

UROLOGY



UROLOGICAL APPLICATIONS USING BOWA ELECTROSURGICAL SYSTEMS

FUNDAMENTALS OF MODERN HIGH-FREQUENCY SURGERY | CUTTING AND COAGULATION MODES | ARGON PLASMA COAGULATION (APC) | PRACTICE AND METHODS | AVOIDING COMPLICATIONS | RECOMMENDATIONS ON SETTINGS | REFERENCES | USAGE-PRODUCT MATRIX

IMPORTANT INFORMATION

BOWA electronic GmbH has taken the greatest possible care in the drafting of this brochure and in the accuracy of the information contained herein. However, it is not possible to rule out errors completely.

No claims may be lodged against BOWA on the basis of the recommended settings, data and information presented. If legal liability should result, then it will be limited to intentional and gross negligence.

All information on recommended settings, points of application, duration of application and the use of the instruments is based on clinical experience. Some centres and physicians will have a preference for other settings, differing from those recommended here.

The values given herein are guideline values only. They must be verified by the user of the instruments.

Depending on the individual circumstances, it may be necessary to deviate from the information given in this brochure.

Medical technology is advancing continuously through ongoing research and clinical experience. For this reason too, it may be expedient to depart from the settings recommended herein.

To improve comprehension we may refer to one gender or another. Naturally, the information applies equally to both genders.

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1 | FUNDAMENTALS OF MODERN HIGH-FREQUENCY SURGERY

1.1 | A BRIEF HISTORY OF ELECTROSURGERY

The concept of treating tissue with heat extends back to the era of Egyptian papyri and took the form of ferrum candens ("glowing iron") down through the Middle Ages up to the surgical use of ligatura candens (cutting snare) following the invention of galvanocautery in the 19th century.

High-frequency surgery (HF surgery) as currently practised was only developed in the 20th century. Heat is generated in this surgery directly within the tissue itself. This is in contrast to previous techniques in which heat was transferred to the tissue through heated instruments.

The first universal instruments based on thermionic valves were developed around 1955, followed by transistor-based instruments in the 1970s and specifically argon beamers around 1976. Microprocessor-controlled HF surgical instruments have been available since the beginning of the 1990s. These allowed, for the first time, a large number of parameters to be varied so that the current characteristics can be matched to the treatment with precision.

1.2 | THE BASIS OF HF SURGERY TODAY

Depending on its nature, value and frequency, the action of electrical current on tissue may be described as electrolytic (destructive), faradic (stimulating muscles and nerves) or thermal. HF surgery is based on alternating currents with a frequency of at least 200 kHz, with the thermal effect dominating. Its effect is primarily dependent on the time for which the tissue is exposed to the current, the current density and the specific resistance of the tissue, which on the whole falls with increasing water content or increasing blood circulation. In practice, it is also necessary to consider that portion of current which flows past the target tissue and can heat up and damage other regions (such as during irrigation, seen more with monopolar techniques than with bipolar ones).

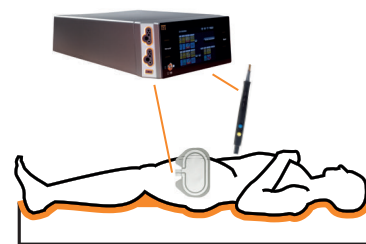


BOWA ARC 400 HF-Surgery Generator

1.2.1 | THE MONOPOLAR METHOD

Monopolar HF surgery deploys a closed current circuit in which current flows from the active electrode of the instrument through the patient to a neutral electrode with a large surface area and then back to the generator.

The contact area between the tip of the monopolar instrument and the tissue is small so that the highest current density of the current circuit is seen here, and brings about the desired thermal action.

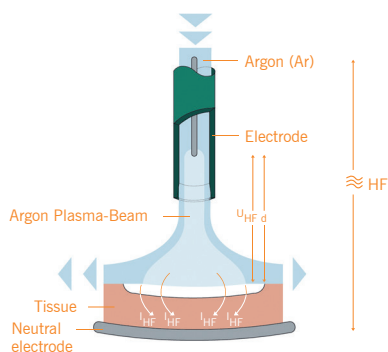


Basic principle of monopolar surgery

Localised heat build-up is reduced to a minimum through the large surface area and the special design of the neutral electrode.

1.2.2 | ARGON PLASMA COAGULATION (APC)

This is a non-contact method in which the HF current flows through ionised argon gas into the tissue so that there is no direct contact between the electrode and the tissue and tissue cannot adhere to the electrode.



Principle of Argon Plasma Coagulation

Argon is a noble gas that is chemically inert and non-toxic and found naturally in the air. It is introduced through a probe and flows in the ceramic tip past a monopolar HF electrode to which a high voltage is applied. Once the required field strength has been reached it starts to ionise to form plasma, with development of a blue flame – the “argon beam”. The electrically conducting plasma is focused automatically on the point with the lowest electrical resistance and at that point coagulates the tissue from a temperature of 50–60 °C. The gas prevents oxygen from reaching the tissue and so prevents carbonisation. The surgeon has a clear view of the tissue since there is no smoke and there is no adverse effect on wound healing or postoperative bleeding due to carbonisation.

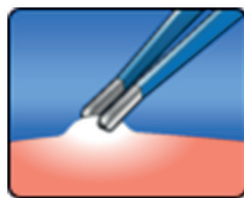


Mode icon for open APC

These effects enable procedures that have a low complication rate and are safe for effective coagulation and the devitalisation of tissue anomalies through homogeneous surface coagulation and a limited penetration depth (0.1–3 mm).

1.2.3 | THE BIPOLAR METHOD

With bipolar HF surgery two active electrodes are integrated into the instrument and current flow is restricted to the tissue between the two electrodes rather than the entire body of the patient.

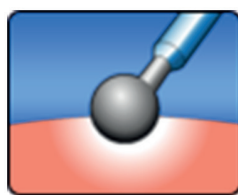


Mode icon for bipolar method

This dispenses with the need for a neutral electrode.

1.3 | ELECTROCOAGULATION

A coagulation effect results if the tissue is heated relatively slowly to a temperature above 60 °C.



Mode icon for electrocoagulation

This heating process results in numerous changes to the tissue, including the denaturation of protein, the evaporation of intracellular and extracellular water and the shrinkage of tissue.

Various types of coagulation are possible, depending on the current characteristics and desired outcome, including contact coagulation, forced coagulation, desiccation (coagulation through a needle electrode), spray coagulation (fulguration),

argon plasma coagulation (APC), bipolar coagulation and bipolar vessel sealing.

Conventional electrocoagulation is unsuitable for blood vessels with a diameter above around 2 mm. To be certain of hemostasis and to seal the vessels in the long term it is necessary to use bipolar methods/ligation: The vessel or tissue bundle is gripped using a special instrument and subjected to a constant defined pressure. A number of automatically controlled current cycles are then applied, with a voltage of less than 200 V, a current of 4 A and a wattage of up to 250 W to fuse the vessel walls that lie opposite one another.

In most cases it is not necessary to visualize the vessels individually; a tissue bundle containing vessels can be gripped and fused. The desired effect can be recognised through a translucent white coagulation zone, within which the tissue can be safely separated. In individual cases it may be advisable to seal the vessel in two places at a small distance apart and to make an incision between them. Bipolar sealing is technically possible up to a vessel diameter of approx. 10 mm, and has been clinically validated up to 7 mm.

Since the tip of the instrument will be hot, care must be taken to maintain a safe distance from susceptible tissue areas

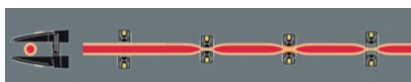


Mode icon for vessel sealing

and to prevent unwanted coagulation by touching tissue with the instrument or laying it down on tissue.

Various studies⁽¹⁻⁵⁾ have demonstrated that vessels sealed in this manner remain sealed. The burst pressure was over 400 mmHg in more than 90% of the cases (up to 900 mmHg), and thus markedly

above the blood values of around 130 Hgmm encountered in practice.



The process of vessel sealing

Histological studies have shown that shrinkage of the vessel wall and the development of thrombi are involved in haemostasis in conventional coagulation.

In contrast, with sealed vessels there is a denaturation of collagen with fusion of the opposing layers, whilst the internal elastic membrane remains largely intact since its fibres only undergo denaturation above 100 °C.

To the side of the sharply-delineated homogeneous coagulation zone there is a transition zone, generally 1–2 mm wide, that exhibits thermal damage, recognisable immunohistochemically of around double the width. This is followed by a sterile resorptive inflammation, above all in the surrounding connective tissue, without any evidence for even a temporary insufficiency of the sealing.

The advantages of bipolar vessel sealing over other methods such as ligation, sutures and vascular clips include the speed of preparation, the rapid and reliable sealing of vessels, the certainty that no foreign materials will be left in the patient and the lower costs. This results in a shorter operating period, reduced blood loss and thus less stress for the patient.



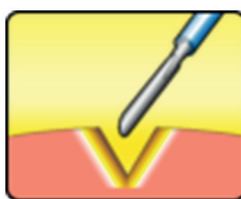
BOWA TissueSeal PLUS

The BOWA ligation instruments Night-KNIFE®, TissueSeal® and LIGATOR® are particularly attractive because they can be reused and thus reduce operating costs.

These instruments can be used in a range of fields, including gynaecology and urology, for open and laparoscopic procedures.

1.4 | ELECTROTOMY

A cutting effect results if tissue is heated very rapidly to a temperature of 90–100 °C. This results in a build-up of steam in the cells which destroys their walls and then acts as an insulator. A voltage then develops between the electrode and the tissue and from a value of approx. 200 V there is a renewed sparking with a very high current density at the base points. This arc will form regardless of the surrounding media (e.g., air or liquid).



Standard cut mode icon

Additional coagulation of the border area of wounds can be achieved through modulation of the current (higher voltage with pauses). The type of cut may be smooth or jagged. The degree of jaggedness can be controlled in 9 different steps and varied to meet requirements.

Further thermal effects of current that are of subsidiary importance for HF surgery are carbonisation (from approx. 200 °C) and vaporisation (from a few hundred degrees).

1.5 | ELECTROSURGERY – GENERAL CONSIDERATIONS

The user must be familiar with the function and use of the instruments (e.g., instruction according to the MDD, training by the manufacturer).

1.5.1 | SAFETY PRECAUTIONS TO PREVENT COMPLICATIONS

- Checking of insulation
- Use of the lowest possible power setting
- Short and intermittent current flow pattern

- No activation if current circuit is open
- No activation in the proximity of another HF instrument or if indirect contact with it
- Use of bipolar electrosurgery

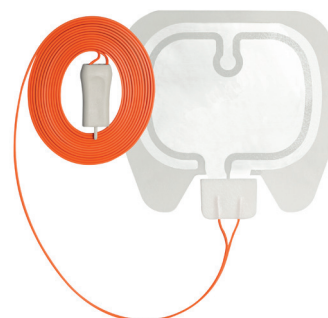
1.5.2 | NEUTRAL ELECTRODES

Neutral electrodes are generally disposable accessories in HF surgery for monopolar applications and are used to close the current circuit between the patient and the HF generator on the passive side.

The main risk associated with the incorrect use of a neutral electrode is localised heating of tissue through to skin burns at the contact point and an incorrect functioning of the HF instruments.

Only neutral electrodes that are free of defects and function correctly are to be used to prevent such unwanted effects. The field in which the neutral electrode is to be used, the patient group (adults or children) and the weight of the patient must all be taken into consideration and any metal jewellery removed in advance.

The point at which the neutral electrode contacts the tissue should be chosen so that the current path between the active and neutral electrodes is as short as possible and extends in a longitudinal or diagonal direction to the body since muscles have a higher conductivity in the direction of the fibrils.



BOWA EASY Universal neutral electrode

Depending on the part of the body undergoing surgery the neutral electrode should be attached to the closest upper arm or thigh, but not closer than 20 cm to the surgical site and at a sufficient distance from the ECG electrodes or implants (such as bone pins, bone plates or endoprotheses). If the patient is in a supine position then the neutral electrode must be attached to the upper side of his or her body so that it is not in a region in which fluids collect to prevent their excessive build-up. The electrode should be attached to skin that is clean without too much hair growth and the skin must not be damaged. If it has been cleaned then it should be allowed to dry fully before attachment of the electrode.

The electrode must be in full contact with the skin, as the area of the contacting electrodes is proportional to the heat generated. The EASY neutral electrode monitoring in the BOWA Generators helps to provide maximal patient safety, by stopping any monopolar activation if the contact of the neutralelectrode is not adequate.

Particular care must be taken if patients have pacemakers or intracardial defibrillators fitted. The information provided by the manufacturer of the pacemaker must be followed and if necessary the cardiologist responsible for the patient is to be consulted.

No adverse effects have been reported for the use of monopolar HF surgery in pregnancy. However, for safety reasons it is recommended that bipolar procedures be used.

The packaging of the neutral electrode should only be opened immediately before use. The electrodes from the package may be used for up to 7 days after the packaging has been opened provided that it is stored in a dry place between 0 °C and 40 °C. Every electrode can be used only once, after which it must be disposed.

1.5.3 | INTEGRITY OF EQUIPMENT

All instruments, cables and other devices must be inspected before use to make certain that they are undamaged.

All instruments must function smoothly and without friction.

Instruments that do not function correctly, are contaminated or have been used previously must not be used.

If an instrument malfunctions in the course of treatment then the power supply must be interrupted immediately so that there is no unwanted current flow or possible damage to tissue. Equipment and instruments that have malfunctioned must be repaired by qualified personnel.

If the foot pedal is not being used then it must be kept at a sufficient distance away to prevent its accidental use.

1.5.4 | NEUROMUSCULAR STIMULATION (NMS)

NMS is a phenomenon seen in electrosurgery, especially in monopolar procedures, in which a muscular contraction is triggered through electrical stimulation.

The frequency of NMS can be reduced markedly if the patient is sufficiently relaxed and may be necessary in particular with interventions in parts of the body at particular risk of perforation.

1.5.5 | CONTACT WITH CONDUCTING OBJECTS

The patient must be sufficiently shielded against contact with conducting objects to prevent unwanted current flow and possible injury.

The patient must therefore lie on a dry surface that is non-conducting.

If metal clips are present close to areas in which HF instruments, such as the loop or APC, are being used then they must be kept at a sufficient distance.

1.6 | GENERAL CONSIDERATIONS

Endoscopy and laparoscopy are now routinely used in clinics. Although risks relating to the technology are rare, as with open surgery there may be perforations, damage to surrounding tissue or bleeding.

2 PRACTICE AND METHODS

2.1 | PRACTICE AND METHODS

High-frequency current has been deployed for cutting and coagulation in all surgical fields for many years and is therefore also established in urology. Monopolar knife electrodes or needle electrodes are used for cutting or coagulation and are now standard instruments. The coagulation performance can be increased substantially in combination with a conducting forceps with which the bleeding vessel is grasped and the impact on the surrounding tissue reduced. The coagulation performance and depth of penetration into the tissue can be varied according to the setting of the generator. A higher coagulation performance and a higher depth of penetration can be chosen for subcutaneous tissue or muscle tissue. However, the coagulation performance should be reduced in the proximity of susceptible organs such as the intestines.



BOWA BiZZER bipolar scissors

In such instances, bipolar coagulation is recommended. Since the flow of current is restricted to the tissue between the two arms of the bipolar forceps it brings precise coagulation of bleeding vessels, and the current only penetrates the tissue to a minimum depth. The use of a bipolar scissors enables smaller blood vessels to be coagulated at the same time.

However, it is not possible to coagulate larger vessels with a bipolar scissors, so they are generally ligated or clipped. Since the use of vascular ligatures is time-consuming and vascular clips are costly, bipolar vessel ligation is a good alternative, using instruments specially developed for this purpose, such as the TissueSeal or LIGATOR.



BOWA LIGATOR for laparoscopic vessel sealing

These instruments enable vessels with a diameter of up to 7 mm to be reliably sealed before being separated.

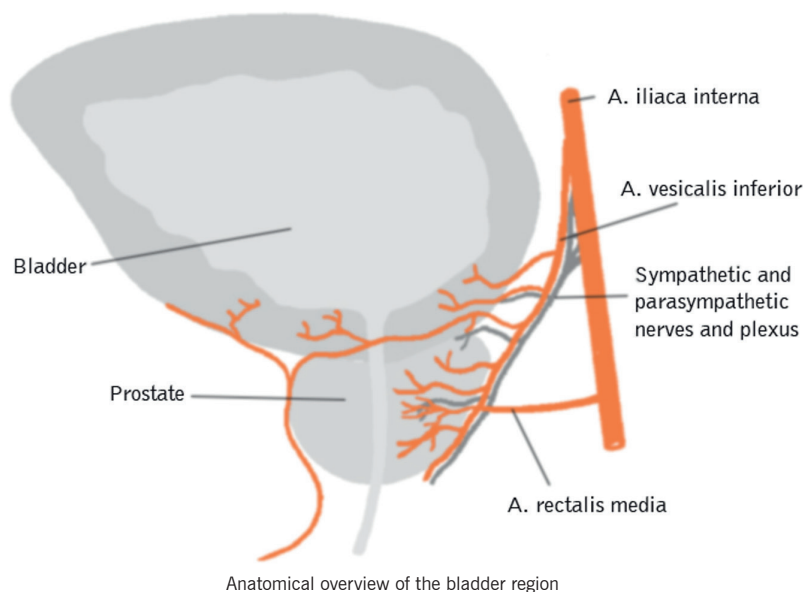
Some possible applications for these instruments in special urological operations are discussed below.

2.2 | NEPHRECTOMY, EXCISION OF RENAL TUMOURS

Nephrectomy, or the removal of a renal tumour is generally necessary if the tumour is malignant. Wherever possible, the kidneys should not be removed so that renal function is retained as far as possible. The risk of renal insufficiency, cardiovascular events and indeed mortality are increased in patients who have had a nephrectomy^(6, 7). Different access routes are selected for laparoscopy or open surgery, depending on the indication, localisation and degree of planned resection.

The urether and hilus vessels are separated through ligature or clipping, whilst bipolar or monopolar vessel sealing is used for smaller vessels.

In addition, for laparoscopic nephrectomy at least, it has been shown that the use of bipolar ligation instruments reduces the time required for surgery (since instruments need to be changed less frequently and there is less use of suture material) and cuts back blood loss⁽⁸⁾.



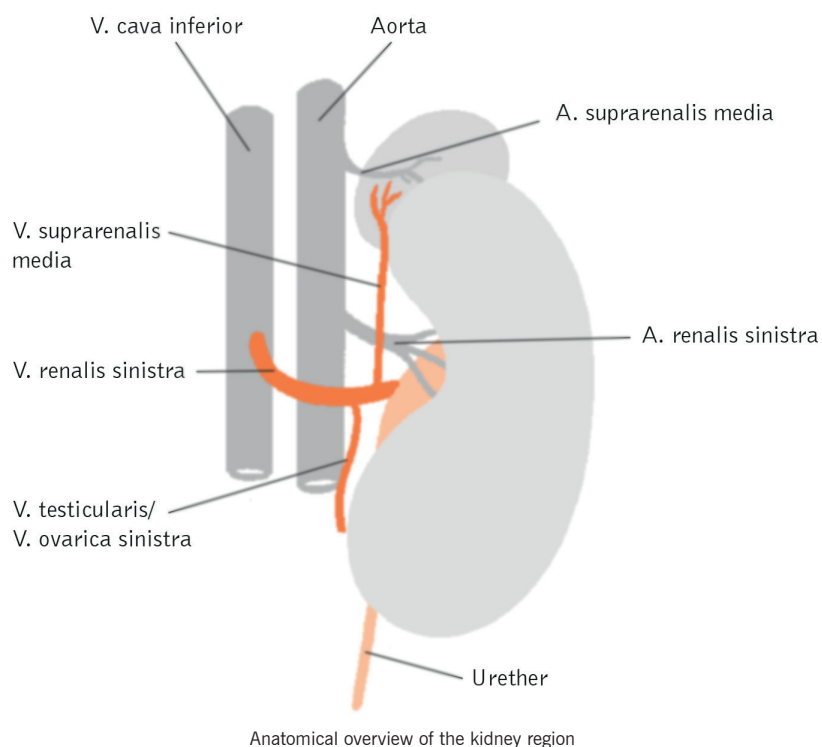
Bipolar ligation additionally enables the removal of a kidney from a live donor without the use of clips in the hilus region, thus considerably simplifying the subsequent use of the endostapler⁽⁹⁾.

It is important that a safety distance be maintained from organs that are sensitive to temperature rises, such as the pancreas, intestines and nerves, to avoid thermal lesions to them.

2.3 | CYSTECTOMY

Radical cystectomy for a malignant tumour in men includes the resection of the seminal tubules and the prostate, and in women a section of the anterior vaginal wall and the uterus with adnexes. It may also be necessary to remove the urethra and regional lymph nodes in both cases.

Bipolar vessel sealing is particularly suitable for the cervical bands and for ligation of the supplying blood vessels (superior and inferior vesical arteries, branches of the obturator artery, middle rectal artery and internal pudendal artery and veins) which



extend into the bladder and prostate columns. The combination of conventional and bipolar vessel sealing reduces the operating time and blood loss^(10, 11).

The nerves in that region, such as the obturator nerve, must be protected against accidental thermal damage.

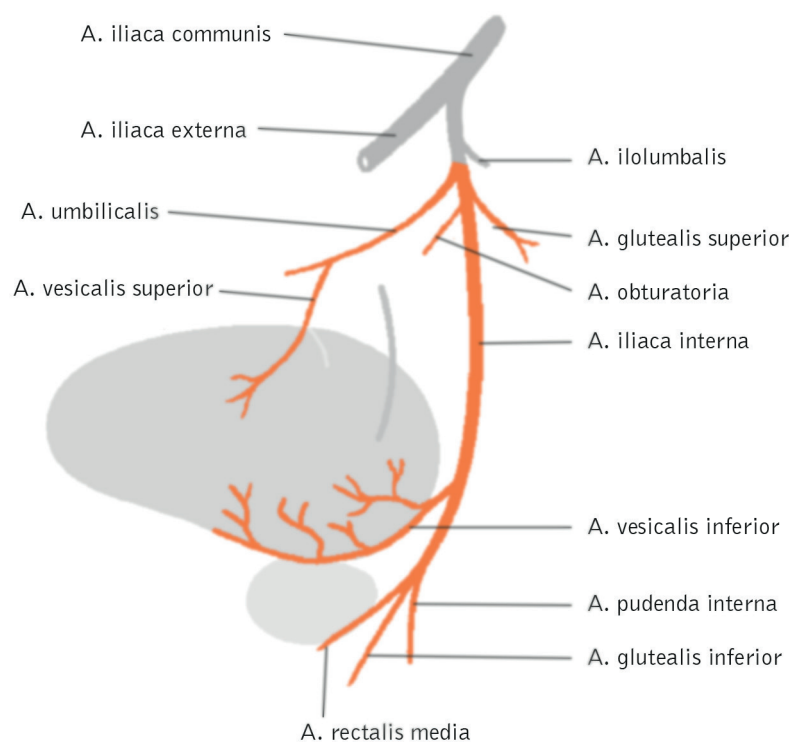
A further possible use of bipolar ligation instruments is for the mesenterium for urine passage. Bipolar ligation here enables reliable sealing of vessels without the need for costly and time-consuming clipping of the mesenterial vessel branches.

2.4 | RADICAL PROSTATECTOMY

Radical prostatectomy is the standard treatment for prostate carcinoma that is still localised, without clinically visible metastases and also embraces the seminal vesicles and where necessary the regional lymph nodes.

Prostatectomy may also involve bipolar sealing of the cervical bands, the blood-supplying vessels (branches of the inferior vesical artery and the middle rectal artery) as well as the prostatic plexus. Here too, the combination of conventional and bipolar vessel sealing reduces the operating time and blood loss⁽¹⁰⁾.

A sufficient distance must be maintained from sensitive organs such as the urethra and the outer closing muscle during coagulation, as well as the vessel-nerve bundles behind and to the side of the prostate.

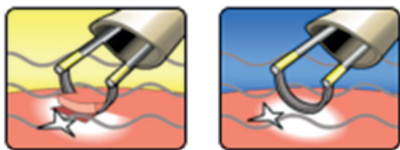


Blood supply of the bladder and prostate

3 | TRANSURETHRAL RESECTION

3.1 | TRANSURETHRAL RESECTION OF THE PROSTATE (TUR-P)

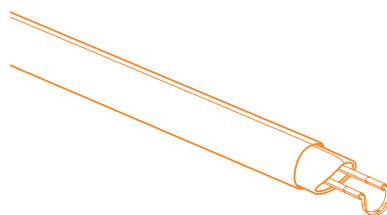
TUR-P is presently the standard approach for the treatment of symptomatic benign prostatic hyperplasia. A large number of studies have demonstrated the efficiency of this established method^(12, 13).



Resection modes for cutting and coagulating

In TUR-P, prostate tissue is removed by a loop through which electric current is passed (monopolar or bipolar) introduced through the urethra.

Good results have been obtained with TUR-P in patients with prostate gland weights of up to 80–100 g. Numerous studies have demonstrated the good long-term results of this approach, with reoperation rates of 12–15 % after 8–10 years⁽¹⁴⁾.



Resectoscope for transurethral resection with loop electrode

If the prostate is larger, than the results are not so good, and open adenoma enucleation is the preferred option. An alternative less invasive method that has been available for some years is holmium or thulium laser enucleation of the prostate^(15, 16).

3.1.1 | MONOPOLAR TUR-P

Monopolar TUR-P has been the standard transurethral resection method for a number of years.



The BOWA ARC 303 HF-Generator

This method requires the use of an electrolyte-free non-conducting irrigating fluid to complete the circuit so that current can flow through the body of the patient to the neutral electrode. There are some disadvantages to this approach. As with all monopolar methods, there is the danger that deeper structures, such as nerves, will be damaged by the current flow, and moreover it may impact on cardiac pace-makers or intracardial defibrillators.

A particular risk associated with monopolar TUR-P is the development of transurethral syndrome. If excess electrolyte-free hypoosmolar liquid accumulates in the body then the patient will develop hypotonic hyperhydration with hyponatremia. Possible consequences include nausea, confusion, bradycardia and hypotonia, through to severe cardiovascular complications and pulmonary and cerebral oedema.

Although TUR syndrome is a very rare complication, when it does occur it can be life-threatening.

These risks can be minimised through the use of bipolar TUR-P, which has been available for some years^(12, 13, 17).

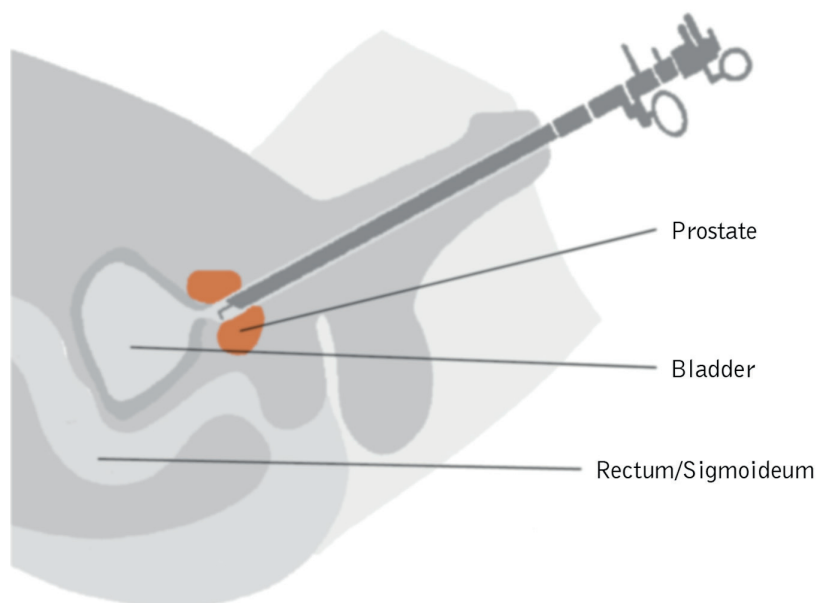
3.1.2 | BIPOLAR TURP



The BOWA ARC 400

Bipolar TUR-P is a refinement of conventional TUR-P. Physiological saline is used for irrigation and to conduct current instead of electrolyte-free solution. Although both the active cutting electrode and the neutral electrode are on the resectoscope, current flows directly via the irrigating medium and the intermediate tissue.

The cutting effect is brought about through the generation of plasma as the loop heats up the saline solution and the tissue. This causes a gas bubble to develop that forms plasma which then ignites and vaporises the tissue, thus enabling the cut. The ignition is visualised through the bright-yellow colour of the loop. The bipolar route of the current brings some advantages over the monopolar standard method. Firstly, the localised current flow means that its effect deeper in the body is reduced. It is therefore less likely that deeper-lying structures will be damaged and any possible effect on cardiac pacemakers is also likely to be reduced. The major advantage, however, is that the use of physiological saline theoretically rules out the possibility of TUR syndrome⁽¹³⁾.

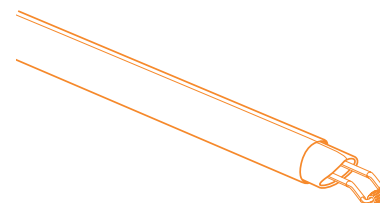


Anatomical overview of a TUR-P intervention

Various randomised studies have compared bipolar TUR-P and the standard monopolar method in recent years. As expected, both methods brought about comparable improvements in the signs and symptoms such as maximum urine flow rate and residual urine values⁽¹⁸⁻²¹⁾. Although somewhat better haemostasis was reported in ex vivo studies for bipolar TUR-P⁽²²⁾, the results for blood loss were not uniform. In some studies it was possible to remove the bladder catheter one day earlier for the bipolar group, and the measured drop in haemoglobin was comparable for both groups^(20, 21). The use of physiological saline for irrigation brings advantages for the resection of large organs in particular, since there is a greater risk of fluid build-up and thus TUR syndrome in such cases.

A very recent development is bipolar plasma vaporisation. The method is based on the TUR-P technique (see above). However, instead of an electric loop a specially-shaped electrode is used (a so-called mushroom), which creates a flat plasma beam in saline solution.

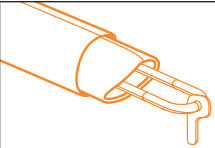
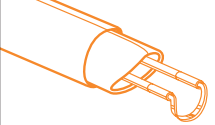
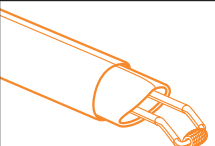
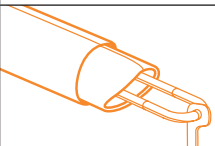
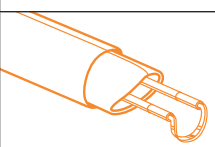
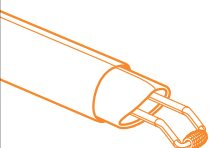
Excess prostate tissue is vaporised by this plasma beam. An initial study has shown that the results obtained are promising. However, it is necessary to wait for long-term results and for a systematic comparison with other methods^(12, 23, 24).



Resectoscope for coagulation and vaporisation

Bipolar plasma vaporisation of the prostate in saline solution (TUVis) in patients receiving oral anticoagulants resulted in lower bleeding and shorter catheter times and hospital stay compared to TUR-P patients⁽²⁵⁾.

3.2 | RECOMMENDED SETTINGS FOR PROSTATE APPLICATIONS

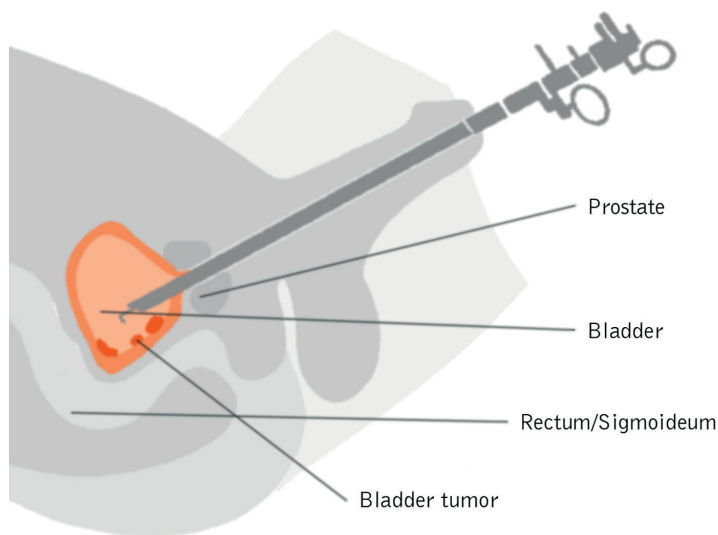
APPLICATION				ARC 400/ARC 350		ARC 303	
				EFFECT	POWER (W)	EFFECT	POWER (W)
TUR-P PROSTATE	M O N O P O L A R		CUT	1	---	3-6	50-100
			COAG	---	40-70	---	40-70
			CUT	4	---	5-8	150-200
			COAG	---	70-100	---	70-100
TUR-VAP PROSTATE VAPORISATION	M O N O P O L A R		CUT	4	---	6-9	150-260
			COAG	---	90-120	---	90-120
TUR-P PROSTATE	B I P O L A R		CUT	1	---	NOT AVAILABLE	
			COAG	---	200		
			CUT	2	---		
			COAG	---	250		
TUR-V PROSTATE VAPORISATION	B I P O L A R		CUT	3	---		
			COAG	---	300		

3.3 | TRANSURETHRAL RESECTION OF THE BLADDER (TUR-BT)

The uses of TUR-BT include demonstration of space requirements for the bladder through histology, endoscopic treatment of surface tumours of the bladder and as part of palliative treatment of advanced tumours of the bladder, in particular if there is bleeding involved⁽²⁶⁾.

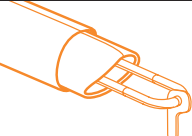
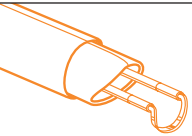
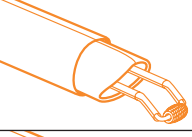
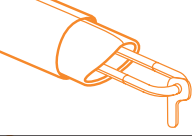
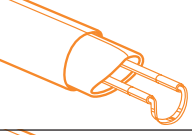

In technical terms, resection of bladder tumours is analogous to resection of the prostate. Both monopolar and bipolar resection systems may be used. However, one of the main benefits of bipolar resection is not exploited here since the resection of bladder tumours does not generally lead to fluid accumulation, so that there is very little risk of TUR syndrome. The localised flow of current in bipolar resections does, however, offer the advantage that there

is less risk of stimulation of the obturator nerve when tumours on the side wall of the bladder are resected. This, however, is difficult to quantify in practice.



Anatomical overview of a TUR-BT intervention

3.4 | RECOMMENDED SETTINGS FOR TUR-BT

APPLICATION				ARC 400/ARC350		ARC 303	
				EFFECT	POWER (W)	EFFECT	POWER (W)
TUR-BT BLADDER	M O N O P O L A R		CUT	1	---	3-6	50-100
			COAG	---	40-70		40-70
			CUT	2	---	5-8	100-150
			COAG	---	60-90		60-90
TUR-VAP BLADDER VAPORISATION	M O N O P O L A R		CUT	4	---	6-9	150-250
			COAG	---	90-120		90-120
TUR-BT BLADDER	B I P O L A R		CUT	1	---	NOT AVAILABLE	
			COAG	---	200		
			CUT	2	---		
			COAG	---	200		
TUR-BT BLADDER VAPORISATION	B I P O L A R		CUT	3	---		
			COAG	---	200		






4

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5 | USAGE- PRODUCT MATRIX

Instrument	ARC 400/ARC 350	ARC 303	NightKNIFE LIGATOR	TissueSeal	BiZZER
Fig.					
NEPHRECTOMY, EXCISION OF RENAL TUMOURS, PROSTATECTOMY, CYSTECTOMY	●			●	●
NEPHRECTOMY, EXCISION OF RENAL TUMOURS, PROSTATECTOMY, CYSTECTOMY	●		●		
TUR (MONOPOLAR) PROSTATE BLADDER	●	●			
TUR (MONOPOLAR) VAPORISATION	●	●			
TUR (BIPOLAR) PROSTATE BLADDER	●				
TUR (BIPOLAR) VAPORISATION	●				

6 | FAQ – USE OF THE BOWA ARC IN UROLOGY

How does the EASY system work?

The EASY system monitors split neutral electrodes, detects detachments and stops monopolar activations in case of errors and therefore minimizes the risk of burns at the site where the neutral electrode is attached.

A dynamic reference resistance is set when applying the neutral electrode. If the measured resistance at the neutral electrode is 50 % higher than the reference resistance the EASY system will stop monopolar activation, give an acoustic signal and show an error code on the display.

What is the advantage of bipolar resection?

When using bipolar resection, the current runs only between the two electrodes of the instrument, as both electrodes are on the instrument. This means, that the heat effect is more localised, and the risk of damaging deeper structures is smaller. This also means, that there is no need for a neutral electrode when using bipolar technique, thus eliminating the risk of burns as well. Bipolar resection permits the use of NaCl as a conducting irrigating

fluid so that the risk of TUR syndrome is reduced.

What is TUR syndrome?

If the monopolar method is used with non-conducting irrigating fluids then the irrigating fluid can enter the circulation through veins opened during surgery, leading to fluid overload, disturbed electrolyte balance and hyponatraemia.

The resulting symptoms are very diverse and can affect the central nervous system (e.g. headache, cerebral oedema, convulsions, coma), the cardiorespiratory system (e.g. blood pressure disturbances, pulmonary oedema, cyanosis) or can be generalized (e.g. abdominal pain, hypothermia, blood clotting disturbances (such as Disseminated Intravascular Coagulopathy, DIC)) as well. The treatment is difficult and mainly supportive.

What are the risks of bipolar resection?

Irrigation must be continuous and continuous activations must be avoided to prevent complications through the heating of the irrigating fluid.

If resectoscopes with a conducting outer shaft are used then conducting lubricating gels should be used as the urethra may otherwise be damaged.

When bipolar resection is used can it also lead to jerk movements of the patient?

This has been reported to a lesser degree with bipolar resection, but if the resection is carried out very close to nerves then the use of anaesthetics is recommended.

What is the purpose of the BOWA ARC CONTROL?

The minimum power level required for a reproducible tissue effect can be achieved through the arc in a fraction of a second, so that only the minimum quantity of energy required is delivered to the patient.

How is the effect of bipolar resection set on the instrument?

Three effects are available: Effect 1 for needle-knife electrodes and small loops, effect 2 for resection loop electrodes and effect 3 for vaporisation.

Why is a high initial cutting power required?

The initial cutting power facilitates immediate onset of the arc, resulting in a smooth cutting effect without jerking movements. The high power is only delivered directly during initial cutting and is controlled to a constant value of 250 W within a fraction of a second. The ARC 400 has the power to deliver this.

What is the purpose of the BOWA COMFORT cable?

The plug is fitted with an RFID chip, so that the instrument is clearly identified. The parameters are selected automatically in advance together with the release of the power required for the application.

Which resectoscopes can be used?

BOWA offers connecting cable for the monopolar and bipolar resectoscopes of Storz, Wolf and Olympus.

Can connecting cables of the resectoscope manufacturers be used with BOWA generators?

With bipolar resection only BOWA connecting cables may be used with BOWA ARC generators as these cables meet the requirements for high initial cutting power and have the chip to release maximum power.

Can BOWA cables be used with instruments from other manufacturers?

The connecting cables have been developed specifically for use with BOWA ARC generators with a COMFORT function and are not compatible with those from other manufacturers.

Can the BOWA ARC generator also be used for other applications?

The BOWA ARC 400 can be used in all electrosurgical fields.

Can accessories from other manufacturers be used?

Common standard accessories can be directly connected via a corresponding jack configuration without an adapter.

Can the BOWA ARC 400 also be used for the sealing of vessels?

BOWA offers the ligation option for the ARC 400 as well as a range of laparoscopic and open surgery instruments.

What is the service life of BOWA cables?

BOWA cables are guaranteed to work for 100 autoclave cycles.

The number of uses is logged on the instrument and can be read out. If the cables are used beyond the guaranteed number of cycles then the user bears responsibility for this.

How to determine whether an instrument is disposable or reusable?

The single-use instruments are always clearly marked with the “single-use” symbol.



Always consult the manual before using an instrument.



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