

Why applying an “enhanced recovery after surgery =ERAS” programme to your patients?

The concept of enhanced recovery after surgery was first developed for colo-rectal surgery with the goal to improve the outcome of the patients by reducing the harms generated by the surgery and the anaesthesiological management.

The patient undergoing a surgical procedure following the concept of enhanced recovery will have fewer side effects from the surgical procedure, a lower risk of complications, resulting in a faster, safer, easier and more comfortable recovery and a shorter stay in the hospital and an earlier uptake of normal activity. In summary, the procedure will be less aggressive and the patient will recover much sooner, avoiding unnecessarily long hospital stays.

The concept of ERAS is based on three main tools. These are: minimal invasive surgery, a standardized clinical pathway and an active and involved patient. ERAS helped in colorectal surgery to reduce significantly the rate of complications and with this the length of stay in the hospital. This concept is more and more frequently extended to other surgical procedures. Today the concept is also applied in urology.

We consider the improved outcome of the patients the main advantage for our patients. A positive side-effect is an earlier discharge of the patient liberating valuable hospital capacities.

The development of an ERAS programme is depending on several key points:

1. ERAS is a multi-disciplinary as well as multi-professional approach involving at the same time and on equivalent levels surgeons, anaesthetists, nursing staff, patient manager, dieticians, physiotherapists, and, in some cases, also internal medicine and geriatricians. Without the dedication and involvement of each of these contributors, an ERAS programme will only be a limited success. In your hospital, we strongly recommend to found an ERAS team involving members of each of the above key players. Only inside such a team you will be able to develop a successful, functional and dynamic ERAS programme.
2. Each of the above key players needs to contribute to the standardized clinical pathways that aim to optimize the management of the patients. We provide with this document written clinical pathways for radical cystectomy with urinary diversion, radical prostatectomy and radical or partial nephrectomy. These protocols represent a summary of the protocols that are already applied in experienced centres over Europe and should help to establish a standardized clinical ERAS pathway in your centre. Of course, it might be necessary and helpful to adapt the protocols to your local needs, conditions and circumstances as well as it might be necessary to adapt the protocol to an individual patient. However, you need to be aware that the more tools and elements of an ERAS protocol are applied the higher the effect on the outcome. Studies have shown that at least 80% of the elements need to be applied in order to generate a positive effect. Integrating and informing medical care providers that will take care of the patients after discharge, such as the general practitioners or liberal nurses, will also be of help. A generic information letter for these peoples is also part of the document and might be translated in your language .
3. The written standardized clinical pathway will allow that the effect of an ERAS programme is reproducible in any patient and by any member of your multi-disciplinary and multi-professional team. To make sure that the elements of ERAS are applied, the application needs to be evaluated in a constant process. Moreover, complications and deviations from the protocols should also be systematically registered. This data can be used to generate constant quality improvement circles following the concept of “plan –do –check –act”. By identifying problems, the clinical pathway can be adjusted with the aim to lower the risk that

such a deviation or complication will occur again. A list of points that should constantly be evaluated is included in this document as well.

4. The active patient plays a key role in the ERAS programme. This means that you need to actively integrate the patient into the management and pathway. For this, you need to inform and educate the patient about the steps and measures that are taken inside an ERAS protocol before the surgical intervention. A generic information letter with the necessary explanations in English is also provided with this document and can be translated in your language.

5. Minimal invasive surgery represents another key element of an ERAS programme as minimal invasive surgery will reduce the trauma and aggression to a patient. Despite this, open surgery is not an exclusion criteria of an ERAS programme. Many of the elements can and should also be applied in patients scheduled and treated with open surgery. In order to evaluate the recovery process, the patient should keep track of the peri- and post-operative period. This will allow you to measure important outcomes of the patients' recovery, especially those of mobilization, physical activity, food and fluid intake and uptake of normal physical and professional activity.

In order to develop an ERAS programme in your hospital, you should thoroughly read and understand all the provided documents in detail. We hope that we are able to be of help with this task.

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PATIENT INFORMATION

Improving and shortening the hospital stay with the help of enhanced recovery after surgery

You will undergo a surgical procedure following the concept of enhanced recovery. As a result of specific surgical as well as anesthesiological measures and tools, you will have less side effects from your surgical procedure, a lower risk of complications and a shorter stay in the hospital. The procedure will be less aggressive and you will recover much sooner, avoiding unnecessarily long hospital stays.

In case that an early discharge from the hospital is not possible, alternatives will be explored already with you and your family at the time point of procedure planning.

Your active participation and involvement will be an essential aspect to achieve the goals of this programme.

In order to evaluate your recovery process, we would like you to keep a logbook of your peri- and post-operative period. This logbook will allow us to measure important outcomes of your recovery, especially those of your mobilization, physical activity and food and fluid intake.

In the following we would like to go through some important points and details of this programme:

In preparation for the procedure at home :

- Please maintain or increase your physical activity with at least 1h of walking per day or 10000 steps. Your smartphone might be of help to monitor these goals.
- If you smoke, please stop smoking 4 weeks before the procedure. We are happy to provide you with help to obtain this goal.
- Please stop alcohol intake 4 weeks before the procedure

Before the procedure in the hospital :

- Be aware that an intestinal preparation is not necessary. In some cases your surgeon might ask for an exception from this rule. However, a rectal enema will be applied before the procedure.
- To have nothing by mouth since the day before surgery is not recommended. It does reduce your ability of healing. In fact, we will offer you energizing drinks the evening and the morning before the procedure. They can be taken up to 2 hours before you leave for the OR.
- To take a pill against stress and anxiety is not recommended the day nor the morning of the intervention. Its effect frequently remains active after the surgery and does slow down your recovery process.

During the procedure :

- For your procedure, we will give preference to a minimal invasive approach whenever possible. This is done through small, 1-3cm long, incisions using laparoscopic or robot-assisted surgical techniques avoiding large openings of the abdominal wall. This technique usually reduces substantially the surgical trauma, the postoperative pain and blood loss.
- We will rely on an efficient pain management that will be started already during the intervention. It will consist of several drugs and local or loco-regional analgesic techniques. In case that you feel pain after the procedure, we would like to invite you to keep us informed about this situation

so we can adapt the pain protocol to your needs and render you pain free. The absence of pain is an essential aspect that will allow your early mobilization and with this your improved recovery.

- The same approach is used for postoperative nausea and vomiting. We will start measures against this situation already during the procedure. In case that the treatment is not sufficient, please keep us informed, so we can adjust the protocol to your needs.

After the procedure :

Return to your room

- As soon as you return to your room, we will offer you beverages and a light meal. We will also encourage and help you to get out of bed or in a relaxing chair. This mobilization will help you to shorten the time for reactivation of the digestive function, reduce the risk of nausea, allow an early food intake, lower the risk of pulmonary complications and lower the risk of thrombosis /phlebitis as well as pulmonary embolism.
- You might receive all medical treatment by mouth only. If you have an i.v. line, it will be removed as soon as possible.
- You will be provided with chewing gums. The chewing will stimulate the digestive function of your body and shorten the time to reactivation of bowel movements.
- You should wear compression stockings all the time, for the 4 weeks following the procedure.
- A blood test might be done in the evening or the next morning after the procedure.

The day after the surgery

- Starting on postoperative day 1, you will receive normal food and you should aim to drink 1,5-2 liters of fluid during the day. You should maintain the chewing of chewing gums. You should remain out of bed at least 6 hours during the day and walking outside of your room is strongly recommended.
- If the procedure allows, drains, catheters and i.v. lines will be removed.
- If your situation allows, you might be discharged from the hospital today or at one of the following days.
- The reappearance of bowel movements might take up to 3 days after the surgery. We might provide you with a treatment that helps to activate this process (laxatives). The absence of bowel movements is not a reason to keep you in the hospital.
- The day of your discharge, you will receive your appointments for the follow-up and control visits as well as the necessary papers for your postoperative care by your family practitioner, nursing staff, etc..

After return to your home :

- You should maintain a physical activity, ideally by regular walking. Avoid prolonged lying in bed or sitting.
- You should receive an injection of heparine once a day to lower the risk of thrombosis /phlebitis as well as pulmonary embolism during the 4 weeks after surgery.
- If you experience any problems during the days after your return to your home, such as fever, pain, bleeding, dizziness and vomiting, please contact us under the following number: XXXXXXXX
- Please keep your log-book updated and bring it to your next follow-up visit.

A team helping you through surgery :

All members of the your medical team in our hospital : surgeons, anesthetists, nursing staff, patient manager, dieticians, physiotherapist, etc. are actively contributing to the success of your procedure and treatment. However, your own participation and compliance with our programme are the essential aspects to render your intervention more comfortable and safer for you, and at the same time less painful, less aggressive and at a lower risk of complications. We thank you fro your participation to obtain these goals.

INFORMATION

Improving and shortening the hospital stay with the help of enhanced recovery after surgery

Your patient will undergo a surgical procedure following the concept of enhanced recovery. As a result of specific surgical as well as anesthesiological measures and tools, the patient will have less side effects from the surgical procedure, a lower risk of complications and a shorter stay in the hospital. The procedure will be less aggressive and the patient will recover much sooner, avoiding unnecessarily long hospital stays.

The concept of enhanced recovery after surgery was first developed for colo-rectal surgery and helped here to reduce significantly the rate of complications and with this the length of stay in the hospital. This concept is more and more frequently extended to other surgical procedures. We are aiming to provide the same advantages to our patients by applying the concept in our hospital as well. The main objective of this protocol is to reduce the harms and the aggression that is generated by the surgical procedure as well as the anesthesiological management, resulting in a faster, safer, easier and more comfortable recovery. We consider this a main advantage for our patients. We want to make clear, that the aim of this approach is not to discharge the patient unreasonably early to liberate hospital capacity. The main advantage of the enhanced recovery programme is the increase in safety for our patients and the earlier uptake of normal activity.

The active participation and involvement of our patients will be an essential aspect to achieve the goals of this programme. In addition to this, your support and involvement will also help to make this approach a success. We are happy to discuss details with you if you wish.

In order to evaluate the recovery process, the patient will keep track of the peri- and post-operative period. This will allow us to measure important outcomes of the patients' recovery, especially those of mobilization, physical activity and food and fluid intake.

In the following we would like to go through some important points and details of this programme:

In preparation for the procedure at home :

- The patient should maintain or increase physical activity with at least 1h of walking per day or 10000 steps. A smartphone might be of help to monitor these goals.
- If the patient smokes, he/she should stop smoking 4 weeks before the procedure. Your help to achieve this task is very welcome. We will also provide help to the patient to obtain this goal.
- The patient should stop alcohol intake 4 weeks before the procedure.

Before the procedure in the hospital :

- An intestinal preparation is not necessary.
- The patient will be allowed to eat up to 6 h before surgery and we will offer energizing drinks the evening and the morning before the procedure to improve the outcome. They can be taken up to 2 hours before surgery.
- Medical treatment against stress and anxiety is not recommended the day nor the morning of the intervention. Its effect frequently remains active after the surgery and does slow down the recovery process.

During the procedure :

- We will give preference to a minimal invasive approach whenever possible. This is done using laparoscopic or robot-assisted surgical techniques avoiding large openings of the abdominal wall. This technique usually reduces substantially the surgical trauma, the postoperative pain and blood loss.
- We will rely on an efficient pain management that will be started already during the intervention. It will consist of several drugs and local or loco-regional analgesic techniques. The absence of pain is an essential aspect that will allow early mobilization and with this an improved recovery.
- The same approach is used for postoperative nausea and vomiting.

After the procedure :

Return to the ward

- As soon as the patient returns to the ward, we will offer beverages and a light meal. We will also encourage and help the patient to get out of bed or in a relaxing chair. This mobilization will help to shorten the time for reactivation of the digestive function, reduce the risk of nausea, allow an early food intake, lower the risk of pulmonary complications and lower the risk of thrombosis /phlebitis as well as pulmonary embolism.
- The patient will receive by preference medical treatment by mouth only.
- The patient will be provided with chewing gums. This will stimulate the digestive function and the reactivation of bowel movements.
- The patient should wear compression stockings all the time, for the 4 weeks following the procedure.

The day after the surgery

- Starting on postoperative day 1, the patient will receive normal food and beverages and should remain out of bed at least 6 hours during the day and walking outside of the patients' room is strongly recommended.
- If the procedure allows, drains, catheters and i.v. lines will be removed.
- If the situation allows, the patient might be discharged from the hospital on day 1 or at one of the following days.
- The reappearance of bowel movements might take up to 3 days after the surgery. We might provide the patient with a treatment by laxatives. The absence of bowel movements is not a reason to keep the patient in the hospital.
- The day of discharge, the patient will receive appointments for the follow-up and control visits as well as the necessary papers for the postoperative care.

After return to your home :

- The patient should maintain a physical activity, ideally by regular walking. Prolonged lying in bed or prolonged sitting should be avoided.
- The patient should receive an injection of heparine once a day to lower the risk of thrombosis /phlebitis as well as pulmonary embolism during the 4 weeks after surgery.
- If the patient experiences any problems during the days after return to home, such as fever, pain, bleeding, dizziness and vomiting, the patient is supposed to contact us under the following number: XXXXXXXX. If you discover any of these abnormalities please contact us under the same phone number

We hope that we will be able to improve the outcome of our patients by a joint effort between you and our hospital team. We thank you for your help and support to achieve this goal.

Recommended reporting elements for ERAS

The written standardized clinical pathway will allow that the effect of an ERAS programme is reproducible in any patient and by any member of your multi-disciplinary and multi-professional team. To make sure that the elements of ERAS are applied, the application needs to be evaluated in a constant process. Moreover, complications and deviations from the protocols should also be systematically registered. This data can be used to generate constant quality improvement circles following the concept of “plan –do –check –act”. By identifying problems, the clinical pathway can be adjusted with the aim to lower the risk that such a deviation or complication will occur again. A list of points that should constantly be evaluated and reported is shown below:

Patient-specific details:

- Admission date
- Age
- Comorbidities (ASA grade, charlson index)
- Treatment that might increase complications (i.e.:Platelet aggregation inhibitors, etc...)
- BMI
- Preoperative staging (TNM)
- Administration of neoadjuvant chemotherapy Y/N
- Smoker preoperatively Y/N
- Given guidance to help quit smoking Y/N
- Continued to smoke postoperatively Y/N

Operation details:

- Surgical technique (open, robot-assisted, laparoscopic)
- Specific details such as diversion type in cystectomy patients (ileal conduit, orthotopic neobladder, continent pouch, etc..)
- Here also extracorporeal or intracorporeal diversion
- Intraoperative complications
- Blood loss
- Pathologic staging (TNM)
- Length of stay (LOS) in days (date of admission to date of actual discharge)
- Readmission Y/N (date of readmission)
- 30- and 90-d complications (Clavien-Dindo classification)

ERAS-specific details:

- Tabular reporting of all EARS elements included from guidelines and any additional elements
- Clearly explain all ERAS elements including specific algorithms and pathways used in care pathway where applicable, for example:
 - Medications/concentrations used
 - Antibiotic prophylaxis
 - Analgesia escalation strategies
 - Intravenous infusion rates and criteria for goal-directed therapy
 - Drain placement algorithms
 - Epidural (if used)/regional level, single injection vs infusion/catheter placement
- Report compliance for all elements named in ERAS
- When failure of an ERAS element occurs, it should be reported and reason for failure explained including adverse events related to an ERAS element
- Discharge criteria should be reported. If a substitute for LOS such as “readiness for discharge” is used, there should be a report of actual LOS and a listing of reasons for nonmedical extension of hospitalisation

Phase	Item	Elements
pre surgical	1. Preoperative counseling and education	Details of intervention and ERAS protocol
		Details of admission and recovery
		Advice about maintaining activity levels
		Dietary and alcohol advice
		Offer pre cystrectomy education for urinary diversion (i.e.stomatherapy counseling)
		Offer psychological and anxiolytic support
	2. Prehabilitation exercise	Provide written material detailing intervention and post-op recovery plan
		Communicate with general practitioner, nurses network (brochure)
		Walking for 1 hour per day
	3. Preoperative medical optimization	Offer to patients with chronic obstructive pulmonray disease insentive inspirometry
		Optimize managment of co-morbidities
		Smoking cessation advice
		Geriatric evaluation if G8 score ≤ 14
Screen for denutrition (loss of weight, nutritional problems, low serum albumin level)		
4. Correction of anemia/denutrtion	Plan social aspects of dicharge. Who will help/care for patient?	
	Oral iron supplements or i.v. iron	
	Oral nutritional supplements	
	Starting 7 days before surgery oral immun modulators	
5. Oral mechanical bowel preparation	Omitted. Normal diet until pre-op fasting	
6. Self administered thromboprophylaxis	Consider single LMWH injection 12 hours prior to surgery administerd at home	
Admission	7. Pre-operative oral intake	Clear fluid until 2 hours pre-op
		Solid foods until 6 hours pre-op
		Rectal enema the day before and/or the day of surgery
	8. Pre-operative carbohydrate loading	Carbohydrate loading with 50 g of isoosmolar Glucids (e.g. Nutricia PreOp,), 2 loads the night before surgery, 2 loads the morning at least 2 hours before surgery. Careful use in diabetic patients, no use in insulinodepandant diabetic patients
	9. Pre-anaesthesia medication	Avoidance of long-acting or short-acting sedatives or anxiolytics
Anaesthesia	10. Standardized anesthetic protocol	following the principles of:
		Preferred use of short acting molecuels

		Avoid morphine use throughout the intervention
		Prevention of postoperative neusea and vomitting
		Anticipation of postoperative pain
	10.1 Pain management	Epidural anaesthesia omitted
		Consider loco regional analgesia, such as rectus sheath catheters, analgetic wound catheters, etc.
		Consider i.v. lidocain for analgetic effect
		Use only short acting morphine derivates
		Anticipation of postoperative pain managment before wake up
	10.2 Prevention of neausea and vomitting	Consider single dose of corticoids (Dexamethasone 8mg) at induction of anaesthesia to avoid neausea and vomitting
		Systematic use of antiemetics in the periopertiv phase
	10.3 Anti-microbial prophylaxis	In accordance to European or national guidelines/ recommendations
	10.4 Perioperaive ventilation	Limit respiratory volume to 6-8 ml/kg
		Apply a PEEP of 6-8 cmH2O
		Monitor respiratroy pressure (<17cm H20)
		Perform regular alveolar recruitment manouvers to avoid atelectasia
	10.5 Thromboembolic prophylaxis	Thromboembolic compression stockings
		28 days pharmacological prophylaxis with LMWH starting day before surgery
		Consider intra-operative pneumatic compression stockings
	10.6 Perioperative fluid management	Avoid overhydration or underhydration. Use vasopressors to maintain arterial tension if needed. Aim for 3-5ml/kg/hour as i.v. fluid intake, depending on the surgical approach.
	10.7 Nasogastric intubation	No NGT or it is removed at the end of surgery
	10.8 Preventing intraoperative hypothermia	Use of a warming blanket (pulsed heated air)
Surgery	11. Minimally invasive approach	Give preference to miminal invasive surgery such as robot assisted radical cystectomy
		Maintain intrabdominal pressure as low as possible (<14mmHg, ideally <10mmHg)
		Mini-Open Cystectomy incision
	12. Resection site drainage	Consider omitting pelvic drain or use only 1 drain
		Removal of drain as early as possible (< day 3)
		Consider creatinin levels on drain liquid if >200cc/24h to exlcude urinary fistula
	13. Skin closure	If subcutaneous tissue is not contaminated, consider intracutaneous sutures and glue skin dressings

	14. Urinary drainage	Give preference to transurethral ureteral stents (simple J) or double J stents. Give preference to transurethral neo-bladder catheter.
Post-operative	15. Post-operative pain management	Use a multimodal analgetic protocol starting with Paracetamol
		Use nonsteroidal antiinflammatory drugs for 48 hours if no contra indication
		Use local analgesia for 48-72 hours
		Avoid or reduce the use of morphine derivates if possible or use by need (patient control)
	16. Preventon of postoperative respiratory complications and thrombosis	Use of insentive inspirometry in patients with chronic obstructive pulmonray disease
		Administer pharmacological prophylaxis with LMWH
		Apply compression stockings for 28 days
	17. Post-operative diet and prevention of ileus	Chewing gum to start at 4 hours after surgery
		Oral fluids to start evening of surgery - 30mls/hour of clear non-fizzy fluids
		Resume diet when passing flatus, mobile and pain controlled.
		Give preference to non morphinic analgetics
		Optimise i.v. fluid intake and stop as soon as possible
		Consider systematic use of prokinetic agents and laxatives
		In case of ileus, consider NGT, i.v. fluides and i.v. medication
		Consider stress ulcer prophylaxis with proton pump inhibitors during hospitalisation
	18. Prevention of PONV	Anti-emetics as needed
		Early resumption of oral fluids
	19. Early mobilization	6 Hours out of bed on POD 1
		Walk 10m or more on POD 1
		Walk 50m or more on POD 2
		Walk >100m or more on POD 3+
	20. Urinary drainage	Assure constant7reliable drainage by stents and neo-bladder catheter by regular flushing
		Ureteral stents removed as early as possible (day 5 to day 10).
		Neo-bladder catheter removed after cystogram for neobladder as early as possible.
		Consider urin culture 2-3 days before stent/catheter removal to treat possible UTI, possibly resulting in febrile UTI after stent removal
		Offer early education for the urinary diversion: stomatherpy for ileal conduit, explantions for management of continent diversions

		Monitor renal function in the postoperative period
		Offer alkaline substitution after catheter removal in neo-bladder patients to avoid metabolic acidosis (by mineral water or oral supplement)
After discharge	21. Management after discharge	Advice about maintaining activity levels
		Offer support for management of urinary diversion
		Consider post discharge support and monitoring by nurses network, stomatherapist, physiotherapist, dietician, psychologist
		Dietary advice
		Offer alkaline substitution in neo-bladder patients to avoid metabolic acidosis (by mineral water or oral supplement)
		Monitor: complications up to 90days postoperative, readmission rates, non scheduled out patient visits, phone calls
	22. Audit, adjust, apply	Audit compliance. Understand problems. Identify solutions. Keep resource within team

LMWH: Low molecular weight heparin

NGT: Nasogastric tube

POD: Post-operative day

PONV: post-operative nausea and vomiting

iRARC: Robot assisted Radical Cystectomy with intra-corporeal reconstruction

I/V: Intravenous

Phase	Item	Elements	
Pre surgical	1. Preoperative counseling and education	Details of intervention and ERAS protocol	
		Details of admission and recovery	
		Advice about maintaining activity levels	
		Dietary and alcohol advice	
		Offer psychological and anxiolytic support	
		Provide written material detailing intervention and post-op recovery plan	
		Communicate with general practitioner, nurses network (brochure)	
	2. Prehabilitation exercise	Walking for 1 hour per day	
		Offer to patients with chronic obstructive pulmonray disease insentive inspirometry	
	3. Preoperative medical optimization		Optimize managment of co-morbidities
Smoking cessation advice			
Geriatric evaluation if G8 score ≤ 14			
Screen for denutrition (loss of weight, nutritional problems)			
Admission	4. Pre-operative oral intake	Clear fluid until 2 hours pre-op	
		Solid foods until 6 hours pre-op	
		Rectal enema the day before and/or the day of surgery	
	8. Pre-operative carbohydrate loading	Carbohydrate loading with 50 g of isoosmolar Glucids (e.g. Nutricia PreOp,), 2 loads the night before surgery, 2 loads the morning at least 2 hours before surgery. Careful use in diabetic patients, no use in insulinodepandant diabetic patients	
	9. Pre-anaesthesia medication	Avoidance of long-acting or short-acting sedatives or anxiolytics	
Anaesthesia	10. Standardized anesthetic protocol	following the principles of:	
		Preferred use of short acting moleculs	
		Avoid morphine use throughout the intervention	
		Prevention of postoperative neusea and vomitting	
		Anticipation of postoperative pain	
	10.1 Pain management		Epidural anaesthesia omitted
			Consider i.v. lidocain for analgetic effect
Use only short acting morphine derivates			
		Anticipation of postoperative pain managment before wake up	

	10.2 Prevention of neausea and vomitting	Consider single dose of corticoids (Dexamethasone 8mg) at induction of anaesthesia to avoid neausea and vomitting
		Systematic use of antiemetics in the periopertiv phase
	10.3 Anti-microbial prophylaxis	In accordance to European or national guidelines/ recommendations
	10.4 Perioperaive ventilation	Limit respiratory volume to 6-8 ml/kg
		Apply a PEEP of 6-8 cmH2O
		Monitor respiratroy pressure (<17cm H2O)
		Perform regular alveolar recruitment manouvers to avoid atelectasia
	10.5 Thromboembolic prophylaxis	Thromboembolic compression stockings
		28 days pharmacological prophylaxis with LMWH
	10.6 Perioperative fluid management	Avoid overhydration or underhydration. Use vasopressors to maintain arterial tension if needed. Aim for 3ml/kg/hour as i.v. fluid intake.
	10.7 Nasogastric intubation	No NGT or it is removed at the end of surgery
	10.8 Preventing intraoperative hypothermia	Use of a warming blanket (pulsed heated air)
Surgery	11. Minimally invasive approach	Give preference to miminal invasive surgery such as robot assisted radical prostatectomy
		Maintain intrabdominal pressure as low as possible (<14mmHg, ideally <10mmHg)
		Mini-Open prostatectomy incision
	12. Resection site drainage	No pelvic drain
	13. Skin closure	Intracutanious sutures and glue skin dressings
	14. Urinary drainage	Transurethral Foley catheter of 18-20 Ch
Post-operative	15. Post-operative pain management	Use a multimodal analgetic protocol avoiding i.v. administration
		Use nonsteroidal antiinflammatory drugs for 48 hours if no contra indication
		Avoid or reduce the use of morphine derivates if possible
	16. Preventon of postoperative respiratory complications and thrombosis	Use of insentive inspirometry in patients with chronic obstructive pulmonray disease
		Administer pharmacological prophylaxis with LMWH
		Apply compression stockings for 28 days
	17. Post-operative diet and prevention of ileus	no i.v. administration after leaving the recovery room
		Chewing gum to start at 4 hours after surgery
		Free oral fluids and solid diet start evening of surgery
		Resume normal diet on day 1

		Give preference to non morphinic analgetics avoiding i.v. administration
		Consider systematic use of laxatives starting on day 1
		Consider stress ulcer prophylaxis with proton pump inhibitors during hospitalisation
	18. Prevention of PONV	Anti-emetics as needed
	19. Early mobilization	start mobilisation and position out of bed on day 0
		At least 6 Hours out of bed on POD 1 including walking, seating and food intake out of bed
	20. Urinary drainage	Assure reliable drainage by bladder catheter
		Bladder catheter removed as early as possible
		A cystogram is not mandatory. The need depends on the surgical approach
		Early education for the use of the bladder catheter and the urine collector to allow discharge with the catheter
After discharge	21. Management after discharge	Discharge as early as possible, starting on day 1 if following criteria fulfilled: <ul style="list-style-type: none"> - Pain controlled by oral anaetetics (VAS \leq3) -Oral food intake well tolerated -No i.v. administration -Independant mobilisation / autonomy -bowel function recovered passing gas -No signs of infection, -Patient accepts discharge
		Advice about maintaining activity levels
		Consider post discharge support and monitoring by nurses network
		Monitor: complications up to 90days postoperative, readmission rates, non scheduled out patient visits, phone calls
	22. Audit, adjust, apply	Audit compliance. Understand problems. Identify solutions. Keep resource within team

LMWH: Low molecular weight heparin

NGT: Nasogastric tube

POD: Post-operative day

PONV: post-operative nausea and vomiting

i.v.: Intravenous

Phase	Item	Elements
Pre surgical	1. Preoperative counseling and education	Details of intervention and ERAS protocol
		Details of admission and recovery
		Advice about maintaining activity levels
		Dietary and alcohol advice
		Offer psychological and anxiolytic support
		Provide written material detailing intervention and post-op recovery plan
		Communicate with general practitioner, nurses network (brochure)
	2. Prehabilitation exercise	Walking for 1 hour per day
		Offer to patients with chronic obstructive pulmonray disease insentive inspirometry
	3. Preoperative medical optimization	Optimize managment of co-morbidities
Evaluate preoperative renal function and estimate postoperative renal funtion, consider nephrologic consultation if moderate to severe renal function impairment is expected		
Smoking cessation advice		
Geriatric evaluation if G8 score ≤ 14		
Screen for denutrition (loss of weight, nutritional problems)		
Admission	4. Pre-operative oral intake	Clear fluid until 2 hours pre-op
		Solid foods until 6 hours pre-op
		Rectal enema the day before and/or the day of surgery
	8. Pre-operative carbohydrate loading	Carbohydrate loading with 50 g of isoosmolar Glucids (e.g. Nutricia PreOp,), 2 loads the night before surgery, 2 loads the morning at least 2 hours before surgery. Careful use in diabetic patients, no use in insulinodepandant diabetic patients
	9. Pre-anaesthesia medication	Avoidance of long-acting or short-acting sedatives or anxiolytics
Anaesthesia	10. Standardized anesthetic protocol	following the principles of:
		Preferred use of short acting moleculs
		Avoid morphine use throughout the intervention
		Prevention of postoperative neausea and vomitting
		Anticipation of postoperative pain
	10.1 Pain management	Epidural anaesthesia omitted

		Consider i.v. lidocain for analgetic effect
		Use only short acting morphine derivates
		Anticipation of postoperative pain managment before wake up
	10.2 Prevention of neausea and vomitting	Consider single dose of corticoids (Dexamethasone 8mg) at induction of anaesthesia to avoid neausea and vomitting
		Systematic use of antiemetics in the periopertiv phase
	10.3 Anti-microbial prophylaxis	In accordance to European or national guidelines/ recommendations
	10.4 Perioperaive ventilation	Limit respiratory volume to 6-8 ml/kg
		Apply a PEEP of 6-8 cmH2O
		Monitor respiratroy pressure (<17cm H2O)
		Perform regular alveolar recruitment manouvers to avoid atelectasia
	10.5 Thromboembolic prophylaxis	Thromboembolic compression stockings
		28 days pharmacological prophylaxis with LMWH
	10.6 Perioperative fluid management	Avoid overhydration or underhydration. Use vasopressors to maintain arterial tension if needed. Aim for 3ml/kg/hour as i.v. fluid intake.
	10.7 Nasogastric intubation	No NGT or it is removed at the end of surgery
	10.8 Preventing intraoperative hypothermia	Use of a warming blanket (pulsed heated air)
Surgery	11. Minimally invasive approach	Give preference to miminal invasive surgery such as robot assisted or laparoscopic partial nephrectomy or radical nephrectomy
		Maintain intrabdominal pressure as low as possible (<14mmHg, ideally <10mmHg)
		Minimize incisions in open surgery
	12. Resection site drainage	Avoid use of abdominal or retroperitoneal drain
	13. Skin closure	Intracutanious sutures and glue skin dressings
	14. Urinary drainage	Transurethral Foley catheter removed in the recovery room if no contra indication
Post-operative	15. Post-operative pain management	Use a multimodal analgetic protocol
		Use nonsteroidal antiinflammatory drugs for 48 hours if no contra indication
		In case of arterial clamping during partial nephrectomy avoid the use of nonsteroidal antiinflammatory drugs, the same applies for patients after radical nephrectomy with a risk of moderate to severe renal function impairment
		Avoid or reduce the use of morphine derivates if possible
	16. Preventon of postoperative respiratory complications and thrombosis	Use of insentive inspirometry in patients with chronic obstructive pulmonray disease

		Administer pharmacological prophylaxis with LMWH
		Apply compression stockings for 28 days
	17. Post-operative diet and prevention of ileus	Consider i.v. hydration (1000ml) during the first postoperative night to protect renal function, especially after arterial clamping
		no i.v. administration after the first postoperative night
		Chewing gum to start at 4 hours after surgery
		Free oral fluids and solid diet start evening of surgery
		Resume normal diet on day 1
		Give preference to non morphinic analgetics avoiding i.v. administration
		Consider systematic use of laxatives starting on day 1
		Consider stress ulcer prophylaxis with proton pump inhibitors during hospitalisation
	18. Prevention of PONV	Anti-emetics as needed
	19. Early mobilization	start mobilisation and position out of bed on day 0
		At least 6 Hours out of bed on POD 1 including walking, seating and food intake out of bed
	20. Urinary drainage	If foley catheter not removed in the recovery room, removal of catheter at day 1
After discharge	21. Management after discharge	Discharge as early as possible, starting on day 1 if following criteria fulfilled: <ul style="list-style-type: none"> - Pain controlled by oral anaetetics (VAS \leq3) -Oral food intake well tolerated -No i.v. administration -Independant mobilisation / autonomy -bowel function recovered passing gas, urinary function recovered -No signs of infection, no fever, normla blood tests - Patient accepts discharge
		Advice about maintaining activity levels
		Consider post discharge support and monitoring by nurses network
		Monitor: complications up to 90days postoperative, readmission rates, non scheduled out patient visits, phone calls
	22. Audit, adjust, apply	Audit compliance. Understand problems. Identify solutions. Keep resource within team

LMWH: Low molecular weight heparin

NGT: Nasogastric tube

POD: Post-operative day

PONV: post-operative nausea and vomiting

i.v.: Intravenous