

Integrating Modern Asepsis and Antimicrobial Stewardship into Shalya Parasurgical Practice: A Contemporary Approach to Safeguarding Traditional Surgical Heritage While Promoting Global Patient's Safety

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ABSTRACT

Shalya Tantra, the classical Ayurvedic surgical science, represents a profound heritage of parasurgical interventions such as Kshara Sutra, Agnikarma, Raktamokshana, and Jalauka therapy. These modalities are still widely practiced for their efficacy, minimal invasiveness, and patient-centered approach. However, with the changing landscape of healthcare, the integration of modern infection control practices—particularly asepsis and antimicrobial stewardship—has become indispensable. The misuse of antibiotics, rising prevalence of multidrug-resistant pathogens, and lapses in aseptic technique pose significant threats to both traditional and modern healthcare systems. This paper explores the theoretical framework, historical roots, challenges, scope, and strategies for incorporating evidence-based aseptic protocols and antimicrobial stewardship into Shalya parasurgical practice. By doing so, it establishes a roadmap for harmonizing traditional wisdom with contemporary biomedical standards to ensure patient safety, preserve efficacy, and support global public health goals.

KEYWORDS: *Shalya Tantra, parasurgical practice, asepsis, antimicrobial stewardship, Kshara Sutra, Agnikarma, Raktamokshana, Jalauka, Ayurveda, infection control, multidrug resistance.*

INTRODUCTION

Surgery and parasurgery occupy a unique and honored place in the history of Ayurveda. Shalya Tantra, one of the eight classical branches of Ashtanga Ayurveda described by Acharya Sushruta, is considered the earliest systematic documentation of surgical science in human history. This branch deals not only with major surgical interventions but also with parasurgical procedures such as Kshara Sutra (medicated alkaline thread therapy), Agnikarma (therapeutic cauterization), Raktamokshana (bloodletting), and Jalauka (leech therapy), which continue to be practiced effectively in various parts of India and abroad. These interventions have demonstrated significant benefits in the management of conditions such as fistula-in-ano, hemorrhoids, chronic ulcers, musculoskeletal pain, varicose veins, and dermatological disorders.

However, the practice of parasurgery in the present era cannot be isolated from the global context of infection prevention, patient safety, and antimicrobial resistance. With increasing microbial threats and the spread of multidrug-resistant organisms, healthcare systems worldwide are re-emphasizing the importance of aseptic techniques and antimicrobial stewardship (AMS). Modern surgery is inseparable from these two pillars: asepsis, which prevents the introduction of pathogens into surgical fields, and AMS, which ensures the judicious use of antibiotics to combat resistance.

While Ayurvedic texts highlight hygiene, fumigation, and purification methods as preventive measures against contamination, the scientific understanding of microbes and resistance was not available in ancient times. In the current healthcare environment, these traditional measures must be harmonized with modern evidence-based protocols such as instrument sterilization, personal protective equipment (PPE), hand hygiene practices, and rational antibiotic usage. Without such integration, the credibility and acceptance of Shalya parasurgical practice in mainstream healthcare could be questioned.

Moreover, in many clinical settings, especially in rural and semi-urban regions, parasurgical procedures are conducted in resource-limited facilities. These centers may lack standardized sterilization units, infection-control training, or stewardship protocols. At the same time, there is often overreliance on empirical antibiotic prescriptions, which not only increases treatment costs but also accelerates the problem of antimicrobial resistance. Addressing these challenges

through the integration of modern asepsis and AMS within parasurgical frameworks is therefore critical.

This paper aims to analyze the theoretical foundations, practical challenges, and future prospects of integrating modern asepsis and antimicrobial stewardship into Shalya parasurgical practice. By doing so, it seeks to present a model where traditional wisdom and modern scientific rigor converge, ensuring patient safety, global acceptance, and sustainability of these time-tested interventions.

LITERATURE REVIEW

Traditional understanding of asepsis in Ayurveda

Ayurvedic texts such as Sushruta Samhita and Charaka Samhita emphasize cleanliness, environmental hygiene, fumigation, and purification of instruments as measures for infection prevention. Although the microbiological rationale was not known, these measures were functionally equivalent to asepsis. For example, the use of herbal fumigation (dhupana), alkaline preparations, and antiseptic herbs reflected an empirical understanding of microbial contamination.

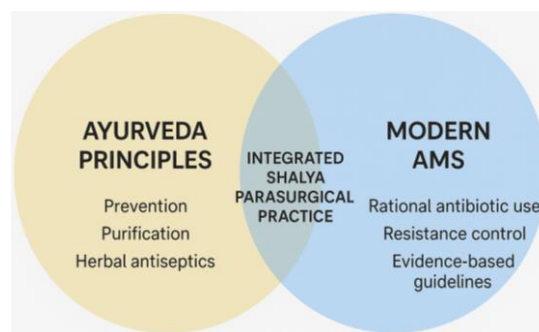


Figure 2. Conceptual Integration of Ayurveda and Modern Antimicrobial Stewardship

Modern perspectives on asepsis

In contemporary medicine, asepsis refers to practices that prevent contamination of wounds and surgical fields by microorganisms. This includes hand hygiene, sterilization of instruments, use of personal protective equipment (PPE), environmental disinfection, and adherence to standard precautions. Global health bodies stress asepsis as a foundation of surgical safety.

Antimicrobial stewardship in modern healthcare

Antimicrobial stewardship (AMS) programs aim to optimize the use of antibiotics by ensuring the right drug, dose, and duration. They seek to minimize the development of resistance while maintaining effective treatment. Inappropriate antibiotic use in both modern and traditional healthcare practices contributes significantly to AMR.

Table 1. Antimicrobial Stewardship in Parasurgical Practice: Dos and Don'ts

Practice Area	Dos	Don'ts
Antibiotic Use	Use only when clinically indicated; culture sensitivity preferred	Do not prescribe empirically for minor parasurgical procedures
Duration	Short, targeted therapy (3–5 days if required)	Avoid prolonged courses without indication
Prophylaxis	Reserve for high-risk invasive procedures	Avoid routine use for superficial or minor interventions
Record Keeping	Document indication, duration, and patient response	Do not ignore follow-up and resistance patterns

Need for integration in Shalya parasurgical practice

Though parasurgical procedures often avoid deep tissue trauma, the risk of infection is not negligible. Procedures like Kshara Sutra or Raktamokshana involve invasive steps that demand aseptic precautions. Moreover, empirical or prophylactic antibiotic overuse in such contexts can accelerate resistance. Therefore, harmonizing traditional methods with modern infection control is crucial.

Table 2. Comparative View of Traditional and Modern Asepsis in Shalya Parasurgical Practice

Aspect	Traditional Measures (Ayurveda)	Modern Asepsis Measures
Instrument Sterilization	Herbal fumigation, alkaline solutions (Kshara)	Autoclaving, chemical sterilants, disposable instruments
Practitioner Hygiene	Ritual bathing, clean attire, fumigation	Hand hygiene with alcohol rubs, PPE (gloves, masks, gowns)

Aspect	Traditional Measures (Ayurveda)	Modern Asepsis Measures
Environmental Hygiene	Dhupana (herbal smoke), clean surroundings	HEPA filters, disinfectants, laminar airflow
Wound Care	Herbal pastes, medicated oils	Antiseptic dressings, sterile gauze, antibiotics (when needed)

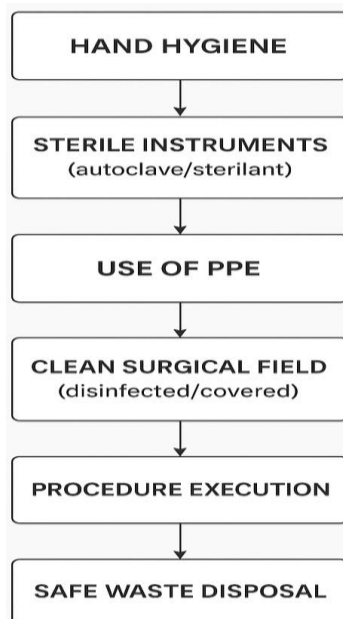


Figure 1. Schematic Representation of Aseptic Workflow in Shalya Parasurgical Procedures

CHALLENGES IN CURRENT PRACTICE

Overreliance on antibiotics

In many traditional clinics, antibiotics are prescribed indiscriminately for minor parasurgical procedures, often without culture sensitivity tests. This not only exposes patients to unnecessary drugs but also promotes microbial resistance.

Inadequate aseptic environment

Smaller centers or rural setups practicing parasurgical interventions often lack proper sterilization facilities. Instruments may not undergo autoclaving, and hand hygiene compliance is often inconsistent.

Educational and systemic gaps

Ayurvedic curricula and training sometimes underemphasize modern microbiology, asepsis, and antimicrobial guidelines. Consequently, practitioners may be inadequately prepared for infection control.

Resistance from traditionalists

Some practitioners hesitate to integrate modern protocols, perceiving them as dilution of Ayurvedic authenticity. This cultural barrier can hinder effective infection prevention.

SCOPE OF INTEGRATION

Enhancing patient safety

By adopting modern aseptic protocols, parasurgical interventions can minimize postoperative infections, thereby boosting confidence among patients and policymakers.

Preserving therapeutic credibility

Demonstrating compliance with global standards ensures that Ayurvedic parasurgical techniques maintain legitimacy in modern healthcare ecosystems.

Global acceptance

Integration enhances opportunities for collaboration with international health agencies, promoting Ayurveda as a safe, complementary practice.

Antimicrobial resistance mitigation

Adhering to AMS principles within parasurgical contexts can significantly reduce irrational antibiotic prescriptions, contributing to the global fight against resistance.

STRATEGIES FOR IMPLEMENTATION

Standardizing aseptic protocols

- Instruments used in Kshara Sutra, Agnikarma, and Jalauka therapy should undergo autoclaving or validated sterilization techniques.
- Hand hygiene protocols using alcohol-based hand rubs should be mandatory.
- Use of disposable gloves, sterile drapes, and masks should be emphasized in all invasive procedures.

Strengthening antimicrobial stewardship

- Avoid prophylactic antibiotics in low-risk procedures such as superficial Agnikarma.
- Use antibiotics only when clinically indicated, following culture and sensitivity tests when possible.
- Develop guidelines for antibiotic duration in parasurgical cases to avoid unnecessary prolonged use.

Training and capacity building

- Incorporate microbiology, asepsis, and stewardship modules in Ayurveda postgraduate and undergraduate curricula.
- Conduct workshops and continuous medical education (CME) programs to train practitioners in infection control.

Documentation and audit

- Maintain records of aseptic compliance and antibiotic use.
- Conduct periodic audits to assess adherence to protocols and identify areas for improvement.

Research and innovation

- Validate traditional disinfectants, herbal fumigants, and antiseptic agents with modern laboratory studies.
- Explore synergies between herbal antimicrobials and synthetic drugs for integrated stewardship.

DISCUSSION

The integration of asepsis and antimicrobial stewardship into Shalya parasurgical practice is not merely a technical exercise but a philosophical convergence of traditional wisdom and modern science. Ayurveda inherently values prevention and preservation of health. Modern infection control resonates with this philosophy by preventing iatrogenic harm.

By applying evidence-based aseptic measures, practitioners not only safeguard their patients but also elevate the credibility of parasurgical interventions. Similarly, rational antibiotic use

ensures long-term sustainability of these practices by avoiding microbial resistance. Bridging these two worlds requires sensitivity, training, and policy support, but the outcome benefits both systems of medicine and global health alike.

FUTURE DIRECTIONS

Integration into health policy

Governments and health councils should frame policies that mandate aseptic compliance in traditional clinics offering parasurgical treatments.

Collaborative frameworks

Partnerships between Ayurvedic institutions and modern hospitals can create hybrid models where best practices from both systems are exchanged.

Community awareness

Patients should be educated about the importance of asepsis and rational antibiotic use, fostering a culture of shared responsibility in infection prevention.

Technology adoption

Portable sterilization units, low-cost PPE, and digital antibiotic monitoring systems can be customized for Ayurveda clinics in rural settings.

CONCLUSION

Shalya Tantra parasurgical practices embody the timeless wisdom of Ayurveda, offering effective, patient-centered alternatives to conventional surgery. However, in the modern era, patient safety demands rigorous adherence to asepsis and antimicrobial stewardship. Integrating these principles ensures that parasurgical procedures remain safe, credible, and globally acceptable. The synergy of traditional wisdom with modern infection control is not a compromise but a reaffirmation of Ayurveda's holistic vision. By embracing this integration, practitioners contribute not only to safeguarding patients but also to addressing one of the greatest challenges of contemporary medicine—antimicrobial resistance.

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