

THUNDERBEAT ALL-IN-ONE ENERGY PLATFORM

Ein Leitfaden für medizinisches Fachpersonal.





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PRODUKTINFORMATIONEN ZU THUNDERBEAT

**Weltweit einmalige Integration von Bipolar- und
Ultraschalltechnologie in einem einzigen Gerät.**

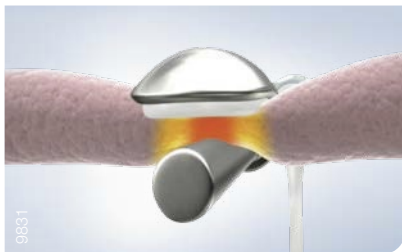
BIPOLAR- UND ULTRASCHALLENERGIE IN EINEM EINZIGEN MULTIFUNKTIONELLEN INSTRUMENT

Bahnbrechende integrierte Technologie

Als derzeit EINZIGES Schneidinstrument bietet THUNDERBEAT die gleichzeitige Abgabe von modernster bipolarer Energie und Ultraschallenergie in nur einem multifunktionellen Gerät. Durch die Integration beider Energiearten können alle Vorzüge genutzt werden: die Fähigkeit des Ultraschalls, Gewebe schnell zu durchtrennen und die zuverlässige Gefäßversiegelung mit bipolarer Energie.

Der THUNDERBEAT Unterschied

Nur Ultraschallenergie



Schnelle Gewebedurchtrennung



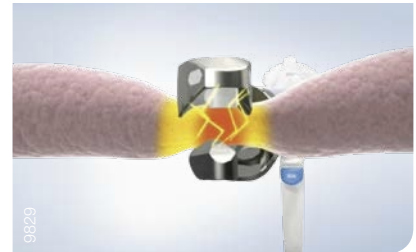
Nur bipolare Energie



Zuverlässige Gefäßversiegelung



THUNDERBEAT



Schnelle Gewebedurchtrennung UND zuverlässige Gefäßversiegelung

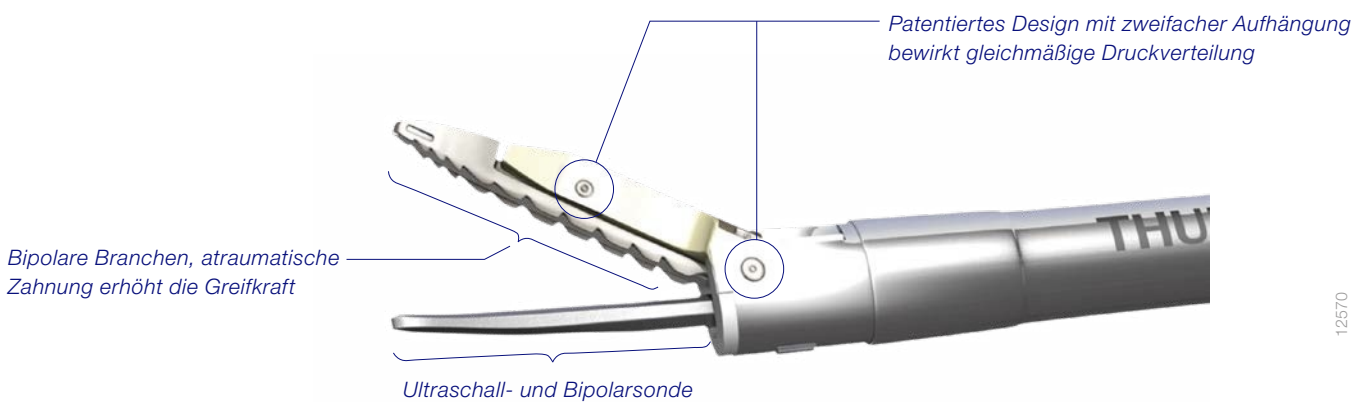
Die Vorteile beispielloser Vielseitigkeit

- Schnellste Schnittgeschwindigkeit in dieser Klasse
- Zuverlässige Gefäßversiegelung bis 7 mm
- Präzise Präparation durch feine Branchenform
- Bipolare Energie zur Hämostase auch ohne Schneiden stets verfügbar
- Höchste Greifkraft der Sondenspitze in dieser Klasse
- Minimale thermische Ausbreitung
- Weniger Instrumentenwechsel
- Verminderte Dampfbildung für eine bessere Sicht



Revolutionäres Branchendesign

Alle THUNDERBEAT Geräte zeichnen sich durch ein patentiertes Branchendesign mit Wiper-Jaw-Mechanismus aus. Dieser einzigartige Mechanismus gestattet eine gleichmäßige Verteilung des Schließdrucks auf das Gewebe, während gleichzeitig die Greifkraft erhöht wird. Die Ergebnisse sind eine verbesserte Feindissektion und stumpfe Freipräparation sowie eine zuverlässigere Gefäßversiegelung.

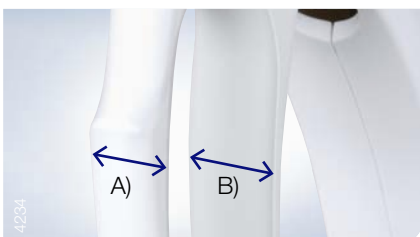


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Intuitive, leicht zugängliche Handschalter

- Die intuitiven, aus verschiedenen Richtungen leicht zugänglichen Handschalter ermöglichen eine leichte Aktivierung, unabhängig von der Größe oder Position der Hand
- Zusätzliche Noppen auf dem Knopf „SEAL“ (VERSIEGELN) sorgen für eine taktile Wiedererkennung und damit für einen reibungslosen Operationsablauf
- **Modus Seal & Cut (Versiegeln & Durchtrennen)**
Bipolare Energie und Ultraschallenergie für zuverlässige Gefäßversiegelung und Koagulation bei gleichzeitigem Durchtrennen
- **Seal (Versiegeln)**
Fortschrittliche bipolare Energie für zuverlässige Gefäßversiegelung und Gewebekoagulation ohne gleichzeitiges Durchtrennen



Optimiertes Design des Betätigungsgriffs

- A) Der schmalere vordere Teil des Betätigungsgriffs gibt dem Chirurgen ein direktes taktiles Feedback für die stumpfe Präparation
- B) Der breitere hintere Teil des Betätigungsgriffs sorgt beim Greifen und Durchschneiden des Gewebes für Stabilität

2

ENGLISCHSPRACHIGE FACHPUBLIKATIONEN ZU THUNDERBEAT

ENGLISCHSPRACHIGE FACHPUBLIKATIONEN ZU THUNDERBEAT: ABSTRACTS

1

Safety and Efficacy of New Integrated Bipolar and Ultrasonic Scissors Compared to Conventional Laparoscopic 5 mm Sealing and Cutting Instruments

Seehofer D, Mogl M, Boas-Knoop S, Unger J, Schirmeier A, Chopra S, Eurich D.

Surg Endosc. 2012 Sep; 26(9): 2541-9

Background: Hemostasis is a central issue in laparoscopic surgery. Ultrasonic scissors and bipolar clamps are commonly used, with known advantages with each technique.

Methods: The prototype of new surgical scissors, delivering ultrasonically generated frictional heat energy and bipolar heat energy simultaneously, THUNDERBEAT (TB), was compared to ultrasonic scissors Harmonic ACE (HA) and an advanced bipolar device LigaSure (LS) using a pig model. As safety parameters, temperature profiles after single activation and after a defined cut were determined. As efficacy parameters, seal failures and the maximum burst pressure (BP) were measured after in vivo sealing of vessels of various types and diameters (categories 2–4 and 5–7 mm). Moreover, the vertical width of the tissue seal was measured on serial histological slices of selected arteries. The cutting speed was measured during division of isolated arteries and during dissection of a defined length of compound tissue (10 cm of mesentery). Burst pressure measurement and histological analysis were performed by investigators blinded to the used sealing device.

Results: Using the TB, the burst pressure in larger arteries was significantly higher (734 ± 64 mm Hg)

than that of the HA (453 ± 50 mm Hg). No differences in the rate of seal failures were observed. The cutting speed of the TB was significantly higher than that of all other devices. Safety evaluation revealed temperatures below 100 °C in the bipolar device. The maximum temperature of the HA and the TB was significantly higher. No relevant differences were observed between the HA and the TB.

Schlussfolgerungen: Mit der Kombination aus Ultraschall und bipolarer Energie kann der TB die Präparationsgeschwindigkeit von Ultraschallgeräten übertreffen und bietet gleichzeitig die Versiegelungseffizienz bipolarer Klemmen. Bei der klinischen Anwendung sollte jedoch die Hitzeentwicklung, die mit der von konventionellen Ultraschallschere vergleichbar ist, beachtet werden.

2

Postoperative Efficacy and Safety of Vessel Sealing: an Experimental Study on Carotid Arteries of the Pig

Berdah SV, Hoff C, Poornorozy PH, Razek P, Van Nieuwenhove Y.

Surg Endosc. 2012 Aug; 26(8): 2388-93

Background: The aim of this preclinical study was to analyze the burst pressure of large in vivo sealed vessels, not just immediately, but also in the first 7 postoperative days.

Methods: In 26 anesthetized pigs, the right carotid artery was sealed and cut using a novel device that integrates bipolar and ultrasonic energy. The animals were then awakened. They underwent a second surgical procedure after different follow-up periods ranging from

1 to 7 days: the left common carotid artery was sealed and cut in the same way as the contralateral artery. Perioperative and postoperative clinical events, evolution of burst pressure over time, and comparison between immediate and delayed burst pressure were analyzed.

Results: All sealings were successful. There were no perioperative or postoperative complications. Median immediate (day 0) burst pressure was 949 mm Hg (IQR 781–1181). Burst pressure decreased postoperatively but was never below 500 mm Hg in any pig.

Schlussfolgerung: Es traten postoperative Variationen des Berstdrucks bei in vivo versiegelten Arterien auf. Der unmittelbare Berstdruck sollte nicht allein für die Validierung von Geräten zur Gefäßversiegelung herangezogen werden.

3

Evaluation of the Safety, Efficacy, and Versatility of a New Surgical Energy Device (THUNDERBEAT) in Comparison with Harmonic ACE, LigaSure V, and EnSeal Devices in a Porcine Model

Milsom J, Trencheva K, Monette S, Pavor R, Shukla P, Ma J, Sonoda T.

J Laparoendosc Adv Surg Tech A. 2012 May; 22(4): 378-86

Background: THUNDERBEAT (TB) (Olympus, Japan) simultaneously delivers ultrasonically generated frictional heat energy and electrically generated bipolar energy. The aim of this study was to evaluate the versatility, bursting pressure, thermal spread, and dissection time of the TB compared with commercially available devices: Harmonic ACE (HA) (Ethicon Endo-Surgery, USA), LigaSure V (LIG) (Covidien, USA), and EnSeal (Ethicon).

Methods: An acute study was done with 10 female Yorkshire pigs (weighing 30–35 kg). Samples 2 cm long of small (2–3 mm)-, medium (4–5 mm)-, and large (6–7 mm)-diameter vessels were created. One end of the sample was sent for histological evaluation, and the other was used for burst pressure testing in a blinded fashion. Versatility was defined as the performance of the surgical instrument based on the following five variables, using a score from 1 to 5 (1 = worst, 5 = best), adjusted by coefficient of variable importance with weighted distribution: hemostasis, 0.275; histologic sealing, 0.275; cutting, 0.2; dissection, 0.15; and tissue manipulation, 0.1. There were 80 trials per vessel group and 60 trials per instrument group, giving a total of 240 samples.

Results: Versatility score was higher ($P < .01$) and dissection time was shorter ($P < .01$) using TB compared with the other three devices. Bursting pressure was similar among TB and the other three instruments. Thermal spread at surgery was similar between TB and HA ($P = .4167$), TB and EnSeal ($P = .6817$), and TB and LIG ($P = .8254$). Difference in thermal spread was noted between EnSeal and HA ($P = .0087$) and HA and LIG ($P = .0167$).

Schlussfolgerung: Der TB ist vielseitiger im Vergleich zu den anderen getesteten Instrumenten und bietet eine schnellere Präparationsgeschwindigkeit, ähnlichen Berstdruck und eine akzeptable thermische Ausbreitung. Dieses neue Energie-Instrument ist eine attraktive, sichere Alternative für das Schneiden, Koagulieren und Präparieren von Gewebe während eines chirurgischen Eingriffs und dürfte zu einem verringerten Zeitaufwand und höherer Vielseitigkeit der chirurgischen Verfahren führen.

4

A Randomized Study Comparing the Use of THUNDERBEAT Technology vs. Standard Electrosurgery During Laparoscopic Radical Hysterectomy and Pelvic Lymphadenectomy for Gynecological Cancer

A. Fagotti, G. Vizzielli, F. Fanfani, V. Gallotta, C. Rossitto, B. Costantini, S. Gueli-Alletti, N. Avenia, R. Iodice, G. Scambia

J Minim Invasive Gynecol. 2014 May-Jun;21(3):447-53

Study objective: To compare the use of Thunderbeat (TB) with standard electrosurgery (SES), during laparoscopic radical hysterectomy and pelvic lymphadenectomy for gynecological tumors, with respect to operative time

Design: Evidence obtained from a properly designed, randomized, controlled trial.

Design: classification: Canadian Task Force classification I

Setting: Gynecologic Oncology Unit of the Catholic University of the Sacred Heart in Rome

Patients: Fifty patients with early stage cervical cancer (FIGO stages IA2-IB1-IIA<2cm), locally

advanced cervical cancer (FIGO stages IB2-IIA>2cm-IIIB) submitted to neo-adjuvant treatment (chemotherapy or radio-chemotherapy) showing a complete/partial clinical response and early stage endometrioid endometrial (FIGO stages IB-II) were randomly assigned to undergo TB (arm A) and SES (arm B)

Intervention: Laparoscopic radical hysterectomies with bilateral pelvic lymphadenectomy, with an easily reproducible technique were performed.

Measurements and main results: Fifty patients were available for the analysis, with 25 women randomly assigned to TB (arm A) and 25 to SES (arm B). The median operative time was 85 min vs. 115 min for TB and SES, respectively ($p=0.001$). At multivariate analysis, endometrial cancer ($p=0.0001$) and TB ($p=0.001$) were independently associated with less operating time. No differences in terms of peri-operative outcomes and post-operative complications were observed in both arms. Patients undergoing TB reported less post-operative pain, both at rest and after Valsalva' maneuver ($p=0.005$ and $p=0.008$, respectively), with less additional analgesics beside standard therapy than in arm B ($p=0.02$)

Schlussfolgerung: Im Vergleich zu Standardtechniken (SES) zeigte sich für TB bei Patienten mit Gebärmutterkrebs eine Verkürzung der Operationsdauer sowie eine Verringerung der postoperativen Schmerzen.

3

LEISTUNGSEVALUIERUNG VON THUNDERBEAT

LEISTUNGSEVALUIERUNG VON THUNDERBEAT: WHITE PAPER

1

Gefäßversiegelungsleistung von THUNDERBEAT im Vergleich zu LigaSure V und EnSeal

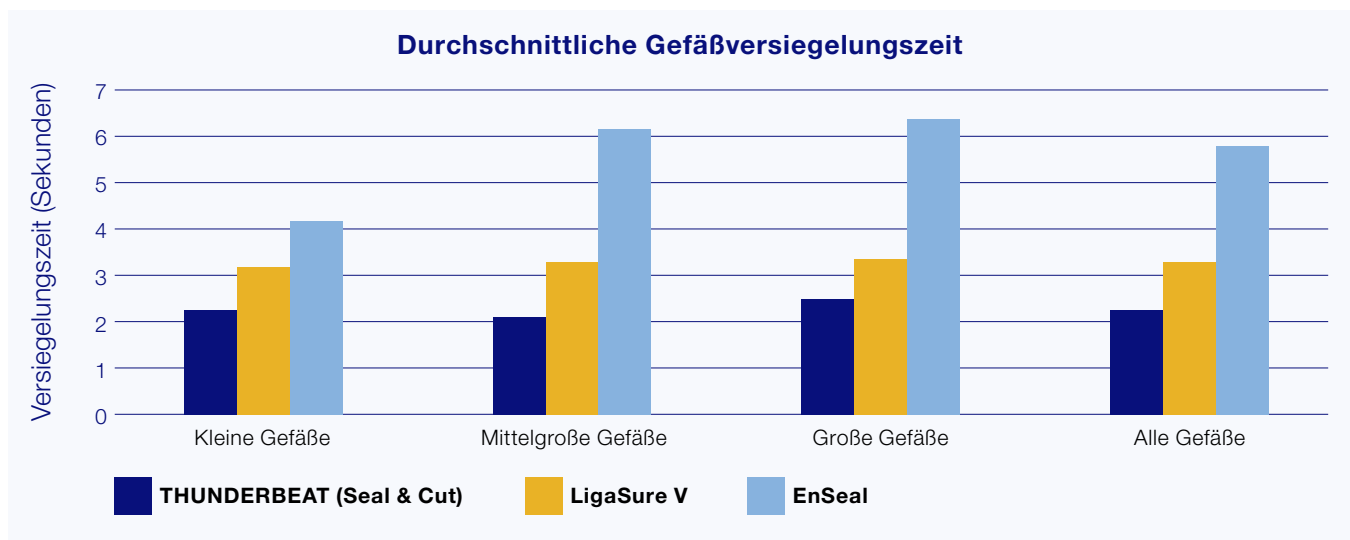
Olympus Medical Systems Corporation, Tokio, November 2012

Ziel: Das Ziel dieser Studie war, die Gefäßversiegelungsleistung (Berstdruck und Versiegelungsgeschwindigkeit) von THUNDERBEAT im Vergleich zu ähnlichen Geräten (LigaSure V und EnSeal) zu evaluieren.

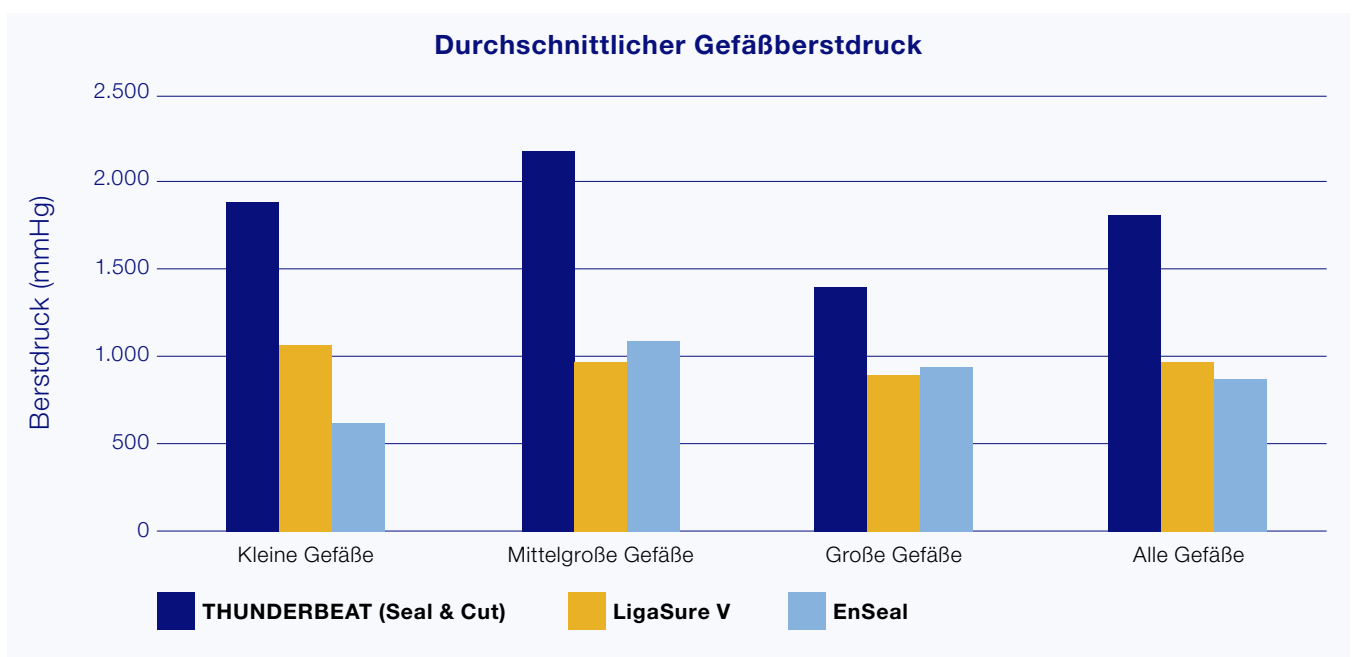
Methoden: Es wurden Gefäßversiegelungstests an Karotis-, Nieren- und Milzarterien, die aus einem Schweinemodell isoliert worden waren, durchgeführt. Als kleine Blutgefäße wurden alle Blutgefäße mit einem Durchmesser kleiner als oder gleich 2,0 mm klassifiziert, als mittelgroße Blutgefäße alle Blutgefäße mit einem Durchmesser zwischen 2,0 und 4,0 mm und als große Blutgefäße alle Blutgefäße mit einem Durchmesser zwischen 4,0 und 7,0 mm. Mit jedem Instrument wurden mindestens 30 Gefäße der jeweiligen Größenkategorie versiegelt. Jedes Gefäß wurde mit dem jeweils getesteten Instrument am Versiegelungspunkt gegriffen. Die zum Versiegeln oder Versiegeln und Durchtrennen jedes Gefäßes erforderliche Zeit wurde aufgezeichnet. Nach der Gefäßversiegelung wurde der maximale Berstdruck mit einem Druckmesser gemessen und anschließend dokumentiert.

Ergebnisse:

| Gefäßversiegelungsgeschwindigkeit | | | | | |
|-------------------------------------|---------------------------------------|---------------|--------------------|--------------|-------------|
| Instrumente | | Kleine Gefäße | Mittelgroße Gefäße | Große Gefäße | Alle Gefäße |
| THUNDERBEAT (Seal & Cut) | Mittlere Versiegelungszeit (Sekunden) | 2,48 ± 0,84 | 2,18 ± 0,34 | 2,62 ± 0,92 | 2,43 ± 0,76 |
| LigaSure V | Mittlere Versiegelungszeit (Sekunden) | 3,15 ± 0,34 | 3,24 ± 0,33 | 3,34 ± 0,28 | 3,24 ± 0,32 |
| EnSeal | Mittlere Versiegelungszeit (Sekunden) | 4,25 ± 0,38 | 6,22 ± 0,34 | 6,39 ± 0,48 | 5,62 ± 1,05 |



| Gefäßberstdruck (mmHg) | | | | | |
|-------------------------------------|----------------------|-------------|-------------|------------|-------------|
| Instrumente | | Klein | Mittel | Groß | Alle Gefäße |
| THUNDERBEAT (Seal & Cut) | Probengröße | 31 | 30 | 35 | 96 |
| | Mittlerer Berstdruck | 1.848 ± 567 | 2.150 ± 730 | 1364 ± 733 | 1.766 ± 751 |
| | Berstdruckbereich | 929–3.507 | 1.052–3.349 | 282–2.822 | 282–3.507 |
| LigaSure V | Probengröße | 30 | 30 | 35 | 95 |
| | Mittlerer Berstdruck | 1.073 ± 364 | 945 ± 373 | 869 ± 366 | 958 ± 373 |
| | Berstdruckbereich | 344–1.944 | 378–2.202 | 360–1.902 | 344–2.202 |
| EnSeal | Probengröße | 30 | 31 | 34 | 95 |
| | Mittlerer Berstdruck | 623 ± 276 | 1.074 ± 469 | 891 ± 355 | 866 ± 414 |
| | Berstdruckbereich | 213–1.306 | 290–2.175 | 327–1.843 | 213–2.175 |



Schlussfolgerungen: THUNDERBEAT erzeugte bei allen getesteten Gefäßgrößen einen höheren mittleren Berstdruck als LigaSure V oder EnSeal. Ebenso erzielte THUNDERBEAT bei allen getesteten Gefäßgrößen eine schnellere mittlere Versiegelungszeit als LigaSure V oder EnSeal. Die Wahrscheinlichkeit, dass THUNDERBEAT einen größeren Berstdruck als 360 mmHg erreichte, betrug im Modus Seal & Cut (Versiegeln & Durchtrennen) 96,9%. Bei LigaSureV betrug die Wahrscheinlichkeit für einen größeren Berstdruck als 360 mmHg 94,5% und bei EnSeal lag sie bei 88,9%. THUNDERBEAT zeigt bei der Versiegelung von Gefäßen mit einem Durchmesser bis einschließlich 7 mm eine mit LigaSure V und EnSeal vergleichbare Versiegelungsleistung.

LEISTUNGSEVALUIERUNG VON THUNDERBEAT: WHITE PAPER

2

Gewebeschnittgeschwindigkeit von THUNDERBEAT und SONICBEAT im Vergleich zu LigaSure V, Harmonic ACE und EnSeal

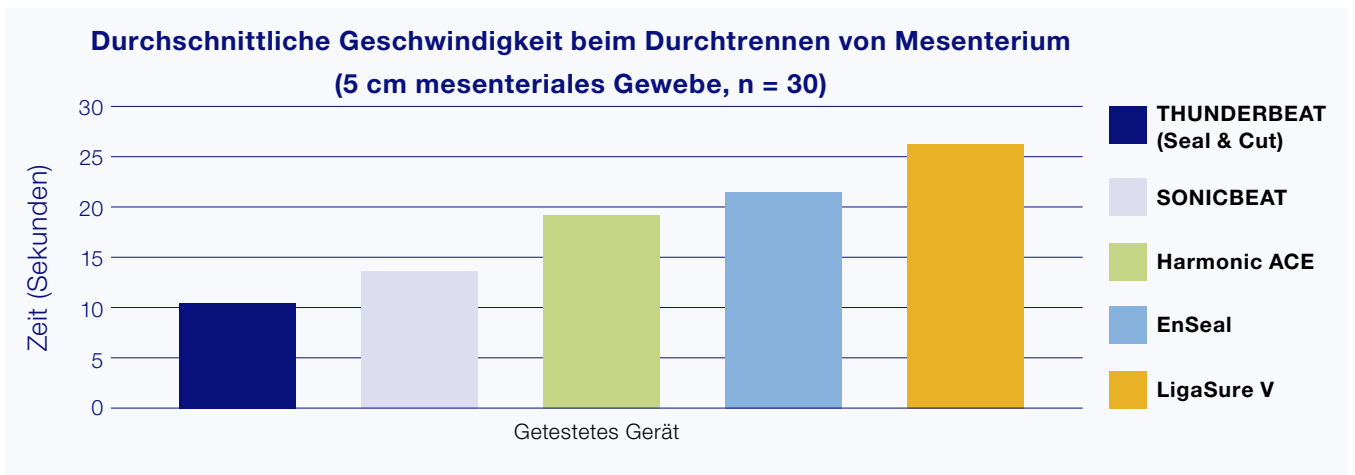
Olympus Medical Systems Corporation, Tokio, November 2012

Ziel: Das Ziel dieser Studie bestand darin, die Gewebeschnittgeschwindigkeit von THUNDERBEAT und SONICBEAT mit ähnlichen Instrumenten in einem anerkannten Schweinegewebemodell zu vergleichen.

Methoden: Der Schnittgeschwindigkeitstest wurde an Schweinemesenterien durchgeführt. Für zuverlässige Testdaten wurde das Gewebe in einer simulierten In-vivo-Umgebung behandelt. Die Gewebe wurden randomisiert, und die Zeit zum Durchtrennen von 5 cm Mesenterialgewebe wurde dokumentiert. Für jedes Instrument wurde eine Probengröße von 30 verwendet.

Ergebnisse:

| Geschwindigkeit beim Durchtrennen von Mesenterium in Sekunden | | |
|---------------------------------------------------------------|------------------------------------------------------|--------------|
| THUNDERBEAT (Seal & Cut Mode) | Probengröße | 30 |
| | Durchschnittliche Schnittgeschwindigkeit in Sekunden | 10,7 ± 4,50 |
| SONICBEAT | Probengröße | 30 |
| | Durchschnittliche Schnittgeschwindigkeit in Sekunden | 13,2 ± 4,18 |
| LigaSure V | Probengröße | 30 |
| | Durchschnittliche Schnittgeschwindigkeit in Sekunden | 26,9 ± 8,00 |
| Harmonic ACE | Probengröße | 30 |
| | Durchschnittliche Schnittgeschwindigkeit in Sekunden | 18,8 ± 3,80 |
| EnSeal | Probengröße | 30 |
| | Durchschnittliche Schnittgeschwindigkeit in Sekunden | 21,6 ± 10,08 |



Schlussfolgerung: THUNDERBEAT zeigte eine durchschnittliche Schnittgeschwindigkeit von 10,7 Sekunden (68% schneller als Harmonic ACE, 102% schneller als EnSeal und 151% schneller als LigaSure V). THUNDERBEAT durchtrennt mesenteriales Gewebe signifikant ($p < 0,05$) schneller als LigaSure V, Harmonic ACE und EnSeal.

SONICBEAT zeigte eine durchschnittliche Schnittgeschwindigkeit von 13,2 Sekunden (42% schneller als Harmonic ACE, 64% schneller als EnSeal und 104% schneller als LigaSure V). SONICBEAT durchtrennt mesenteriales Gewebe signifikant schneller ($p < 0,05$) als LigaSure V.

LEISTUNGSEVALUIERUNG VON THUNDERBEAT: WHITE PAPER

3

Dampfbildung von THUNDERBEAT und SONICBEAT im Vergleich zu Harmonic ACE

Olympus Medical Systems Corporation, Tokio, November 2012

Ziel: Bei intraabdominellen Operationen führt der Einsatz chirurgischer Ultraschallinstrumente aufgrund der durch die Ultraschallschwingungen der Sonde verursachten Kavitation zur Entstehung von Dampf. Der entstandene Dampf füllt den Bauchraum aus, was zu einer eingeschränkten endoskopischen Sicht und erhöhten Belastung des Operateurs führt. Zur Reduzierung der Kavitation hat OLYMPUS die Geräte THUNDERBEAT und SONICBEAT mit einem proprietären Branchendesign entwickelt. In diesem Bericht wurden THUNDERBEAT und SONICBEAT bezüglich der Dampfbildung im Vergleich zu einem ähnlichen chirurgischen Ultraschallinstrument, dem Harmonic ACE, untersucht.

Methoden: Nach allgemeiner Auffassung führt das Durchtrennen von Fett mit einem chirurgischen Ultraschallinstrument dazu, dass das Fett spritzt und Dampfschwaden in den Bauchraum gelangen. Um ein Worst-Case-Szenario für die Dampfbildung zu schaffen, wurde Schweinefett als Gewebemodell für diese Studie ausgewählt. Die quantitative Messung der Dampfbildung erfolgte mit einem Dampfmessgerät. In diesem Modell verhält sich die Menge des gebildeten Dampfes direkt proportional zum Ausmaß der Infrarotlichtabschwächung. Das getestete Gewebe wurde in der Mitte der Ultraschallsonde gegriffen. Jedes Instrument wurde so lange aktiviert, bis das Gewebe vollständig durchtrennt war. Aufgezeichnet wurden die maximale Dampfbildung und die Dampfbildung nach 15 Sekunden. Nach jedem Test wurde die Innenfläche des Dampfmessgeräts gereinigt. Die Datenpunkte wurden durch zehnmalsiges Testen der einzelnen Instrumente ermittelt. Aus insgesamt 30 Tests pro Instrument wurden drei Datenpunkte für jedes Instrument gewonnen.

Ergebnisse:

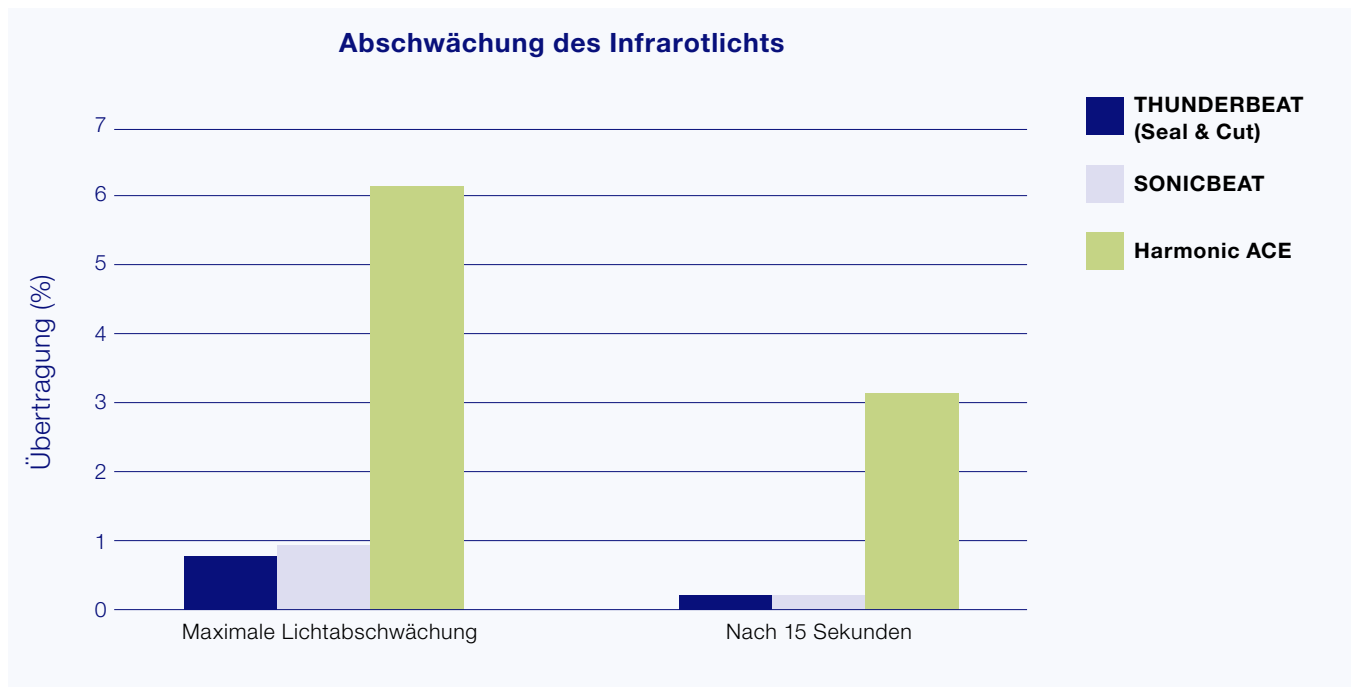
Dampfmessung bei maximaler Lichtabschwächung

| | | Abschwächung der Infrarotlichtübertragung (%) | | | |
|-----------------------------------------|-----------------------------------|-----------------------------------------------|-------------|-------------|--------------|
| | | Versuch 1 | Versuch 2 | Versuch 3 | Durchschnitt |
| THUNDERBEAT (Seal & Cut) | Probengröße | 10 | 10 | 10 | – |
| | Durchschnittliche Abschwächung | 0,96 ± 0,60 | 0,77 ± 0,24 | 0,42 ± 0,26 | 0,72 ± 0,45 |
| SONICBEAT | Probengröße | 10 | 10 | 10 | – |
| | Durchschnittliche Abschwächung | 0,70 ± 0,30 | 1,00 ± 0,58 | 0,90 ± 0,78 | 0,87 ± 0,61 |
| Harmonic ACE | Probengröße | 10 | 10 | 10 | – |
| | Durchschnittliche Abschwächung | 5,54 ± 1,84 | 5,89 ± 2,52 | 7,01 ± 2,67 | 6,15 ± 2,49 |

Dampfmessung 15 Sekunden nach der Leistungsaktivierung

| Abschwächung der Infrarotlichtübertragung (%) | | | | | |
|-----------------------------------------------|--------------------------------|-------------|-------------|-------------|--------------|
| | | Versuch 1 | Versuch 2 | Versuch 3 | Durchschnitt |
| THUNDERBEAT (Seal & Cut) | Probengröße | 10 | 10 | 10 | – |
| | Durchschnittliche Abschwächung | 0,33 ± 0,21 | 0,23 ± 0,18 | 0,16 ± 0,20 | 0,24 ± 0,21 |
| SONICBEAT | Probengröße | 10 | 10 | 10 | – |
| | Durchschnittliche Abschwächung | 0,31 ± 0,14 | 0,23 ± 0,22 | 0,21 ± 0,15 | 0,25 ± 0,18 |
| Harmonic ACE | Probengröße | 10 | 10 | 10 | – |
| | Durchschnittliche Abschwächung | 2,69 ± 0,67 | 3,22 ± 1,44 | 3,88 ± 1,86 | 3,26 ± 1,52 |

Dampfmessung



Schlussfolgerung: THUNDERBEAT erzeugte signifikant weniger Dampf als Harmonic ACE ($p < 0,001$). SONICBEAT erzeugte signifikant weniger Dampf als Harmonic ACE ($p < 0,001$). THUNDERBEAT und SONICBEAT gewährleiten eine freiere laparoskopische Sicht auf die Dissektion als Harmonic ACE. Harmonic ACE erzeugt etwa siebenmal mehr Dampf als THUNDERBEAT und SONICBEAT.

LEISTUNGSEVALUIERUNG VON THUNDERBEAT: WHITE PAPER

4

Dissektionsleistung von THUNDERBEAT und SONICBEAT im Vergleich zu LigaSure V, Harmonic ACE und EnSeal

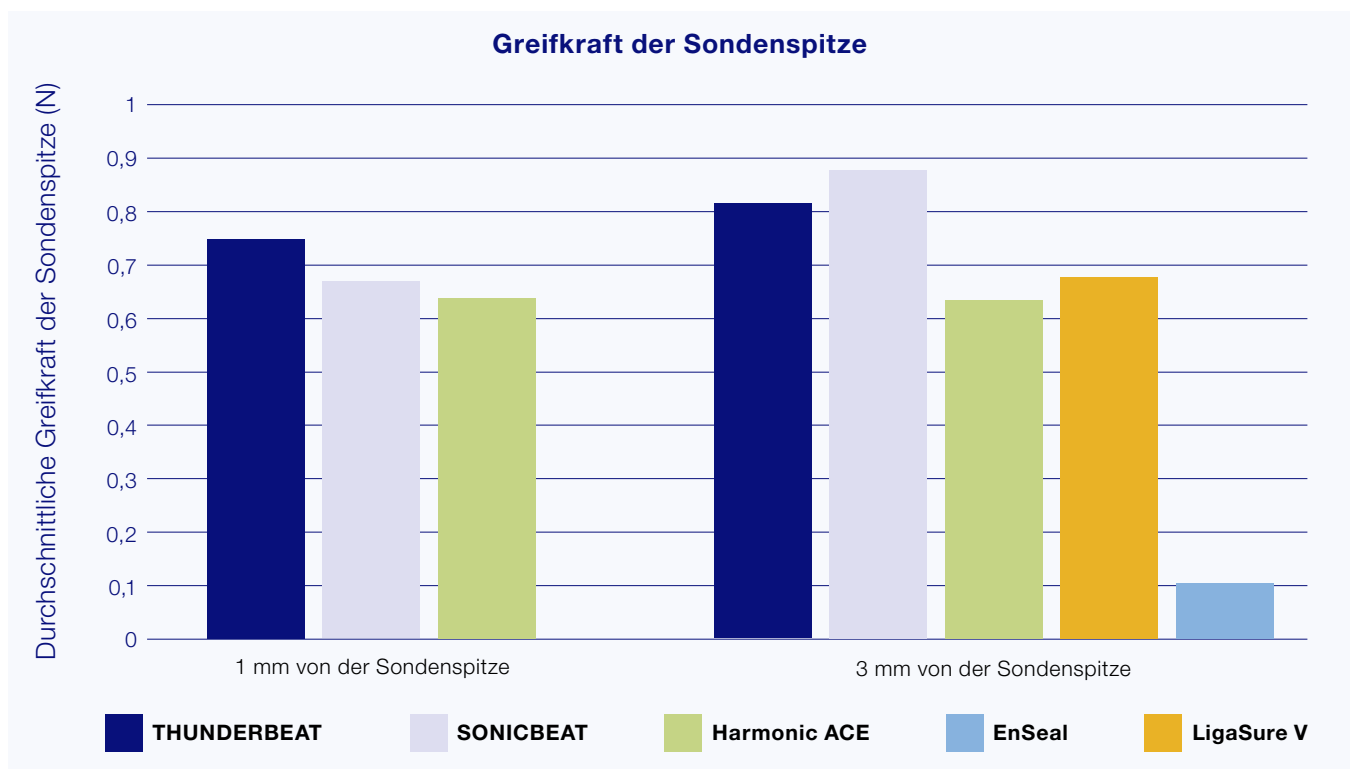
Olympus Medical Systems Corporation, Tokio, November 2012

Ziel: Eine bessere Dissektionsleistung von energiebasierten chirurgischen Instrumenten kann zum Einsatz von weniger Instrumenten, zu weniger Instrumentenwechseln, einem unterbrechungsfreien chirurgischen Arbeitsablauf und zu Einsparungen bei der Gesamtoperationsdauer beitragen. Das Ziel dieser Studie bestand darin, die Dissektionsleistung von THUNDERBEAT und SONICBEAT mit ähnlichen Geräten (LigaSure V, Harmonic ACE® und EnSeal) zu vergleichen.

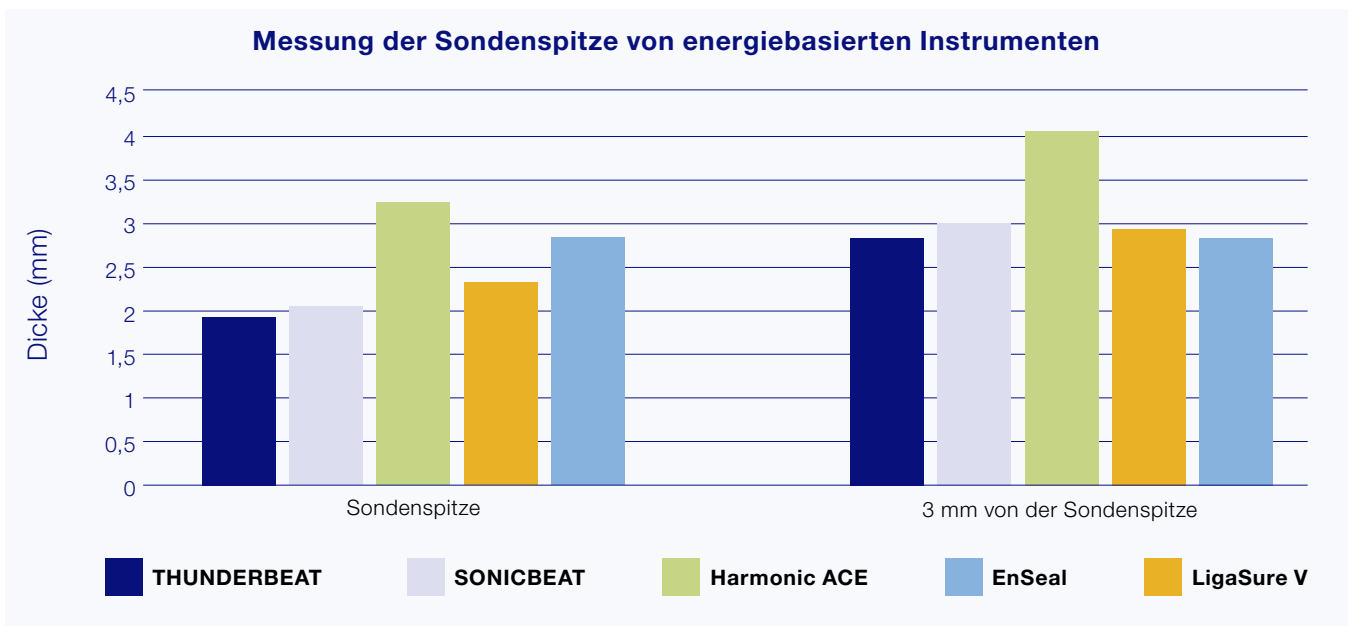
Methoden: Die Dissektionsleistung wurde mithilfe verschiedener Faktoren, wie Greifkraft der Sondenspitze, Dicke der Sondenspitze und Dissektionskraft, evaluiert. Die Greifkraft wurde mit einem druckempfindlichen Papier bestimmt und 1 bzw. 3 mm von der Sondenspitze gemessen. Zur Beurteilung der Dicke der Sondenspitze wurden die Branchen an der Spitze und 3 mm proximal von der Spitze gemessen. Die Dissektionskraft wurde durch Anwendung bekannter Kräfte (5 N, 10 N und 15 N) auf das Handstück jedes Geräts und Messung der Öffnungskraft an einem Punkt 3 mm proximal von der Sondenspitze ermittelt.

Ergebnisse:

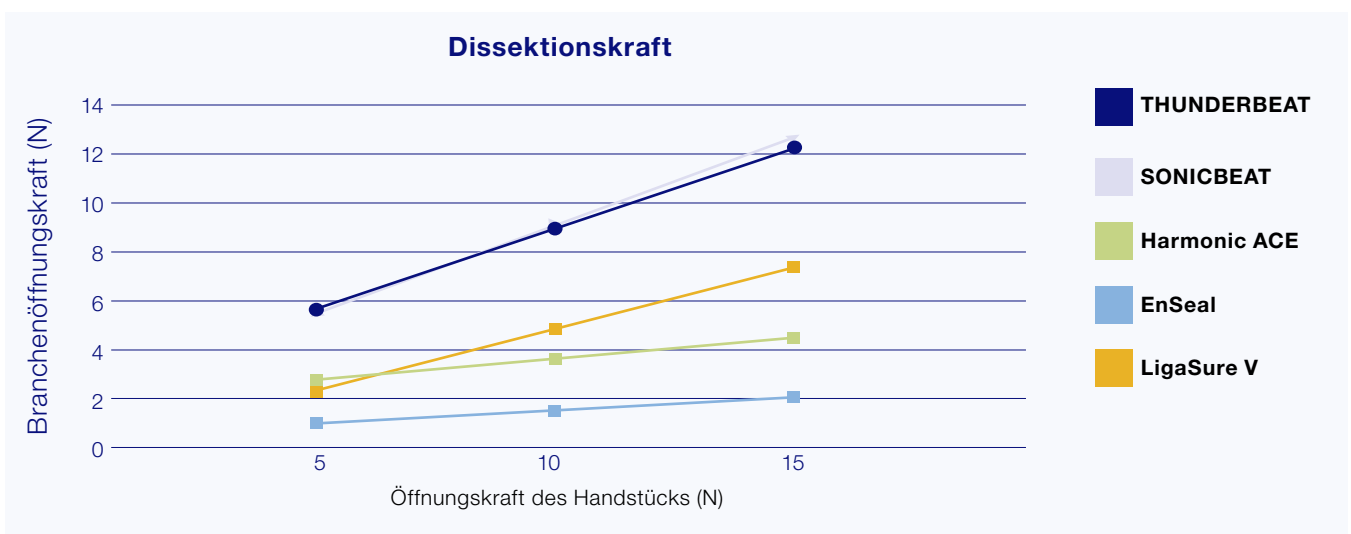
Greifkraft der Sondenspitze



Dicke der Sondenspitze



Branchenöffnungskraft (Dissektionskraft)



Schlussfolgerung: Der Test ergab, dass THUNDERBEAT und SONICBEAT eine höhere Greifkraft der Sondenspitze, geringere Abmessungen der Sondenspitze und eine höhere Branchenöffnungs- bzw. Dissektionskraft als ähnliche Geräte besitzen. THUNDERBEAT und SONICBEAT zeigen gegenüber den Vergleichsprodukten (LigaSure V, Harmonic ACE und EnSeal) eine überlegene Dissektionsleistung.

4

ENGLISCHSPRACHIGE ANWENDERERERFAHRUNG:
SPECIAL REPORT - GENERAL SURGERY
NEWS ISSUE: AUGUST 2013 | VOLUME: 40
**Clinical Perspectives on Using Advanced Vessel-Sealing Technology:
Experience with the Multifunctional THUNDERBEAT Device**

EXPERIENCE WITH THE MULTIFUNCTIONAL THUNDERBEAT DEVICE

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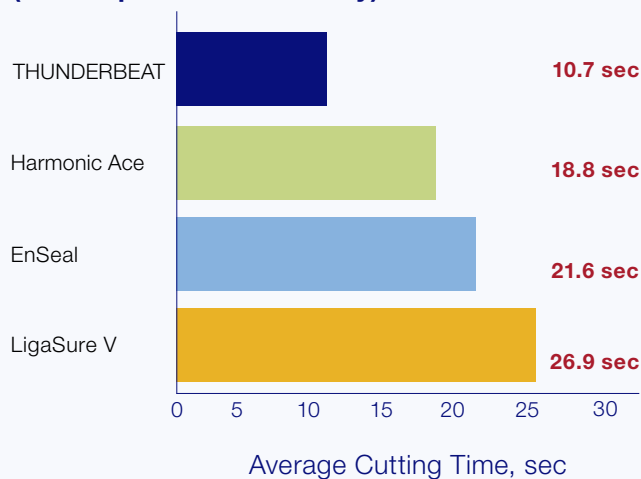
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Since the introduction of energy-based devices into the surgeon's armamentarium, manufacturers have sought to improve device function and versatility in order to provide surgeons with tools that are effective at both cutting and coagulating tissue.¹ As new models are introduced, manufacturers have added features to advance the use and efficacy of energy-based devices, and not only in their cutting ability. Sealing vessels and providing effective hemostasis, which can be difficult to achieve with methods that solely rely on compression (eg, sutures, clips, and staples), also have improved with each new generation of devices. Although these devices have been developed over time to hone their ability to seal vessels and dissect tissue – as well as provide ease of use and multifunctionality – no device has been able to offer complete efficacy without some risk.

Bipolar devices offer advantages over monopolar instruments in terms of safety and precision as they pass current only between electrodes placed closely together and better control the dispersed current.¹ However, bipolar devices that cut in addition to cauterizing usually rely on the addition of a mechanical blade activated independent of cauterizing. Ultrasonic

Figure 1: Tissue cutting speed (50 mm porcine mesentery)



Harmonic Ace and EnSeal are trademarks of Ethicon Endo-Surgery, Inc. LigaSure V is a trademark of a Covidien company. From reference 6.

energy, which emerged in the 1980s as an alternative to mono- and bipolar devices, relies on friction, rather than radiofrequency energy, to effectively desiccate tissue. Although the risk for electricity to spread through the patient's body is avoided, ultrasonic devices have been known to reach maximum temperatures of approximately 200 °C or even higher at the jaws (eg, after activation for 10 seconds).^{2,3}

The THUNDERBEAT Platform: Fully Integrated Bipolar and Ultrasonic Technology

Energy-based vessel-sealing devices have provided surgeons with increasingly sophisticated options, but only the Olympus THUNDERBEAT combines both bipolar and ultrasonic technology in a single multifunctional instrument. Surgeons have found THUNDERBEAT capable of sealing vessels up to and including 7 mm in diameter while also providing fastest-in-class cutting speed.⁴ THUNDERBEAT's fine jaw design provides precise dissection and forceful grasping, while its always available bipolar energy ensures hemostasis without the need to cut. The 5-mm diameter device can serve surgeons performing open or laparoscopic cases in a variety of disciplines, including general, urologic, gynecologic, bariatric, thoracic, and reconstructive surgery.⁴

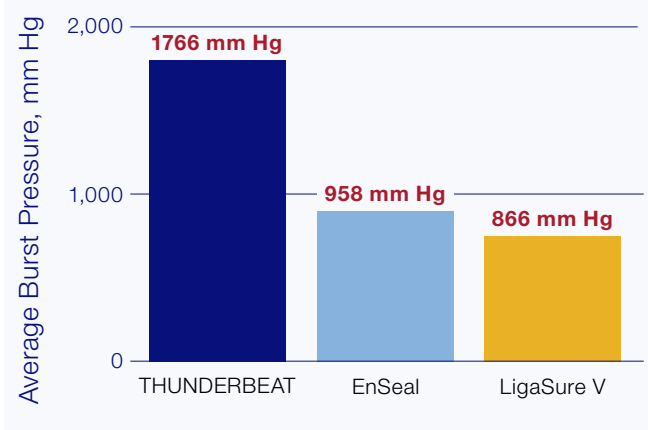
Considering Energy-Based Devices

Kevin Tri Nguyen, MD, PhD, assistant professor of surgery in the Division of Hepatopancreatobiliary Surgery and Advanced Gastrointestinal Surgery at the University of Michigan Health Systems in Ann Arbor, experienced both the benefits and drawbacks of competing devices before he began using THUNDERBEAT. "The Harmonic ACE is fast, but I was not comfortable with its ability to adequately seal vessels," he said. "The LigaSure provided me comfort that it was sealing vessels appropriately, but it was too slow. After I'd seal, I would have to press the cut button multiple times, and even then it didn't cut completely. So when I was introduced to THUNDERBEAT, I liked that it combined the sealing capability of the LigaSure and the quick-cutting ability of the Harmonic ACE all in one."

Dr. Nguyen performs approximately 200 major procedures per year and uses THUNDERBEAT exclusively in all his cases that require an energy-

based device. "I've now replaced the LigaSure with THUNDERBEAT for all my procedures. I use it for all my pancreas and liver cases, to mobilize the stomach and the colon or divide the pancreas or liver – in all my procedures. It's helped move the cases along, and since I started using it I've been really happy with it." The surgical armamentarium of Jeffrey W. Milsom, MD, chief of colon and rectal surgery and professor of surgery at NewYork-Presbyterian Hospital/Weill Cornell Medical College in New York City, has included various energy-based devices over the past 25 years.

Figure 2: Vessel (<2 to 7 mm) sealing average burst pressure



*LigaSure V is a trademark of a Covidien company.
ENSEAL is a trademark of Ethicon Endo-Surgery, Inc.
Adapted from reference 7.*

"Monopolar energy, especially in minimally invasive surgery, carries the risk for arcing and for injury by the electrical current straight from the tip. It provides no compression, can result in a build-up of carbon material, and there are a lot of charring issues. It's less precise than other forms of energy and doesn't work on all types of tissues equally," he said. "Bipolar energy requires more specialized equipment and many physicians are not familiar with how to use it. But I think bipolar devices have fewer limitations than monopolar, in general."

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“Ultrasonic energy has the limitation of becoming hot, and it puts off a lot of vapor and mist, which clouds the operative field sometimes. Also, with traditional ultrasonic devices, you are not able to close off major blood vessels compared with bipolar,” Dr. Milsom said. “The THUNDERBEAT represents the latest development of energy use in surgery and it will allow surgeons to be much more efficient in their procedures.”

THUNDERBEAT Technology and the Benefits of Versatility

Cutting Speed

The area in which THUNDERBEAT offers perhaps its greatest advantage over competing devices is in terms of speed, without sacrificing any vessel-sealing security. Douglas Olsen, MD, FACS, associate clinical professor of surgery at Vanderbilt University in Nashville, Tennessee, has used THUNDERBEAT for bariatric procedures—mostly sleeve gastrectomy, Roux-En-Y gastric bypass, and duodenal switch—and said that he was instrumental in bringing THUNDERBEAT to his institution. “When I first began performing bariatric surgery, I used Harmonic technology and then I used a variety of bipolar devices before finally settling on LigaSure, which I’ve used over the past couple of years,” he said, “But when Olympus began working on THUNDERBEAT, I was very interested.”

Comparing the THUNDERBEAT with its competitors, Dr. Olsen added, “where the THUNDERBEAT wins is as the fastest in class in cutting speed. It beats the rest of them hands down.” Even when the speed of a Harmonic device is optimal, that device sacrifices another element crucial to surgery: “Most surgeons use the fast mode on the Harmonic. They can get through tissues pretty quickly, but the device’s seal ability falls off tremendously,” he said.

In a study by Seehofer et al, THUNDERBEAT surpassed the Harmonic ACE and LigaSure V in terms of cutting and sealing speed.⁵ These researchers also concluded that THUNDERBEAT has the potential to deliver sealing at a speed exceeding that of a solely ultrasonic device.⁵ On 5-cm porcine mesentery, THUNDERBEAT has been shown to be 76% faster than the Harmonic ACE, 102% faster than ENSEAL, and 151% faster than the LigaSure V, which was a significant improvement in speed over all 3 devices (Figure 1).⁶ Additionally, a study conducted by Milsom et al reported that THUNDERBEAT has a higher versatility compared with other energy instruments with faster dissection speed and acceptable thermal spread.⁷

When using THUNDERBEAT during major colorectal procedures, Dr. Milsom said the device speeds up procedures via its multifunctionality, its ability to independently seal and divide vessels, and its capacity to be used as a dissector and grasper. “It’s versatile. You can use one instrument for all the tissue dissection you need to do within the abdomen,” he said. “First of all, it lets you use fewer instruments. You can use it for virtually all applications. It gives you the ability to do some very fine dissection compared with other instruments. You can use the grasping function to pick up tissue, which you can’t really do with other instruments. As with all ultrasonic devices, you do have to be careful – it can get hot so you may have to modify things to make sure you don’t touch any neighboring tissues within the first few seconds after using it.”

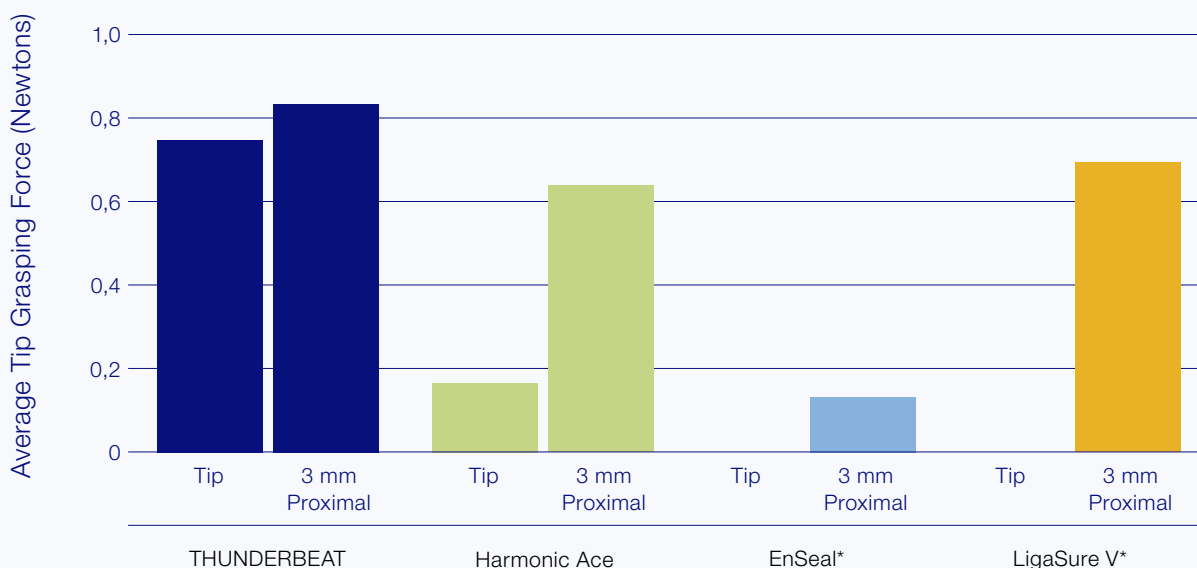
In addition to reducing the need to exchange instruments, Dr. Milsom finds that THUNDERBEAT allows him to cut and seal various tissues quickly and easily. “I think it will allow [a surgeon] to move along more quickly and efficiently, and in tight spaces like

the pelvis, it will allow you to dissect with a lot of precision,” he said. This greater potential for speed benefits everyone, Dr. Milsom noted. “For a 2-hour procedure, this may save you 10 or 15 minutes, which is really quite significant. The patient has shorter anesthesia and the health care team gets through the procedure more quickly.” Overall, longer surgical times often are associated with increased rate of complications, whereas shorter operating times are associated with better patient outcomes.⁸ Michael J. Fahey, MD, a general, vascular, thoracic, and trauma surgeon in Yuba City, California, performs a wide variety of noncardiac chest, general surgical, and hernia procedures every year. He has worked with every generation of ultrasonic and bipolar devices in both open and laparoscopic procedures. “Probably the biggest limitation with the LigaSure [device] is that it’s a little slow to work, a little unpredictable in maintaining a seal on a 7-mm vessel, and there’s a fair amount of charring and instrument jaw cleaning that goes on in some cases. Sometimes, the blade is

either not as reproducibly sharp as it should be or it dulls quickly,” he said. “The precision of the Harmonic [device] is nice, and it can be used in areas where a stapling device has left staples, which you can’t do with the LigaSure. But its secondary use as a grasper is not very good; things slip through its jaws more easily than they do with the LigaSure.”

Thus, the drawbacks of using those instruments can lengthen the duration of a procedure. “If you have to go back and control bleeding that should have been controlled the first time from the device you’re using, whether it’s an energy device or a stapler, that’s a big increase in time,” Dr. Fahey explained. “Also, if you’re using a bipolar or ultrasonic device, you have to wait for the tissue to be functionally desiccated. These are 5-mm devices; if you need to divide 10 inches or 20 cm of tissue, there’s a true wait time for each opening and closing of the jaws. If you can turn to a device in which each division is faster and more hemostatic, you’ll have a smoother case, rather than constantly

Figure 4: Distal Grasping Force



1. Sample Size: = 9

* Due to jaw design, the LigaSure V and EnSeal were unable to exert any grasping force at the tip of the device

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having to backtrack to control bleeding or waiting (for an instrument to perform) before moving forward to your next step.”

THUNDERBEAT seems to have resolved these time-consuming problems, Dr. Fahey explained. “Overall, it’s faster and more accurate. As you move through the case, it saves you time without the risk for increased bleeding. Usually I was pushing the other technologies to move a little faster, or having to wait on them,” he said. “Also, the jaws of THUNDERBEAT have fairly good grasping capability, the clarity of the division of tissue is good, and the jaws require minimal cleaning.”

Reliable Vessel Sealing

The same integration of ultrasonic and bipolar energy that makes THUNDERBEAT fast also enhances its reliability in sealing vessels up to and including 7 mm in diameter,⁴ making it equivalent in sealing capacity to the leading pure bipolar devices (Figure 2).⁷

In the comparison of THUNDERBEAT to Harmonic ACE and LigaSure V by Seehofer et al, researchers found that all 3 instruments were capable of safely dividing vessels up to 4 mm in size, but the burst pressure of larger vessels, 5 to 7 mm, was significantly higher (734±64 mm Hg) in those sealed with THUNDERBEAT than in those sealed with the Harmonic ACE (453±50 mm Hg).⁵

“Speed and the dependability of the seal are important factors,” Dr. Olsen said. “From a surgeon’s standpoint, THUNDERBEAT’s speed is certainly nice. When I’m doing something like a sleeve gastrectomy, taking down the greater curvature of the stomach and I have multiple vascular pedicles to divide, I want to be able to move through that quickly and know with confidence that I have the vessels sealed.” In bariatric

surgery, Dr. Olsen often encounters mixed tissues, such as pedicle or adipose tissue, all with vessels throughout. He found both Harmonic and LigaSure devices good at sealing some, but not all, types of tissues. “Harmonic is very good at sealing larger vessels, but is not good at sealing the little capillaries in the adipose tissue; same with the LigaSure,” he said. “I feel THUNDERBEAT gets better hemostasis through those tissues completely.”

In Seal mode, THUNDERBEAT uses only advanced bipolar energy for vessel sealing and tissue coagulation, a feature that other ultrasonic devices cannot provide. Dr. Fahey noted that hemostasis provided by THUNDERBEAT was superior to the sealing capabilities of competing devices. “We always test (new) devices on the open mesentery of colon in the open portions of cases before we start trusting them in closed, laparoscopic procedures, and the ability of the THUNDERBEAT to divide sigmoid colon or rectal lateral stocks was much more efficacious in terms of hemostasis than the 2 competitors,” he said. “The larger vessels seemed to be controlled.

THUNDERBEAT still runs into the same limitations all devices have in people with atherosclerotic arteries, where they don’t work best. But because it features an ultrasonic side, you can use it around staples, whereas with LigaSure, you would have to change modalities to monopolar devices or clips.”

Dr. Fahey advises that surgeons spend some time becoming familiar with the instrument. “You have to play with it, be appropriately instructed, and take some time with your first few cases so that you appreciate the range of settings that are available on THUNDERBEAT,” Dr. Fahey said.

Also, his colleagues in gynecologic surgery who perform laparoscopic hysterectomy – a procedure historically

Figure 5: NEW Handle

Front Actuated handle designed to help minimize hand fatigue through improved ergonomics



associated with postoperative bleeding – have migrated to THUNDERBEAT as their device of choice for uterine vessel division. “Clearly the other service lines have decided that between competing technologies, this is the one that gives them the best hemostasis,” Dr. Fahey said.

Dr. Nguyen added that THUNDERBEAT saves him time in procedures. “There are certain parts of procedures that just move a lot faster. For example, mobilizing the greater curve of the stomach,” he said. Also, having confidence that THUNDERBEAT provides a reliable seal contributes to operative time savings. “There are a lot of major blood vessels that I dissect around and divide in my surgeries, and I feel comfortable sealing and dividing with THUNDERBEAT,” Dr. Nguyen said. In the past, when he wasn’t confident about the seal a device provided, he would, “either clip or tie, which is more time-consuming.”

Precise Dissection and Optimized Grasping

In addition to providing superior speed and equivalent

hemostasis compared with its leading competitors, THUNDERBEAT offers several other features that make it a truly multifunctional instrument: a fine-tip design, strong jaw-opening force, wide jaw-opening aperture, high grasping force at the tip, and stability of the jaw. All of these features are designed to ease the surgeon’s ability to access and separate tissue planes (Figure 3).

Employing an advanced “wiper jaw” mechanism, THUNDERBEAT provides a high grasping force throughout the length of the jaw, which creates the potential for the device to be used as an alternative to generic graspers (Figure 4).⁹ THUNDERBEAT’s dissecting and grasping capabilities together may result in a reduction of instruments used in the operating room, which in turn may lead to shorter procedure duration. When he was using LigaSure, Dr. Olsen found the bulky jaw design to be a subpar dissector, which he said often is the case with pure

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bipolar devices. “That meant that you’d often need to use a second instrument to develop a tissue plane so that you could bring your (bipolar) device in across that tissue, close it, divide and seal,” he said. “So that would slow down surgery because you would have to stop and bring in a dissecting instrument to develop that tissue plane.

“Harmonic and THUNDERBEAT, on the other hand, have the ability to be excellent dissectors; the active blade on THUNDERBEAT, which is the same as the active blade on the Harmonic, is a long, thin rod, so you can use it to tease into tissues, develop the tissue plane, then close the instrument and fire it,” Dr. Olsen added. Now that he uses THUNDERBEAT in his procedures predominantly, Dr. Olsen said that he rarely needs to employ other dissectors, and in most cases does not need a curved dissector, which has streamlined his operating efficiency. Dr. Milsom also finds that using THUNDERBEAT allows him to cut down on the number of additional instruments he might use. “It gives you the ability to do some very fine dissection compared with other instruments, and you can use the grasping function to pick up tissue— with other instruments you can’t really do that,” he said.

Dr. Fahey has found the integration of fine dissection and reliable grasping to contribute to THUNDERBEAT’s ability to save surgical time and reduce instrument use. “Olympus has listened, I think, to surgical discussions that you don’t need just fine dissection, but you also need to be able to grasp tissue and hold it. Otherwise, you’re having to add other ports or other instruments— so the combination of fine dissection and grasping has been a nice integration,” Dr. Fahey said.

In the past, during complex paraesophageal or redo antireflux procedures, Dr. Fahey found that he would need to use 2 energy-based technologies to complete the surgery. “We’d use a Harmonic (device) for

dissection and a LigaSure (device) for vessel control. Or, we’d plan to staple everything else to save on energy source in terms of cost,” he said. “But now in those cases we tend to use only THUNDERBEAT. This is probably why it is more reproducible to say it takes only 20 minutes or less to take down the splenic flexure of the colon, because we don’t run into a vessel or omental bleeding that is not controlled by the device.”

The THUNDERBEAT Platform

By integrating ultrasonic and bipolar energy into one multifunctional device, THUNDERBEAT gives surgeons the choice of selecting the technology choice most appropriate to their specific procedural needs.

THUNDERBEAT also is compatible with the Olympus Integrated OR System, is hand- and/or foot-switch compatible, and features 3 handle designs (inline, pistol, and the new front-actuated grip (Figure 5) and 4 working lengths (10, 20, 35, and 45 cm).^{9,10}

Furthermore, the THUNDERBEAT platform also is the only surgical tissue management system that delivers every common form of energy used in surgery today (ie. monopolar, bipolar, ultrasonic, and advanced bipolar) as well as the revolutionary combination of advanced bipolar and ultrasonic energies. “For institutions that are looking for a cost-efficient way to add an entire energy platform, it makes a lot of sense,” Dr. Olsen said.

For those who prefer to use an ultrasonic energy-only device, Olympus offers SONICBEAT. Like THUNDERBEAT, SONICBEAT cuts tissue faster and provides a stronger grasping force than the Harmonic ACE; it also produces 85% less smoke and mist.^{11,12} Per Dr. Olsen, “If they’re comfortable just with the ultrasonic [devices], they can use the SONICBEAT, and for more advanced procedures when they want to add bipolar energy, they can plug in THUNDERBEAT.”

Schlussfolgerung: THUNDERBEAT ist das erste am Markt erhältliche Gerät, das die Geschwindigkeit der Ultraschallenergie mit der Zuverlässigkeit bipolarer Energie in einem einzigen Instrument vereint. THUNDERBEAT erlaubt eine saubere Trennung des Gewebes und eine wirksame Versiegelung von Blutgefäßen bis zu einer Größe von 7 mm. Darüber hinaus ermöglicht es präzises Präparieren und kraftvolles Greifen, wodurch sich die Zahl der erforderlichen Instrumentenwechsel verringern lässt. „Die Weiterentwicklung von Techniken zur Gewebetrennung ist in vollem Gange, und dieses Produkt repräsentiert die Zukunft der Energieanwendung zum sicheren Schneiden von Geweben“ so Dr. Milsom. „Chirurgen, die an dieser modernen Energieanwendung zur Gewebetrennung teilhaben wollen, brauchen dieses Gerät.“

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Disclosures: Dr. Fahey reported no relevant financial conflicts of interest. Dr. Milsom reported receiving grant/research funding from Olympus. Dr. Nguyen reported no relevant financial conflicts of interest. Dr. Olsen reported receiving honoraria from Olympus.

Disclaimer: This monograph is designed to be a summary of information. While it is detailed, it is not an exhaustive clinical review. McMahon Publishing, Olympus, and the authors neither affirm nor deny the accuracy of the information contained herein. No liability will be assumed for the use of this monograph, and the absence of typographical errors is not guaranteed. Readers are strongly urged to consult any relevant primary literature.

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BESTELLINFORMATIONEN

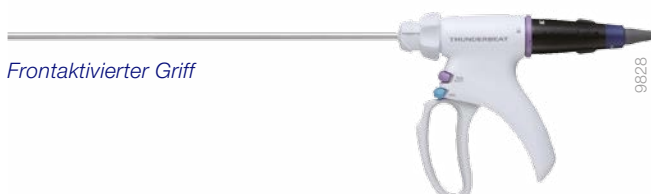
BESTELLINFORMATIONEN

THUNDERBEAT Handstücke für die offene Chirurgie

| | |
|-----------------|--------------------------------------------------------------------|
| N4505530 | THUNDERBEAT Open Extended Jaw, 9 mm, 20 cm, frontaktivierter Griff |
| N3810730 | THUNDERBEAT 5 mm, 20 cm, In-Line-Griff |
| N3810830 | THUNDERBEAT 5 mm, 10 cm, In-Line-Griff |
| N4505730 | THUNDERBEAT Open Fine Jaw, In-Line-Griff |

THUNDERBEAT Handstücke für die Laparoskopie

| | |
|-----------------|-------------------------------------------------|
| N4488930 | THUNDERBEAT 5 mm, 45 cm, frontaktivierter Griff |
| N4489130 | THUNDERBEAT 5 mm, 35 cm, frontaktivierter Griff |
| N3810330 | THUNDERBEAT 5 mm, 45 cm, Pistolengriff |
| N3810430 | THUNDERBEAT 5 mm, 35 cm, Pistolengriff |
| N3810530 | THUNDERBEAT 5 mm, 45 cm, In-Line-Griff |
| N3810630 | THUNDERBEAT 5 mm, 35 cm, In-Line-Griff |



Mit drei Handgrifftypen und fünf Arbeitslängen passt sich THUNDERBEAT flexibel Ihren Bedürfnissen an

Generatoren und Zubehör

| | |
|-----------------|------------------------------------|
| WB91051W | Elektrochirurgiegenerator ESG-400* |
| N3808660 | Ultraschallgenerator USG-400 |
| N3808760 | Transducer für THUNDERBEAT |
| N3809330 | Kommunikationskabel – kurz: 0,25 m |
| N3809630 | Docking-Vorrichtung |
| WA956215 | Netzkabel Euro-Stecker (2x) |

Optional

| | |
|-----------------|--------------------------------------------------------------------|
| N3635730 | Energieversorgungswagen |
| N3809230 | Fußschalter für THUNDERBEAT |
| WB50403W | Fußschalter, einzelnes Pedal (bipolar) |
| N3809430 | Kommunikationskabel – lang: 10 m** |
| N3809530 | Adapter zum Anschluss an das Insufflationsgerät UHI-2 oder UHI-3** |
| E0427213 | Neutralelektrodenkabel (wiederverwendbar) |

* Einschließlich eines Doppelfußschalters

** Für die automatische Dampf- und Rauchgasabsaugungsfunktion erforderlich



Chirurgische All-in-One Energy Plattform mit Energieversorgungswagen TC-E400

THUNDERBEAT-ALL-IN-ONE ENERGY PLATTFORM

Die THUNDERBEAT-Schere: Unübertroffene Vielseitigkeit

Ziel der vorliegenden Broschüre ist es, die technischen Details von präklinischen und klinischen Tests und die Resonanz der Anwender zum Nutzen der THUNDERBEAT All-in-One Energy Plattformen vorzustellen.

Ein wirklich vielseitiges und modernes energiebasiertes Laparoskopieinstrument punktet mit den folgenden Parametern:
(Quelle: Untersuchung zur Marktakzeptanz, Olympus Europa, 2011)

- **Schnittgeschwindigkeit**
- **Zuverlässigkeit bei der Versiegelung großer Gefäße (bis einschließlich 7 mm)**
- **Erzielung einer sekundären Hämostase mittels moderner bipolarer Energie**
- **Vereinfachtes Greifen, Halten, Präparieren und Durchtrennen von Gewebe**

THUNDERBEAT erfüllt diese Anforderungen. Seine Leistung übertrifft in einer Vielzahl von Simulationen die Leistung anderer auf dem Markt erhältlicher Geräte.

Kundenerfahrungen

Prof. Dr. med. Karl-Hermann Fuchs, Agaplesion Markus Krankenhaus, Ärztlicher Direktor, Chefarzt der Klinik für Allgemein-, Viszeral- und Thoraxchirurgie

Wir haben eine Studie begonnen, um den möglichen Vorteil von THUNDERBEAT anhand objektiver Messungen zu beurteilen. Aus den Daten geht hervor, dass THUNDERBEAT sicher und schnell ist, was uns einen Vorteil im OP verschafft: Die Operationszeit verkürzt sich um mindestens 15%. Die Zeitersparnis ergibt sich aus einer zuverlässigen Koagulation und der schnellen Durchtrennung beliebiger Gewebe, ohne die Instrumente wechseln zu müssen – noch nicht einmal für die stumpfe Präparation und fürs Greifen. (Mai 2014)

Dr. med. Peiman Poornorozy, Universitätsklinikum Odense, Chefchirurg, Abteilung für gastrointestinale Chirurgie

Mit THUNDERBEAT lassen sich alle größeren Gefäße durchtrennen und versiegeln. Instrumentenwechsel entfallen. THUNDERBEAT ist sehr schnell und sicher und im Vergleich zu Harmonic wird weniger Dampf erzeugt. (Mai 2014)

Dr. Peter Razek, Sozialmedizinisches Zentrum Floridsdorf – Krankenhaus und Geriatriezentrum, Oberarzt der chirurgischen Abteilung

THUNDERBEAT ist besser als andere Instrumente. Die Versiegelung ist äußerst sicher und die Geschwindigkeit des Instruments ist wirklich beeindruckend. (Mai 2014)

Dr. med. Andreas Keerl, Kantonsspital Baden, Leitender Arzt, Department Chirurgie

Ich bevorzuge THUNDERBEAT als mein Standardinstrument bei kolorektalen Operationen, weil die kombinierten Technologien eine präzise Präparation und eine sichere und schnelle Gefäßversiegelung ermöglichen. Ich verwende THUNDERBEAT, weil es sicher, benutzerfreundlich und schnell ist. (Mai 2014)

Dr. med. Andreas Zerz, Kantonsspital Baselland, Chefarzt, Klinik für Chirurgie

THUNDERBEAT ist sicher, schnell und ein sehr vielseitiges Instrument. (Mai 2014)

Prof. Dr. Yves van Nieuwenhove, Universitätsklinikum Gent, Klinikleiter, Abteilung für gastrointestinale Chirurgie

THUNDERBEAT: schnell und trocken. THUNDERBEAT: bedeutet eine vollständige Kolonresektion ohne einen einzigen Tropfen Blut. (Mai 2014)

Der Hersteller behält sich Änderungen der technischen Daten, der Ausstattung und des Designs ohne Vorankündigung vor.

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