



General surgery

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Erbe Website	www.erbe-med.com
Erbeplus academy / Further education	https://de.erbe-med.com/de-en/education/
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Publications review

Erbe technology in general surgery

PARTIAL HEPATECTOMY WITH BICLAMP®

Uchiyama H, Morita K, Itoh S, Takenaka K, Maehara Y. BiClamp-Fracture Method in Pure Laparoscopic Hepatectomy: Verifying its Efficacy Irrespective of Liver Stiffness. Surg Laparosc Endosc Percutan Tech. 2015 Aug;25(4):e113-6.

Retrospective study of laparoscopic partial hepatectomy involving 21 patients. The procedure could be carried out effectively and without complications using LAP BiClamp in the cirrhotic liver, irrespective of the extent of liver stiffness.

Itano O, Ikoma N, Takei H, Oshima G, Kitagawa Y. The superficial precoagulation, sealing, and transection method: a "bloodless" and "ecofriendly" laparoscopic liver transection technique. Surg Laparosc Endosc Percutan Tech. 2015 Feb;25(1):e33-6.

During the course of laparoscopic partial hepatectomy, blood vessels (< 5 mm) could be effectively sealed with the reusable LAP BiClamp. (small case series of 14 patients).

Uchiyama H, Itoh S, Higashi T, Korenaga D, Takenaka K. Pure laparoscopic partial hepatectomy using a newly developed vessel sealing device, BiClamp. Surg Laparosc Endosc Percutan Tech. 2013 Jun;23(3):e116-8.

Effective laparoscopic hepatectomy without complications performed using LAP BiClamp as part of a small case series of 9 patients.

Itoh S, Fukuzawa K, Shitomi Y, Okamoto M, Kinoshita T, Taketomi A, Shirabe K, Wakasugi K, Maehara Y. Impact of the VIO system in hepatic resection for patients with hepatocellular carcinoma. Surg Today. 2012 Dec;42(12):1176-82.

BiClamp in SOFT COAG mode enabled effective monitoring of intraoperative bleeding during the course of open hepatectomy in liver tumor patients.

Chen JM, Geng W, Liu FB, Zhao HC, Xie SX, Hou H, Zhao YJ, Wang GB, Geng XP. BiClamp® forceps liver transection versus clamp crushing technique for liver resection: study protocol for a randomized controlled trial. Trials. 2015 Apr 30;16:201.

Publication of a study protocol. In this two-armed, randomized study with 48 patients each, open liver transection using the BiClamp is to be compared with the clamp crushing technique.

Aikawa M, Miyazawa M, Okamoto K, Toshimitsu Y, Okada K, Ueno Y, Yamaguchi S, Koyama I. Thoracoscopic hepatectomy for malignant liver tumor. Surg Endosc. 2014 Jan;28(1):314. Aug 27.

In this case study it was demonstrated that the liver parenchyma could be prepared effectively with the LAP-BiClamp in thoracoscopic hepatectomy.

PARTIAL HEPATECTOMY WITH WATERJET TECHNOLOGY

H. G. Rau, A. P. Duessel, S. Wurzbacher The use of water-jet dissection in open and laparoscopic liver resection. HPB Surgery (Oxford) 2008; 10(4):275-80

In this study, a data base including a total of 950 liver resections was evaluated. The Erbe waterjet technology was employed for 350 of these interventions. A clinical study with 591 liver resections, where the blunt preparation (n = 279) with CUSA (n = 175) and waterjet dissection (n = 137) were compared, showed the practicability and safety of the waterjet application: compared with the blunt preparation, the resection time was shorter, blood loss incl. blood requirements was lower and the necessary Pringle maneuver time was shorter. There were no differences between the two methods in terms long-term survival prognosis.

Riediger C, Mueller MW, Geismann F, Lehmann A, Schuster T, Michalski CW, Kuhn K, Friess H. Comparative analysis of different transection techniques in minor and major hepatic resections: a prospective cohort study. Int J Surg. 2013;11(9):826-33.

A total of 272 liver resections were evaluated as part of this prospective cohort study. For major hepatectomies the stapler and Erbe waterjet technology were used for a first group, and for the minor hepatectomies mono-/bipolar cauterization, the stapler or Erbe-waterjet technology. There were no significant differences for the major and minor hepatectomies between the methods in terms of operating time and complications. The R0 resection rate was the same for minor hepatectomies, whereas the waterjet technology was superior to the stapler technology in major hepatectomies at an R0 rate of 100 % vs. 88 % war. Electro-cauterization is the least expensive method. Use of the waterjet was less expensive compared to the stapler.

TONSILLECTOMY WITH BICLAMP®

Lee SW, Jeon SS, Lee JD, Lee JY, Kim SC, Koh YW: Lee SW, Jeon SS, Lee JD, Lee JY, Kim SC, Koh YW. A comparison of postoperative pain and complications in tonsillectomy using BiClamp forceps and electrocautery tonsillectomy. Otolaryngol Head Neck Surg. 2008 Aug;139(2):228-34.

Prospective, randomized study comparing tonsillectomy when performed using BiClamp (105 patients) and when using conventional electrocauterization (110 patients). The procedure was carried out both in children and in adults. Where BiClamp was used, the operative time and intraoperative blood loss were significantly reduced.

THYROIDECTOMY WITH BICLAMP®

Pniak T, Formánek M, Matoušek P, Zeleník K, Komínek P. Bipolar thermofusion BiClamp 150 in thyroidectomy: a review of 1156 operations. Biomed Res Int. 2014;2014:707265.

Retrospective study of the use of BiClamp 150 in comparison with the conventional ligature technique in thyroidectomies, for which a total

of 1156 surgeries were evaluated. When using BiClamp, the operative time was significantly shorter and there were fewer incidences of subsequent bleeding.

Paolo Del Rio et al. The use of energy devices for surgical thyroid procedures. Harmonic focus vs Biclamp 150. Ann. Chir. Ital. 2015, 86: 553 – 559

Conducting a prospective study with 40 patients each comparing the re-usable BiClamp 150 C with the disposable Harmonic Focus instrument, Ethicon, in conventional thyroidectomy. Both instruments enabled thyroidectomies to be performed safely and effectively without significant differences in terms of the surgical outcome. The ensuing instrument costs, however, differed considerably: the BiClamp 150 C resulted in instrument costs of 1,000 € in the study, compared with 18,000 € when using the Harmonic Focus.

P. F. Alesina, T. Rolfs, M. K. Walz. Bipolar thermofusion vessel sealing system (TVS) versus conventional vessel ligation (CVL) in thyroid surgery — results of a prospective study. Langenbecks Archives of Surgery 2010; 395(2): 115-9

Prospective, non-randomized study for thyroidectomies with the re-usable BiClamp compared with conventional suture ligation. 93 patients each, were treated in both study arms.

Thyroidectomy could be performed quicker with the BiClamp, less drainage was required, and no nerve paresis occurred. Surgery could be performed as safe as with suture ligation.

Elie Oussoultzoglou, Fabrizio Panaro, Edoardo Rosso, Ion Zeca, Philippe Bachellier, Patrick Pessaux, Daniel Jaeck. Use of BiClamp Decreased the Severity of Hypocalcemia after Total Thyroidectomy Compared with LigaSure: A Prospective Study. World Journal of Surgery 2008; 32:1968-1973

Prospective, non-randomized study for total thyroidectomies with the re-usable BiClamp 150 compared with LigaSure Precise. 46 and 40 respectively were treated. Surgery was as safe and effective with BiClamp as with the LigaSure instrument. There were no deaths, no repeat surgery due to postoperative bleeding and no nerve paresis. The advantages of the BiClamp were the shorter average operating time on the one hand, and in addition the patients required less oral calcium due to falling below the physiological serum calcium levels.

COLON SURGERY WITH ERBEJET® 2

Sidorov DV, Frank GA, Mainovskaya OA, Lozhkin MV, Grishin NA, Petrov LO, Troitskiy AA, Kirsanova ON. Total mesorectal excision with water-jet dissection in patients with rectal cancer: surgical and morphological aspects. Colorectal Dis. 2014 May;16(5):0182-5.

ERBEJET2 was used in a small patient population of 10 patients for the mesorectal excision of rectal tumors and compared with 10 patients in each case in whom this type of exposure was carried out using monopolar electrodes or using the Harmonic scalpel. Using ERBEJET 2, exposure of the rectum could be carried out without damaging the pelvic nerves. There was no voiding dysfunction of the urinary bladder or any intraoperative or postoperative complications.

In contrast, thermal lateral damage was evident in the macroscopic and histological assessment of resection carried out using electro-surgical methods. This was more strongly apparent in the case of monopolar electrodes than in the case of resection performed using the Harmonic scalpel.

Touloumtzidis A, Kühn P, Goretzki PE, Lammers BJ. Water-jet dissection in rectal cancer surgery: surgical and oncological outcomes. Surg Technol Int. 2010 Oct;20:115-23.

TME (total mesorectal excision) with waterjet dissection (WJD) for treating rectal cancer in 105 patients. In a postoperative observation period from 2 – 96 months, TME with ERBEJET allowed simple exposure of the mesorectal fascia and the surrounding pelvic nerves, thus allowing excellent preservation of the autonomous nerves at acceptable postoperative morbidity and low mortality. The oncological result was comparable to the results from other centers.

Touloumtzidis A, Sostmann B, Hilgers N, Renter MA, Kühn P, Goretzki PE, Lammers BJ. Functional long-term results after rectal cancer surgery--technique of the athermal mesorectal excision.

Int J Colorectal Dis. 2014 Mar;29(3):285-92.

Study with 125 adenocarcinoma patients with the ERBEJET2 in total mesorectal excision (TME). In the follow-up period of 2 – 117 months, the recurrence rate = 9.6 %, the 5-year survival rate = 75.4 %. The rate of bladder dysfunction = 6 %, sexual dysfunction in males = 25 %, however, comparable with other centers. A specific advantage of the ERBEJET is the easier dissection between the mesorectal fascia and the surrounding nerve tissue.

Helmy S, Tutton M: The use of TEM-ESD for massive rectal adenoma in a 23-hour day-case setting. Abstract und Kongressposter Colorectal Disease, Vol17 (Suppl 2) Sept. 2015, p. 94

Safe en-bloc resection of benign rectal polyps using the ERBEJET waterjet technique in a case series of 13 patients. Lesions of 20-75 mm could be removed. The muscle layer of the rectum remains intact in the case of submucosal resection and inflammatory responses in the perirectal fatty tissue as can occur in TEM total wall excisions are largely avoided.

Baral J, Kouladouros K, Fender S, Pullig F, Schon M: TEM-ESD: A new standard approach for large rectal adenomas? Kongressposter: The American Society of Colon and Rectal Surgeons, Annual Scientific Meeting, Boston 30th May – 3rd June 2015

In this case series comprised of 93 patients, using the ERBEJET2 technique enabled rectal lesions with an average size of 4.8 cm (max. size 22.9 cm) to be safely removed en-bloc without damaging the colon wall and mesorectum. As the rectal wall had been fully preserved, inflammatory responses were avoided and the required total wall excisions could be carried out without difficulty.

Hanna W, Baral J, Fender S, Schöttler A, Rüdiger T, Schön MR: Transanale endoskopisch mikrochirurgische Exzision (TEM) von Rektumadenomen und T1-Karzinomen mittels Hydrojet unterstützter Submukosadisektion. Videodemonstration, Ergebnisse und Follow-up. Abstract. Z Gastroenterol 2010; 48 - P199

En-bloc resection of large, surface rectal adenomas and T1 rectal carcinomas using hydrojet-supported submucosal dissection. According to the authors, using this method enabled TEM to be carried out safely, quickly and without complications in a case series of 22 patients.

Baral J, et al.: The Waterjet Supported Submucosal Transanal Endoscopic Microsurgical Excision of Giant Rectal Adenomas (ESD - TEM), video presentation, ACS San Francisco 2011

This method enables improved histological differentiation and offers potential benefits in terms of preventing recurrence.

Leijtens J.W.A., Heemskerk J: ESD-TEM: A new technique for large rectal adenomas combining endoscopic submucosal dissection and TEM with the hydrojet. Video presentation: Nederlandse Vereniging voor Gastroenterologie, Oktober 2015

In this study, waterjet-supported submucosal dissection of large rectal adenomas was carried out in 20 patients. According to the authors, ESD TEM is a highly-promising method for the resection of large rectal adenomas in addition to standard endoscopic procedures. As a result of elevation using physiological saline solution, cutting behavior is improved during electrosurgical cutting and lesions could be resected safely without damaging the muscularis propria.

PRE-CLINICAL, EXPERIMENTAL STUDIES

Jiang SJ, Shi H, Swar G, Wang HX, Liu XJ, Wang YG. Trans-umbilical endoscopic cholecystectomy with a water-jet hybrid-knife: a pilot animal study. *World J Gastroenterol.* 2013 Oct 28;19(40):6857-62.

NOTES-cholecystectomy with the ERBEJET 2/ HybridKnife (HK). Pilot study in a porcine model (n=3).

According to the authors, and based on the experiences from this pilot study, actual trans-umbilical NOTES-cholecystectomy with the ERBEJET/HK is feasible and safe, however, verification is required through long-term studies in an animal model.

Shi H, Jiang SJ, Li B, Fu DK, Xin P, Wang YG. Natural orifice transluminal endoscopic wedge hepatic resection with a water-jet hybrid knife in a non-survival porcine model. *World J Gastroenterol.* 2011 Feb 21;17(7):926-31.

NOTES-liver resection with the ERBEJET2/HybridKnife. Pilot study in a porcine model.

According to the authors transanal and transvaginal surgery is possible and safe (operating time: 2 hours, intraoperative blood loss: 100 - 250 ml). Further studies on optimizing dissection time would be desirable.

Bschleipfer T, Hackethal A, Tacke S, Collet P. Natural orifice transluminal endoscopic surgery in urology: feasibility of a transrectal, flexible retroperitoneoscopy in a porcine model. *Urologe A.* 2014 Dec;53(12):1786-92.

NOTES-transrectal retroperitoneal NOTES- lymphadenectomy with the ERBEJET2/HybridKnife

Preparation with the ERBEJET2 resulted into no injuries to the blood vessels, nerves nor lymph vessels. This is therefore a feasible and safe application for transrectal, flexible, endoscopic retroperitoneoscopy as pre-requirement for establishing transrectal NOTES-RLA.

Park PO, Long GL, Bergström M, Cunningham C, Vakharia OJ, Bakos GJ, Bally KR, Rothstein RI, Swain CP. A randomized comparison of a new flexible bipolar hemostasis forceps designed principally for NOTES versus a conventional surgical laparoscopic bipolar forceps for intra-abdominal vessel sealing in a porcine model. *Gastrointest Endosc.* 2010 Apr;71(4):835-41.

Effective laparoscopic vessel sealing of blood vessels up to 6 mm diameter in the uterus, ovaries and the mesenteries of the cecum with the LAP BiClamp in the porcine animal model.

VIO SOFT COAGULATION

Uchiyama A, Miyoshi K, Nakamura K. VIO soft-coagulation system for major pulmonary resections: results in 68 patients with primary lung cancer. *Gen Thorac Cardiovasc Surg.* 2011 Mar;59(3):175-8

Retrospective study for using VIO soft-coagulation as part of lung resection in patients with lung cancer (68 patients) in comparison to resection with conventional electro-cauterization (78 patients). Blood loss was significantly lower when using VIO soft-coagulation, and the authors describe VIO soft-coagulation overall as a safe and effective method for this indication.

Hirokawa F, Hayashi M, Miyamoto Y, Iwamoto M, Tsunematsu I, Asakuma M, Shimizu T, Komeda K, Inoue Y, Tanigawa N. A novel method using the VIO soft-coagulation system for liver resection. *Surgery.* 2011 Mar;149(3):438-44

The coagulation of blood vessels ($\varnothing \leq 3$ mm) with VIO soft-coagulation was performed as part of hepatectomies in liver parenchyma resection (97 patients). Compared with a group of 115 patients, where this step was performed using conventional bipolar electro-cauterization, the blood loss and number of required blood transfusions was lower, there was no postoperative bleeding or leakage of bile fluid. The operating time and the length of the hospital stay were significantly shorter.

Yamada N, Amano R, Kimura K, Murata A, Yashiro M, Tanaka S, Wakasa K, Hirakawa K. Two-surgeon technique for liver transection using pre-coagulation by a soft-coagulation system and ultrasonic dissection. *Hepatogastroenterology.* 2015 Mar-Apr;62(138):389-92

Saline electro-coagulation + CUSA (102 patients) was compared with the VIO soft-coagulation + CUSA (61 patients) as part of the resection of liver tumors and liver metastases. In the patient group where VIO soft-coagulation was used for pre-coagulation of the resection line or the coagulation of blood vessels up to 3 mm, blood loss was significantly lower and the hospital stay considerably shorter.

Ikegami T, Maeda T, Kayashima H, Oki E, Yoshizumi T, Sakaguchi Y, Toh Y, Shirabe K, Maehara Y. Soft coagulation, polyglycolic acid felt, and fibrin glue for prevention of pancreatic fistula after distal pancreatectomy. *Surg Today.* 2011 Sep;41(9):1224-7

In a small case study with a total of 9 patients, the VIO soft-coagulation proved an effective measure for avoiding pancreatic fistulas in distal pancreatectomies in addition to using PGA fleece with a fibrin glue. Eight of 9 patients were without fistulas postoperatively.

Ishiko T, Inomata Y, Beppu T, Asonuma K, Okajima H, Takeiti T, Tikamoto A, Yamamoto H, Baba H. An improved technique for liver transection using a new device for soft coagulation in living donor hepatectomy. *Hepatogastroenterology.* 2012 Sep;59(118):1907-10.

As part of donor liver preparation, hemostasis with VIO soft-coagulation and monopolar forceps (70 patients) was compared with electro-coagulation using bipolar forceps (125 patients). Intraoperative blood loss was significantly less with VIO soft-coagulation (435.2 +/- 424.7 vs. 763.9 +/- 494.4 ml).

Okamoto K, Koyama I, Toshimitsu Y, Aikawa M, Okada K, Ueno Y, Miyazawa M. Liver resection using a soft-coagulation system without the Pringle maneuver. *Hepatogastroenterology.* 2012 May;59(115):875-7.

As part of hepatectomies, VIO soft-coagulation was used for hemostasis in 102 patients instead of the Pringle maneuver. Compared with this comparable operation, the operating time with VIO soft-coagulation was significantly shorter (135 min vs. 297 min.) and the blood loss significantly lower (200 ml vs. 704 ml).

Nagakawa Y, Tsuchida A, Saito H, Tohyama Y, Matsudo T, Kawakita H, Ikeda T, Kasuya K, Ozawa T, Aoki T. The VIO soft-coagulation system can prevent pancreatic fistula following pancreatectomy. *J Hepatobiliary Pancreat Surg.* 2008;15(4):359-65

In a comparative study as part of pancreatectomies, pancreatic fistulas were observed in one patient (=9.1 %) of the VIO soft-coagulation group (11 patients) and in 5 patients (= 20.8 %) in the comparator group (24 patients).

PULMONARY LOBECTOMY

Tohru Sakuragi et al. The utility of a reusable bipolar sealing instrument, BiClamp® , for pulmonary resection. *European Journal of Cardio-Thoracic Surgery* 2008; 34:505-509

Pre-clinical study with 6 dogs and report on a small case series with 17 patients respectively, on pulmonary lobectomy or wedge resection respectively with the re-usable BiClamp as part of laparoscopic VATS and open thoracotomy respectively. The lung parenchyma was coagulated safely and effectively with the BiClamp. There were no complications in the human study, persisting air leakage occurred in none of the patients. In the opinion of the authors, the use of staplers could be reduced, thus saving costs.

Sakuragi T, Ohteki H. The utility of BiClamp® for intraoperative air leakage control in video-assisted thoracic surgery for pulmonary lobectomy. *Gen Thorac Cardiovasc Surg.* 2012 Nov;60(11):781-3.

Small series of cases with 18 lung cancer patients on the use of the re-usable BiClamp (incl VIO 300D) in laparoscopic VATS - pulmonary lobectomy. The lung parenchyma was coagulated effectively and appropriately with the BiClamp during air leakage management. According to the authors, this method is mainly of use in VATS.

Sakuragi T, Takeda Y, Teishikata T, Sakoda K, Morita S. Is bipolar thermofusion an acceptable option for unseparated interlobar fissure division in pulmonary lobectomy? *Interact Cardiovasc Thorac Surg.* 2013 Jul;17(1):26-31.

Retrospective study with 95 patients comparing pulmonary lobectomies with staplers and the re-usable BiClamp (incl. VIO 300D). In 66 patients the lung parenchyma was coagulated with the BiClamp as part of open thoracotomy and laparoscopic VATS respectively. In addition, the BiClamp enabled safe and effective air leakage management in VATS in addition to the established routine (application of PGA coating and fibrin glue). The advantage of the BiClamp is the application of VATS (video assisted thoracic surgery) and the cost savings through limiting the use of staplers.

Sakuragi T, Ohma H, Ohteki H. Efficacy of SOFT COAG for intraoperative bleeding in thoracic surgery. *Interact Cardiovasc Thorac Surg.* 2009 Nov;9(5):767-8.

Case report on 2 tumor patients. The Erbe SOFT COAG mode was used with a ball electrode for hemostasis as part of treatment of a lung tumor and a tumor in the mediastinum respectively. Active bleeding from the pulmonary artery and the intercostal vessels was stopped effectively.

Sakuragi T, Okazaki Y, Mitsuoka M, Itoh T Dramatic hemostasis of the transected pulmonary artery model using SOFT COAG electro-surgical output. *Interact Cardiovasc Thorac Surg.* 2008 Oct;7(5):764-6.

In a small animal study, the effective vessel sealing of pulmonary arteries was demonstrated with VIO 300 D SOFT COAG and a ball electrode.

VESSEL SEALING

Szyrach MN, Paschenda P, Afify M, Schälller D, Tolba RH, Evaluation of the novel bipolar vessel sealing and cutting device BiCision in a porcine model, *Min Invasiv Tech* 2012; 21: 402-7.

The laparoscopic bipolar vessel sealing instrument BiCision was compared with the laparoscopic bipolar vessel sealing instrument EnSeal using the visceral and peripheral arteries and veins in an animal (porcine) model.

In terms of the parameters that were investigated (burst pressure in veins, cutting quality, tissue adhesion to the instrument, vessel sealing interval, vessel diameter and lateral thermal damage), both instruments delivered comparable results.

Moreover, the BiCision instrument delivered significantly greater burst pressures when sealing arteries.

Conclusion: BiCision is just as efficient and reliable as EnSeal under preclinical conditions.

Wallwiener CW, Junginger SH, Zubke W, Brucker SY, Enderle MD, Neugebauer A, Schönfisch B, Wallwiener M, Bipolar vessel sealing: instrument contamination and wear have little effect on seal quality and success in a porcine in vitro model, *Langenbecks Arch Surg* 2014; 399: 863-71.

As part of a systematic investigation, the authors describe the impact of contamination of the BiClamp instrument on sealing quality. Mixtures of blood, collagen and fat were applied to the instrument surfaces in order to simulate contamination with biological tissue.

Conclusion: While the pressure applied was of critical significance in bipolar vessel sealing, it could be demonstrated that the experimental contamination did not have a negative impact on the quality of vessel sealing.

Rothmund R, Krämer B, Neis F, Brucker S, Wallwiener M, Reda A, Hausch A, Scharpf M, Szyrach MN, Efficacy and safety of the novel electro-surgical vessel sealing and cutting instrument BiCision, *Surg Endosc* 2012, 26: 3334-43.

The efficiency and safety of the new BiCision dissection, hemostasis and cutting instrument (Erbe) was compared with the EnSeal (Ethicon Endo-Surgery) instrument.

The authors compared the following parameters: closure rate, sealing quality, sealing interval, lateral thermal damage, cutting quality, tissue adhesion to the instrument, vessel burst pressure and complications in an in vivo animal (porcine) model. It was evident that BiCision was at least as good as EnSeal for all parameters tested. In fact, BiCision was superior to EnSeal in terms of burst pressure with regard to arteries and veins, as well as in terms of cutting quality.

Conclusion: The authors could demonstrate that the efficiency and quality of vessel sealing (vessels up to 7 mm) using the BiCision instrument.

Sven Richter, Otto Kollmar, Eva Neunhoeffer, Martin K. Schilling, Michael D. Menger, Georg Pistorius. Differential Response of Arteries and Veins to Bipolar Vessel Sealing: Evaluation of a Novel Reusable Device. *Journal of laparoendoscopic & advanced surgical techniques* 2006; 16(2):149-55

Using the re-usable BiClamp, arteries and veins up to 7 mm diameter were sealed as effectively in an animal study as with the LigaSure vessel sealing instrument.

Richter S, Kollmar O, Schilling MK, Pistorius GA, Menger MD, Efficacy and quality of vessel sealing. Comparison of a reusable with a disposable device and effects of clamp surface geometry and structure, *Surg Endosc* 2006; 20: 890-94.

As part of an animal study, different vessel sealing instruments (BiClamp and LigaSure) are compared on a porcine model in terms of the impact of various jaw surface structures on sealing quality. For this purpose, smooth unstructured surfaces (BiClamp for open surgery; LigaSure lap.) are compared to surfaces with a grooved structure (BiClamp lap.; LigaSure for open surgery).

Clamps with an unstructured surface result in less failure during sealing, however, lateral thermal damage and adhesion is greater in this case.

GENERAL ELECTRO SURGERY

A. Neugebauer, M. Zenker, M. D. Enderle Grundlagen der Hochfrequenz-Chirurgie *Endo heute* 2012; 25(1): 8-13

The authors of the review article provide a short overview of the fundamentals of electrosurgery. The principles of electrosurgical cutting and coagulation, argon plasma coagulation, hemostasis and devitalization are explained.

A. Repici, M. D. Enderle, A. Neugebauer, H. Manner, A. Eickhoff Grundlagen der Hochfrequenz-Chirurgie – Teil 2: Anwendungen in der Endoskopie *Endo heute* 2012; 25(4): 225-234

The authors of the review article provide a short overview of the use of electrosurgery in endoscopy. Applications such as polypectomy, mucosal resection, papillotomy, staunching of blood, argon plasma coagulation, devitalization and tumor ablation are explained.

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