

Nadi Yantra in Ayurveda and Modern Laparoscopic Ports: A Comparative Conceptual Review

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Abstract: Ayurveda has described numerous surgical instruments under the classification of Yantras in the classical texts, particularly the Sushruta Samhita. Among them, Nadi Yantra is a tubular instrument designed for visualization, drainage, irrigation, extraction of foreign bodies, and administration of medicines into body cavities. Modern laparoscopic surgery employs trocar-cannula systems and endoscopic cameras to achieve similar objectives through minimally invasive access. Although developed in different eras, both systems share common principles of accessing internal cavities with minimal tissue trauma. This review explores the conceptual similarities between the Ayurvedic Nadi Yantra and modern laparoscopic instruments while acknowledging the technological advances of contemporary surgery.

Keywords: Nadi Yantra, Sushruta, Laparoscopy, Trocar, Cannula, Endoscope, Minimal Access Surgery, Ayurveda

1. Introduction

Sushruta is regarded as the father of surgery due to his detailed description of surgical techniques and instruments. In Samhita he described 101 yantras and 20 shastras in detail. Also give detail of its use and correlation with their karma. Among the various Yantras, Nadi Yantra which are 20 in number is described as a hollow tubular instrument used for examination, drainage, irrigation, and extraction of foreign bodies.

Modern laparoscopy also utilizes tubular access devices (trocars and cannulas) through which cameras and specialized instruments are introduced into the abdominal cavity. This article examines the conceptual relationship between these ancient and modern surgical tools.

Yantras:

Foreign bodies that cause pain to Manah and Sharir is called Shalya and the methods to remove these are called Yantras. Based on innumerable Shalyas, Yantras can also be innumerable. But to have bird's eye view, Acharyas have classified Yantras into 101 types. Though Yantras are indicated for specific function but Vaidya, applying his Yukti, can use them accordingly to his purpose and can also invent and make new instruments.

Yantras can be taken as blunt instruments as per their description in texts.

Based on the Aakriti or shape, Yantras are of 6 main types:

- 1) Swastika Yantra- cruciform forceps (24 varieties)
- 2) Samdansa Yantra- pincer like forceps (2 varieties).
- 3) Taala Yantra- pick lock like (2 varieties)
- 4) Nadi Yantra- tubular instruments like catheters, cannula etc. (20 varieties)
- 5) Salaka Yantra- bougie like probes and sounds (28 varieties)
- 6) Upayantra- accessory instruments like dressings, as clothe, twine, etc., (25 varieties)

Characteristics of Yantra:

According to Acharya Susrutha, a good Yantra should be-

- a) Susamahitha- suitable in measurement
- b) Khar slashna mukha – hard and soft or smooth mouth
- c) Sudrida- strong
- d) Surupa- nice looking, handsome or attractive in appearance
- e) Sugraha – easy handling

Nadi Yantra (Tubular Instruments)

Nadi yantra are Anekprakarani, Anek prayojanani, Ekatomukhani, Ubhayatomukhanani, and Its length is Srotodwarparinahan Vathayogdirghani.

Briefly they are used for following purposes:

- a) Srotogata shalya uddharnarth - for extracting foreign bodies from the srotas (channels, minute pore etc)
- b) Rogdarshana-nartham (to observe the abnormalities inside the channels)
- c) Aachushanarth -for sucking (vitiated fluids like blood, pus etc)
- d) Kriyasaukaryartham- for convenience of functions (surgical and medical activities) Even today laparoscopy and endoscopy has same applications.

Some of these are- 1. Arsoyantra with 1 slit and 2 slits 2. Bhagandara yantra with 1 slit and 2 slits 3. Vrana yantra 4. Bastiyantra 3 in number or 4 in number 5. Uttarabasti yantra Male and female 3 6. Mutravridhi yantra 1 in number. 7. Dakodara yantra 1 in number 8. Dhuma yantra 3 in number 9. Nirudhaprakasha yantra 1 in number 10. Sannirudhaguda yantra 1 in number 11. Alabu yantra 12. Srnga yantra.

Modern Laparoscopic Instruments

The basic laparoscopic system consists of:

- Trocar
- Cannula
- Telescope (laparoscope)
- Camera
- Light source
- CO₂ insufflator
- Monitor

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- Working instruments

The trocar provides access to the abdominal cavity, while the cannula acts as a tubular passage for the camera and surgical instruments.

Conceptual Correlation:

Nadi yantra	Modern laproscopic instruments
Hollow tubular instrument	Cannula
Creates access to body cavity	Trocar entry
Used for examination	laproscopic camera
Used for drainage	Suction – irrigation system
Introduces medicines	Instrument channel
Removes foreign bodies	Graspers and retrieval bags
Minimizes tissue injury	Minimally invasive surgery

References

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2. Discussion

The concept of Nadi Yantra reflects an advanced understanding of minimally invasive access in ancient Ayurvedic surgery. While it lacked modern optics and video technology, its fundamental principle- a hollow conduit to access internal structures- resembles the role of the laparoscopic cannula.

Modern laparoscopy expands upon this principle through high-definition imaging, illumination, insufflation, and precision instruments, enabling complex surgical procedures with minimal trauma.

Thus, Nadi Yantra may be viewed as a conceptual predecessor of tubular access devices rather than a direct equivalent of modern laparoscopic systems.

Advantages of the Correlation:

Highlights the scientific heritage of Ayurveda.

Demonstrates continuity in the evolution of surgical concepts.

Encourages interdisciplinary research between Ayurveda and modern surgery.

Provides historical context for minimally invasive techniques.

3. Limitations

- Nadi Yantra did not incorporate optical or digital visualization.
- Modern laparoscopy is based on advanced engineering and imaging technologies.
- The comparison is conceptual and historical, not functional equivalence.

4. Conclusion

Nadi Yantra, as described in the Sushruta Samhita, represents an early concept of tubular surgical access. Although it differs significantly in technology from modern laparoscopic trocars, cannulas, and camera systems, both share the fundamental objective of providing minimally traumatic access to body cavities. Studying these similarities offers valuable insights into the evolution of surgical innovation and underscores the enduring relevance of classical Ayurvedic surgical principles.