



Painless
Vaginal Hysterectomy
with BiClamp



The authors would like to thank the following colleagues for their support and valuable criticism:

*Professor B. Blanc
Hôpital de la Conception – Marseille (France)
Professor K. Czajkowski
Karowa Hospital – Warsaw (Poland)
Dr. M. Cosson
University Clinical Center – Lille (France)
Professor D. Dargent
Edouard-Herriot Hospital – Lyon (France)
Professor J. Dequesne
Hospital in Lausanne (Switzerland)
Professor H. Fernandez
Antoine-Béclère Hospital – Clamart (France)
Dr. J. Hourcabié
European Training Center for Practical
Endoscopic Surgery – Périgueux (France)
Professor J-P. Lefranc
La Pitié Salpêtrière Hospital – Paris (France)
Dr. A. Magos
Royal Free Hospital – London (Great Britain)
Professor D. Stucki
University Clinical Center – Fribourg (Switzerland)
Professor H.R. Tinneberg
University Clinical Center – Giessen (Germany)
Dr. W. Zubke
University Clinical Center – Tübingen (Germany)*

It is a great pleasure for me to write a dedication for this work of Henri Clavé on vaginal hysterectomy. The strategy proposed by my colleague and his co-workers is based on the principle of combining local anesthesia, general anesthesia and postoperative pain relief, all finely attuned to one another.

A great part of the outstanding quality of the results presented here can be attributed to this approach. Yet the most important thing is the surgical technique itself. Initial comparative studies between vaginal hysterectomies and laparoscopic hysterectomies have shown that the latter is far less traumatic: less bleeding, less pain. The difference can only be due to the method used for hemostasis. Bipolar coagulation, the treatment of choice for some time for laparoscopic hemostasis, seals the blood vessel directly at the point of application and has only a limited effect on adjacent tissue. This results in a more precise hemostasis and a reduced inflammatory reaction, factors which all play an important role in postoperative pain.

Following the procedure described by Henri Clavé will result in operations being quicker. Bleeding and postoperative pain are reduced. The proof of this is supplied by a comparison of the "new hysterectomy" (an "electrical" hysterectomy?) with the classical abdominal hysterectomy procedure. It only remains to compare it with laparoscopic hysterectomy. This may be no light undertaking, for the schools of thought dividing the world of gynecological surgery these days are still poles apart. With this brief foreword I would like to appoint myself the spokesman of ecumenicalism and also call to mind the comment of Raoul Palmer, which he made when I first passed on a communication on the "celoscopic view of certain indications for vaginal hysterectomy" to him on November 20, 1972. Raoul Palmer had no concept that his students would one day have the audacity to achieve even better results with the celoscope than with "celo-assisted vaginal" hysterectomy, and he commented: There is a danger that techniques which simplify operations may lead to an excessive expansion of indications.

Caveat!

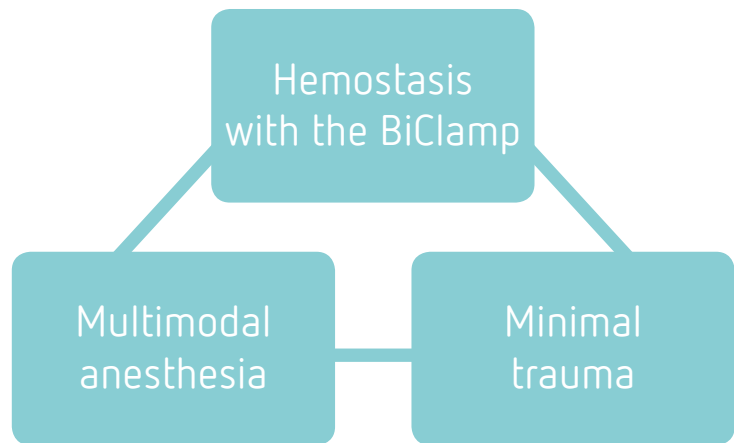
D. Dargent

Our special thanks go to Professor Daniel Dargent who did not just pass on his knowledge on vaginal surgery to his French surgical colleagues but also inspired them with his passion for this work.

CONTENTS

I – GENERAL BACKGROUND	5	IV – MINIMAL TRAUMA	22
		A) Information for patients	22
II – MULTIMODAL ANESTHESIA	6	B) The stay in hospital	22
The local anesthetic	6		
General anesthesia	7		
Prevention of postoperative pain	7	V – THERMAL HEMOSTASIS	22
III – THE OPERATIVE TECHNIQUE	8	1) The VIO generator	22
A) Positioning	8	2) The BiClamp	23
The patient	8	3) Mode of operation	24
The two assistants	8	4) Impact on pain	24
The instrument table	9		
The VIO generator	9	VI – OUR RESULTS	25
B) General principle	10	1) The pain	25
		2) Reduction of morphine	25
C) Sequence of the operation	11	3) Duration of the hospital stay	26
1) Vaginal circumferential cut around the portio	11	4) Duration of the procedure	26
2) Hemostasis around the cervix	12		
3) Amputation of the cervix	13	CONCLUSION	26
4) “Apple-shaped” uterus	14		
5) Hemostasis and additional amputation of the uterine vessels	15	LITERATURE	27
6) Amputation of the uterus at the adnexa	16		
7) Occlusion of the vaginal stump	17		
8) Adnexectomy procedures with the BiClamp	18		
9) Hemisection or morcellation	19		
10) Other interventions	19		
D) Prevention of accidents	20		
Skin/mucosal burns	20		
Thermal necroses at the ureter	20		
Thermal wounds to the digestive tract	20		
Bleeding – Immediate	21		
– Secondary	21		

General Background



The three pillars for success

Despite numerous new treatment modalities hysterectomy is still a very frequent operation (1)

The problem:

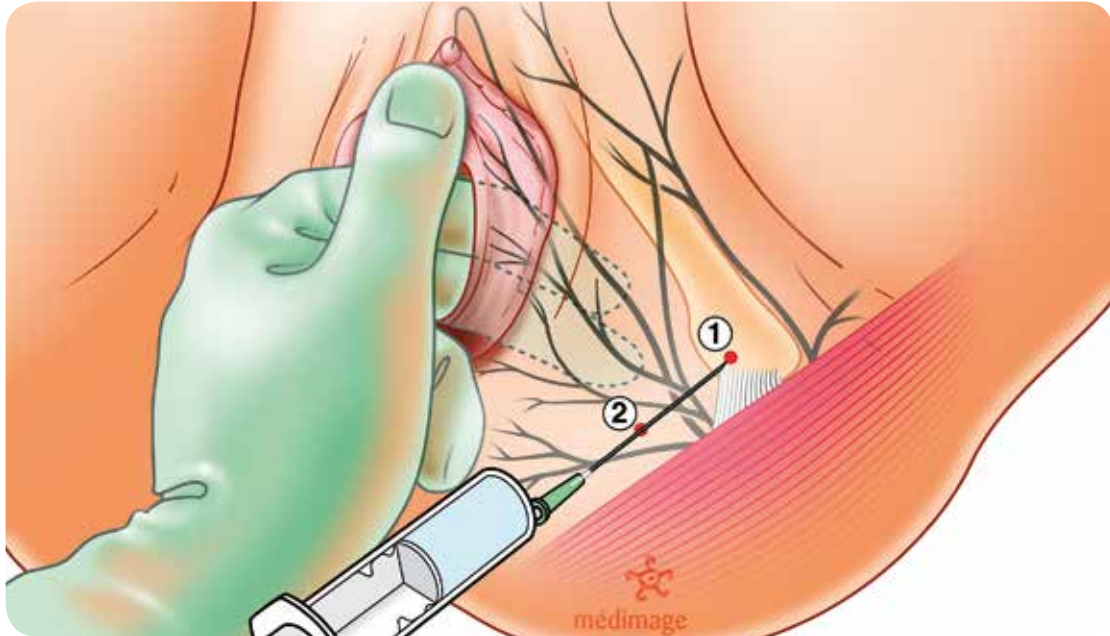
- ☑ While the immediate postoperative pain is extremely stressful for the patient
- ☑ The operation itself is also technically demanding, due to the narrow point of access through the vagina

For these reasons in the last few years developments have primarily focused on laparoscopic hysterectomy techniques in which bicoagulation is used for hemostasis.

The success of the new vaginal hysterectomy technique rests on three pillars of modern surgery, namely:

- ☑ Technical innovation through the introduction of the BiClamp for **thermal hemostasis**
- ☑ The introduction of a **multimodal anesthesia**, a combination of a conventional general anesthesia with a local anesthetic with a long-term effect
- ☑ And minimal **intraoperative trauma** to the tissue

Multimodal anesthesia



combines general anesthesia with a local anesthetic. This combination makes it possible to use a "light" general anesthesia. The local anesthetic with a long-term effect prevents postoperative pain and allows the patient to wake up pleasantly without experiencing pain from the operation.

THE LOCAL ANESTHETIC

For local anesthesia we combine a pudendal anesthetic with a paracervical block

The following solution is used for local anesthesia: 30 ml ropivacaine (Naropin®) 7.5 0/00, combined with clonidine (Catapressan®) at a ratio of 1 g/kg, to prolong the effect for period of at least 12 hours

For the **pudendal anesthetic** 10 ml of this solution are injected in the vicinity of the Alcock's canal on either side near the ischium, using a 100 mm long 22-G cannula with a 20-ml syringe. The needle is positioned 3 cm laterally to the vulva and in the direction of the inner side of the ischiadic tuber. Two fingers of the contralateral hand are placed in the vagina to control this procedure. Prior to injecting the anesthetic a brief aspiration is carried out with the tip of the syringe to ensure that no vessel has been punctured

For the **paracervical block** the remaining 10 ml are injected paracervically at the 5 o'clock and the 7 o'clock positions. This anesthesia covers the entire paracervical area of the hypogastric plexus. This injection is carried out submucosally; it has an additional beneficial vasoconstrictive effect (in contrast to Naropin®, which is used here, Xylocain® has a vasodilative effect)



GENERAL ANESTHESIA

General anesthesia is carried out using a laryngeal mask. The same medication is used as that used for small gynecological operative interventions.

- ☑ Propofol (Disoprivan®) is administered using an automatic, preprogrammed infusion pump for the intravenous concentrated administration of medications
- ☑ Remifentanyl (Ultiva®) is administered using a special automatic infusion pump

PREVENTION OF POSTOPERATIVE PAIN

In the first few hours after the intervention the patient can be given propacetamol (Perfalgan® 1g every 8 hours) and AINS (Ketoprofène® 100mg every 12 hours) as required. An anticipated suspension of the analgesic effect can be prevented by the administration of Di Antalvic®, the patient can take the medication herself as required. Normal nourishment can be resumed a few hours after the operation if the patient wishes. On discharge the patient can be given painkillers and anticoagulation preparations at her own request.

The operative technique



Positioning

THE PATIENT

The patient is placed in the dorsosacral position with a slightly elevated pelvis, the lower legs are fixed in stirrups.

- ☑ The pubic hair is **not** removed as the removal of pubic hair increases the risk of infection and the shaving of pubic hair is unpleasant for the patient
- ☑ The bladder is **not catheterized**: the patient should empty her bladder immediately prior to the operation. The catheterization of the bladder is the most common cause of nosocomial bladder infections and should therefore be avoided. In addition, due to the short duration of the operation, catheterization serves no purpose. Catheterization also poses an additional risk as injuries to the bladder may remain undetected

The skin is disinfected as usual with a Betaisodona solution, vaginal disinfection is carried out with Betaisodona or a similar disinfectant solution.

THE SURGEON

The surgeon is seated between the legs of the patient.

THE TWO ASSISTANTS

They stand on either side of the surgeon.

No scrub nurse is required to handle instruments since few instruments are used and the individual steps of the operation are fairly simple.



THE INSTRUMENT TABLE

Six basic instruments are laid out on the table:

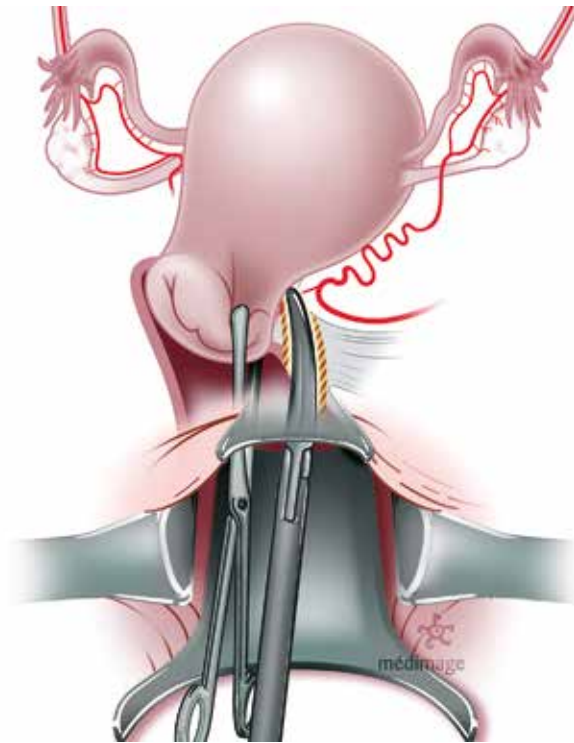
- one short-handled scalpel, no. 11 blade
- one small forceps, 18 cm
- one Mayo scissors, 16 cm
- one bullet forceps or one Museux forceps
- one needle forceps, 16 cm
- and one Bengolea-type forceps

as well as:

- one set of Breisky specula and one vaginal speculum
- the BiClamp
- one suction tube
- one vaginal tamponade
- 10 sponges
- the instruments for the local anesthetic
(two 20-ml injections, two long infiltration needles)

THE VIO GENERATOR

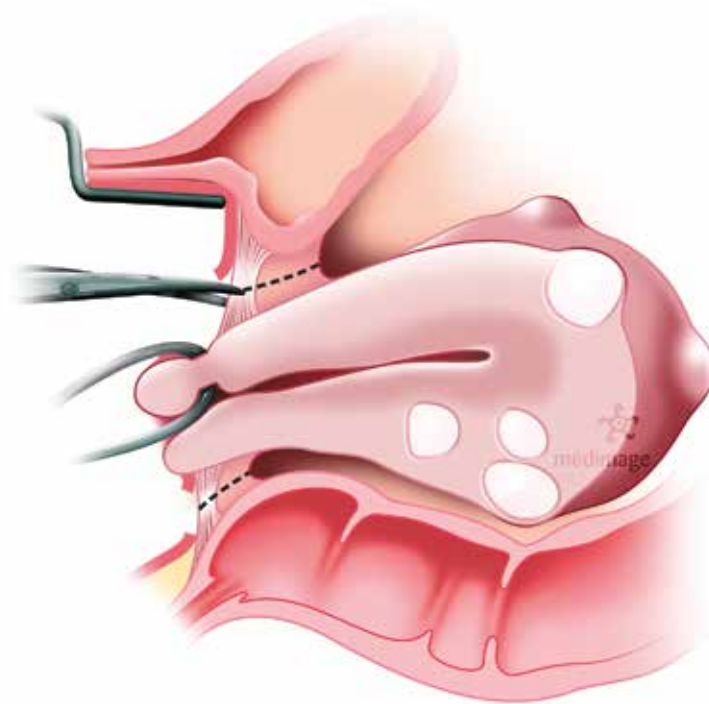
The generator should be positioned such that it is clearly visible to the surgeon, allowing him to monitor the changes in power output on the display. The volume of the alarm and the Auto Stop signal must be adjusted such that the signals can be heard clearly and unmistakably by the operating team.



General principle

This operative procedure follows the classical steps of conventional vaginal hysterectomy, however three new principles must be taken into account:

- 1 Only two other instruments are present in the vagina in addition to the specula**
 - the bullet forceps to properly fix the area which will require coagulation and
 - alternately either the BiClamp or the scissors
- 2 Hemostasis must always be carried out as close to the middle of the vaginal canal as possible; here it is important to make good use of the concave or convex shape of the instrument to ensure an optimal application of the BiClamp at the edge of the uterus. It may be necessary to carry out two coagulations with the BiClamp to ensure that the cut area is really dry.**
- 3 No traction should be used and there should be no attempt to pull out the uterus in order to work "outside" the vagina. This helps prevent postoperative pain and unwanted bleeding.**



Sequence of the operation

VAGINAL CIRCUMFERENTIAL CUT AROUND THE PORTIO

The operation commences with a circumferential incision around the cervix carried out with a sharp scalpel. It may be advisable to infuse 10 ml of an adrenalin solution at the beginning (1/4 mg in a 40-ml physiological infusion solution) to reduce bleeding in the frontal part of the vagina during the operation and to improve visibility.

- ☑ The bullet forceps are used to pull the cervix downwards, the anatomical forceps lift the edge of the front part of the vaginal wall, and the front speculum pushes the bladder in a ventral direction.

Now the bladder sulcus can be incised:

- not too high so as not to perforate the bladder
- not too low so as not to cut into the uterus

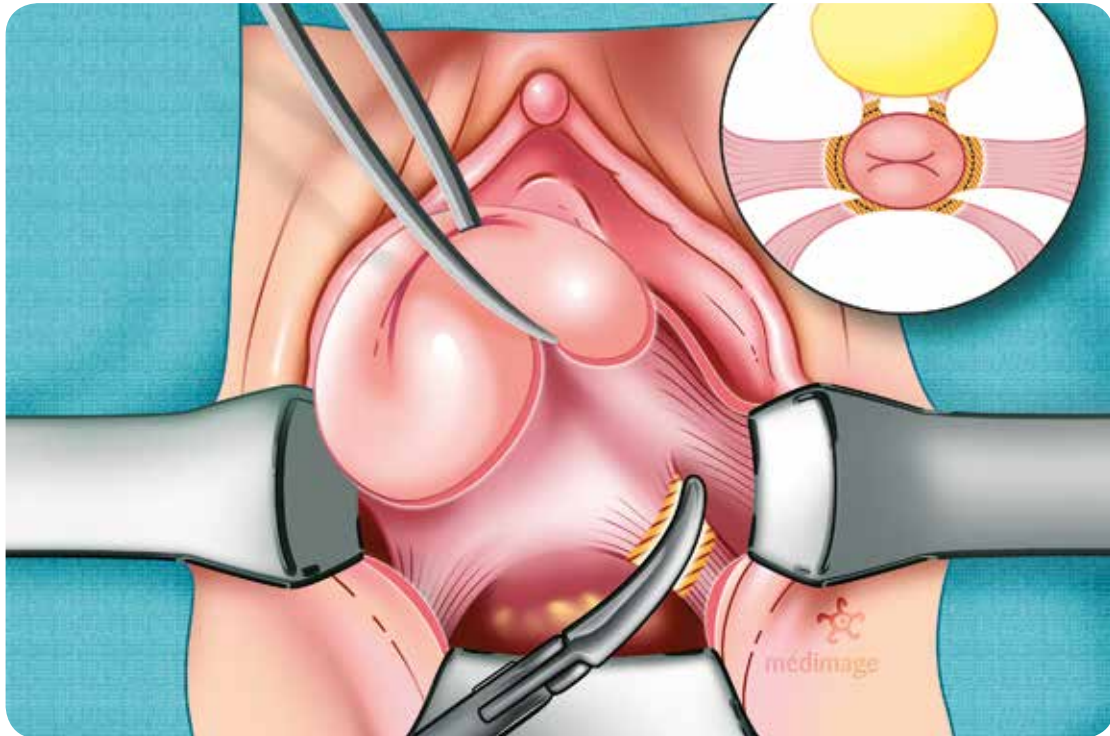
Using a narrow speculum, the posterior fornix of vagina is arranged so that there is a view of the sacrouterine arch and the caudal wall of the pouch of Douglas.

- ☑ The bullet forceps are positioned at the posterior lip of the cervical os and luxated ventrally. At the same time, using the claw forceps, the posterior vaginal edge of the incision is pulled dorsally. The pouch of Douglas is opened using scissors. If there are intestinal adhesions, these can now be prepared and detached.

Introduction of the self-locking speculum.

Palpation of the pericervical tissue using two fingers.

Sequence of the operation

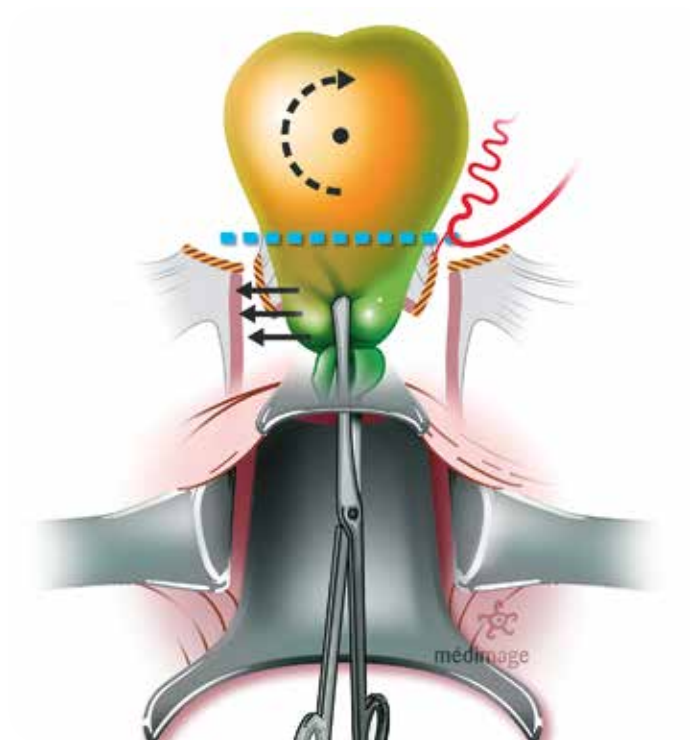


HEMOSTASIS AROUND THE CERVIX

- ☑ With the BiClamp the exposed structures of the parametria can be coagulated, either in one go or in smaller steps, and then severed with the scissors. The amputation of the sacrouterine ligaments in particular improves the mobility of the uterus.
- ☑ Manual palpation serves as an aid during the stepwise amputation of the cervix with the BiClamp.
- ☑ The cardinal ligaments and the columns of the bladder are severed very much caudally to the curve of the uterine arteries; it is important to ensure that the bladder is elevated using the front speculum
- ☑ At this stage it is simpler to open up the front of the peritoneum and to introduce a broader speculum under the bladder

*The technique is simple if the uterus is mobile.
If mobility of the uterus is restricted, then the
BiClamp offers an important advantage...*

...particularly if the paracervical tissue is very firm, very short or otherwise pulled out of place, or if the sacrouterine ligaments are located at the end of a narrow vagina.



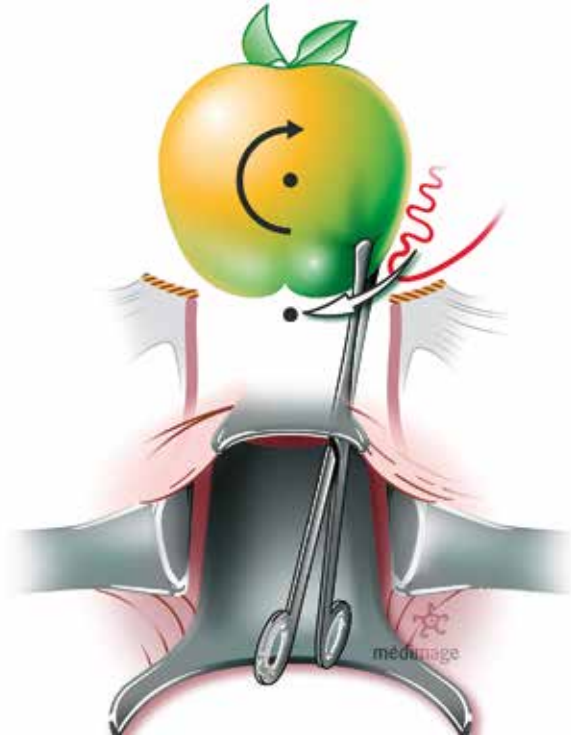
AMPUTATION OF THE CERVIX

If one does not pull the uterus or luxate it in front of the vulva, the cervix will be in the way of an operation carried out through the vagina.

A **pear-shaped uterus** is difficult to turn or to move sideways.

For this reason the cervix is amputated with a scalpel; this turns a "pear-shaped" uterus into an ...

Sequence of the operation



... "APPLE-SHAPED" UTERUS

Such a uterus has a rounder shape: it can be moved more easily and can be gradually turned without unnecessary pulling or traction.

"Cheek-to-cheek" surgery

It is very simple to apply the curved branches of the BiClamp to the concave or convex side of the uterus: so-called "cheek-to-cheek" surgery.

After the excision of the cervix a longette is placed in the pouch of Douglas:

- ☑ to protect the intestinal loops in this area from thermal hemostasis
- ☑ and to offer better visibility of the posterior operative area



HEMOSTASIS AND ADDITIONAL AMPUTATION OF THE UTERINE VESSELS

The bullet forceps are used to grasp the edge of the isthmus where coagulation and dissection should be carried out.

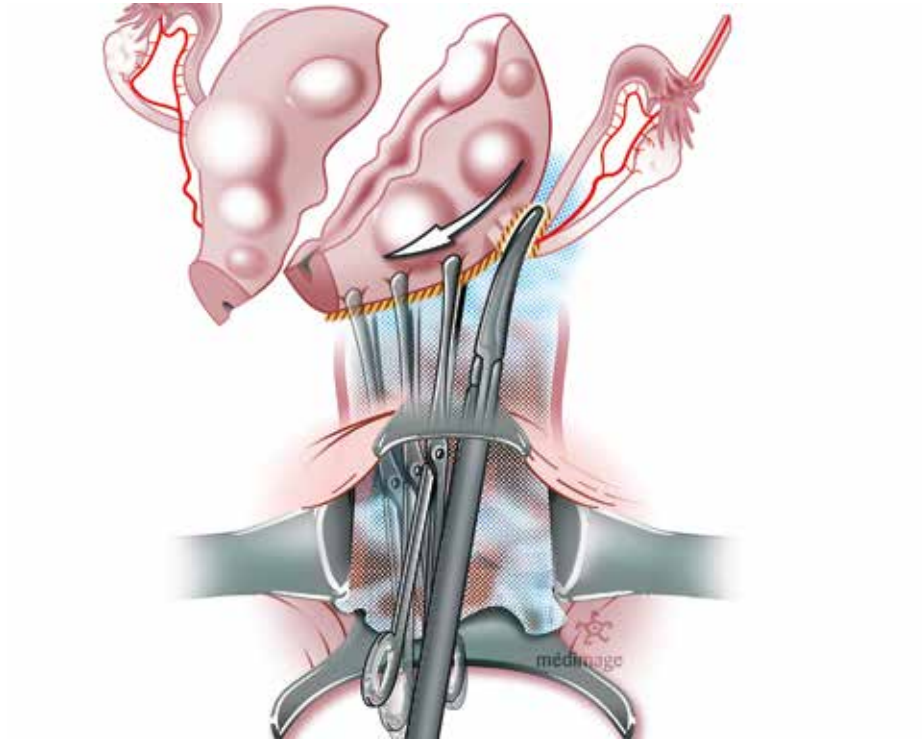
The forceps are used to pull the uterus slightly downwards. At the same time one of the assistants places a suitable speculum beneath the bladder, pushes it away ventrally and thereby distances the uterine artery from the ureter.

Using the BiClamp the branches of the uterine vessels are coagulated twice: one coagulation is placed next to the other. The coagulated area will turn white; the cut should not be made in the middle of this area, but with 1/3 of the coagulated area on the side of the uterus which will be removed and 2/3 on the side of the remaining uterine artery. It is not necessary to prepare the stalk of the vessel any further. Any further preparation or dissection could lead to bleeding. Afterwards the bullet forceps is used to grasp the contralateral side of the uterus to amputate the uterine vessels in the same manner.

This method differs from the classical technique with clamps and purse-string sutures or ligatures.

The BiClamp can then be placed in the axis of the vagina at the isthmus.

Sequence of the operation



AMPUTATION OF THE UTERUS AT THE ADNEXA

If the adnexa are to be left in place, then the end of the adnexa must be grasped directly where it is attached to the uterus and coagulated once or twice with the BiClamp, after which it can then be amputated with scissors.

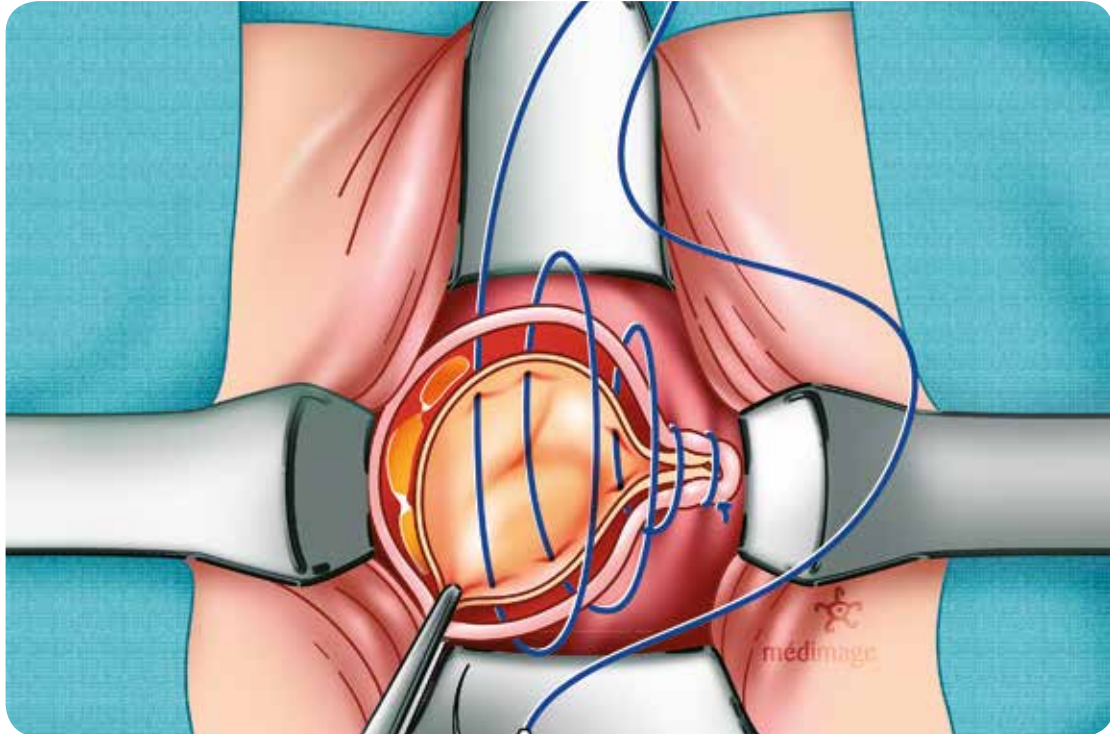
Depending on the anatomy it is possible to make use of either the concave or the convex shape of the instrument.

The adnexa are grasped at the upper part of the vagina.

It is not necessary to pull out the uterus or to tilt it to carry out hemostasis outside the vulva.

If necessary it is always possible to halve the uterus or morcellate it in order to reach the end of the adnexa without creating **any traction**.

It is important to ensure that the end of the BiClamp is always clearly visible and that the intestinal loops have been securely pushed up and back with gauze strips.



OCCLUSION OF THE VAGINAL STUMP

By this stage the uterus has already been removed, either in one piece or after morcellation.

The operative area must be inspected to ensure that all bleeding has ceased. For this the gauze strip is removed. If it shows extensive traces of blood then the source of the bleeding must be searched for.

In exceptional cases it may be necessary to carry out an additional or repeat coagulation of a small area. If necessary, fixation of the vagina can additionally be carried out.

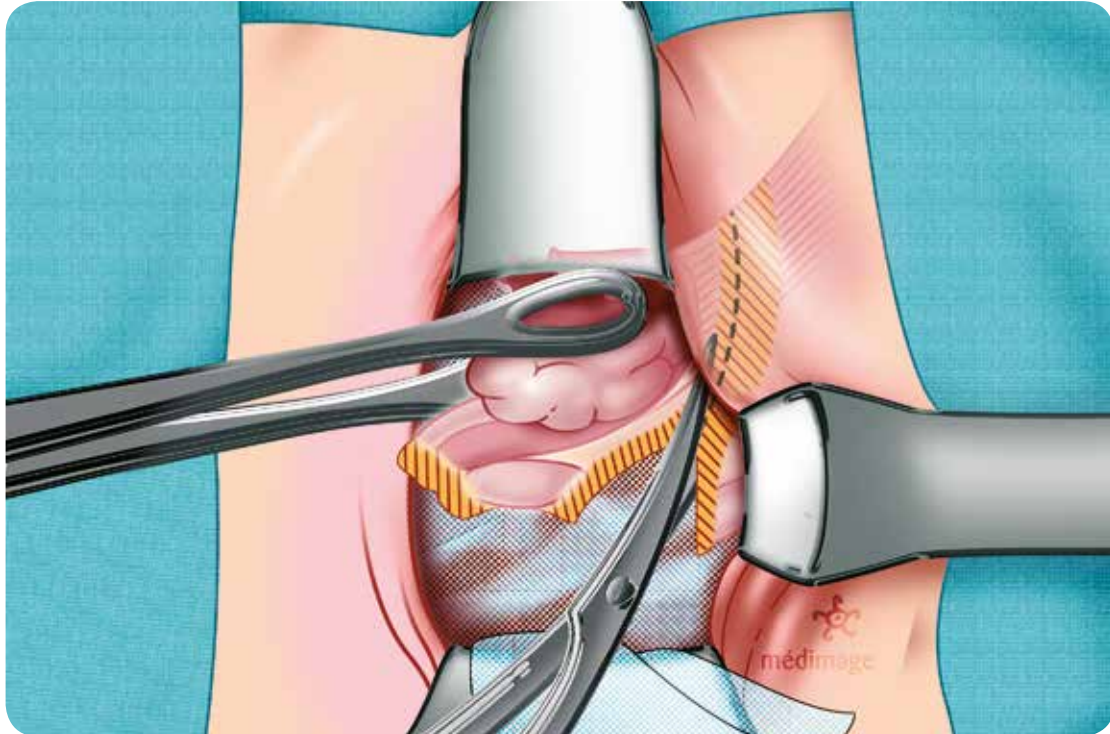
This is unproblematic, as with this technique all structures remain unchanged.

The vaginal occlusion is carried out using a single Monocryl 0 suture (only suture type required for this operation)

The suture joins both the dorsal and ventral vaginal walls as well as the ventral and the dorsal peritoneum to prevent bleeding in this interstice, which is otherwise a frequent occurrence.

- ☑ The knot of the Monocryl suture will have dissolved within 3 to 4 weeks.
- ☑ This will ensure that scarring at the vaginal stump remains soft, regular and without knots or thickening. This will allow **sexual activity to be resumed without pain**.

Sequence of the operation



ADNEXECTOMY PROCEDURES WITH THE BICLAMP

Vaginal adnexectomy:

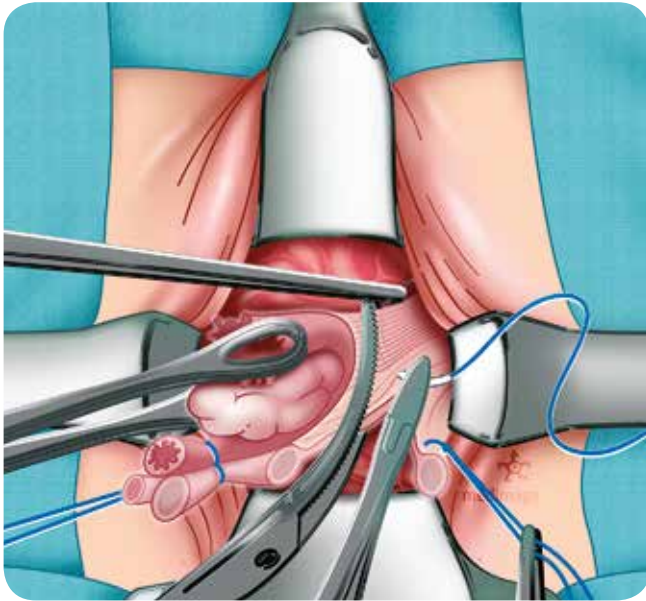
- ☑ This procedure can be carried out **more easily** with the BiClamp than with the classical technique
- ☑ Coagulation of the round ligament as close to the pelvic wall as possible is essential as a first step
- ☑ The bullet forceps are positioned at the uterine horn to distance it from the pelvic wall. The uterine horn, which is thereby positioned in the middle of the vagina, pushes back the infundibular pelvic ligament towards the pelvic wall
- ☑ The ovary and the ovarian tube are grasped with a fenestrated clamp
- ☑ The BiClamp is used to coagulate the infundibular pelvic ligament in one or two steps

It is important that the tip of the BiClamp always remains visible; it may be necessary to isolate it from **the intestinal loops with a longette**.

Vaginal adnexectomy procedures with the BiClamp

- ☑ Are safer than those using conventional ligatures, provided no traction is exerted during the procedure
- ☑ Due to the location of the infundibular pelvic ligament and the placing of the axis of the BiClamp in the middle of the axis of the vagina, the coagulation cut can also be carried out at an angle.

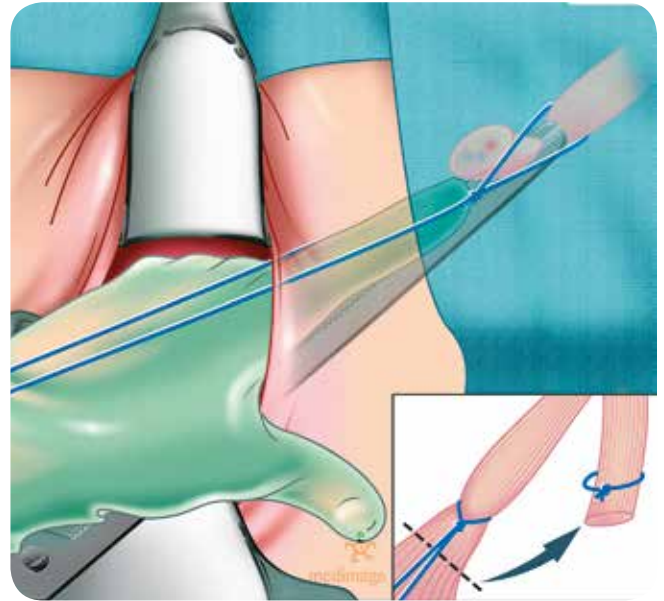
With the classical technique it is imperative that the ligature used for hemostasis is knotted at right angles to the axes of the vessels in order to prevent a decrease of hemostasis when the ligament retracts.



HEMISECTION OR MORCELLATION

With a large uterus or if the mobility of the uterus is restricted, it is easier to carry out hemisection or morcellation than with the classical technique: as there is no retrograde bleeding, the operative area remains clean and dry and visibility is good. It is important to avoid any unintentional or strong traction and any forcible pulling out of the uterus.

It is better to remove the uterus in several pieces than to forcibly extract it as this has a negative impact on postoperative pain and on hemostasis.



OTHER INTERVENTIONS

There is no reason why additional interventions which are indicated cannot be carried out

- Prolapse therapy
- the introduction of a mesh
- the treatment of incontinence
- the treatment of an ovarian cyst

Prevention of accidents

The prevention of burns must be a guiding principle for the surgeon.

Due to the simplicity of the technique and the similarity of the BiClamp to other commonly used coagulation forceps, mistakes or accidents may occur if a surgeon is unduly hasty.

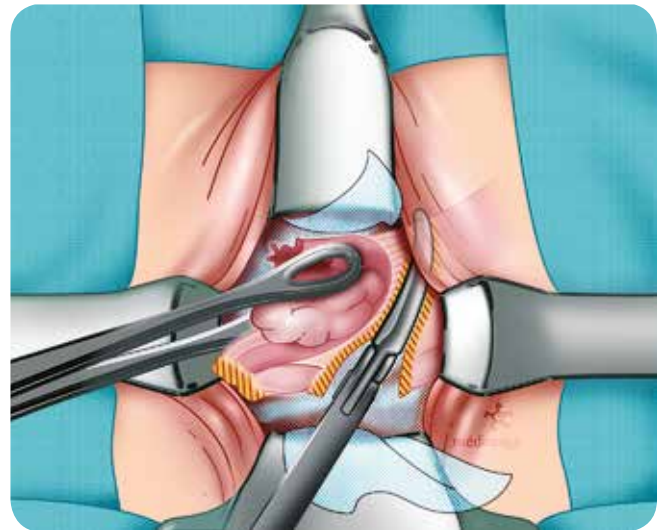


SKIN/MUCOSAL BURNS:

These are caused by prolonged contact of the forceps with the skin or vaginal wall. They are not electrical burns but are first-degree thermal burns (caused by the heating of the forceps during coagulation). They are a result of negligence on the part of the team which is used to placing a 45° forceps against the wall of the vagina in order to reach the ligaments and to place a suture.

Preventive measures include:

- ☑ Positioning the forceps as close as possible in the middle of the vagina
- ☑ Entrusting an assistant with the dual task of suctioning off the surgical smoke plume created during coagulation with the BiClamp and monitoring to ensure that the forceps do not touch the vaginal wall.



THERMAL NECROSES AT THE URETER

Every laparoscopic or vaginal hysterectomy procedure carries the risk of injuring the ureter, a serious complication of this procedure.

It is important to remember that the uterine artery must not be clamped as with the classical technique, because if the artery is grasped too far laterally, there is a very real danger of burns to the ureter with immediate or secondary effects.

If only one assistant is employed, this danger is greater.

THERMAL WOUNDS TO THE DIGESTIVE TRACT

These are created by the tip of the BiClamp coming into contact with an intestinal loop or with the wall of the colon during coagulation.

Preventive measures include:

- ☑ The use of a gauze strip to push away the intestinal loops and pad them, also ensuring better visibility of the operative area
- ☑ Constant direct visual monitoring during coagulation.



BLEEDING

Immediate bleeding

To prevent bleeding occurring immediately, it is necessary to be extremely conscientious when applying the instrument; it is particularly important to react to the "Auto Stop" signal. The flow of current should not be interrupted too early. If necessary, coagulation must be repeated to ensure that only properly white, dry and parchment-like tissue is severed.

In addition it is important to stick to an essential principle of electrosurgical procedures: namely, that no coagulation should be carried out in tissue which is under traction. If this precaution is not observed there is the risk that the tissue will tear before proper hemostasis has been achieved.

In endoscopic surgery we have learnt to adhere to these principles.

Secondary bleeding

This hemostasis procedure does not create any scabbing, so no secondary bleeding due to the sloughing off of scabs will occur.

Secondary bleeding can affect the vaginal incision and for this reason this cut must be carefully sutured using a hemostatic suture that will only dissolve very slowly.

Minimal Trauma

INFORMATION FOR PATIENTS

In general, hysterectomy procedures have a very bad reputation among the general public, sometimes even among gynecologists. It is therefore very important to explain to patients how the operation is carried out and what the results of the procedure will be.

The course of the operation, the reduction of pain and the decrease in impediments to daily activity and sexual activity should be particularly emphasized.

As reassurance and to prevent unnecessary fear the patient should receive a comprehensive brochure describing her stay in hospital and the sequence of events.

THE STAY IN HOSPITAL

Ideally the patient will come to the hospital on the day of the operation without having eaten. After a shower and after having emptied her bladder, she will be given premedication and wheeled into the operating room.

The patient will not be shaved, her bladder will not be catheterized and she will not be given an enema or clyster.

After the operation and a stay in the recovery room, the patient is brought to her room and as a precautionary measure she is given analgesics via an infusion. After the operation she can empty her bladder in the toilet as long as she is accompanied there. She will be given additional analgesics to use as necessary. Feeding may also be resumed on the same day as soon as the patient wishes to do so. The discharge from hospital can be planned for the day after the intervention after prior agreement with the patient.



THE VIO GENERATOR

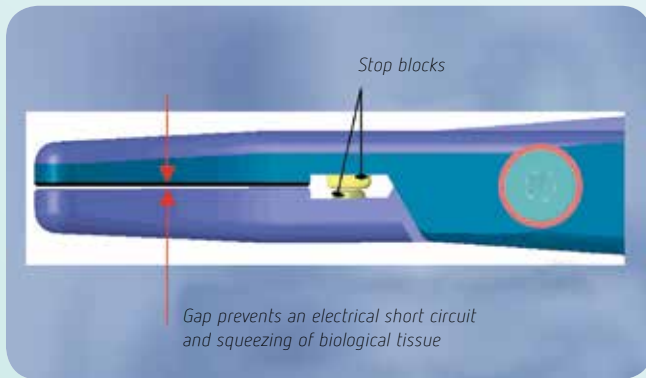
The progress made and the experience gained in the last few years in using high-frequency current means that safe hemostasis of large vessels is possible (7, 8, 9).

This generator (11) provides a high-frequency current with a higher peak amperage than that of classic bipolar current (4 Ampere). In addition, this current is modulated and pulsed; i.e. the variable energy depends on the change in impedance of the target tissue. This means that the heating of the tissue occurs in controlled dosages which helps prevent carbonization. No carbonization means no scabbing and therefore no danger of the dreaded sloughing off of scabs which occurs after conventional thermal hemostasis procedures.

This multifunctional HF generator has a large monitor and the different programs are easy to operate.

The programs can be stored individually according to the indication or to the operating physician. There is an "Auto Stop" function which discontinues the flow of current and indicates to the operating physician that the hemostasis procedure is now complete.

Thermal hemostasis



Design/Engineering of the BiClamp

THE BICLAMP



The sterilisable BiClamp is a sort of "Jean-Louis Faure" or "Heanly" forceps. It is handled in the same way so that it is not necessary to learn a new set of movements.

BiClamp allows larger tissue areas to be coagulated without it being necessary to dissect the different tissue structures.

Three elements are particularly important to prevent tissue structures from being crushed:

- ☑ The avoidance of a ratchet helps prevent the user from being tempted to completely close the mouthpiece of the forceps
- ☑ and the absence of a serrated mouthpiece can help to avoid the tearing of tissue during a flowing current recoil.

The forceps are available in different lengths.

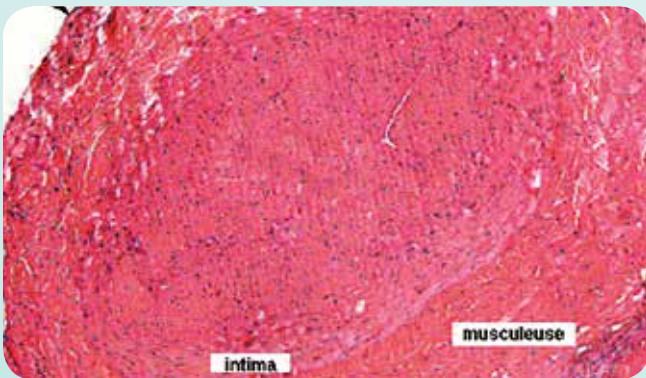
All forceps have an integrated electric system: the two branches of the forceps function like the two electrodes of a bipolar forceps.

The jaws of the forceps have a broad, smooth, steel coating; their surface varies depending on the respective model (130 to 250 mm²).

The smoothness of the coating offers an important advantage to users. It helps prevent the tissue from sticking to the forceps and thereby reduces the risk of carbonization.

The structure of the branches (corrugated, waffle-shaped) helps prevent the tissue from slipping away and offers a better purchase when the tissue is grasped but it also results in (12):

- ☑ a **stronger sticking effect** with the risk that when the instrument is retracted the coagulated area may tear
- ☑ a **greater degree of carbonization** which makes it more difficult to assess the extent of coagulation
- ☑ **increased thermal injury** to adjacent tissue with a concomitant risk of tissue trauma (artery, bladder).



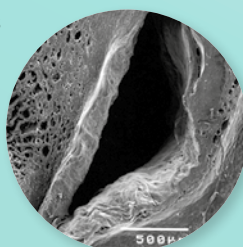
MODE OF OPERATION

A safe and definitive occlusion of vessels is created by the interaction of two different effects:

- ☑ mechanical: flattening and compression of the two sides of the vessel and displacement of the blood
- ☑ thermal: the thermal effect from one branch of the forceps to the other leads to an increase in temperature which results in:
 - **dehydration of tissue** which is recognizable by the white discoloration of the tissue and the generation of water vapor
 - **destruction of the proteins** and a melting of the collagen
 - The **hardening of the collagen** gives the vessels their final shape and occludes them.

The electronic (Prof. Nicaise) and optical (Dr. J-C Hammou) microscopy pictures made in the Centre Commun de Microscopie Appliquée (Center for Applied Microscopy) of the University of Nice Sophia Antipolis corroborate the durability of the three effects with thermal molding of the adventitia and muscular vessel walls and thermal fusion of the intima.

Clinically the tissue has a parchment-like coagulation surface. After severing with the scissors this area feels as though it were made of plastic.



IMPACT ON PAIN

Thermal hemostasis **reduces inflammatory and painful events**. The pedicles along the ligature are not crushed so that there is no tissue necrosis.

The **absence of necrotic tissue and foreign bodies** (sutures) results in a reduction of the resorption process and of phagocytosis. This has already been noted by physicians carrying out endoscopic surgery who have been using bipolar coagulation for hysterectomy procedures since many years.

R. K. Purohit noted a decrease in the amount of analgesics required in 88% of cases if the vaginal hysterectomy was carried out with laparoscopic bipolar forceps (25).

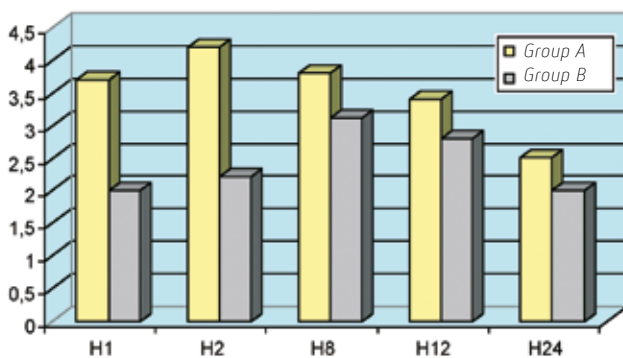
In a short comparative series W. Zubke was also able to confirm this distinct decrease in the amount of analgesic medications required when using the BiClamp (26).

Our results

This technique was first used in March 2002. It has since been developed further and subjected to a continual assessment and provides the basis for the description given in this brochure.

The results are based on a study with 150 patients operated on between March 2002 and July 2004 by the same physician and using the same anesthetic technique.

Intensity of
0 to 10
B.E.V.A



Comparative randomized study of both operative techniques

THE PAIN

During a randomized comparative study the pain experienced was particularly studied (2).

On the first day the visual analog assessment (EVA) lessened from 38 to 25 ($P < 0.05$) and confirmed the clinical impression of the nursing staff.

The quest for "zero tolerance" with respect to pain is only possible in a clinical environment in which the avoidance of unnecessary trauma is given highest priority.

Thus the **reduction of pain** is the result of:

- Good psychological preparation of the patient prior to the intervention
- The multimodal anesthesia
- The non-aggressive operative technique with no forcible pulling of the pedicles and the ligaments
- And finally, the principle of ensuring hemostasis through thermofusion and without ligatures.

REDUCTION OF MORPHINE

The prevention of postoperative pain using a long-term local anesthetic results in a **substantial decrease in the use of opiates and thereby also avoids side-effects**. It could be shown that a substantial part of the postoperative discomfort experienced, such as nausea, vomiting, urine retention, are more due to the administration of morphine than a result of the operative intervention itself.

	A (Control group) (n = 25)	B (BiClamp®+ALR) (n = 25)	
EVA/J1	38 +/- 9	25 +/- 10	$p < 0.05$
Morphine administration (T1) (mg/24 h)	21.6 +/- 6.8	0	$p < 0.0001$
Side-effects:			$p < 0.05$
nausea	4	1	
vomiting	3		
retention of urine	4		
tiredness	1		

Comparative randomized study of both operative techniques

DURATION OF THE HOSPITAL STAY

This innovative technique allows the hysterectomy procedure to be carried out on a purely outpatient basis, particularly in favorable cases (small mobile uterus, well-adjusted psychological profile, no additional stress, favorable social conditions).

Hospital stays of less than 24 hours account for more than 85% of our indications, although patients may extend the duration of their stay if they so wish.

Mean weight of the fibromatous uteri (g)	355	(40 – 900)
Duration of operation (50 last patients)	30 min	(12 – 80)
Hospitalization period: (50 last patients)		
– Out-patient < à 12 h	6	(12 %)
– < 24 h	37	(74 %)
– Discharge on 2nd day	4	(8 %)
– Discharge on 3rd day	3	(6 %)

DURATION OF THE PROCEDURE

A thermal hemostasis procedure may sometimes appear to take rather long, particularly if the operating physician carries out the hemostasis twice.

In fact, thermal hemostasis consists of only three steps compared to the six steps necessary for classical hemostasis with sutures, which requires switching between numerous instruments.

Thermal hemostasis of both edges of the pedicles prevents a flowing back of blood, so that the suctioning off of blood and frequent swabbing with compresses is avoided.

The **visibility at the operative area** is also **better**, which shortens the duration of the intervention.

THERMAL HEMOSTASIS	CLASSICAL HEMOSTASIS WITH SUTURES
1 Positioning of the BiClamp	1 Positioning of the hemostasis forceps
2 Removal of the BiClamp after the generator has shut down automatically	2 Severing of the pedicle using scissors
3 Cutting with scissors when working with the combination 1/3 – 2/3	3 Placing of the suture with a needle holder
	4 Knotting
	5 Removal of the forceps
	6 Cutting of the suture with scissors

Conclusion

Vaginal hysterectomy procedures using the BiClamp are:

- ☑ **Simpler**
- ☑ **Safer**
- ☑ **Quicker**
- ☑ **And more cost-effective**

than classical vaginal hysterectomy procedures.

For the patients this technique represents substantial progress with respect to the pain experienced, so that the acceptance of the intervention is higher leading to a better quality of life.

Nevertheless, as with every new surgical technique, it does require:

- ☑ **A minimal learning process**
- ☑ **Knowledge about potential incidents and accidents**
- ☑ **Specialized knowledge about this hemostasis procedure**

This innovation can be expected to motivate the team of surgeon and anesthesiologist to extend this new paradigm to other pathological indications and situations.

Literature

- 1 – CNAM: données du PMSI 2000.
- 2 – Clavé H, Niccolai P. Hystérectomie sans douleurs: une technique innovante. *J Gynecol Obstet Biol Reprod* 2003; 32: 375–380
- 3 – Wallwiener D, Becker S. Perspectives in gynecologic surgery: past, present and future. *Gynecol Surg* 2004; 1: 63–65
- 4 – Chauveaud A, de Tayrac R, Gervaise A, Anquetil C, Fernandez H. Total hysterectomies for a non prolapsed benign uterus in women without vaginal deliveries. *J Reprod Med* 2002; 47: 4–8
- 5 – Boukerrou M, Lambaudie E, Narducci F, Crepin G, Cosson M. Hystérectomie pour lésions bénignes: Quelle place reste-t-il à la voie abdominale? *J Gynecol Obstet Biol Reprod* 2001; 30 (6): 584–9
- 6 – Martin X, Gjata A, Golfier F, Raudrant D. Hystérectomie pour lésions bénignes: La voie vaginale peut-elle être utilisée dans tous les cas? *J Gynecol Obstet Biol Reprod* 1999; 28 (2): 124–30
- 7 – Sigel B, Dunn MR. The mechanisms of blood vessel closure by high frequency electrocoagulation. *Surg Gynecol Obstet* 1965; 121: 823–831
- 8 – Kennedy JS, Stranahan PL, Taylor KD, Chandler KO. High burst strength, feedback controlled bipolar vessel sealing. *Surg Endosc* 1998; 12: 876–878
- 9 – Peterson SL, Stranahan PL, Schmaltz D, Mihaichuk C, Cosgriff N. Comparison of healing process following ligation with sutures and bipolar vessel sealing. *Surgical Technology International* (1999)
- 10 – Richter S, Kollmar O, Schilling MK, Pistoriul GS. Histomorphological analysis of bipolar energy for vessel sealing (in press)
- 11 – Erbe Elektromedizin GmbH.
Waldhoernlestraße 17, D 72072 Tuebingen
- 12 – Richter S, Kollmar O, Schilling MK, Pistoriul GS. Evaluation study: Erbe BiClamp® vs Valleylab Ligature™ (in press)
- 13 – Cosson M, Querleu D, Dargent D. *Traité de chirurgie vaginale* 2003. Masson, Paris
- 14 – Dargent D, Querleu D, Plante M, Reynolds K. Vaginal and laparoscopic vaginal surgery 2004; Taylor and Francis Editor, London
- 15 – O'Neal MG, Beste T, Shackelford DP. Utility of preemptive local analgesia in vaginal hysterectomy. *Am J Obst Gynecol* 2003; 189 (6): 1539–1541
- 16 – Kehlet H. Acute pain control and accelerated postoperative surgical recovery. *Surg Clin North Am* 1999; 79: 431–443
- 17 – Ottesen M, Sorensen M, Rasmussen Y, Smidt-Jensen S, Kehlet H, Ottesen B. Fast track vaginal surgery. *Acta Obstet. Gynecol. Scand.* 2002; 81 (2): 138–46
- 18 – Kehlet H. Multimodal approach to control postoperative pathophysiology and rehabilitation. *Br J Anaesth* 1997; 78: 606–617
- 19 – Kehlet H, Morgensen T. Hospital stay of 2 days after open sigmoidectomy with a multimodal rehabilitation programme. *Br J Surg* 1999; 86: 227–230
- 20 – Capdevilla X, Barthelet Y, Biboulet P, Ryckewaert Y, Rubenowitch J, d'Athis F. Effect of perioperative analgesic technique on surgical outcome and duration of rehabilitation after major knee surgery. *Anesthesiology* 1999; 91: 8–15
- 21 – Dieudonne N, Gomola A, Bonnichon P, Ozier Y. Prevention of postoperative pain after thyroid surgery: a double-blind randomized study of bilateral superficial cervical plexus blocks. *Anesth analg* 2001; 92: 1536–1542
- 22 – Viel E, Ripart J, Eledjam JJ. L'analgésie postopératoire: améliore-t-elle la récupération fonctionnelle? Evaluation et traitement de la douleur 2000; 67–77 Editions scientifiques et médicales Elsevier SAS et SFAR
- 23 – Jugnet N, Cosson M, Wattiez A, Donnez J, Buick V, Mage G, Querleu D. Comparing vaginal and coelioscopic total or subtotal hysterectomies: prospective multicentre study including 82 patients. *Gynaecological Endoscopy* 2001; 10: 315–321
- 24 – Miskry T, Magos A. Randomized, prospective, double blind comparison of abdominal and vaginal hysterectomy in women without uterovaginal prolapse. *Acta Obstet Gynecol* 2003; 82: 351–358
- 25 – Purohit RK, Pattnaik KK. Vaginal hysterectomy by electrosurgery (an extraperitoneal approach). *J Obstet Gynecol India* 2001; 51(5): 162–164
- 26 – Zubke W, Becker S, Kramer B, Wallwiener D. Vaginal hysterectomy: a new approach using bicoagulation forceps. *Gynecol Surg* (2004) 1:179–182
- 27 – Easton K, Read MD, Woodman NM. Influence of early discharge after hysterectomy on patient outcome and GP workloads. *Br J Obstet Gynaecol* 2003; 23 (3): 271–275
- 28 – Conditions du développement de la chirurgie ambulatoire. Programme National Inter Régime de l'Assurance Maladie 25/09/2003 (ameli.fr/pdf/1047.pdf)
- 29 – Clavé H, Baar H, Niccolai P. Painless vaginal hysterectomy with thermal hemostasis (result of a series of 152 cases) DOI:10.1007/s10397-005-0112-x on <http://www.springerlink.com>



Henri Clavé
Doctor of medicine,
former resident faculty physician
for anatomy, gynecologic surgeon
– Saint-George Clinic in Nice

Harald Baar
Doctor of medicine,
degree holder of the University of
Würzburg, anesthesiologist –
Saint-Antoine Clinic in Nice

Jean Claude Hammou
Doctor of medicine,
doctor for anatomopathology –
Laboratory for Anatomopathology
in Nice

Patrick Niccolai
Doctor of medicine,
anesthesiologist, Department of
Anesthesia and Intensive Medicine
– CHPG Monaco