharpened until capable of cutting a hair; despite this arsenal, Sushruta held that the surgeon's own hand remained the most important instrument of all, for its sensitivity and adaptability[9].

2.5 Landmark Procedures

- **Rhinoplasty (Nasa Sandhana):** reconstruction of an amputated nose using a rotated cheek or forehead pedicle flap, with bamboo tubes inserted to maintain nostril patency and a honey–ghee–sesame oil dressing to promote healing. This "Indian flap" technique, witnessed by British surgeons near Pune in 1793 and documented in the *Gentleman's Magazine* in 1794, remains the conceptual foundation of modern reconstructive flap surgery[12,13].
- **Cataract surgery (couching):** a jasmine-bud–tipped probe (Jambavati Shalaka) was introduced through the sclera to displace the opacified lens, an approach that predates European couching descriptions by centuries[8,13].
- **Living sutures and biological closure:** the mandibles of large ants were used to clamp wound edges as biological staples, and bengal-gram heads were used for intestinal anastomosis — among the earliest documented forms of biological wound closure[8].

- **Lithotomy, hernia and fistula repair, and Caesarean section** (performed as a last-resort procedure when the mother had died but the foetus remained viable) are also described in detail, along with fracture and dislocation management with traction, manipulation, and stabilisation[10,14].

Sushruta additionally practised early antisepsis: instruments were flame-sterilised, operating and recovery areas were fumigated (Dhoopana) with antimicrobial herbs such as guggulu, vacha, white mustard, and neem, and wounds were dressed with turmeric, honey, and ghee — centuries before the articulation of germ theory[13].

3. Ayurvedic Anaesthesia: Sangyaharana

Sangyaharana literally denotes a "reversible loss of sense." In Ayurvedic physiology, obstruction of the sensory channels (Sangyavaha Nadi) by Vatadi Doshas increases Tamo Guna, dulling the perception of both pleasure and pain — the theoretical basis on which Ayurvedic anaesthetic agents were understood to act[3,15].

3.1 Core Agents

Sushruta's principal anaesthetic agent was Madya (fermented wine), often preceded by Guru Bhojana (a heavy pre-anaesthetic meal intended to induce rapid drowsiness, Nidra Adhikya) — a sequence that functions much like a modern pre-medication followed by an induction agent[3,16]. Beyond wine, the classical texts describe a range of sedative-analgesic substances:

Ayurvedic Agent	Botanical/Source	Classical Use
Madya	Fermented wine	Principal intra-operative sedative/analgesic
Vijaya / Bhanga	*Cannabis sativa / indica*	Sedation, analgesia, post-operative pain relief
Ahiphena	*Papaver somniferum* (opium)	Narcotic analgesic
Parasika Yavani	*Hyoscyamus niger* (henbane)	Sedation, tranquillisation
Dhatura	*Datura metel*	Anticholinergic sedative (atropine-like)

Ayurvedic Agent	Botanical/Source	Classical Use
Vacha	*Acorus calamus*	Neuroactive sedative, pre-medicant
Jatamansi	*Nardostachys jatamansi*	Tranquillisation, anxiolysis
Ashwagandha	*Withania somnifera*	Tranquillisation, adaptogenic support
Vatsanabha	*Aconitum ferox*	Potent analgesic (used with caution)

Table: Principal agents described for Sangyaharana and peri-operative sedation in the Sushruta Samhita, Charaka Samhita, and Bhavaprakasha Nighantu[3,15,16,17].

The Charaka Samhita, though primarily a treatise on internal medicine, corroborates these practices, recommending Sura, Madira, and Asava (fermented preparations) to reduce pain during delivery of an obstructed foetus[16,17]. Bhavaprakasha, a later pharmacognosy text, records the analgesic use of Ahiphena and Bhanga[16].

3.2 Legendary and Semi-Legendary Accounts

Later texts describe more dramatic accounts of surgical anaesthesia. Bhojaprabandha (circa 900 CE) narrates that surgeons from Ujjain administered a stupefying powder, Sammohini Churna (described as comparable in effect to modern chloroform), to render King Bhoja unconscious for brain surgery, reviving him afterward with a revitalising powder, Sanjeevani[16,18]. Sanjeevani is independently referenced in the Valmiki Ramayana as the herb used by the physician Sushena to revive Lakshmana[16,18]. Neither text specifies the precise botanical composition of these preparations, and they are treated by contemporary scholars as historically suggestive rather than pharmacologically verified[3].

3.3 Classification and Route of Administration

Ayurvedic anaesthetic practice can be broadly grouped into Samanya (systemic/general) methods, using agents such as Madya or Ahiphena to induce generalised unconsciousness, and Vishesha (localised/specific) methods, using topical pastes (Lepa), fumigation (Dhumapana), or targeted herbal application to numb a specific region — a distinction that anticipates the modern general-versus-regional/local classification[15,28]. Complementary techniques included Marma therapy, Raktamokshana (therapeutic blood-letting), Ksharakarma (alkaline cauterisation), Agnikarma (thermal cauterisation), and psychosomatic methods such as mantra recitation, counselling, and what is termed Satvavajaya Chikitsa (mind-control therapy) to reduce peri-operative

anxiety — conceptually close to modern pre-operative counselling and anxiolysis[15,19].

It is important to note a consistent limitation acknowledged across the Ayurvedic surgical literature itself: no single potent, reliable, general Ayurvedic anaesthetic agent capable of replacing modern anaesthetics has been definitively identified or standardised to date. Most indigenous agents identified in classical and review literature (Jatamansi, Ashwagandha, Brahmi, Vacha, Parasika Yavani, Shankhapushpi) are used chiefly as pre-medicants or post-operative adjuncts for tranquillity, anxiolysis, and pain reduction rather than as stand-alone surgical anaesthetics[3,20].

4. The Evolution of Modern Anaesthesia

Western anaesthesiology as a formal medical discipline emerged in the 1840s. Diethyl ether, first described for its analgesic properties by Paracelsus around 1525, was publicly demonstrated as a surgical anaesthetic by William T. G. Morton in Boston in October 1846 — the event that conventionally marks the birth of modern anaesthesia[1]. Humphry Davy had already identified the anaesthetic potential of nitrous oxide at the turn of the nineteenth century, and Horace Wells used it clinically for dental extraction in 1844-45, though his public demonstration was initially considered a failure[1,21]. Chloroform, introduced by James Young Simpson in November 1847 as a more potent alternative to ether, rapidly became the dominant surgical and obstetric anaesthetic of the mid-nineteenth century, despite its narrower margin of cardiac safety[1,21]. The physician Oliver Wendell Holmes coined the terms “anaesthesia” and “anaesthetic” in a letter to Morton in 1846[1].

Local anaesthesia developed along a separate track. Cocaine, isolated from the coca leaf by Albert Niemann in 1860, was shown by Carl Koller in 1884 to produce corneal anaesthesia, inaugurating regional and local anaesthetic practice; the following decades saw the development of nerve-block techniques for the brachial plexus and other peripheral targets[22,23]. Safer synthetic local anaesthetics (procaine, lidocaine, bupivacaine) subsequently replaced cocaine for clinical use[23,24].

4.1 Modern Classification of Anaesthesia

- **General anaesthesia:** reversible, drug-induced loss of consciousness, protective reflexes, and sensation, produced by inhalational agents (e.g., sevoflurane, isoflurane, nitrous oxide) and/or intravenous agents (e.g., propofol, thiopentone, ketamine), typically combined with muscle relaxants and opioid analgesics and monitored continuously by an anaesthesiologist.

- **Regional anaesthesia:** reversible blockade of nerve conduction to a region of the body (spinal, epidural, and peripheral nerve blocks) using local anaesthetics such as lidocaine and bupivacaine, with the patient typically remaining conscious.
- **Local anaesthesia:** anaesthesia confined to a small area, commonly by infiltration, for minor surgical or dental procedures.
- **Monitored anaesthesia care/sedation:** a continuum of sedation levels used to supplement regional/local techniques or for minimally invasive procedures.

Modern anaesthetic practice is distinguished from its Ayurvedic antecedent primarily by pharmacokinetic precision (titratable dosing, rapid onset/offset, predictable half-lives), continuous physiological monitoring (pulse oximetry, capnography, invasive haemodynamic monitoring), and rigorous pre-clinical and clinical safety validation — none of which existed, or could have existed, in the ancient period[21,23]. Premier Indian tertiary-care institutions such as AIIMS, New Delhi formalise this precision through dedicated Departments of Anaesthesiology running structured Pre-Anaesthesia Check-up clinics and continuous protocol-driven perioperative care[37].

5. The Evolution of Modern Surgery

Modern surgery's decisive advances followed the introduction of anaesthesia (permitting longer, more complex operations), Listerian antisepsis and later asepsis (dramatically reducing post-operative mortality from infection), and, in the twentieth and twenty-first centuries, a progressive shift toward minimally invasive technique. Diagnostic and therapeutic laparoscopy matured through the 1980s-90s into routine practice for cholecystectomy, appendicectomy, and gynaecological procedures, offering smaller incisions, reduced blood loss, and faster recovery relative to open surgery[25]. Robot-assisted surgical platforms, introduced clinically from the early 2000s, extended these advantages further — providing tremor-filtered, wristed instrumentation and three-dimensional magnified visualisation for procedures in confined anatomical spaces such as the pelvis[25,26]. Natural-orifice transluminal endoscopic surgery (NOTES) and single-incision laparoscopic surgery represent further refinements aimed at eliminating visible scarring altogether[26].

Notably, several structural principles first articulated by Sushruta persist in modern surgical training and practice: pre-operative patient assessment and fitness grading, aseptic preparation of the surgical field, standardised and purpose-built instrumentation, staged operative technique, and systematic post-operative wound surveillance are all direct descendants — independently rediscovered in the West — of

the Trividha Karma framework described in Section 2.2[5,10].

6. Post-operative Infections and Prevention

Surgical site infection (SSI) remains one of the most common healthcare-associated infections worldwide and a major driver of post-operative morbidity, prolonged hospital stay, and cost[39,41]. A multicentre surveillance study spanning six Indian cities, conducted under the International Nosocomial Infection Control Consortium, found SSI rates for several procedure categories exceeding benchmark data from high-income-country surveillance networks, underscoring that infection prevention is a determinant of surgical outcome rather than a peripheral safety measure, particularly in resource-constrained settings[40]. The World Health Organization's Global Guidelines for the Prevention of Surgical Site Infection (2nd edition, 2018) set out an evidence-graded bundle of pre-, intra-, and post-operative measures — preoperative bathing, surgical hand antisepsis, correctly timed antibiotic prophylaxis, alcohol-chlorhexidine skin preparation, maintenance of normothermia and euglycaemia, and sterile technique during dressing changes — that, when implemented together as coordinated care bundles rather than as isolated measures, produce a consistent reduction in SSI incidence[39,41].

Sushruta's own Paschat Karma protocols (Section 2.2) anticipated several of these principles empirically, centuries before the articulation of germ theory: flame-sterilised instruments, fumigation of the operative theatre with antimicrobial herbs (Dhoopana), and wound dressings combining honey, turmeric, and ghee (Section 2.5)[8,22]. Contemporary pharmacological studies lend partial support to these traditional wound-care practices. Honey (Madhu), applied according to Sushruta's Shashthi Upakrama, has demonstrated antibacterial and debriding activity in clinical observation of chronic wounds (Dushta Vrana)[42,43]; topical Neem (*Azadirachta indica*) oil combined with systemic Haridra (*Curcuma longa*/turmeric) has shown measurable benefit in non-healing wounds of leprotic, venous, and pressure-ulcer aetiology[44]; and a broader review of Ayurvedic Vrana Chikitsa (wound management) attributes the antimicrobial activity of formulations such as Jatyadi and Panchavalkala taila/malahar to their combined anti-inflammatory and antibacterial phytochemistry[45].

As with anaesthetic agents, these Ayurvedic wound-care agents currently function best as adjuncts within, rather than replacements for, a modern evidence-based infection-prevention bundle: none has been validated in adequately powered randomised trials against standard antiseptic and antibiotic prophylaxis protocols, and their role is consistent with the broader integrative-research framework discussed in

Section 8.

7. Comparative Analysis

The table below summarises key dimensions of contrast and convergence between the Ayurvedic and modern systems.

Dimension	Ayurvedic System (Shalya Tantra / Sangyaharana)	Modern System
Historical origin	~600 BCE, Sushruta Samhita	1846 CE onward (ether, chloroform, nitrous oxide)
Anaesthetic agents	Madya, Vijaya/Bhanga, Ahiphena, Dhatura, Parasika Yavani	Propofol, sevoflurane, lidocaine, bupivacaine, ketamine
Mechanism understanding	Empirical/experiential; explained via Dosha-Guna theory	Receptor-level pharmacology (GABA-A, NMDA, sodium channels)
Dosing precision	Qualitative, constitution (Prakriti)-based	Weight/age-based, titratable, monitored in real time
Monitoring	Surgeon's clinical observation only	Continuous multiparameter electronic monitoring
Instrumentation	121 hand instruments (101 Yantra, 20 Shastra)	Precision steel/robotic instruments; laparoscopic and robotic platforms
Reconstructive technique	Pedicled cheek/forehead flap rhinoplasty	Free flaps with microvascular anastomosis; same core principle
Wound care	Honey, turmeric, ghee dressings; herbal fumigation	Sterile dressings, antibiotics, antiseptic solutions
Validated safety data	Limited modern clinical-trial evidence	Extensive randomised-trial and pharmacovigilance evidence
Post-operative infection control	Dhoopana fumigation; honey, turmeric, and neem dressings (emerging evidence)	WHO SSI-prevention care bundles; timed antibiotic prophylaxis; standardised aseptic dressing protocols

Table: Comparative summary across historical, pharmacological, and technical dimensions[3,8,15,21,23,25,39,42].

8. Integration and Current Research

India's Ministry of AYUSH has taken active steps toward integrating Ayurveda with mainstream biomedicine, including co-location of AYUSH facilities within allopathic hospitals, joint research protocols, and support for evidence generation on traditional therapies[27,34,35,36]. A concrete example is AIIMS New Delhi's Centre for Integrative Medicine and Research (CIMR), which conducts collaborative Ayurveda- and Yoga-based clinical research alongside contemporary medical departments, complemented by the newer AYUSH-ICMR Advanced Centres for Integrative Health Research established at AIIMS Delhi, Jodhpur, Nagpur, and Rishikesh[35,36]. The same integrative infrastructure extends to regional AYUSH-ICMR clinical-trial networks: government-supported multicentre trials on AYUSH formulations have included Rajendra Institute of Medical Sciences (RIMS), Ranchi as a participating study site, illustrating how tertiary teaching institutions beyond the metropolitan AYUSH-ICMR centres are being drawn into standardised, evidence-based AYUSH clinical research[36]. Within this framework, several strands of research bear directly on anaesthesia and surgery:

- **Pre-anaesthetic premedication trials:** herbs such as Vacha (*Acorus calamus*), Jatamansi, Brahmi, Mandukparni, and Shankhapushpi have undergone small clinical trials as pre-anaesthetic agents, assessed for their ability to reduce anxiety, potentiate modern anaesthetic agents, and lower required doses (and hence toxicity) of allopathic anaesthetics[3,20].
- **Post-operative pain and inflammation management:** Nirgundi, Rasna, Erandamoola, Bhringaraja, Parijata, Triphala Guggulu, and Shigru (*Moringa oleifera*) are studied as adjunctive anti-inflammatory analgesics in the post-operative period, intended to complement rather than replace standard analgesia[3,20].
- **Perioperative procedures with modern correlates:** Kshara Karma (alkaline cauterisation), Raktamokshana (therapeutic blood-letting/leech therapy), and Agnikarma (thermal cauterisation) continue to be studied for efficacy and clinical relevance alongside modern electrocautery and sclerotherapy techniques[11].
- **Preliminary exploratory findings:** isolated researchers have proposed that agents such as Sarpunkha and Tagara may hold spinal- and local-anaesthetic potential respectively, though these findings have not been independently replicated, standardised, or commercialised[17].

- **Novel polyherbal formulation research:** preclinical work on polyherbal local-anaesthetic formulations (for example, Injection Harsha 22) has shown analgesic activity comparable to lignocaine in animal models, though confirmatory human clinical trials remain pending[31].
- **Ayurgenomics and precision-medicine research:** translational work exploring Prakriti-based genomic correlates is being examined internationally as a way to personalise perioperative risk stratification and drug-response prediction[33].

Across this literature, a consistent and candid conclusion recurs: Ayurveda has not yet delivered a single herbo-mineral compound validated as a stand-alone general or regional surgical anaesthetic meeting modern efficacy and safety standards. Contemporary Ayurvedic surgeons (practitioners of modern Shalya Tantra) therefore continue to use allopathic anaesthetic agents for the operative phase itself, while drawing on Ayurvedic pharmacology for pre- and post-operative adjuncts[3,17,20,29]. Reviewers have called for systematic, standardised pharmacological and clinical-trial investigation of classical anaesthetic dravyas (substances) as the necessary next step toward validated integration[4,18].

8.1 Challenges to Integration

- Absence of standardised dosing, purity, and pharmacokinetic data for most classical agents.
- Limited large-scale randomised controlled trials; much of the literature consists of narrative reviews, case reports, and small observational studies.
- Interaction risk between herbal premedicants and modern anaesthetic/analgesic drugs, which current peri-operative guidelines address by recommending discontinuation of herbal medications before surgery — a recommendation some Ayurvedic researchers argue merits re-examination on an evidence-based, herb-by-herb basis rather than as a blanket policy[5,30,38].
- Regulatory pathways for herbo-mineral anaesthetic or analgesic formulations remain underdeveloped compared with those for synthetic pharmaceuticals.

9. Conclusion

The Ayurvedic surgical tradition, epitomised by Sushruta's Shalya Tantra and Sangyaharana, represents a genuinely early and sophisticated system of surgical technique, instrumentation, and pain management — one that anticipated the staged

pre-/intra-/post-operative framework, principles of asepsis, and reconstructive flap surgery that modern medicine would independently re-derive many centuries later. Modern anaesthesiology and surgery, however, remain categorically distinct in their pharmacological precision, physiological monitoring, and evidence base, built on receptor-level mechanistic understanding and rigorous clinical trials unavailable to ancient practitioners. Current integrative research — supported by India's Ministry of AYUSH and an active body of Ayurvedic pharmacology literature — is testing selected herbal premedicants and post-operative adjuncts against modern standards, but has not yet produced a validated Ayurvedic substitute for a modern surgical anaesthetic. The most productive path forward, as reflected across the reviewed literature, lies not in treating the two systems as competing alternatives but in rigorously evaluating specific Ayurvedic agents and perioperative principles as potential adjuncts within an evidence-based, integrative surgical care model.

10. Declarations

Author Contributions

Dr. Shafaque Kamran conceived the review, conducted the literature search, and wrote, reviewed, and approved the final manuscript in its entirety.

Conflicts of Interest

The author declares no conflicts of interest.

Funding

This review received no external funding or financial support.

Ethical Approval

Not applicable. This is a narrative literature review; it did not involve primary human or animal data collection.

Data Availability

All data supporting this review are derived from the publicly available sources cited in the reference list.

References

1. Desai SB, Cherkil S. Ether Day: An Intriguing History. *Anesth Essays Res*. PMC4920664.
2. Origin and Evolution of Sangyaharan (Anaesthesia) in Ancient India. *Intl J Res & Innovation in Social Science (IJRSI)*. rsisinternational.org.
3. Panigrahi HK. A critical review on Sangyaharana Chikitsa. *Intl J Res in Ayurveda*

& Pharmacy (IJRAP). 2020;11(3). ijrap.net.

4. Sangyaharana and Vedana Shamana: an Ayurvedic perspective. *Intl J of AYUSH and Pharmaceutical Research (IJAPR)*. 2026. ijapr.in.
5. Ayurvedic Surgery from Sushruta to the Modern Era. *Intl J of Novel Medicine and Surgery (IJNMS)*. internationaljournal.org.in.
6. Sarkar PK, Chaudhary AK. DHARA: Digital Helpline for Ayurveda Research Articles — a bibliographic gateway for Ayurveda literature. *J Ayurveda Integr Med*. PMC3371566.
7. Ministry of AYUSH, Government of India. AYUSH Research Portal — evidence-based research data of AYUSH systems at the global level. ayushportal.nic.in.
8. Sushruta: The Father of Surgery. *Cureus*. PMC11527508.
9. Sushruta: the father of surgery. *Natl J Maxillofacial Surgery*. PMC5512402.
10. Ancient Indian surgical practice and its instrumentation. *Intl Journal of History*. historyjournal.net.
11. Gupta AK, Farheen K, Mahanta V, Sherkhane R, Gupta SK. Ashtavidha Shastra Karma in surgical practice. *J Ayurveda Integrative Med Sciences (JAIMS)*. 2020;5(3). jaims.in.
12. Surgical instruments and endoscopes of Susruta. *Indian J Surgery*. PMC3452414.
13. Sushruta and his contribution to plastic and reconstructive surgery. *Plast Reconstr Surg Glob Open*. PMC11000756.
14. History of Surgery Part 6: Anaesthesia and analgesia in ancient Indian surgery. Association of Surgeons of India. asiindia.org.
15. Anesthesia and pain management in Ayurveda. *Intl J of AYUSH*. internationaljournal.org.in.
16. Pandey RK, Tare M, Chaudhary A. A literary study of Sangyaharana in pre-historic India: a review study. *JETIR*. 2022;9(7). jetir.org.
17. A comparative study of ancient anesthesia (Sangyaharan) with modern anesthesia. scispace.com.
18. A review on Sangyaharana in Ayurveda. *Ayurlog*. ayurlog.com.
19. Ayurvedic perspectives on anaesthesia. *Intl J of Ayurvedic and Pharmaceutical Chemistry (IJAPC)*. 2026. ijapc.com.
20. A critical analysis of Sangyaharana with special reference to anaesthesia. *IJCRT*. ijcrt.org.
21. The history and development of anesthetics. In: *Pharmacology and Physiology for*

Anesthesia. Oxford University Press. academic.oup.com.

22. The history of local anesthesia. *Acta Med Philipp*. PMC11144816.
23. History of the development and evolution of local anesthesia since 1943. *Anesthesiology*. pubs.asahq.org.
24. History of local anesthesia. *Anesthesiol Clin*. PubMed 29855722.
25. The evolution of robotic surgery. *JSLS*. PMC9135605.
26. Robotic surgery: a comprehensive review. *Cureus*. PMC10784205.
27. Press Information Bureau, Government of India. Progress of integration of AYUSH systems with modern medicine. pib.gov.in.
28. Classification of anaesthesia. *Indian J Anaesth*. PMC3190505.
29. Integrative approaches combining Ayurveda and modern medicine. *J Ayurveda Integr Med*. PMC8039338.
30. Herb–drug interactions: challenges and opportunities for improved predictability. *Ayu*. PMC3665191.
31. Efficacy of a polyherbal formulation (Injection Harsha 22) as a perioperative adjunct. *J Exp Pharmacol*. PMC10065419.
32. A critical review of Sushruta Samhita. *Anc Sci Life*. PubMed 23559784.
33. Ayurgenomics-based frameworks in precision and integrative medicine: translational opportunities. Cambridge University Press. cambridge.org.
34. Central Council for Research in Ayurvedic Sciences (CCRAS). Clinical research services. ccras.nic.in.
35. All India Institute of Medical Sciences (AIIMS), New Delhi. Centre for Integrative Medicine and Research (CIMR) — introduction. aiims.edu.
36. Press Information Bureau, Government of India. Union Minister launches AYUSH–ICMR Advanced Centre for Integrated Health Research at AIIMS. pib.gov.in.
37. All India Institute of Medical Sciences (AIIMS), New Delhi. Department of Anaesthesiology, Pain Medicine and Critical Care. aiims.edu.
38. Rewatkar Y. Ayurveda and anaesthesia – a path to discover more. *Int J Ind Med*. 2024;5(4):18–24. ijim.co.in.
39. World Health Organization. *Global Guidelines for the Prevention of Surgical Site Infection*, 2nd ed. Geneva: WHO; 2018. who.int.
40. Singh S, Chakravarthy M, Rosenthal VD, et al. Surgical site infection rates in six cities of India: findings of the International Nosocomial Infection Control

Consortium (INICC). *Int Health*. 2015;7(5):354–359. PubMed 25487724.

41. Wolfhagen N, Boldingh QJJ, Boermeester MA, de Jonge SW. Perioperative care bundles for the prevention of surgical-site infections: meta-analysis. *Br J Surg*. 2022;109(10):933–942. PMC10364698.
42. Dudhamal TS, Gupta SK, Bhuyan C. Role of honey (Madhu) in the management of wounds (Dushta Vrana). *Int J Ayurveda Res*. 2010;1(4):271–273. PMC3059452.
43. Wound healing activity of honey: a pilot study. *Ayu*. PMC3665090.
44. Singh A, Singh AK, Narayan G, Singh TB, Shukla VK. Effect of Neem oil and Haridra on non-healing wounds. *Ayu*. 2014;35(4):398–403. PMC4492024.
45. Antimicrobial and wound-healing potential of Ayurvedic Vrana Chikitsa formulations: a review. *Intl J Res in Ayurveda & Pharmacy (IJRAP)*. ijrap.net.

❑