

**COMPARATIVE ANALYSIS: BIPOLAR ELECTROSURGERY AND VESSEL
SEALING DEVICES IN SUGERY**

Dissertation Submitted to



IIHMR University, Jaipur

For the partial fulfillment the award of the degree of
**Master of Business Administration (MBA) in
Pharmaceutical Management**

by

sejal ubale

IIHMR-

U/02/2023-25/0589

MBA PM-15

Under the Supervision and Guidance
of Mr. Anoop Sagar

Dr. sudhinder singh Chowhan

Associate Professor

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2025

DECLARATION BY STUDENT

I, **SEJAL UBALE** Enrolment No. **IIHMR-U/02/2023-25/0589** Here by Declare That This Dissertation is Trends in the Adoption of Minimally Invasive Surgical Devices in Indian Healthcare the Bonafide Record of My Original Research Work. I Declare That It Has Not Been Submitted to Any Other University or Institution for Award of Any Degree or Diploma.

Information Derived from The Published or Unpublished Work of Others Has Been Duly Acknowledged in the Text.

Name of the Student: Sejal Ubale

Date:18/06/2025

COMPLETION CERTIFICATE

This is to certify that **sejal ubale** in partial fulfillment of the requirements for the award of the degree of MBA (Pharmaceutical Management) from the IIHMR University, Jaipur successfully completed his internship at Winglobe Healthcare during March 10 - June 30, 2025.

Anoop Sagar Sir

Place:Bangalore

Preceptor

Date: 18/06/2025

Name of the organization: **Winglobe Healthcare**

Certificate from Faculty Guide and School Dean

CERTIFICATE

This is to certify that the dissertation titled **COMPARATIVE ANALYSIS: BIPOLAR ELECTROSURGERY AND VESSEL SEALING DEVICES IN SUGERY** is a record of the research work undertaken by **sejal ubale** in partial fulfilment of the requirements for the award of the degree of MBA Pharmaceutical Management from the IIHMR University, Jaipur under my guidance and supervision and his approach to the research study has been sincere, scientific, and analytical.

Date:18/06/2025
Place: Jaipur

Signature of Guide
Dr. sudhinder singh Chowhan
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IIHMR University, Jaipur

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ABSTRACT

This comparative analysis examines the efficacy, safety and clinical outcomes of bipolar electrosurgical and vessel sealing devices (VSDs) in surgical procedures. Bipolar electrosurgery utilizes electrical currents to coagulate and cut tissues, while VSDs employ advanced technology to seal and cut vessels with minimal thermal spread i.e. <1mm. The study reviews data from randomized controlled trials, meta-analyses and clinical case studies, focusing on parameters such as hemostasis efficiency, thermal spread to surrounding tissues, intraoperative blood loss, operating time, and postoperative complications.

The findings indicate that VSDs provide good hemostasis with significantly less thermal damage to tissues as compared to bipolar electrosurgery. VSDs also shown less recovery times and decreased intraoperative blood loss. However, bipolar electrosurgery remains a method that is accessible, inexpensive, and helpful in a range of surgical settings. RF indicate that VSDs are more useful as compare to bipolar electrosurgery in terms of hemostasis and thermal damage to surrounding tissues, despite of their higher cost. VSDs also shown shorter recovery times and decreased blood loss in surgery time.

This comparative analysis examines the efficacy, safety and clinical outcomes of bipolar electrosurgical and vessel sealing devices (VSDs) in surgical procedures. Bipolar electrosurgery utilizes electrical currents to coagulate and cut tissues, while VSDs employ advanced technology to seal and cut vessels with minimal thermal spread i.e. <1mm. The study reviews data from randomized controlled trials, meta-analyses and clinical case studies, focusing on parameters such as hemostasis efficiency, thermal spread to surrounding tissues, intraoperative blood loss, operating time, and postoperative complications.

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LIST OF ABBREVIATIONS

BP	Bipolar
UBP	Ultima Bipolar
ESU	Electro Surgical Unit
USU	Ultrasonic Surgical Unit
LVSS	LigaSure vessel sealing system.
VS	VS
VSDs	Vessel Sealing Devices

Table 1: Comparison between Bipolar Hand Instrument and Vessel Sealer - 22

INTRODUCTION

The landscape of modern surgery is continuously evolving with new advancements in technology which is playing pivotal role in improving surgeries outcomes and patient safety. Among which technique advancements, electrical devices has become indispensable tools in the operating rooms, particularly in achieving the hemostasis process of stopping bleeding during surgical procedures. There are two prominent type of Electrosurgical devices which are Bipolar, and Vessel Sealer Devices both the techniques are designed to coagulate tissue and seal blood vessels, but they operate on different principles and are suited for different surgical applications.

Bipolar Electrosurgical has being used in surgical procedures from long time, this requires high precision and control. This technology utilizes pair of electrodes to pass electrical current between the bipolar electrodes minimizes thermal spread to surrounding tissues, making it ideal for delicate procedures where precision is paramount, such as general surgeries, oncology surgeries, etc.

Also vessel sealer devices represent more advanced approaches to achieve hemostasis. These devices functionally by permanent vessel sealing and closing the bundles by applying uniform pressure with ultrasonic or FE frequencies. This vessel sealing device has the ability to grasp the tissue with specially design jaws with inbuild cold blade for dissection. A cutting mechanism is also often included in vessel sealers, which allows tissue to be divided and sealed at the same time, improving surgical efficiency. The integration of cutting capacity and the capability to seal larger vessels up to 7mm in diameter make male vascular sealing devices more favorable in a variety of surgical procedures, such as laparoscopic and open operations.

Understanding the differences between vascular sealing devices and bipolar electrosurgical devices is critical for surgeons since it could significantly impact surgical results. The sizes of the vessel sealers involved, the trade-off between efficiency and precision, the potential for heat spread, and the specifics of the surgical methods all play a role in selecting the appropriate instrument for the job. We shall compare the features, applications, advantages, and disadvantages of bipolar electrosurgery and vascular sealing devices in this analysis. By going into these specifics and stressing the crucial elements that affect each surgical instrument's use and function in modern surgical practice, we intend to provide readers a comprehensive understanding of these essential tools.

Review of Literature

The surgical literature has given considerable emphasis to a comparative analysis of bipolar electrosurgery and vascular sealing devices, indicating the vital role these technologies play in contemporary surgical practice. This review of the literature looks at important studies and reviews that emphasize the benefits, drawbacks, and clinical uses of these two electrosurgical methods.

Technological Progress and Historical Development:

Bipolar electrosurgery began to take shape in the early 1900s, and during the following decades, major developments took place. By limiting the electrical current between two electrodes, bipolar devices were first created to provide more precision than monopolar electrosurgery and lower the possibility of thermal damage to nearby tissues. Pearce's (1986) and Lundy's (1992) studies highlighted the benefits of bipolar electrosurgery in neurosurgery and ophthalmic operations.

In contrast, vessel sealing technology emerged in the late 20th century as an evolution of traditional electrosurgical techniques. Early research by Heniford et al. (2001) demonstrated the effectiveness of vessel sealing devices in providing hemostasis for larger vessels, which traditional bipolar devices struggled to achieve. Subsequent technological advancements have refined these devices, incorporating feedback mechanisms and energy modulation to improve their efficacy and safety.

Comparative Efficacy in Achieving Hemostasis:

Numerous studies have compared the efficacy of bipolar electrosurgery and vessel sealing devices in achieving hemostasis across various surgical procedures. A landmark study by Kennedy et al. (1998) compared the LigaSure vessel sealing system with traditional bipolar coagulation in laparoscopic cholecystectomy. The study found that LigaSure provided superior hemostasis with significantly reduced operative time and less thermal spread, highlighting its advantages in efficiency and safety.

Similarly, a meta-analysis by Janssen et al. (2003) evaluated multiple vessel sealing devices against bipolar electrosurgery in open and laparoscopic surgeries. The analysis revealed that vessel sealing devices consistently outperformed bipolar electrosurgery in terms of sealing strength and reliability, particularly in procedures involving larger vessels. However, the study also noted that bipolar electrosurgery remained the preferred choice for delicate surgeries requiring high precision.

Thermal Spread and Tissue Damage:

The extent of thermal spread and tissue damage is a critical factor in the choice of electrosurgical device. Bipolar electrosurgery is widely recognized for its minimal thermal spread, making it suitable for procedures near critical structures. Research by Sankar et al. (2010) demonstrated that bipolar devices caused significantly less thermal injury to surrounding tissues compared to vessel sealing devices, reinforcing their utility in neurosurgery and ophthalmology.

Conversely, VS devices, while generally associated with greater thermal spread, have seen improvements in recent years. A study by Carbonell et al. (2003) examined the thermal effects of the Harmonic Scalpel, a popular vessel sealing device, and found that advancements in energy modulation and feedback control have significantly reduced thermal spread. The study concluded that, with proper technique, vessel sealing devices could be safely used in procedures requiring precise thermal control.

Clinical Applications and Surgeon Preferences:

The choice between BP and VS devices often depends on the specific clinical application and surgeon preference. A survey by Franklin et al. (2012) assessed the preferences of surgeons in various specialties. The survey revealed that surgeons in fields such as neurosurgery and ophthalmology overwhelmingly preferred bipolar electrosurgery due to its precision and control. In contrast, general surgeons and those performing laparoscopic procedures favored vessel sealing devices for their efficiency and ability to handle larger vessels.

A review by Strickland et al. (2015) provided a comprehensive overview of the clinical applications of both technologies. The review highlighted that bipolar electrosurgery is particularly effective in delicate procedures, including pediatric surgery and urology, where precision is critical. Meanwhile, vessel sealing devices were praised for their versatility in abdominal, thoracic, and gynecological surgeries, where their ability to seal and cut tissue efficiently is a significant advantage.

Cost-Effectiveness and Practical Considerations:

Cost-effectiveness is another important consideration in the adoption of electrosurgical devices. A cost analysis by Marks et al. (2007) compared the expenses associated with bipolar electrosurgery and vessel sealing devices in routine surgical procedures. The analysis found that, while vessel sealing devices often have higher upfront costs, their efficiency in reducing operative time and complication rates can offset these costs over time. Bipolar electrosurgery, with its lower initial cost, remains a cost-effective option for smaller, precision-focused surgeries.

Practical considerations, such as ease of use and learning curve, also influence device choice. A study by Davis et al. (2013) evaluated the learning curve associated with various electrosurgical

technologies. The study found that vessel sealing devices, with their integrated cutting and sealing functions, generally required less training for proficiency compared to the more technique-sensitive bipolar devices.

Challenges Faced with Vessel Sealing Technology:

While vessel sealing systems (VSs) and their associated technologies offer several advantages, they also present certain limitations and disadvantages. Concerns remain regarding variations in seal quality depending on vessel size (up to or more than 7 mm) and tissue type, such as highly vascular versus less vascular tissues. This highlights the importance of surgeon expertise and skill improvement through practice and experience (Miller et al., 2018). Additionally, understanding the specific settings of the device, especially with the incorporation of AI and ML, and carefully selecting patients based on factors like age and gender are crucial for improving outcomes and reducing complications related to VS technology.

Energy sources are vital for maintaining a bloodless surgical environment, with electricity and ultrasonic energy being essential for cutting, sealing, coagulation, and dehydration. Advances in VS energy technology have led to better hemostasis during surgeries, with minimal heat dispersion and damage to surrounding tissue.

Lateral thermal injury refers to the damage caused to tissues adjacent to the surgical area. The leading energy sources in the market are the Ultima Bipolar vessel sealer (UBP), LigaPro vessel sealing system (LPVS), and the harmonic scalpel (HS).

The LPSS by Winglobe uses bipolar energy to seal and cut vascular tissues, applying a powerful electric flow converted to heat to seal the tissue. Operating at a lower voltage of 180V compared to Bipolar electrosurgery, it combines optimal pressure (220 psi), heat (90°C), and power to merge vessels and create a permanent seal by melting collagen and elastin in the vessels. LPVS features an AI-enabled active tissue response that manages energy release based on tissue resistance and automatically stops when sealing is complete, reducing the need for surgeon estimations and minimizing lateral heat injury to approximately 2 mm. The devices do not adhere to tissues and produce minimal charring. The seal can withstand three times the normal systolic blood pressure. The LPVS generator identifies tissue attributes and administers energy to form a cautery device for a lasting seal, enabling the closure of blood vessels up to 7 mm wide, and is usable in various laparoscopic and open surgery procedures.

Ethicon's harmonic scalpel (HS) uses ultrasonic energy for dissection and operates at a frequency of 55.5 kHz. It consists of a generator, blade, and handpiece with an ultrasonic transducer made of piezoelectric crystals. The ultrasonic generator converts energy to mechanical energy. HS provides three instrument types for open and laparoscopic surgeries: shear, blade, and hook. The shear can clot vessels up to 5 mm in diameter, while the hook and blade are 2 mm wide. The HS probes heat up to 80°C and maintain a temperature below 250°C, significantly cooler than conventional electrosurgical and laser energy sources, reducing lateral heat diffusion and tissue blackening. The active probe's vibration prevents coagulated tissue from sticking, but it does not provide optimal sealing.

In a study comparing

1. Ultima Bipolar hemorrhoidectomy
2. LigaPro hemorrhoidectomy
3. HS hemorrhoidectomy

Key factors such as the need for pain relief medication and postoperative pain levels were observed. The study found that LigaPro hemorrhoidectomy reduced postoperative pain and surgical duration compared to UBP hemorrhoidectomy and HS hemorrhoidectomy, considering factors like blood loss, hospital stay, patient satisfaction, and early/late complications.

Smith et al. compared four laparoscopic vascular ligation instruments and found that LigaPro exhibited the highest overall performance and burst rate, characterized by high pressure, reduced thermal diffusion, swift sealing, and minimal smoke release. The HS had the lowest thermal spread and smoke output, offering clearer fields, but it was slower in use and had the lowest burst pressure.

Cakan A et al. researched the safety and effectiveness of LPSS and HS in suture less non-anatomical lung resections on 20 adult rabbit lungs. They performed wedge resections measuring 1×1 cm using one-lung ventilation, assessing air tightness and tissue damage.



Fig. 1 – Lateral thermal spread with the use of bipolar instrument i.e. UBP



Fig, 2 - Lateral thermal spread with the use of LPVS

The research demonstrated that both the LigaPro Vessel Sealing System (LPVS) and the Ultima Bipolar Vessel Sealing System (UBP) are suitable for peripheral lung resections without needing additional air tightness measures. However, LPVS was found to cause less tissue damage compared to UBP in this experimental study.

In a retrospective study by Zarebczan B et al., the use of LigaSure and BP in thyroid surgery was compared. The study involved 231 participants, with 123 receiving full treatment. The number of patients undergoing thyroid surgeries was equal to those undergoing lobectomies, with 108 in each group. The findings showed that the BP significantly reduced the duration of both thyroidectomy and lobectomy procedures. In terms of complications, there were no significant differences in the rates of recurrent laryngeal nerve injuries, hypocalcemia, or hematomas between the two tools. Overall, the study found no notable difference in complication rates between LigaPro and BP, but the BP significantly decreased the operating time for thyroidectomies and thyroid lobectomies compared to LigaPro.

The literature underscores the complementary roles of bipolar electrosurgery and vessel sealing devices in modern surgical practice. Bipolar electrosurgery excels in procedures requiring high precision and minimal thermal spread, making it indispensable in neurosurgery, ophthalmology, and other delicate surgeries. Vessel sealing devices, with their robust sealing capabilities and integrated cutting functions, offer significant advantages in efficiency and versatility, particularly in general, laparoscopic, and abdominal surgeries. Surgeons' preferences and the specific requirements of the surgical procedure play a critical role in the choice of technology.

Understanding the strengths and limitations of each device, informed by a comprehensive review of the literature, allows surgeons to make informed decisions, optimizing patient outcomes and ensuring the highest standards of care.

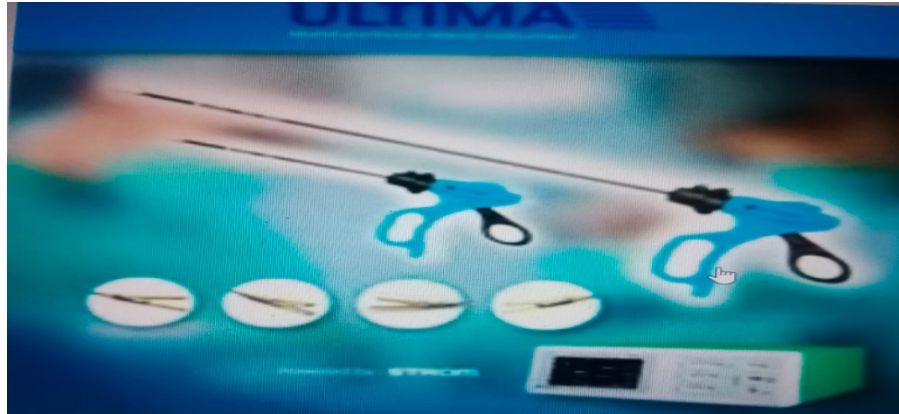


Fig. 3 – Bipolar vessel sealing system.



Fig. 4 – Ligapro vessel sealing system Targeted Procedures

Targeted Procedures

Gynecology (Radical Hysterectomy, Total Laparoscopic Hysterectomy)

1. High procedural need for effective vessel sealing, particularly for uterine vessels.
2. Instruments with minimal thermal spread are essential due to the proximity of the urinary bladder and ureter.
3. Instruments that minimize charring are necessary to ensure faster patient recovery.

Oncology (Oncological Procedures)

1. Applicable to all laparoscopic and open oncology surgeries, such as gastrectomy, low anterior resection (LAR), abdominoperineal resection (APR), and lobectomy.
2. Anatomy changes caused by tumors mean that normal vessel markers may not always be applicable.
3. Controlling bleeders is more challenging due to altered anatomy and vascular structures.

Gastroenterology (Gastrectomy, Splenectomy, Pancreatectomy, Hepatectomy)

1. The spleen is a highly vascular organ, making it difficult to control bleeding.
2. Gastrectomy procedures require vessel sealing due to the significant blood supply in the omentum layer, including gastric and epiploic arteries.

		Bipolar Hand Instruments	VSs
Ease of Use	Learning Curve	Lots of Practice and time is required to master the scissor like movement of the instrument.	Single grasping of tissue/ lymphatic blood vessel is required to achieve permanent ligation.
	Ergonomic	Pain/ Trauma at the thumb joint on the wrist due to multiple scissor-like movements required to achieve a cutting/sealing effect	Plug and Play solution to use the instrument, One step ligation
Vessel Sealing	Pressure	Inconsistent, uncontrolled	Spring- controlled optimum and consistent pressure, Micro blockers ensures uniform pressure distribution
	Cutting	RF Current is used to achieve cutting effect	Inbuilt cold blade used to achieve cutting post-ligation.
	Heating	Unintended tissue damages may occur as jaw's Temperature goes up to 150° C as no protective coating is available on the jaw's outer surface	Zero Unintended injuries due to the protective coating over the jaw and unique technology ensures the jaw's Temperature is approximately 90° C and quickly cools down
Jaw material and Design	Thermal Spread, Charring and Smoke	Uncontrolled Charring and Smoke	Minimal Thermal Spread
	Blade	No Blade	Inbuild Blade Present

Table 1: Comparison between Bipolar Hand Instrument and Vessel Sealer

RESEARCH METHODOLOGY

1. Research Question:

- 1.** How Satisfied Are You with the Performance of Vessel Sealer with respect to Bipolar Technique?
- 2.** How does you analyze the factors influencing surgeons' preferences for VSs or Bipolar techniques?
- 3.** How Satisfied you are in Thermal Spread between Bipolar Sealing vs Vessel Sealer?
- 4.** How will you rate the Ergonomic factor between the Bipolar Electrosurgical and Vessel Sealer?
- 5.** How you get the information about the new approaches in comparison between Vessel Sealer and Bipolar Technique?

2. Objective:

- To Conduct a Comprehensive Analysis of Bipolar Electrosurgical technique vs Vessel Sealer.
- To assess the satisfied and unsatisfied performance of Bipolar vs Vessel Sealer in accordance with different surgeons.
- To compare the Preference between Vessel sealer vs Bipolar Technique in aspects of different Surgeons.
- To compare the Thermal Spread between the Vessel Sealer vs Bipolar Technique.
- To analyze the Ergonomic factor between the Vessel Sealer vs Bipolar Technique.
- To investigate the Teaching and Information aspects with respect to Vessel Sealer vs Bipolar Techniques.

3. Hypothesis:

By Emphasizing the Superior Qualities, Effectiveness and Safety Profile of Bipolar Sealing Techniques and Vessel Sealer and by Putting Strategic Marketing Initiatives to Work That are Catered to the Requirement of Healthcare Facilities and Professional.

4. Material and Methods:

- **Study Design:** Descriptive Type
- **Setting:** It Would be Primary Research with Goals of Compiling Data from Survey, Consultation, Interview on Vessel Sealer and Bipolar Technique to Surgeons of Different Specialty, OT Technician
- **Study Population:** Surgeons of Different Specialties
- **Sample Source:** Primary Research
- **Study Tool:** MS Excel by Analyzing the Survey of KOL and Surgeons
- **Duration of Study:** 3 Months
- **Sample Size:** 25 General Surgeon, 25 Gynecology ,25 Oncology,
25 Gastrointestinal Surgeons
- **Sample Population:** 100 Surgeons

5. Operational Definitions:

“The Percentage of Surveys Gynecologist, Oncologist, GI Surgeons who have decided to use Bipolar Electrosurgical vs Vessel Sealer in their practice of Adoption Rate.”

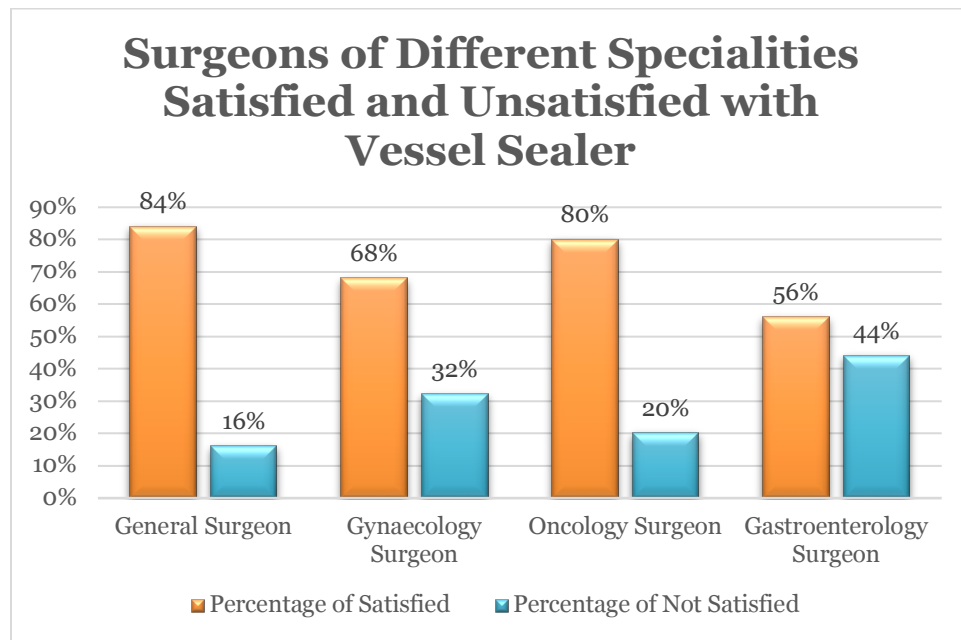
“Surgeons Belief on How much there is Enhancement in their Surgical Procedure Efficiency, Outcomes and Patient Satisfaction and How User Friendly The Sealing techniques in between Bipolar and Vessel Sealer existing In Surgical Practices is Perceived Usefulness and Perceived Ease of Use”

6. Ethical Consideration:

Ensure that all participants have given their information consent are aware of the purpose of the study as well as their right to withdraw at any time. By using codes to identify the participants' responses rather than personally identifiable information, you can guarantee their confidentiality and anonymity. An ethics committee will examine and approve the study to guarantee that research ethics are followed.

RESULT AND DISCUSSION

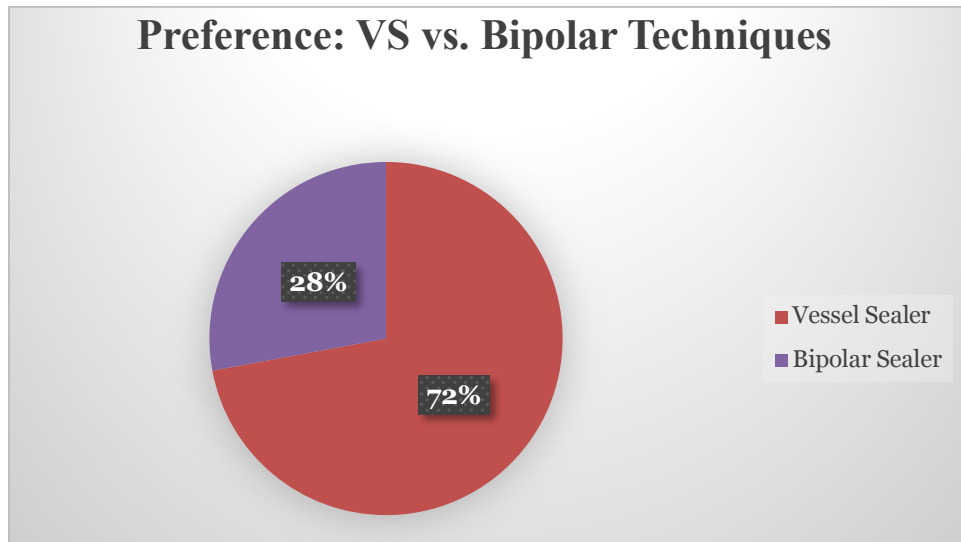
1. Surgeons Satisfied and Unsatisfied with Performance of Vessel sealer.



As Data Shows the responses of Sample Size of 25 Surgeons of Each Different Specialty Which Includes General Surgeons- 84%are Satisfied with Vessel sealer and 16% are unsatisfied, In Case of Gynecology Surgeon – 68% are Satisfied and 32% are unsatisfied. In the case of Oncology Surgeons 80% Surgeons are Satisfied and 20% are unsatisfied. In Case of Gastro Surgeons 56% are Satisfied and 44% are unsatisfied.

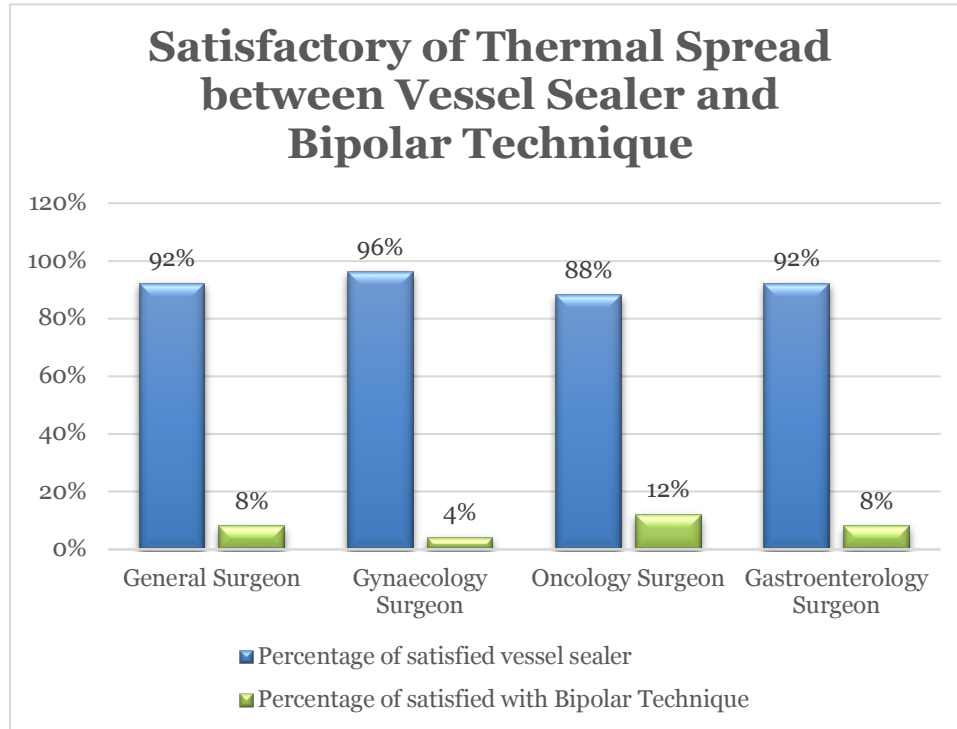
The reason behind the Satisfaction of vessel sealers is that the Vessel Sealer gives Permanent Vessel Sealing and also it is seen that there is less amount of Blood Loss in surgeries which increases the chances of patient safety. There are some Surgeons who are Unsatisfied , in this case at some point Monopolar Technique.

2. Surgeons of Different Specialty Choosing Preference between Vessel Sealer vs Bipolar Technique



This significant preference for VS suggests that a majority of surgeons find these devices more advantageous and beneficial for patient safety. The reasons being efficiency, precision in performance and use during the procedure, reduced blood loss in surgery, and patient safety of patient. On the other hand, Bipolar techniques was preferred by those often-cited familiarity, cost, and the training required for new technology.

3. Satisfactory of Thermal Spread between Vessel Sealer and Bipolar Technique

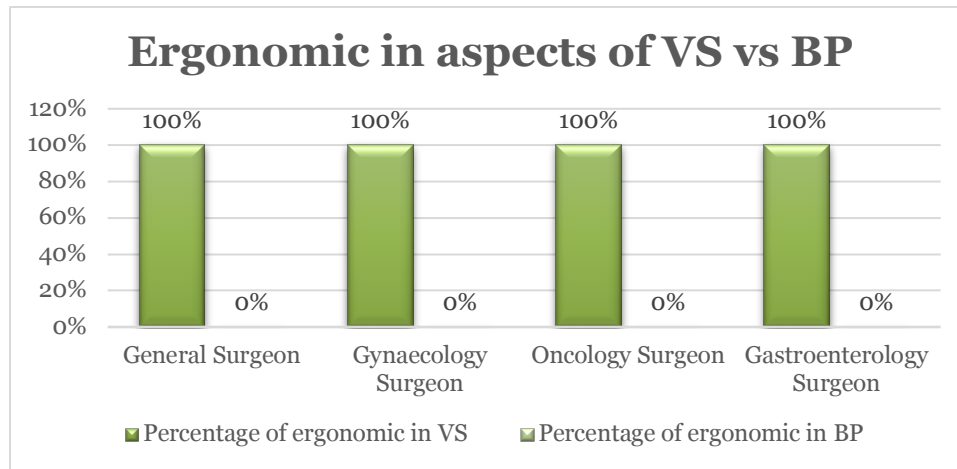


The Study Shows the Response of Surgeons of Satisfied between the Thermal Spread of Vessel sealer and Bipolar Technique. The General Surgeon –92% is satisfied with Vessel Sealer and 8% with Bipolar, Gynecology Surgeon – 96% Satisfied with Vessel Sealer and 4% with Bipolar , Oncology Surgeon – 88% Satisfied with Vessel Sealer and 12% with Bipolar. Gastro Surgeon – 92% Satisfied with Vessel Sealer and 8% with Bipolar.

The common reasons behind the satisfaction of Vessel sealer is that, There is <1mm thermal spread by using Vessel Sealer and there is no Charring of Tissue.

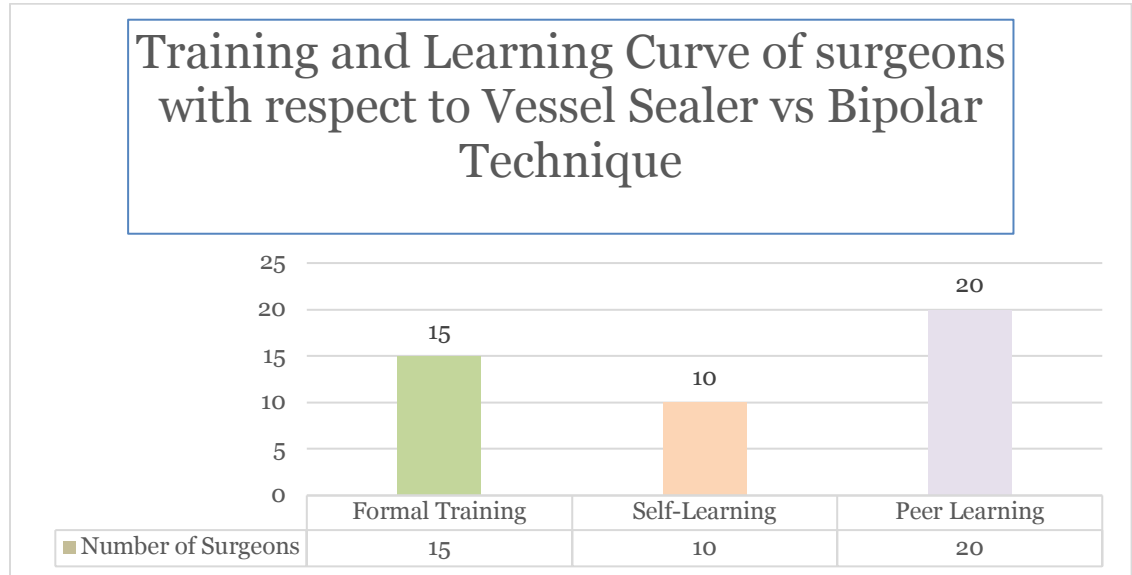
In Bipolar there are some surgeons who are not familiar with the Vessel Sealer as they are having years of hands in Bipolar Technique, and they feel satisfied even after Charging of Tissue and >1mm Thermal Spread.

4. To evaluate the Ergonomic aspects of Vessel Sealer vs Bipolar according to different Surgeons.



The above Graph compares the ergonomic aspects of vessel sealers Vs Bipolar Electrosurgery across different surgical specialties. The sample size for each specialty is 25 surgeons. The result show that 100% of the surgeons in each specialty (General Surgery, Gynecology, Oncology and Gastroenterology) found vessel sealers to be ergonomic, while none reported bipolar electrosurgery to be ergonomic, the reason Behind this is Vessel sealer gives permanent vessel sealing and inside the jaw of VS there is Cold Blade for Dissection of Tissue which ease the instrumental exchange during surgeries

5. To investigate the Training and Learning Curve of surgeons with respect to Vessel Sealer vs Bipolar Technique



In this Context of Vessel Sealing Vs Bipolar Techniques, the type of training surgeons receive can significantly impact their proficiency and confidence in using these techniques. As you can see about 15 Surgeons has got the Formal Training which involves Structured Educational Programs, often provided by medical institutions or devices manufactures, that teaches surgeons the proper use of vessel sealing and bipolar electrosurgery devices. This training usually includes theoretical knowledge, practical demonstration, and hands on practice under supervision.

10 Surgeons has acquired knowledge and skills independently, without formal instruction. This could involve reading manuals, watching instructions videos, or practicing on their own, this results in varied levels of expertise and confidence, depending on the individual surgeon's dedication and access to resources.

About 20 Surgeons involves Peer Learning from their colleagues through observation, discussion and hands on practice. This method can be beneficial as it allows for exchange of practical insights and tips from experienced peers.

CONCLUSION

The COMPARATIVE ANALYSIS OF VESSEL SEALERS Vs BIPOLAR ELECTROSURGICAL across various surgical specialties reveals a clear preference for vessel sealers among the surveyed surgeons.

The study include 25 surgeons from each specialty (General Surgery, Gynecology, Oncology and Gastroenterology), highlights several key findings:

When we Observe the Graphs and Responses of the Surgeons of Different Specialty

1. Surgeons Satisfied and Unsatisfied with Performance of Vessel sealer.

General Surgeons: 84% satisfied with vessel sealers, 16% unsatisfied.

Gynecology Surgeons: 68% satisfied and 32% unsatisfied.

Oncology Surgeons: 80% Satisfied and 20% Unsatisfied.

Gastroenterology Surgeons: 56% satisfied, 44\$ Unsatisfied.

The Primary reasons for satisfaction include the vessel sealers ability to provide permanent vessel sealing and significantly reduces blood loss during surgeries, thereby enhancing patient safety. On the other hand, some surgeons remain unsatisfied, preferring the familiarity and cost effectiveness of bipolar techniques despite their limitations.

2. Surgeons of Different Specialty Choosing Preference between Vessel Sealer vs Bipolar Technique

This significant preference for VS suggests that a majority of surgeons find these devices more advantageous and beneficial for patient safety. The reasons being efficiency, precision in performance and use during the procedure, reduced blood loss in surgery, and patient safety of patient. On the other hand, Bipolar techniques was preferred by those often-cited familiarity, cost, and the training required for new technology.

3. Satisfactory of Thermal Spread between Vessel Sealer and Bipolar Technique

General Surgeons: 92% satisfied with vessel sealers, 8% with Bipolar.

Gynecology Surgeons: 96% satisfied with vessel sealers, and 4% with Bipolar.

Oncology Surgeons: 88% Satisfied with vessel sealers and 12% with Bipolar.

Gastroenterology Surgeons: 92% satisfied with vessel sealers, 8% with Bipolar.

Surgeons favor vessel sealers for their minimal thermal spread(<1mm) and lack of tissue charring, which contrasts with the greater thermal spread and tissue charring observed with bipolar techniques.

4. To evaluate the Ergonomic aspects of Vessel Sealer vs Bipolar according to different Surgeons.

The survey results show that 100% of surgeons in each specialty found vessel sealers to be ergonomic, whereas none reported bipolar electrosurgery to be ergonomic. This preference is attributed to the vessel sealer's design, which includes features like cold blade for tissue dissection, reducing the need for frequent instrument exchange during surgeries.

5. To investigate the Training and Learning Curve of surgeons with respect to Vessel

Sealer vs Bipolar Technique

Formal Training: 15 surgeons received structured training, leading to high proficiency and confidence in using vessel sealers and bipolar devices.

Self- Learning: 10 surgeons learned independently, resulting in varied levels of expertise.

Peer Learning: 20 surgeons benefited from peer learning, gaining practical insights and tips from experienced colleagues.

Overall, the Study demonstrates a significant preference for vessel sealers over bipolar electrosurgery due to their superior performance in terms of permanent vessel sealing, reduced blood loss, minimal thermal spread, and ergonomic design. While some surgeons remain loyal to bipolar techniques due to familiarity and cost considerations, the overall trend indicates a shift towards adopting vessel sealing technology to enhance surgical outcomes and patient safety.

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