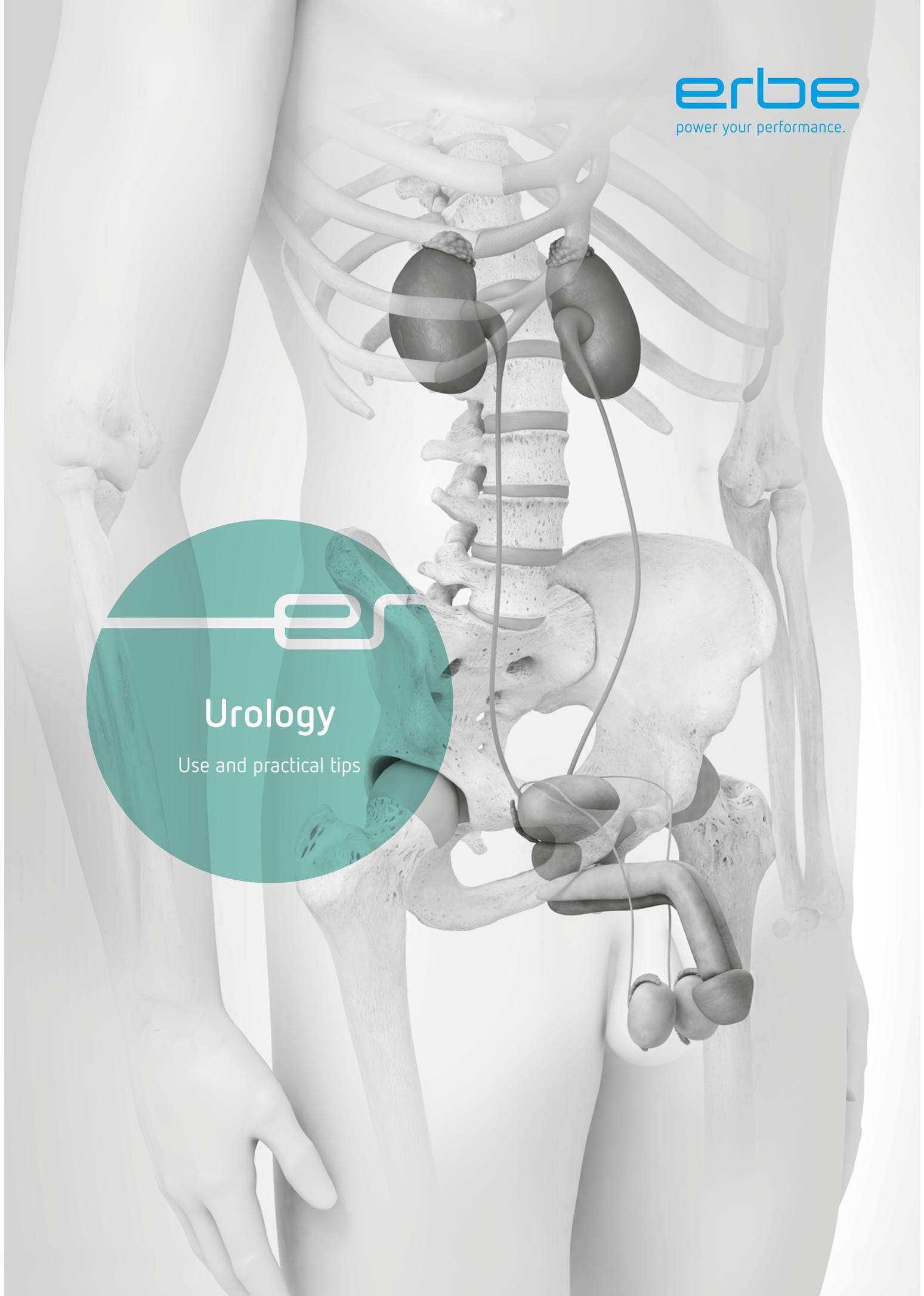




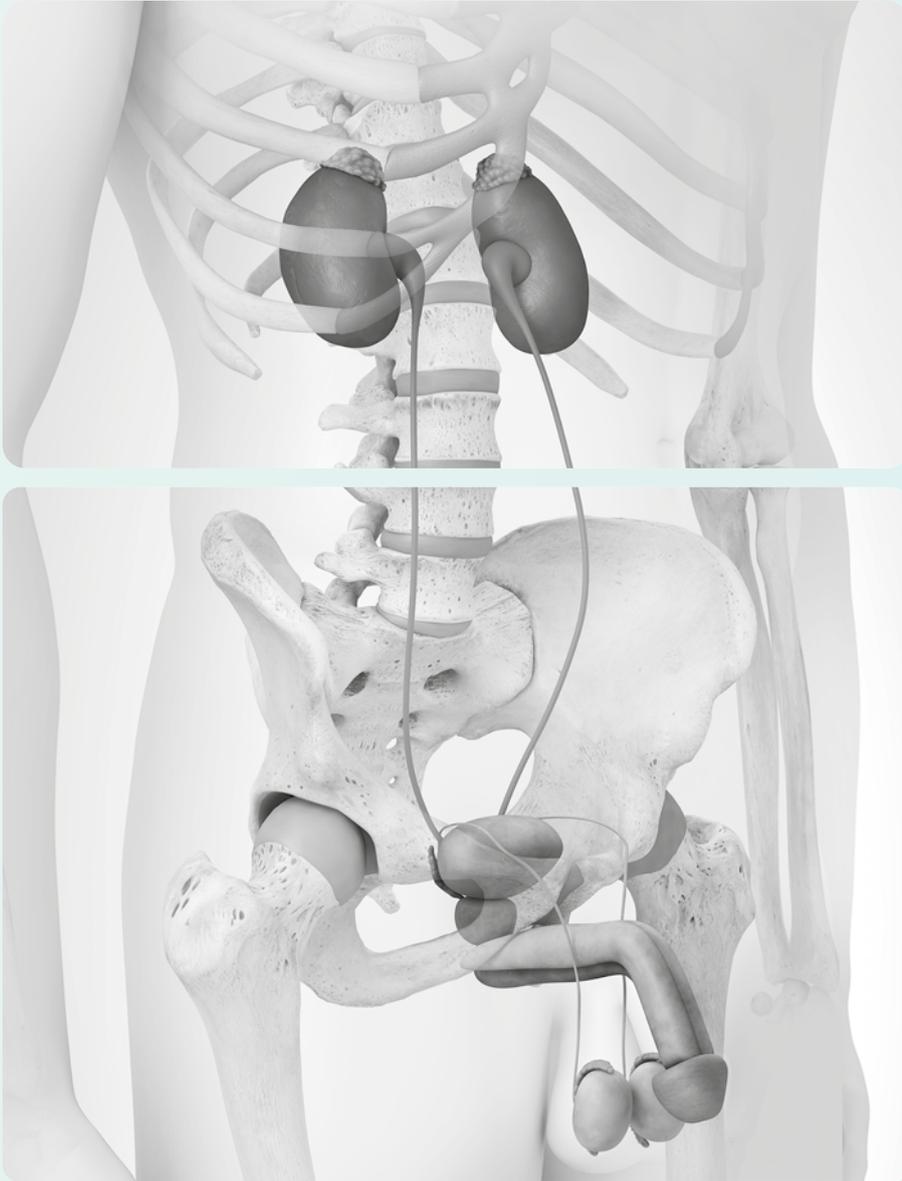
**Urology**  
Use and practical tips





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*Classification into the upper and lower urinary tract was also adopted for the applications from page 20.*

*Electrosurgery plays an important role in urology, making a crucial contribution to the therapeutic success of the different procedures.*

The range of electrosurgical applications extends from open, laparoscopic surgery through to endoscopic procedures. It comprises all areas of the upper and lower urinary tract. The upper urinary tract includes the kidneys, adrenal glands and the ureters. The lower urinary tract is comprised of the prostate, bladder and urethra.

There are a variety of instruments available to the urologist for this range of applications. Instruments are provided with electrosurgical modes by the OR modules of the urology workstation. The tissue effects of these modes are cutting and coagulation, vessel sealing and devitalization. The Hydrosurgery unit supports urological applications. Vessels can be selectively and gently exposed, and tissue layers separated and elevated.

Using this brochure, we would like to provide you with helpful information and recommendations which will permit you to make the most of electrosurgery and hydrosurgery in urology.

# Urology workstation

The fully equipped version of the urology workstation consists of the electrosurgical unit (VIO® 300 D), units for argon plasma coagulation (APC 2) and hydrosurgery (ERBEJET® 2), as well as an ESM 2 unit for the suction of secretions.

It is optimized for use in urology in terms of its software, hardware and modules, as well as a large choice of instruments. The functions of the individual modules are described in the chapters on cutting and coagulation modes (from page 12) and on applications (from page 20).

A urologist can use the electrosurgical units and instruments to perform open, laparoscopic and endoscopic surgery. Electrosurgery allows cutting without the application of force, effective coagulation and vessel sealing as well as devitalization of the target tissue throughout the urinary tract. Argon plasma coagulation, a special form of electrosurgery, staunches bleeding evenly and devitalizes tissue lesions without the instrument coming into direct contact with the tissue. Hydrosurgery is used to dissect tissue while at the same time protecting vessels and nerves. Layers can also be separated and detached from one another.

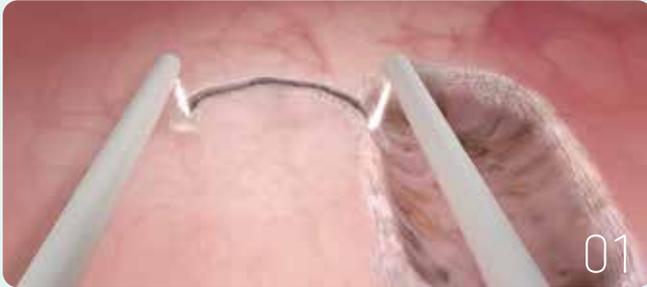
*Urology workstation with units for electrosurgery, plasmasurgery, hydrosurgery, suction module*

- 01 VIO® 300 D
- 02 Bipolar resection adapter
- 03 APC 2
- 04 ERBEJET® 2
- 05 ESM 2



## Tissue effects

# Electrosurgery technique



*Cutting tissue in a case of transurethral resection of the prostate TUR-P*



*Devitalization of a tissue layer using APC*



*Bipolar forceps coagulation of a tissue surface*



*Reliable vessel closure with BiCision®*

---

### CUTTING 01

---

At voltages of 200 V or more, sparks are created between the active electrode and the tissue. In the cutting modes, electrical energy gives rise to temperatures of 100° C or higher. Intracellular and extracellular fluids vaporize so quickly that the cell membranes and cell layers rupture and; the result is cutting of the tissue.

---

### COAGULATION 02

---

Coagulation current is used to staunch bleeding. Converting electrical energy into heat results in temperatures of 60 °C to 100 °C during coagulation. As the cytoplasm vaporizes, the tissue dries out and shrinks. Coagulation can also be used to mark a tumor with a radial safety margin.

---

### DEVITALIZATION 03

---

APC or conventional electrosurgery is used to devitalize the tissue surface. At temperatures of 50–60°C or above and with a corresponding activation time, the damage to the tissue is irreversible.

---

### VESSEL SEALING 04

---

Sealing reliably closes vessels and tissue bundles. The target tissue can then be dissected mechanically. Vessel sealing is increasingly replacing the use of clips and sutures.

# Hydrosurgery

---

## THERMAL EFFECTS ON BIOLOGICAL TISSUE

---

37–40°C

None

From ~ 40°C

### Hyperthermia

Initial tissue damage, edema formation, depending on the duration of application, the tissue can recover or die (devitalization)

From ~ 60°C

### Devitalization

of the cells, shrinkage of the connective tissue through denaturation with simultaneous hemostasis

~ 100°C

### Coagulation/Desiccation

Vaporization of the tissue fluid, depending on the speed of vaporization:

→ Tissue shrinkage and tumor reduction through desiccation (drying out)

or

→ Cutting due to mechanical tearing of the tissue

From ~ 150°C

### Carbonization

The tissue burns and turns black

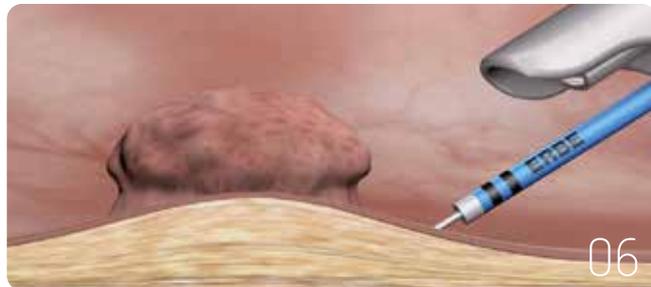
From ~ 300°C

### Vaporization

Tissue vaporizes due to extreme heat



*Selective parenchyma dissection that protects vessels*



*Elevation of the mucosa in the bladder*

---

## DISSECTION AND EXPOSURE USING THE WATERJET 05

---

Using the waterjet, tissue structures are selectively and gently dissected and exposed. Blood vessels and nerves remain intact until a certain pressure is reached. Vessels are then treated in accordance with their size.

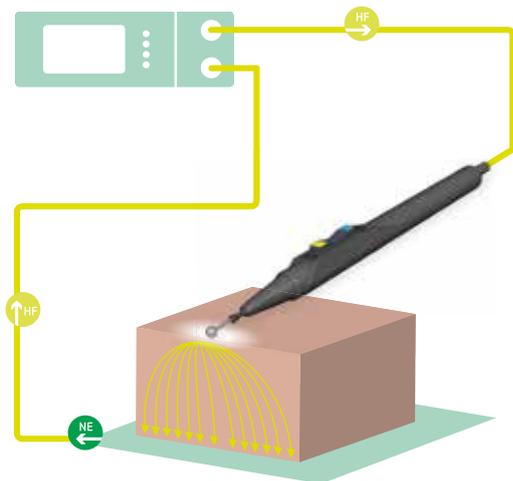
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## ELEVATION AND SEPARATION USING THE WATERJET 06

---

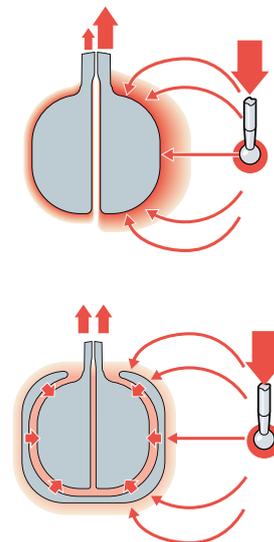
Waterjet elevation can be used to create fluid cushions in the tissue. Anatomical layers can also be separated from one another.

# Electrosurgical procedures



01

*Circuit for monopolar electrosurgery*



02

↑ High current density on the side closest to the operating field in the case of an incorrectly positioned conventional return electrode

↓ Distribution of current without a localized increase in temperature with NESSY® Ω, which can be positioned in any direction

## MONOPOLAR TECHNIQUE

01

In monopolar electrosurgery, high-frequency current ( $I_{HF}$ ) flows in a closed loop from the unit to the instrument, then through the patient's body to the return electrode, and from there back to the unit again. The surgical effect is produced at the tip of the active electrode (AE), which, due to its relatively small contact surface, is where the highest current density is reached. The second electrode, the return electrode, has a large surface area and is placed against the patient's skin at an appropriate location to allow the current to discharge.

At the points of application, the high current density and resulting thermal effect generate an incision or coagulation. By contrast, the increase in temperature on the large surface of the return electrode is not significant due to the low current density.

### Safety in monopolar electrosurgery

Both components – the NESSY® return electrode safety system of the VIO® 300 D and the Erbe NESSY® Ω return electrode – reduce the safety risks involved in monopolar electrosurgery in urology.

NESSY® verifies whether the two-piece return electrode has been positioned correctly and whether its entire surface is in contact with the patient, and also continually compares the currents flowing through the two surfaces of the return electrode.

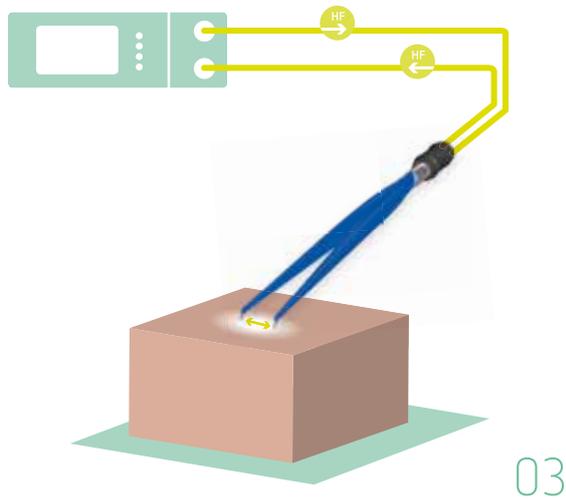
If there are only slight differences, activation is possible. If there are major differences, activation is interrupted a warning signal is sounded. Reactivation is not possible until the return electrode has been correctly positioned. This prevents thermal necrosis.

### Simple and safe application with NESSY® Ω

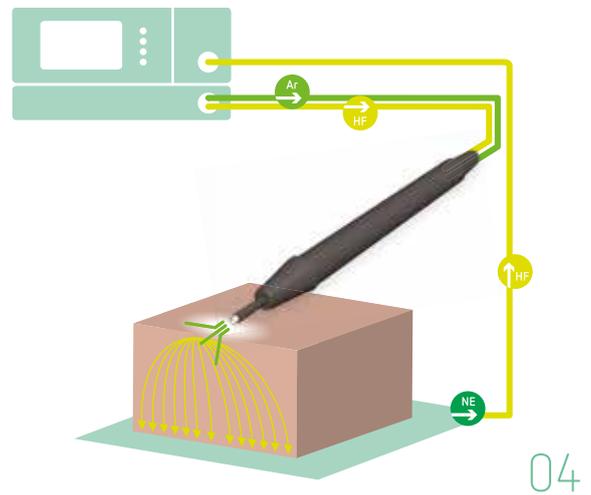
The NESSY® Ω return electrode is equipped with a non-contact ring surface that surrounds the actual electrode surface. The equipotential ring distributes the current evenly across the inner contact surfaces and prevents the return electrode from heating up on one side (leading-edge effect). This means it can be positioned in any direction. Compared with conventional return electrodes, NESSY® Ω (Fig. 02 ↑ and ↓) simplifies positioning and therefore enhances safety. As it is smaller than conventional electrodes, NESSY® Ω is easier to position against the patient's body, making it universally suitable for children and adults alike.

We recommend using NESSY® Ω – for maximum safety in monopolar electrosurgery.

Further information on monopolar electrosurgery is provided in the "Information on safe use" chapter.



*Circuit for bipolar electrocautery*



*Circuit for monopolar APC technique*

## BIPOLAR TECHNIQUE

03

The advantage of the bipolar technique is that the flow of current to the target area between each pole is limited. Unlike monopolar electrocautery, this protects sensitive structures such as nerves that are located within the flow of current between the operating field and the return electrode against inadvertent thermal damage.

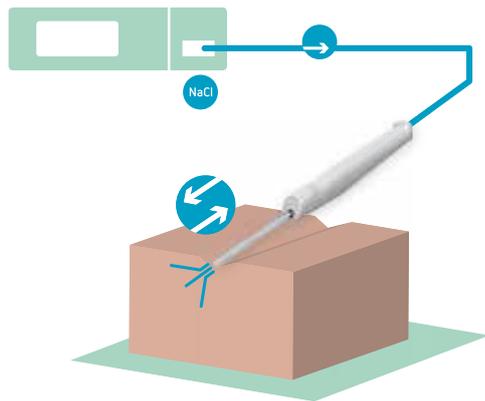
Bipolar electrocautery instruments have two integrated active electrodes. Current flows only in the area of tissue between the two poles and not through the patient's body. The bipolar technique does not require the use of a return electrode.

## ARGON PLASMA COAGULATION (APC)

In APC, ionized argon gas conducts the current to the target tissue without contact between the instrument and the tissue.

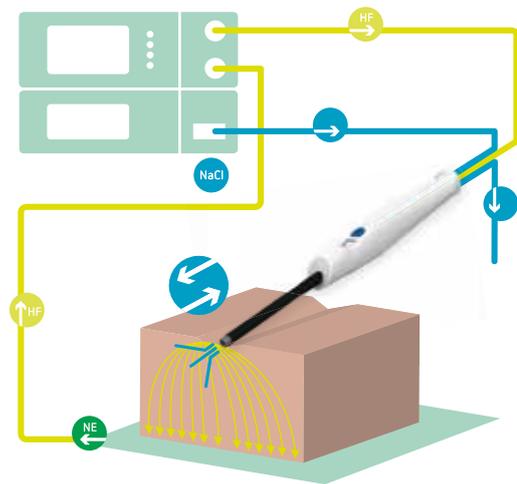
The procedure has few complications, reliably staunches bleeding, and facilitates homogeneous surface coagulation with an adjustable penetration depth. Because it is a non-contact procedure, the advantage of APC is that the distal end of the instrument cannot adhere to the coagulated tissue and tear open the scab that has just formed. The tissue effect depends on the type of probe, the power setting, the APC mode and the duration of application.

# Waterjet procedures



05

*Principle of hydrosurgery*



06

*Principle of hydrosurgery with a combined monopolar circuit and monopolar applicator*

---

## WATERJET DISSECTION

05

The waterjet dissects tissue using finely adjustable pressure according to the varying firmness and elastic properties of the tissue. The parenchyma is fragmented; blood vessels and nerves are retained in this procedure and can be treated in a targeted fashion. In addition to separating the vessels, the expansion effect of the waterjet is used to detach the tissue layers.

For urology procedures users have a choice of instruments for open, laparoscopic and endoscopic surgery.

The effect levels can be set between 1 to 80. The waterjet meets the tissue; the separation medium is aspirated together with the tissue particles through the external lumen of the applicator.

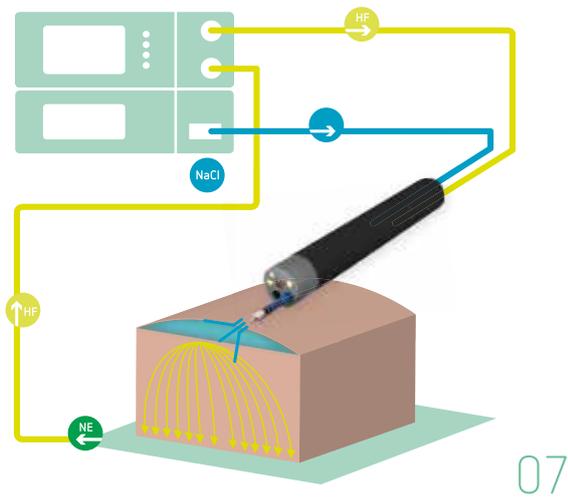
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## WATERJET DISSECTION WITH ELECTROSURGERY

06

Using the monopolar electrosurgical applicator, both surgical techniques can be used at the same time. In partial kidney resection, the waterjet dissects the parenchyma. Blood vessels are retained and are treated simultaneously with coagulation current or alternately. Larger vessels are ligated using clips or sutures.

The diagram shows the monopolar current flowing in a closed loop from the unit to the applicator, then through the patient's body to the return electrode, and from there back to the unit. The separation medium also flows from the ERBEJET® 2 pump unit through the waterjet nozzle of the applicator and meets the target tissue. The tissue is fragmented and aspirated through the external lumen of the applicator together with the separation medium.



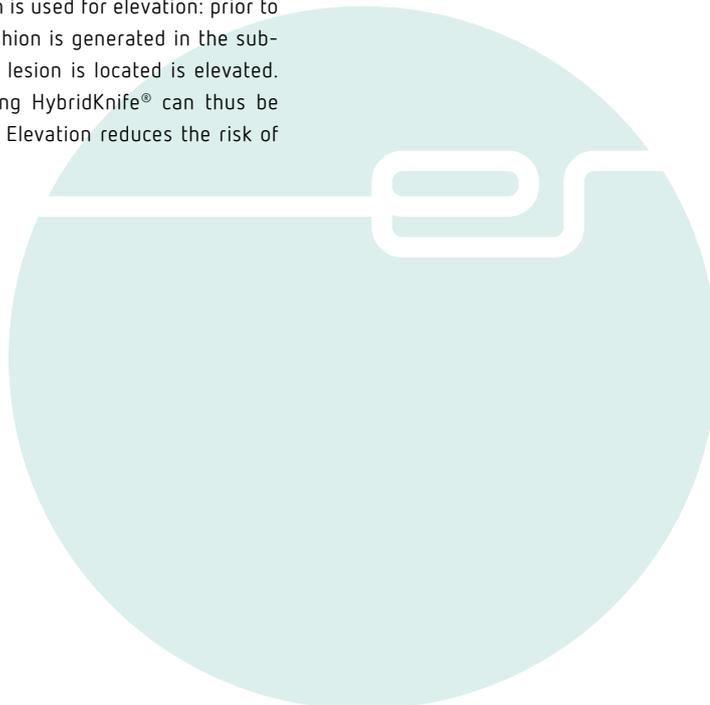
*Principle of electrosurgery with a combined monopolar circuit using HybridKnife®*

---

## WATERJET ELEVATION WITH ELECTROSURGERY 07

---

With HybridKnife®, the waterjet function is used for elevation: prior to resection of bladder tumors, a fluid cushion is generated in the submucosa so that the mucosa where the lesion is located is elevated. Subsequent electrosurgical cutting using HybridKnife® can thus be performed at a defined resection level. Elevation reduces the risk of perforation.



## Cutting and coagulation modes

# Monopolar



*AUTO CUT®, the standard mode in urology*



*DRY CUT® cuts with a significant level of hemostasis*



*HIGH CUT for cutting with a high level of hemostasis*



*SOFT COAG® coagulates gently for deep tissue penetration without adhesion*

---

### AUTO CUT® 01

---

This is the standard mode for cutting with reproducible cutting quality as well as minimum necrosis, for example in subcutaneous tissue. This mode permits clean, precise cutting with hemostasis to protect tissue, as well as effective histological evaluation of the resected tissue. AUTO CUT® can be used in almost any urological procedure, such as monopolar TUR-B, for example.

---

### HIGH CUT 02

---

This mode is suitable for cutting in adipose structures or under water. Due to the high level of hemostasis at the margins of the incision, HIGH CUT is particularly suited to cutting vascular tissue. This mode is distinguished by a sharp incision. The arc intensity is controlled during cutting, so that hemostasis is enabled during all phases of the cut, for example in TUR-P procedures.

---

### DRY CUT® 03

---

This cutting mode offers a significant level of hemostasis with voltage control and modulated forms of current, for example for cutting highly vascular tissue.

In urology, DRY CUT® is suitable for TUR-P. This mode is generally suited to surgical procedures requiring a significant level of hemostasis, for example when accessing and exposing organs.

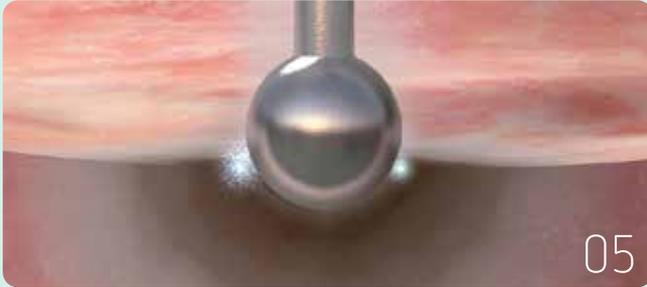
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### SOFT COAG® 04

---

SOFT COAG® is a gentle, conventional mode of coagulation for deep tissue penetration. It minimizes adhesion between the electrode and the coagulated tissue.

This mode is mainly used in urology for hemostasis of parenchymal bleeding in partial kidney resection.



*FORCED COAG®*, the standard coagulation mode in urology



*FORCED APC®* for deep coagulation and effective devitalization



*SWIFT COAG®*, the mode for coagulation and exposure



*PRECISE APC*, finely adjustable coagulation and devitalization

---

**FORCED COAG®** 05

---

This mode provides fast and effective standard coagulation with medium thermal penetration. Due to the slight carbonization, the instrument may adhere to the tissue. In urology, FORCED COAG® is used as the standard mode in almost all cases where hemostasis is required.

---

**SWIFT COAG®** 06

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This mode offers effective and fast coagulation with a significant level of hemostasis that is also suitable for targeted, precise exposure, e.g. in cystectomies.

---

**FORCED APC®** 07

---

This mode of plasmasurgery delivers high energy to the target tissue. FORCED APC® provides deep coagulation and effective, even devitalization.

In the case of partial kidney resection or in other vascular tissue, parenchymal bleeding is staunched using FORCED APC® and the resection bed devitalized.

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**PRECISE APC** 08

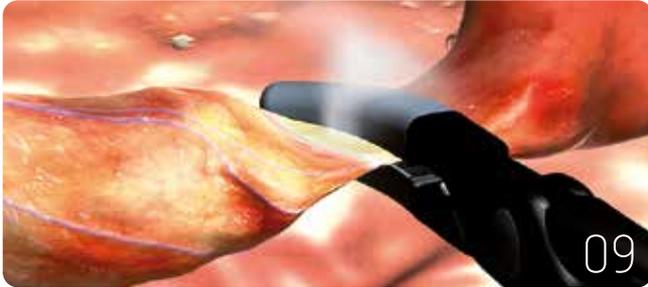
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Unlike FORCED APC®, PRECISE APC works at lower energy ranges. This allows uniform coagulation effects to be precisely adjusted in the target tissue, regardless of the distance between the probe and the tissue.

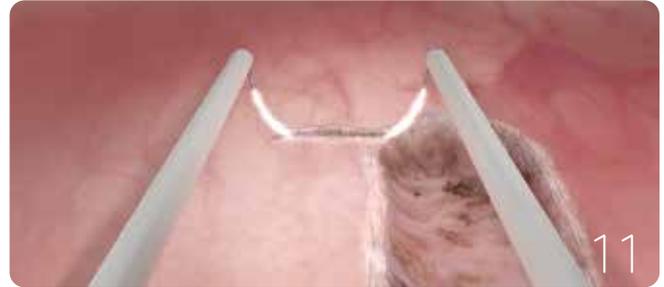
With PRECISE APC, precancerous conditions or other changes in tissue in the external genital area are devitalized.

# Cutting and coagulation modes

## Bipolar



*BiClamp® mode seals vessels and tissue*



*BIPOLAR CUT++ is the mode for bipolar TUR*



*BIPOLAR CUT is used for incisions*



*BIPOLAR SOFT COAG for forceps coagulation*

---

### BICLAMP® 09

---

BiClamp® mode supports the BiClamp® and BiCision® instruments with a form of current that seals vessels of up to 7 mm diameter.\* Generally, neither clips nor sutures are required.

BiClamp® mode is suitable for vessel sealing in laparoscopic or open procedures. Examples: cystectomy, prostatectomy, lymphadenectomy or partial nephrectomy (to seal the distinct collateral vessels of the kidney).

---

### BIPOLAR CUT 10

---

BIPOLAR CUT is suitable for cutting with reproducible cutting quality and minimum necrosis. This mode generates precise cutting with hemostasis to protect tissue. This mode can be used in urology, for example to open the renal capsule.

---

### BIPOLAR CUT++ 11

---

This mode is distinguished by fast, controlled arc formation with immediate incision and low energy input. It is used in saline during bipolar TUR. The controlled arc intensity ensures reliable hemostasis during resection.

---

### BIPOLAR SOFT COAG 12

---

This mode is the standard mode for reliable coagulation using the bipolar forceps or laparoscopic clamp.



*BIPOLAR SOFT COAG++ is the mode for surface coagulation in TUR procedures*

---

**BIPOLAR SOFT COAG++**

**13**

This mode creates a reliable coagulation in bipolar resection. BIPOLAR SOFT COAG++ is used in saline in TUR procedures where plasma should not be formed on the snare.

# Instruments

For urological procedures, we recommend the instruments listed on both double pages. In addition to these application-specific products, standard instruments are also used in urology that are not described individually or in detail here. These include monopolar electrodes of varying lengths and shapes such as ball, spatula, needle or snare electrodes, as well as PREMIUM forceps of varying lengths and shaft shapes, and forceps tips. All Erbe instruments are listed in our accessories catalog.



01

Open-surgery BiClamp® 280  
with anatomically-curved jaw



02

BiClamp® Kelly LAP forceps with curved jaw

## BICLAMP®

01



BiClamp® allows vessels of up to 7 mm diameter to be sealed\* so that clips and sutures are generally not required. BiClamp® instruments are available in various lengths and jaw shapes. In urology, BiClamp® 280 is used, for example in open prostatectomies or to seal renal tumor vessels.

All BiClamp® instruments are reusable. The thermal capacity of the jaws is low, reducing the risk of thermal injury to adjacent structures. The BiClamp® instrument is operated using the BiClamp® mode of the VIO® 300 D electro-surgical unit.

## BICLAMP® LAP FORCEPS

02

### BICLAMP® KELLY LAP FORCEPS



The BiClamp® Kelly LAP forceps feature a specially curved jaw. As well as sealing vessels, they are also suitable for coagulation at selected locations and mechanical exposure.

They are suitable for the exposure of lymphatic tissue along the vessels and for blunt exposure or sealing of smaller vessels.



03

*BiCision®, the multifunctional instrument*



05

*Bipolar LAP forceps with fenestrated jaws*



04

*Bipolar BiSect scissors*



06

*Bipolar Metzenbaum E-LAP scissors*

## BICISION®

03



Vessel sealing and dissection are the two primary functions of this instrument. In addition, the BiCision® can also be used to expose, coagulate and grip tissue.

The shell-shaped jaw offers a larger sealing zone than other instruments with a 5 mm shaft that feature a comparable jaw geometry. As a result of the low thermal capacity and the minimal coagulation seam, adjacent structures (for example nerves) are protected<sup>2</sup>. The cutting length of 18.5 mm allows work to be carried out quickly, for example to expose organs. The BiCision® is operated using the BiClamp® mode of VIO® 300D.

## BIPOLAR LAP FORCEPS

05



Tissue is held firmly thanks to the grooved gripping surface. In addition to the precise electro-surgical coagulation of vessels and structures, the Bipolar LAP forceps are also suitable for blunt exposure. The twin mechanism opens the jaws evenly and grips the tissue with even contact pressure.

## BIPOLAR METZENBAUM LAP SCISSORS

06



This bipolar cutting instrument with a 5 mm shaft and a shaft length of 340 mm results in superior mechanical cutting. In combination with BIPO-LAR SOFT COAG, gentle coagulation is achieved and the jaws of the instrument are protected.

This instrument is also available with an ERGO handle that reduces operator fatigue during surgery.

## BIPOLAR BISECT SCISSORS

04



The bipolar scissors support a variety of applications in open surgery. During mechanical cutting, the tissue is electro-surgically coagulated at the same time. The appropriate form of current with VIO® 300 D is BIPOLAR SOFT COAG mode, for example for full exposure of the kidneys.

## MONOPOLAR SCISSORS



This monopolar cutting instrument is primarily used for resection in sensitive structures with low vascularity. The monopolar scissors can, for example, be used for ureteroneocystostomy.

© Richard Wolf GmbH

# Instruments



07

*The hook electrode for blunt or electrosurgical exposure*



09

*APC applicator for open and laparoscopic surgery*



08

*The needle electrode can be set to 4 cutting depths*



10

*APC applicator for open and laparoscopic procedures*

## HOOK ELECTRODE

07



The monopolar hook electrode is used in urology, for example for adhesiolysis of tissue structures as well as for general exposure.

## APC APPLICATOR

09



With the open-surgery APC applicator, resection surfaces are evenly coagulated, for example following partial kidney resection. The laparoscopic APC applicator is mainly used in urology for coagulation of large resection areas, as in partial kidney resection.

## NEEDLE ELECTRODE

08



With this instrument, the tip of the needle can be extended in 4 stages, allowing the cutting depth to be regulated. Adjustments are performed using the handle. The bipolar needle electrode is available in two shaft lengths, for standard laparoscopy with 320 mm and for bariatric surgery with a length of 480 mm.

## APC applicator

10



This single-use instrument has five integrated functions. Contactless APC as well as cutting and coagulation, each with or without argon gas. In partial nephrectomy, the resection surfaces of the external renal parenchyma can be coagulated homogeneously and over a large area using the APC function.



11

*Open-surgery applicator for hydrosurgery*



13

*HybridKnife® Type I, including handle and connecting cable  
(Type Q, Type T, no illustration)*



12

*Applicator, straight, with monopolar electrosurgical function*



14

*Resectoscope for TUR  
(with the kind permission of: Karl Storz GmbH)*

**APPLICATOR, CURVED TIP**

11



The curved distal end of the waterjet applicator is particularly suited for the exposure of the prostate. Laparoscopic waterjet applicators are also available for laparoscopic prostatectomy (no illustrations).

**HYBRIDKNIFE®**

13



HybridKnife® is used in urology for the resection of bladder tumors.<sup>7,8</sup> Electrosurgery and waterjet functions are integrated in the instrument. All 4 steps, marking of the bladder carcinoma, mucosa elevation, incision / dissection as well as hemostasis are performed using just one instrument.

**APPLICATOR, STRAIGHT WITH MONOPOLAR ELECTROSURGICAL FUNCTION**

12



This applicator features an integrated electrosurgical and waterjet function. During selective dissection, for example of kidney parenchyma, the fully exposed blood vessels are coagulated and separated using COAG current. Both functions can be used simultaneously or alternately.

**RESECTOSCOPE**

14



Monopolar and bipolar resectoscopes are available for transurethral resection in the prostate or bladder.

# Applications in the upper urinary tract

## Kidney and ureter

### NEPHRECTOMY

- ☑ In this procedure, the kidney is completely removed, where necessary together with the adrenal gland. A nephrectomy is often indicated in oncological disorders or following trauma.

### NEPHROURETERECTOMY

- ☑ The ureter is removed at the same time as the kidney because of oncological necessity, or in a non-functional kidney with reflux.

### PARTIAL NEPHRECTOMY

- ☑ In partial kidney resection, only part of the kidney is removed if it is possible or necessary to retain part of the kidney. This procedure is generally performed to treat oncological disorders (Fig. 01).

### ADRENALECTOMY

- ☑ The adrenal gland is removed in primary adrenal gland disorders, depending on the size and hormonal activity. It is also removed in a nephrectomy procedures.

### PYELOPLASTY

- ☑ In this procedure, surgical reconstruction of the renal pelvis is carried out, for example due to ureteropelvic junction obstruction or following partial kidney resection as a result of a tumor.

### URETERONEOCYSTOSTOMY

- ☑ A ureteroneocystostomy is carried out for vesicoureteral reflux and ureteral strictures and injuries to the ureter.

## Open surgical access

The skin incision can be made electrosurgically using a needle electrode and AUTO CUT® mode. In order to locate the renal bed, the individual muscle layers are separated. A spatula or knife electrode and the AUTO CUT® cutting mode are suitable for this with hemostasis to protect tissue. The reduction in carbonization has a positive impact on post operative wound healing.

In the case of highly vascular and less sensitive tissue, DRY CUT® can also be used to achieve greater hemostasis. Any subsequent bleeding is directly coagulated using the spatula or knife electrode with FORCED COAG® or SWIFT COAG® – smaller bleeding vessels are treated with the bipolar forceps.

Once the renal fascia has been opened, the kidney, adrenal gland and adjacent structures can be fully exposed and mobilized using BiClamp® 280 and BiSect bipolar scissors. Due to effective thermofusion, ligature and clip are not generally required.

In these procedures, the target organ is then removed:

- Nephrectomy
- Nephroureterectomy
- Adrenalectomy

### Additional steps in

#### PARTIAL NEPHRECTOMY

01, 02

Once the organ has been exposed, the renal capsule can be opened using the bipolar needle electrode (Fig. 01). The advantage is that the cutting depth can be set on the instrument and thus regulated.

The waterjet function of the straight monopolar applicator is used for selective dissection of the kidney parenchyma. Where required, the exposed vessels are coagulated and separated using the electrosurgical function of the applicator (with SWIFT COAG®). Due to the low levels of blood loss, ischemia, or temporary clamping of the renal vessels, is often not required. The resulting advantages: surgery time is reduced as exposure of the renal hilum is not required. By avoiding ischemia, healthy residual kidney tissue is protected.

Contact coagulation can be performed either at individual locations of the resection bed using the ball electrode (SOFT COAG® mode), or the surface can be treated using argon plasma coagulation (FORCED APC®).

The APC is a non-contact instrument, which is why there is no risk of previously coagulated tissue tearing open again. APC coagulation is homogenous and the procedure can be carried out without pauses.

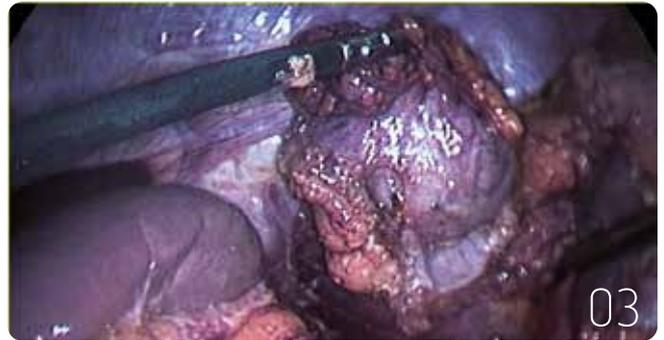
*Additional instruments for these applications as well as proven user settings are provided in the overview tables from page 29*



Partial nephrectomy (open surgery)



Partial nephrectomy with BiCision®



Laparoscopic adrenalectomy

## Laparoscopic access

Using the trocars, the organ is exposed and mobilized using BiCision®, or alternatively using a BiClamp® LAP forceps or a bipolar LAP forceps. The thermofusion instruments also facilitate effective mechanical exposure. BiCision® offers effective vessel sealing with an integrated cutting function as well as optimum staunching of bleeding (Fig. 02). Alternatively, the bipolar Metzenbaum LAP scissors can be used to perform exposure. They offer a mechanical cutting function, combined with bipolar coagulation.

The organ can then be mobilized and resected using the laparoscopic hook electrode and the SWIFT COAG® or AUTO CUT® modes.

*In these procedures, the structures of the kidney can be fully exposed using BiCision® and sealed at the same time:*

### NEPHRECTOMY, NEPHROURETERECTOMY, PARTIAL NEPHRECTOMY

Exposure of the central renal hilum is simplified using the curved applicator (waterjet). This allows the blood vessels that supply the resection area of the kidney to be detected and then clamped in a targeted fashion.

Thanks to this technique, known as zero ischemia, the healthy surrounding kidney tissue continues to be supplied with blood. In a partial nephrectomy, the kidney can be opened using the bipolar needle electrode. The cutting depth can be regulated and is adjusted using the handle of the instrument.

#### Additional steps in

### ADRENALECTOMY

03

Using the mechanical function of the BiCision® instrument, the adrenal gland is fully exposed. Alternatively, a bipolar LAP forceps and a monopolar scissors can be used. The enlarged blood vessels of the tumor can also be quickly and reliably sealed using BiCision®.

The minimal coagulation seam of the BiCision® jaw is an advantage, particularly when sealing near vulnerable structures.

In laparoscopic approaches, the VIO® system supports robot-assisted surgery with DaVinci.

#### Additional steps in

### PYELOPLASTY/URETERONEOCYSTOSTOMY

Following incision and blunt mobilization of the colon, the renal pelvis and sensitive polar vessels are exposed. As hemostasis is of primary importance, we recommend using the SWIFT COAG® mode in combination with monopolar scissors.

AUTO CUT® is the mode best suited for exposure of the ureter, as it reduces the risk of thermal necrosis and perforations, and as a result, of subsequent stenoses in the ureter.

The anatomically-shaped jaw of the BiClamp® Kelly LAP forceps simplifies the exposure of vessels. Smaller vessels can be exposed bluntly, larger vessels sealed.

## Applications in the lower urinary tract

# Prostate, bladder and urethra

### RADICAL PROSTATECTOMY

- ☑ The aim of prostate removal is the therapeutic treatment of a prostate carcinoma. How radical this procedure is depends on the tumor stage as well as the patient's age and prognosis. This also determines whether surgery can be carried out in such a way that nerves are protected.

### CYSTECTOMY (WITH A NEOBLADDER)

- ☑ The bladder is generally removed in the case of bladder tumors that have infiltrated the muscle. There are several options for diverting urine. A neobladder can, for example, be created as a replacement from a piece of the small intestine. It takes over the reservoir function of the bladder. A prerequisite for this is that both the urethra and the sphincter are tumor-free and can be retained.



*Open-surgery prostatectomy*

## Open approach

The skin incision can be made electrosurgically using a needle electrode and the AUTO CUT® mode. In order to locate the operative site, the individual muscle layers are separated. A spatula or knife electrode with the AUTO CUT® cutting mode are suitable for this, in particular as hemostasis is tissue-sparing. The reduced carbonization has a positive impact on post operative wound healing.

In highly vascular and less sensitive tissue, DRY CUT® can also be used to achieve greater hemostasis. Any subsequent bleeding is directly coagulated using the spatula or knife electrode with FORCED COAG® or SWIFT COAG® – smaller bleeding vessels can be treated with the bipolar forceps.

Following exposure, the target organ can be fully exposed and mobilized using BiClamp® 280 and BiSect bipolar scissors (**Fig. 04**). Thanks to effective vessel sealing, ligatures and clips are not generally required.

*Additional instruments for these applications as well as proven user settings are provided in the overview tables from page 29*



*Prostatectomy using the waterjet*



*Cystectomy using BiClamp® 280*

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## PROSTATECTOMY

05

Using the hydrosurgery applicator, the anatomical structures can be detached from one another using gentle mechanical pressure.

Once the capsule has been opened, the glandular tissue is bluntly separated and the exposed vessels are effectively sealed using BiClamp® 280. Due to the length of the instrument and the anatomically-adapted shape of the jaws, sealing can be performed close to the capsule.

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## CYSTECTOMY

06

BiClamp® 280 allows uterovesical ligaments to be quickly and effectively resected. Once the bladder has been removed, the section of small intestine used for the urinary diversion can be quickly exposed with minimal bleeding assisted by the anatomically-adapted jaw of the BiClamp® 280.

## Applications in the lower urinary tract

# Prostate, bladder and urethra

### LYMPHADENECTOMY

- ☑ The aim of this procedure is to diagnose the occurrence and extent of any lymphatic metastasis and to additionally remove pathological lymphatic tissue.

## Laparoscopic access

Using the trocars, the target tissue is exposed and mobilized using BiCision®, or alternatively using a BiClamp® LAP forceps or a bipolar LAP forceps. The thermofusion instruments also facilitate effective mechanical exposure. BiCision® offers reliable vessel sealing with an integrated cutting function as well as optimum staunching of bleeding. Alternatively, the bipolar Metzenbaum LAP scissors or the hook electrode can be used for exposure. They offer a mechanical cutting function, combined with bipolar coagulation.

The VIO® electro-surgical system with SWIFT COAG® and AUTO CUT® supports all laparoscopic electro-surgical instruments when accessing, mobilizing and resecting the organ.

*Additional instruments for these applications as well as proved user settings are provided in the overview tables from page 29*



*Prostatectomy using the waterjet*

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### PROSTATECTOMY

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When exposing the vasa deferentia and the seminal vesicle using the BiClamp® LAP forceps, only low levels of aerosols develop.

The anatomically-shaped jaw of the BiClamp® Kelly LAP forceps simplifies exposure of the vessels and enables vessels to be exposed in a blunt fashion and to be sealed.

The fasciae are mechanically separated using the monopolar scissors. In addition, SWIFT COAG® can be used to perform fast and effective coagulation with a significant level of hemostasis. This mode also offers the characteristics required for electro-surgical exposure characteristics.

Once the prostate has been fully exposed, the capsule can be opened using the bipolar needle electrode. The cutting depth can be regulated and set using the handle of the instrument.

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### PROSTATECTOMY USING THE WATERJET

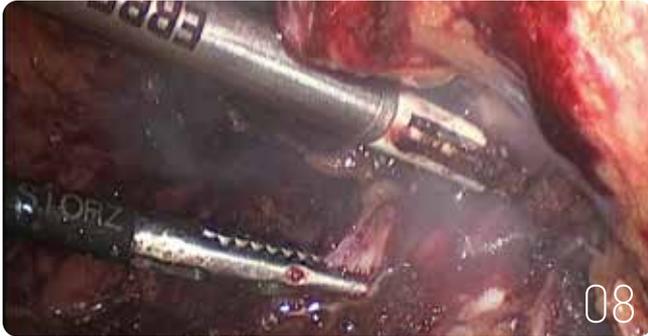
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07

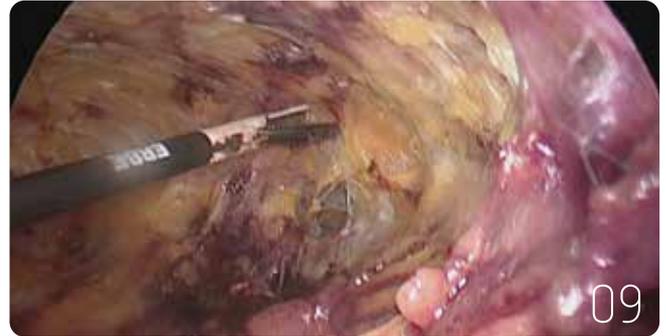
Using the waterjet applicator, the capsule can be detached from the prostate gland, and the fully exposed vessels sealed and separated with the BiClamp® LAP forceps. Using the waterjet technique, gentle mechanical pressure is applied to the nerves, reducing the risk of post operative bladder dysfunction and sexual dysfunction.

A further advantage is the good visibility at the operative site, as the waterjet technique results in minimal bleeding and the operative site can be flushed with the saline solution.

If this procedure is carried out using a DaVinci system, the compatible VIO® 300 D system offers optimal current forms for the instruments used.



*Cystectomy with the BiClamp® LAP forceps*



*Lymphadenectomy with BiCision®*

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## CYSTECTOMY WITH A NEOBLADDER

08

In laparoscopic procedures, a neobladder is created from a piece of the small intestine to act as a reservoir and replace the bladder. A prerequisite for this is that both the urethra and the sphincter (both tumor-free) are retained. When preparing the section of intestine inside the body, the ceramic insulation of the BiCision® jaw reduces the risk of thermal injury to adjacent structures. The minimal coagulation seam also created by the BiClamp® LAP forceps has a positive impact when incorporating the wall of the small intestine in the newly-formed neobladder.

The section of small intestine for the neobladder can be prepared outside the body using BiClamp® 280, saving time and ensuring reliable hemostasis.

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## LYMPHADENECTOMY

09

BiCision® is particularly suited to the exposure of lymphatic tissue along vessels and the sympathetic trunk. Smaller vessels are exposed bluntly, which prevents trauma, and sealed. Sealing the lymph vessels prevents the lymph from leaking.

The instrument also speeds up the steps required as it is multifunctional and offers thermofusion and cutting.

The low thermal capacity of the jaws and the minimal coagulation seam reduces the risk of thermal injury to adjacent structures.

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## LYMPHADENECTOMY USING THE WATERJET

In lymphadenectomy using the waterjet, the applicator can assist in all phases of exposure.

The advantages of the waterjet technique: the high-pressure waterjet separates the various tissue structures according to their layers, enabling selective, interfascial exposure. Nerves and vessel structures are protected. The waterjet is particularly suited to separating lymphatic tissue from the aorta, vena cava and sympathetic trunk<sup>4</sup>.

The waterjet technique can be used atraumatically, without thermal injury to adjacent structures.

# Applications in the lower urinary tract

## Bladder and prostate

### TRANSURETHRAL RESECTION OF THE PROSTATE (TUR-P)

- ☑ Transurethral resection of the prostate is a therapy aimed at benign prostatic hyperplasias.

### TRANSURETHRAL RESECTION OF THE BLADDER (TUR-B)

- ☑ TUR-B is used for the diagnosis and therapy of non-muscle-invasive bladder tumors.

### EN BLOC RESECTION OF BLADDER TUMORS USING HYBRIDKNIFE®

- ☑ This procedure is used to treat early stage bladder cancers.



Monopolar TUR-P

## Endoscopic access

The resection instrument is inserted into the urethra in the direction of the target organ. The monopolar and bipolar techniques are used.

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### MONOPOLAR TUR-P 10

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In the monopolar technique, the urinary tract is flushed with non-conductive fluid using the resectoscope. In electrosurgical cutting with a snare, DRY CUT® offers a significant level of hemostasis. This mode prevents irrigation fluid from flooding into the vascular system. The irrigation fluid remains clear for an extended period; blister formation during cutting is kept to a minimum. Both are important criteria in terms of clear visibility of the target operating area. To smooth the prostatic capsule towards the end of the procedure, HIGH CUT offers optimal cutting as well as a precise incision.

The VIO® 300 D electrosurgical unit enables the user to switch between both modes using the ReMode function on the footswitch. Any bleeding can be coagulated using FORCED COAG®.

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### BIPOLAR TUR-P 11

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With the bipolar technique, the urinary tract is flushed with an isotonic saline solution using the resectoscope.

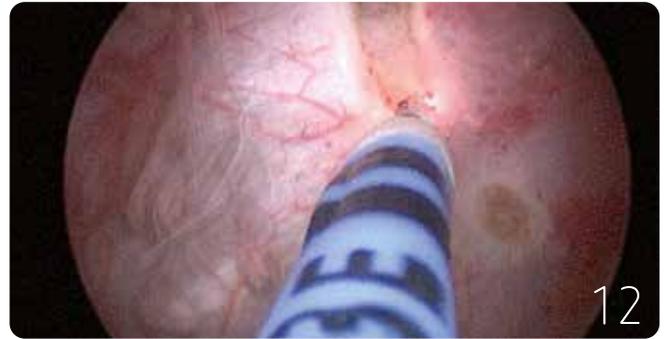
Because of the immediate plasma ignition, BIPOLAR CUT++ mode offers a superior incision with low energy input. A prewarmed saline solution enhances this effect.

Any bleeding can be treated with BIPOLAR SOFT COAG++ using contact coagulation with deep hemostasis. The onset of the coagulation effect is slightly delayed with this mode.

*Additional instruments for these applications as well as proved user settings are provided in the overview tables from page 29*



*Bipolar TUR-P*



*En-bloc resection of tumors of the bladder using HybridKnife®*

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## MONOPOLAR TUR-B

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In the case of the monopolar technique, the urinary tract is flushed with non-conductive fluid via the resectoscope. In the case of snare resection, the monopolar modes AUTO CUT® and HIGH CUT offer effective hemostasis properties. The irrigation fluid remains clear for an extended period; blister formation during cutting is reduced. Both are criteria in terms of clear visibility of the target operating area. HIGH CUT mode supports optimized cutting as well as precise incision. Any bleeding can be coagulated using FORCED COAG®.

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## BIPOLAR TUR-B

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In the case of the bipolar technique, the urinary tract is flushed with an isotonic saline solution via the resectoscope. The bipolar technique reduces the risk of neuromuscular stimulation. Thanks to immediate plasma ignition, BIPOLAR CUT++ mode offers a superior incision with low energy input – without applying mechanical pressure to the tissue. A prewarmed saline solution enhances this effect. Any bleeding can be treated with BIPOLAR SOFT COAG++ using contact coagulation with deep hemostasis. The onset of the effect of coagulation is slightly delayed in this case.

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## EN BLOC RESECTION OF BLADDER TUMORS USING HYBRIDKNIFE®

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12

In selected cases, en bloc resection of early stage bladder cancers can be performed using the multifunctional HybridKnife® instrument. For this, the urinary tract is flushed with non-conductive fluid as is the case in conventional TUR-B procedures.<sup>7,8</sup>

The bladder tumor is first marked using the HybridKnife® mode "FORCED COAG®". The mucosa where the tumor is located is then elevated using the waterjet function.

Once the mucosa has been elevated, an incision is made around the tumor, which is then resected. The fluid accumulates in the submucosa, creating a protective cushion that reduces the risk of perforation. This is particularly beneficial in the case of older patients with a thin bladder wall.

The DRY CUT® mode offers cutting with optimal hemostasis. Repeated elevation results in a defined resection height (beneath the tumors), facilitating the target of R0 resection. Any bleeding can be coagulated using FORCED COAG®.

Unlike conventional TUR-B, in this procedure the tumor is not fragmented but can be removed in one piece. This contributes to improving the pathological diagnosis and evaluation of vertical and horizontal resection margins to assess whether tumor tissue has been fully removed.

# Applications in the lower urinary tract

## More minor surgical procedures

### CIRCUMCISION

- ☑ The foreskin is removed, for example in cases of phimosis.

### REMOVAL OF HYDROCELES

- ☑ This procedure is carried out to treat the accumulation of fluid in the scrotum.

### VARICOCELE THERAPY

- ☑ Enlarged varicose veins in the scrotum are treated with varicocele therapy.

### VASECTOMY

- ☑ This procedure is performed for the purposes of sterilization.



Circumcision

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### CIRCUMCISION

13

In this procedure, the foreskin is completely or partially removed. A mechanical incision is made around the foreskin using a scalpel or scissors. Bleeding is coagulated using a bipolar forceps; tissue adhesion can be minimized using PREMIUM forceps. BIPOLAR SOFT COAG mode also minimizes tissue adhesion.

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### VARICOCELE THERAPY

Therapy is carried out surgically, either by performing sclerotherapy on the afferent vein, or by ligating it.

In both procedures (hydrocele and varicocele therapy), bleeding can be coagulated using the bipolar PREMIUM forceps. These forceps and BIPOLAR SOFT COAG mode prevent tissue from adhering to the gripping surface.

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### VASECTOMY

Sterilization is achieved by severing the spermatic cords.

The skin is mechanically opened using a scalpel, and the vas deferens is then cut. Bleeding as well as the margins of the vas deferens incision can be coagulated using bipolar PREMIUM forceps.

*Additional instruments for these applications as well as proved user settings are provided in the overview tables from page 29*

# Application overview

	CUT	COAG	JET
<b>General skin incision</b>			
Electrode handle with tungsten needle electrode	AUTO CUT®, effect 2, 80 W	FORCED COAG®, effect 2, 60 W	
<b>Nephrectomy/Adrenalectomy, open surgery</b>			
Electrode handle with knife or spatula electrode	AUTO CUT®, effect 4–5, 180 W DRY CUT®, effect 3–5, 160 W	SWIFT COAG®, effect 3–4, 140 W FORCED COAG®, effect 2, 80 W	
BiClamp® 280		BICLAMP®, effect 3	
Bipolar forceps		BIPOLAR SOFT COAG, effect 4–5, 50 W	
Bipolar BiSect scissors (open surgery)		BIPOLAR SOFT COAG, effect 3–4, 60 W	
<b>Nephrectomy, laparoscopic with optional nephroureterectomy</b>			
BiCision®		BICLAMP®, effect 2–3	
Bipolar Metzenbaum LAP scissors		BIPOLAR SOFT COAG, effect 4–5, 60 W	
BiClamp® LAP forceps		BICLAMP®, effect 2	
Hook electrode, (monopolar)	AUTO CUT®, effect 3–4, 80 W	FORCED COAG®, effect 2, 80 W SWIFT COAG®, effect 3, 80 W	
Bipolar LAP forceps		BIPOLAR SOFT COAG, effect 4–5, 60 W	
Monopolar scissors, laparoscopic		SWIFT COAG®, effect 2–3, 80 W FORCED COAG®, effect 2, 80 W	
Applicator, curved tip (laparoscopic)			Effect 25–30
<b>Adrenalectomy, laparoscopic</b>			
BiCision®		BICLAMP®, effect 2–3	
Bipolar Metzenbaum LAP scissors		BIPOLAR SOFT COAG, effect 4–5, 60 W	
BiClamp® LAP forceps		BICLAMP®, effect 2	
Hook electrode, (monopolar)	AUTO CUT®, effect 3–4, 80 W	FORCED COAG®, effect 2, 80 W SWIFT COAG®, effect 2–3, 80 W	
Bipolar LAP forceps		BIPOLAR SOFT COAG, effect 4–5, 60 W	
Monopolar scissors, laparoscopic		SWIFT COAG®, effect 2–3, 80 W FORCED COAG®, effect 2, 80 W	
<b>Partial nephrectomy, open surgery</b>			
Electrode handle with knife or spatula electrode	AUTO CUT®, effect 4–5, 180 W DRY CUT®, effect 3–5, 160 W	SWIFT COAG®, effect 3–4, 140 W FORCED COAG®, effect 2, 80 W	
Applicator, straight, with electrosurgical function, monopolar (suction)		SWIFT COAG®, effect 2–4, 120 W	Effect 30, -800 mbar
BiClamp® 280		BICLAMP®, EFFECT 3	
APC applicator		FORCED APC®, 60–80 W	
Electrode handle with ball electrode (subsequent coagulation)		SOFT COAG®, effect 4, 200 W	
Bipolar forceps		BIPOLAR SOFT COAG, effect 4–5, 50 W	
Bipolar BiSect scissors (open surgery)		BIPOLAR SOFT COAG, effect 3–4, 60 W	

# Application overview

		CUT	COAG	JET
<b>Partial nephrectomy, laparoscopic</b>				
BiCision®			BiClamp®, effect 2–3	
Bipolar Metzenbaum LAP scissors			BIPOLAR SOFT COAG, effect 4–5, 60 W	
BiClamp® LAP forceps			BICLAMP®, effect 2	
APC applicator, APCapplicator			FORCED APC®, 60–80 W	
Needle electrode, bipolar	BIPOLAR CUT, effect 4, 60 W		BIPOLAR SOFT COAG, effect 4–5, 60 W	
Hook electrode, (monopolar)	AUTO CUT®, effect 3–4, 80 W		FORCED COAG®, effect 2, 80 W SWIFT COAG®, effect 2–3, 80 W	
Bipolar LAP forceps			BIPOLAR SOFT COAG effect 4–5, 60 W	
Monopolar scissors, laparoscopic			SWIFT COAG®, effect 2–3, 80 W FORCED COAG®, effect 2, 80 W	
<b>Laparoscopic pyeloplasty with optional ureteroneocystostomy</b>				
BiCision®			BICLAMP®, effect 2–3	
Bipolar Metzenbaum LAP scissors			BIPOLAR SOFT COAG, effect 4–5, 60 W	
BiClamp® Kelly LAP forceps			BiClamp®, effect 2	
Hook electrode, (monopolar)	AUTO CUT®, effect 3–4, 80 W		FORCED COAG®, effect 2, 80 W SWIFT COAG®, effect 2–3, 80 W	
Bipolar LAP forceps			BIPOLAR SOFT COAG, effect 4–5, 60 W	
Monopolar scissors, laparoscopic			SWIFT COAG®, effect 2–3, 80 W FORCED COAG®, effect 2, 80 W	
<b>Prostatectomy, open surgery</b>				
Electrode handle with knife or spatula electrode	AUTO CUT®, effect 4–5, 180 W DRY CUT®, effect 3–5, 160 W		SWIFT COAG®, effect 3–4, 140 W FORCED COAG®, effect 2, 80 W	
BiClamp® 280			BICLAMP®, effect 3	
Bipolar forceps			BIPOLAR SOFT COAG, effect 4–5, 50 W	
Bipolar BiSect scissors (open surgery)			BIPOLAR SOFT COAG, effect 3–4, 60 W	
Applicator, curved tip (open surgery)				Effect 20–25
<b>Prostatectomy, laparoscopic</b>				
BiCision®			BiClamp®, effect 2–3	
Bipolar Metzenbaum LAP scissors			BIPOLAR SOFT COAG effect 4–5, 60 W	
BiClamp® Kelly LAP forceps			BiClamp®, effect 2	
Hook electrode, (monopolar)	AUTO CUT®, effect 3–4, 80 W		FORCED COAG®, effect 2, 80 W SWIFT COAG®, effect 2–3, 80 W	
Bipolar LAP forceps			BIPOLAR SOFT COAG, effect 4–5, 60 W	
Monopolar scissors, laparoscopic			SWIFT COAG®, effect 2–3, 80 W FORCED COAG®, effect 2, 80 W	
Applicator, curved tip (laparoscopic)				Effect 20–25

## CUT

## COAG

## JET

**Cystectomy with a neobladder, open surgery**

Electrode handle with knife or spatula electrode	AUTO CUT®, effect 4–5, 180 W DRY CUT®, effect 3–5, 160 W	SWIFT COAG®, effect 3–4, 140 W FORCED COAG®, effect 2, 80 W	
BiClamp® 280		BICLAMP®, effect 3	
Bipolar forceps		BIPOLAR SOFT COAG, effect 4–5, 50 W	
Bipolar BiSect scissors (open surgery)		BIPOLAR SOFT COAG, effect 3–4, 60 W	

**Cystectomy with a neobladder, laparoscopic**

BiClamp® 280		BICLAMP®, effect 3	
BiCision®		BICLAMP®, effect 2–3	
Bipolar Metzenbaum LAP scissors		BIPOLAR SOFT COAG, effect 4–5, 60 W	
BiClamp® LAP forceps		BICLAMP®, effect 2	
Hook electrode, (monopolar)	AUTO CUT®, effect 3–4, 80 W	FORCED COAG®, effect 2, 80 W SWIFT COAG®, effect 2–3, 80 W	
Bipolar LAP forceps		BIPOLAR SOFT COAG, effect 4–5, 60 W	
Monopolar scissors, laparoscopic		SWIFT COAG®, effect 2–3, 80 W FORCED COAG®, effect 2, 80 W	

**Lymphadenectomy, open surgery**

Electrode handle with knife or spatula electrode	AUTO CUT®, effect 4–5, 180 W DRY CUT®, effect 3–5, 160 W	SWIFT COAG®, effect 3–4, 140 W FORCED COAG®, effect 2, 80 W	
BiClamp® 280		BICLAMP®, effect 3	
Bipolar forceps		BIPOLAR SOFT COAG, effect 4–5, 50 W	
Bipolar BiSect scissors (open surgery)		BIPOLAR SOFT COAG, effect 3–4, 60 W	

**Lymphadenectomy, laparoscopic**

BiCision®		BiClamp®, effect 2–3	
Bipolar Metzenbaum LAP scissors		BIPOLAR SOFT COAG, effect 4–5, 60 W	
BiClamp® LAP forceps		BiClamp®, effect 2	
Hook electrode, (monopolar)	AUTO CUT®, effect 3–4, 80 W	FORCED COAG®, effect 2, 80 W SWIFT COAG®, effect 2–3, 80 W	
Bipolar LAP forceps		BIPOLAR SOFT COAG, effect 4–5, 60 W	
Monopolar scissors, laparoscopic		SWIFT COAG®, effect 2–3, 80 W FORCED COAG®, effect 2, 80 W	
Applicator, curved tip (laparoscopic)			Effect 25–35

# Application overview

	CUT	COAG	JET
<b>Transurethral resection of the bladder (TUR-B) – monopolar</b>			
Resection snare, monopolar	AUTO CUT®, effect 3–4, 150 W HIGH CUT, effect 3–5, 150 W	FORCED COAG®, effect 1–2, 60 W	
<b>Transurethral resection of the bladder (TUR-B) – bipolar</b>			
Resection snare, bipolar	BIPOLAR CUT++, effect 4–5	BIPOLAR SOFT COAG++, effect 4–6	
<b>Transurethral resection of the prostate (TUR-P) – monopolar</b>			
Resection snare, monopolar	DRY CUT®, effect 6, 170 W HIGH CUT, effect 4–6, 150–250 W	FORCED COAG®, effect 2–3, 80–120 W	
<b>Transurethral resection of the prostate (TUR-P) – bipolar</b>			
Resection snare, bipolar	BIPOLAR CUT++, effect 4–6	BIPOLAR SOFT COAG++, effect 5–8	
<b>En-bloc resection of bladder tumors using HybridKnife®</b>			
HybridKnife® Type T/I	DRY CUT®, effect 3, 70 W	FORCED COAG®, effect 2, 50 W	Effect 20–25
<b>Procedures using DaVinci</b>			
Bipolar clamp / grasping forceps		BIPOLAR SOFT COAG, effect 4–5, 60 W	
Monopolar scissors		FORCED COAG®, effect 2, 80 W SWIFT COAG®, effect 2–3, 80 W	
Hook electrode, monopolar	AUTO CUT®, effect 3–4, 80 W	FORCED COAG®, effect 2, 80 W SWIFT COAG®, effect 2–3, 80 W	
<b>Circumcision, vasectomy, spermatocele, varicocele, hydrocele</b>			
Bipolar forceps		BIPOLAR SOFT COAG effect 3–5, 40 W	

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## ADDITIONAL PUBLICATIONS

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## LEAFLETS AND BROCHURES

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- 85800-103 Principles of electrosurgery
- 85800-127 Application brochure of electrosurgery with practical tips
- 85800-107 NESSY® Q application brochure
- 85140-120 VIO® D product leaflet
- 85134-100 APC 2 product leaflet
- 85150-100 ERBEJET® 2 product leaflet
- 85100-100 Instruments and Accessories
- 85100-185 Vessel sealing product leaflet
- 85100-183 BiCision® product leaflet
- 85810-101 Information folder for Urology

Additional information:

Up-to-date product and application information is available at [www.erbe-med.com](http://www.erbe-med.com) and in publications such as our accessories catalog.

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# Safe use of monopolar electrosurgery

## Checklist: Patient preparation



1. Place the patient in an electrically insulated position



2. Select a suitable neutral electrode (NE)



3. Select the position for the neutral electrode (NE)



4. Patients with active or passive implants



5. Prepare the surface for adhesion



6. Attach the neutral electrode correctly

*CAUTION: This checklist does not replace the instructions for use. For device instructions please contact the responsible Erbe representative. If you are interested in the Erbe plus academy training courses, please contact our training department: Erbe plus academy, phone +49 7071 755-174, [training@erbe-med.com](mailto:training@erbe-med.com)*

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## 1. PLACE THE PATIENT IN AN ELECTRICALLY INSULATED POSITION

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- Place the patient on an electrically insulated pad in dry condition.
- Make sure that the arm supports are covered with insulating covering.
- Remove body jewelry (piercings, rings, chains, watches, bracelets, removable dental prostheses); taping over jewelry is not sufficient.
- Position arms and legs so that they are insulated from the body by positioning them at an angle or by interposition of cloths; avoid skin-to-skin contact if there are skin folds or breast folds (by interposition of dry gauze).
- The patient must not touch any electrically conducting objects (IV stands, tubes).
- Dry any liquids underneath the patient during the intervention. Change NE as soon as liquids get underneath the NE.

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## 2. SELECT A SUITABLE NEUTRAL ELECTRODE (NE)

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- Check NE and cable for external damage before application. If damaged, do not use the product!
- Only split NEs are monitored by the safety system.
- Do not use non-split NEs for adults.
- For infants, use appropriate NE.
- We recommend the NESSY® Ω, which can be positioned in any direction.

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## 3. SELECT THE POSITION FOR THE NEUTRAL ELECTRODE (NE)

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- The NE can be positioned e.g. on the thigh, the upper arm or the side of the abdomen.
- Attach the NE as close as possible to the procedural field, with a minimum distance of 15 cm.
- The monopolar current should not be conducted via the body's electrical „bottlenecks“ (e.g. elbow, knee).
- Position the NE over electrically well conducting tissue (muscle tissue).
- Do not attach the NE on fatty tissue, on bones/joints, on skin folds or on the head.
- If possible, attach the NE on healthy tissue. Avoid scars, hemorrhages, tattoos.
- The patient should not lie on the NE, on cables or on the cable connection.
- When repositioning the patient, ensure that the NE and the cable do not become detached and do not lie underneath the patient.

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## 4. PATIENTS WITH ACTIVE OR PASSIVE IMPLANTS

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- Active implants can be damaged by electrosurgical currents.
- For patients with a cardiac pacemaker or other conductive implants, use bipolar instruments wherever possible. The bipolar technique reduces electrical interference from cardiac pacemakers or units connected to the patient (ECG, EEG)
- For the monopolar technique, place the neutral electrode such that no current flows via the implant, the probe or the heart muscle.
- The neutral electrode should be positioned as close as possible to the procedural field but at least 15 cm from the implant.
- Divert the current path away from the implant by positioning the neutral electrode appropriately.
- Choose low settings wherever possible.
- Only activate for short periods and with sufficient pauses to allow the current path to cool down and thus prevent the current from heating the implant.
- Monitor the active implant before, during and after the intervention for any potential malfunction.
- Consult a cardiologist prior to the intervention and observe the recommendations of the implant manufacturer.

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## 5. PREPARE THE SURFACE FOR ADHESION

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- Shave the NE application site.
- The NE application site must be dry and free of grease.

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## 6. ATTACH THE NEUTRAL ELECTRODE CORRECTLY

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- Do not trim the NE.
- Always align a NE without equipotential ring with the long side facing the procedural field.
- Apply the NE over its entire surface without forming any creases; avoid air bubbles.
- The contact surfaces must not overlap when applying the device.
- Insert the contact stud of the NE completely into the connection plug of the cable.
- Do not reapply an already attached NE again.
- In the case of patients with an antithrombosis stocking, the NE can be attached under the stocking. Connector and cable exposed.
- Use self-adhesive NEs only once and without contact gel.
- After the intervention: Remove NE as soon as possible, after 24 hours at the latest.

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## 7. AVOID IGNITION OF FLAMMABLE SUBSTANCES

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- Disinfectants must not be allowed to flow down underneath the patient.
- Do not cover the patient before the disinfectant has dried and the combustible gas has dissipated.
- Avoid inflammable and combustion-supporting gases in the procedural field (e.g. anesthetic or endogenous gases).

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