46 Checklists for the Treatment of Tumors of the Peritoneum: Framework SOP

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46.1 Introduction

Definition of the area and time of application for this standard.	
(Professions, departments, period)	
Signature (Head of surgical department)	**Signature** (Head of anesthesiological department)

46.2 Flowchart Treatment Algorithm

Adapt to the particular department.

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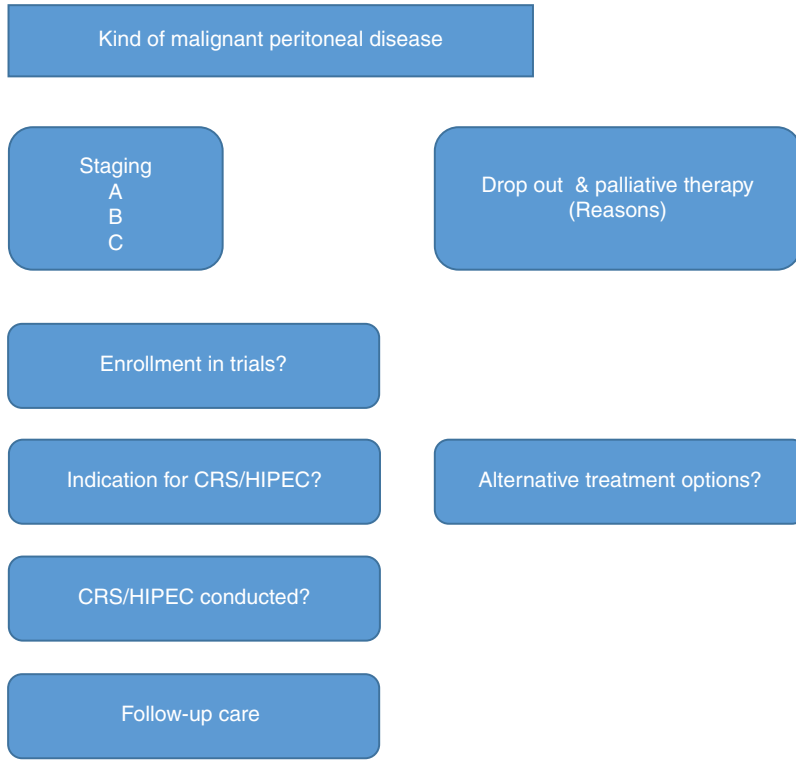

46.3 Recent Clinical Trials

TitleRegistration number
Sponsor

46.4 Manual for Pre- and Postoperative Treatment

46.4.1 Tasks Prior to Admission

Diagnostics

- Meticulous anamnesis
- Screening for multiresistant bacteria, COVID-19
- Contrast-enhanced CT scan thorax/abdomen/pelvis (PET/CT)

Discussion in a GI tumor board
Patient information

- Detailed information about the disease, options, prognosis, and risks of treatment
- Minimization of risk factors possible? Malnourishment? Cardiological/pulmonary/renal optimization possible?

Schedules

- Malnourishment: enteral or parenteral supplementation for 7–10 days
- Specific perioperative treatment
- Order the perfusion equipment
- Order the chemotherapeutics

Anesthesiological consultation

46.4.2 Day Before Surgery

Order the chemotherapeutics

- Exact definition – Who? What? When? How?
- Safety data sheets accessible?

General

- Check for completeness
- Tumor board recommendations?
- Involve hospital social services
- Offer psycho-oncological support

Diagnostics

- Optional if required

Laboratory values

- That is, CBC, electrolytes, AST/ALT, LDH, liver and renal function tests
- Tumor markers
- Blood group, transfusion request

Patient information

- Obtain informed consent for the planned operation and HIPEC.
- Obtain informed consent for enrolment in clinical trials, if applicable.
- Discuss the postoperative course and possible complications, ERAS.

Nutrition

- Liquid diet
- Routine bowel preparation
- In the case of motility disorders/ileus, parenteral nutrition: product, amount, infusion rate

DVT prophylaxis

- What? When? Dose?

Anesthesia

- Obtain informed consent for the planned operation and HIPEC.
- Obtain informed consent for enrolment in clinical trials, if applicable.
- Discuss the postoperative course and possible complications, ERAS.

46.4.3 Day of Surgery

- Check for completeness of required information and the plan of operative strategy
- Follow the regular standards and SOPs of the department
- Thoracic epidural: What? When? Dose?

Antibiotic prophylaxis

- What? When? Dose?

Antiemetic therapy

- What? When? Dose?

Intraoperative measures

- SOP OR-nurse?
- SOP anesthetist and anesthesia nurse?
- SOP surgery?
- Recommendations for occupational health and safety available?

46.4.4 Day of Surgery ICU

Monitoring

- What? When? Interval?
- Vigilance CVP, results
- Ventilation, oxygenation
- Circulation
- Laboratory values
- Renal function/diuresis, core temperature, drained fluid balances

Circulation support

- What? When? Dose?

Diuresis

- Aim at ~1 ml/kgKG/h

Infusions

- What? When? Dose?

Transfusions

- Aim at Hb 8 (−10) mg/dl

Analgesia

- Thoracic epidural: What? When? Dose?
- Without PDA: What? When? Dose?

Ventilation

- Strive for early extubation
- Spontaneous: O_2 4 l/min via nasal probe, CPAP/NIV/HFNC

Nutrition

- What? When? Dose?

Antiemetic Therapy

- What? When? Dose?
- Intraoperative administration?

Mobilization

- Early mobilization according to ERAS recommendations
- Physiotherapeutic support

DVT prophylaxis

- What? When? Dose?

General

- Motivate the patient for active participation

Expect side effects

- Nausea, vomiting, diarrhea, fever
- SIRS
- Impaired vigilance
- Cardiac impairment, cardiac rhythm disorders
- Renal insufficiency
- Paralytic ileus
- Micturition disorders
- Reduction of immunologic competence
- Surgical complications (bleeding, anastomotic insufficiency)
- Pleural effusions

46.4.5 POD 1

Center-specific postoperative monitoring and treatment

For example……
Strive for discharge from ICU

- Stabile circulation without inotropic support
- Sufficient spontaneous breathing, max 3lO_2 via nasal probe
- Stabile renal function
- Efficient pain relief

Monitoring

- What? When? Interval?

Circulation support

- What? When? Dose?

Diuresis

- Aim at ~1 ml/kgKG/h

Infusions

- What? When? Dose?
- No basal infusion rate if possible

Transfusions

- Aim at Hb 8 (−10) mg/dl

Analgesia

- Thoracic epidural: What? When? Dose?
- Daily check for infection of the catheter insertion
- Without PDA: What? When? Dose?

Ventilation

- Strive for early extubation
- Spontaneous: O_2 4 l/min via nasal probe, CPAP/NIV/HFNC

Nutrition

- What? When? Dose?

Antiemetic Therapy

- What? When? Dose?
- Intraoperative administration?

Mobilization

- Early mobilization according to ERAS recommendations
- Physiotherapeutic support

DVT prophylaxis

- What? When? Dose?

General

- Motivate the patient for active participation

46.4.6 POD 2

Strive for discharge from ICU
Monitoring

- What? When? Interval?

Circulation support

- What? When? Dose?

Diuresis

- Aim at ~1 ml/kgKG/h
- If stable: remove bladder catheter

Infusions

- What? When? Dose?
- No basal infusion rate if possible

Transfusions

- Aim at Hb 8 (−10) mg/dl

Analgesia

- Thoracic epidural: What? When? Dose?
- Daily check for infection of the catheter insertion
- Without PDA: What? When? Dose?

Ventilation

- Strive for early extubation
- Spontaneous: O_2 4 l/min via nasal probe, CPAP/NIV/HFNC

Nutrition

- What? When? Dose?

Antiemetic Therapy

- What? When? Dose?
- Intraoperative administration?

Mobilization

- Early mobilization according to ERAS recommendations
- Physiotherapeutic support

DVT prophylaxis

- What? When? Dose?

General

- Motivate the patient for active participation

Dressings

- Removal of abdominal drains (consult surgeon).
- Change wound and stoma dressings.

46.4.7 POD 3

Strive for discharge from ICU
If a treatment on a normal peripheral ward is not achievable the further treatment on ICU should follow the regular ICU-SOPs with the aim of an early complete enteral nutrition and complete mobilization.

Monitoring

- What? When? Interval?

Diuresis

- Aim at ~1 ml/kgKG/h
- If stable: remove bladder catheter

Infusions

- What? When? Dose?
- No basal infusion rate if possible

Transfusions

- Aim at Hb 8 (−10) mg/dl

Analgesia

- Thoracic epidural: What? When? Dose?
- Daily check for infection of the catheter insertion
- Without PDA: What? When? Dose?

Ventilation

- O_2 max. 4 l/min via nasal probe, intermittent CPAP or intensive breathing exercises

Nutrition

- What? When? Dose?

Antiemetic Therapy

- What? When? Dose?

Mobilization

- Early mobilization according to ERAS recommendations
- Physiotherapeutic support, walk on ward, 6–8 h out of bed

DVT prophylaxis

- What? When? Dose?

General

- Motivate the patient for active participation.
- Psycho-oncological support.
- Nutritional counseling.

Dressings

- Removal of abdominal drains (consult surgeon).
- Change wound and stoma dressings.

46.4.8 POD 4–7 or Normal Surgical Ward

Planning the discharge from hospital

Planning the discharge from hospital

- Hospital Social Service counseling
- Organization of ambulant wound and ostomy care
- Organization of ambulant psycho-oncological support
- Organization of palliative care or hospice if needed
- Criteria for discharge:
  - Stabile vital functions
  - Normal inflammation parameters
  - Efficient pain relief
  - Ensured ambulant treatment without interruption
  - Widely independent participation in activities of daily living
  - Intention of the patient

Monitoring

- What? When? Interval?

Infusions

- What? When? Dose?

Transfusions

- Aim at Hb 8 (−10) mg/dl

Analgesia

- What? When? Dose?

Ventilation

- Intensive breathing exercises

Nutrition

- What? When? Dose?

Antiemetic Therapy

- What? When? Dose?

Mobilization

- Physiotherapeutic support, walk on ward, 6–8 h out of bed

DVT prophylaxis

- What? When? Dose?
- Pause for removal of the epidural catheter if necessary

General

- Motivate the patient for active participation.

Dressings

- Removal of abdominal drains (consult surgeon).
- Change wound and stoma dressings.

46.5 Tasks After Discharge

- Check for histopathological report
- Tumor board counseling
- Removal of sutures/staples after 12 days, discussion of the definitive pathologic report
- Discussion and organization of the recommended tumor-specific therapy
- In case of splenectomy: vaccination according to national recommendations (pneumococcus, hemophilus, meningococcus, and seasonal influenza)
- Psycho-oncological counseling
- Definition of the follow-up

46.6 SOP Anesthesia Nursing

Duration of surgery: ~3–8 h

Special features

- Extensive measures for occupational safety reasons: safety glasses, special gloves, and scrubs

Patient positioning

- Lithotomy position
- Active temperature control

Preparation

- Venous access lines
- Arterial access line
- Thoracic epidural catheter
- Endotracheal intubation

Drugs

- What? When? Dose?

Monitoring

- ECG, blood pressure, SaO_2
- CVP
- Intensive hemodynamic measurement (stroke volume, cardiac index)

46.7 SOP Anesthesia

Transfusion requirements

- Blood type, pRBC/FFP

Anesthesia

- TIVA with additional thoracic epidural analgesia

Drugs

- What? When? Dose?

Monitoring

- Internal standards/SOP

Induction

- Internal standards/SOP

Hemodynamic targets

- Mean arterial blood pressure MAP 60–70 mmHg
- Stroke volume variation SVV < 12%
- Cardiac index CI > 2.5
- Hb > 10 g/dl
- DO_2 > 450 ml/min/m^2

Intraoperative fluid administration:

- Crystalloids approx. 500 ml/h
- pRBC according to blood loss and targeted Hb
- FFP in case of massive bleeding or coagulopathy
- (Colloids according to internal standards)

Criteria for hypovolemia/vasopressors

- Internal standards/SOP

Criteria for inotropic support with dobutamine or enoximone

- Internal standards/SOP

Active temperature control

- During CRS: core/bladder >36 °C
- During HIPEC: arterial <38 °C
- During HIPEC: abdominal: 42 °C (cave >42.5 °C)

Renal function

- Awareness for nephrotoxic chemotherapeutics, abdominal hypertensive, impaired renal blood flow, and possible extensive fluid shifts during HIPEC
- Diuresis at least 1 ml/kg/h
- Avoid hypovolemia
- In case of oliguria or hypervolemia high-ceiling diuretics

Antiemetic therapy

- Internal standards/SOP

Postoperative management

- Planned extubation at the ICU

46.8 SOP Surgery

Detailed standard operating procedures and internal guidelines should be developed for at least the following issues:

- Preoperative aspects (patient selection, preparation for surgery, anesthesiological management)
- Typical surgical techniques and techniques for CRS
- General surgical principles for frequently applied resection steps (i.e., oncologically adequate colonic resection, techniques of anastomotic formation, chest tube insertion, techniques of fascia closure, etc.)

46.9 Histopathologic Workup

The pathologic report should describe the basic oncologic findings (assessment, staging). Additional examinations should be possible and follow the (molecular) tumor board counseling.

Additional aspects in cases of colorectal carcinoma
That is, MSI, all-RAS, BRAF

Additional aspects in cases of gastric carcinoma
That is, HER2/neu expression

Additional aspects in cases of mucinous appendix neoplasm
Proliferation index

46.10 Preparation for CRS/HIPEC

HIPEC techique (open/closed)
Diagnosis
Indication
Operating table
Patient positioning
Auxiliary positioning devices
Electrical instruments
Trays
Retractor systems
Trays in standby
Drapes
Scrubs
Sutures
Drains
Additional
Notes
Safety features

46.11 Occupational Health and Safety

- Annual education and training on safety aspects during HIPEC.
- The OR should be indicated using warning signs.
- Only absolutely essential staff should enter the OR during HIPEC.
- Personal safety equipment should be used.
- Excretions are potentially contaminated for up to 24 h depending on the chemotherapeutic drug.

Measures in case of surrounding contamination
Internal standards/SOP

Measures in case of contamination of the personnel
Internal standards/SOP

46.12 Checklist for the Use of Chemotherapeutics for HIPEC

What	Note	Check
Warning signs Caution! Chemotherapy/ biohazard Contact staff before entering the OR	On site? Attached to all entries of the OR?	☐ ☐
Impermeable laundry bags	On site?	☐
Safety glasses with lateral protection	On site?	☐
Impermeable scrubs	On site?	☐
Chemoresistant sterile gloves	On site?	☐
Chemoresistant unsterile gloves	On site?	☐
Chemotherapeutic drugs	On site?	☐
Chemotherapy waste containers	On site?	☐
Spill kit	On site?	☐

Date: Signature:

46.13 Chemotherapeutic Regimen for HIPEC

Origin	Chemotherapeutics center specific
Colorectal	i.p.: mitomycin C 30 mg/m² 90 min (Cisplatin 100 mg/m²)
Appendiceal	i.p.: mitomycin C 30 mg/m² 90 min (Cisplatin 100 mg/m²)
Pseudomyxoma	i.p.: mitomycin C 30 mg/m² 90 min (Cisplatin 100 mg/m²)
Ovarian	i.p.: cisplatin 75 mg/m² + doxorubicin 15 mg/m² 90 min
Gastric	i.p.: cisplatin 75 mg/m² + doxorubicin 15 mg/m² 90 min
Mesothelioma	i.p.: cisplatin 75 mg/m² + doxorubicin 15 mg/m² 90 min

Carrier solution: NaCl 0.9%
Mitomycin C should be given in three doses for 30 min each, due to its short half-life.

46.14 PCI Assessment

0	Central	7	Right lower
1	Right upper	8	Right flank
2	Epigastrium	9	Upper jejunum
3	Left upper	10	Lower jejunum
4	Left flank	11	Upper ileum
5	Left lower	12	Lower ileum
6	Pelvis		

Lesion size
0 – no tumor visible
1 – tumor up to 0.5 cm
2 – tumor up to 5.0 cm
3 – tumor >5.0 cm or confluence

46.15 Information Material for the Anesthetist

Preparation and intraoperative management

- Internal standards/SOP

Severe fluid shifts and coagulation disorders are to be expected due to extensive wound surfaces and the duration of the complete procedure.

Frequent postoperative complications or side effects

- Nausea, vomiting, diarrhea, fever
- SIRS
- Impaired vigilance
- Cardiac impairment, cardiac rhythm disorders
- Renal insufficiency
- Paralytic ileus
- Micturition disorders
- Reduction of immunologic competence
- Surgical complications (bleeding, anastomotic insufficiency)

46.16 Checklist for Outpatient Department

	Ordered	Executed
Documentation of bodyweight and height	☐	☐
Tumor board counseling	☐	☐
Information material for surgery delivered	☐	☐
Information material for chemo/HIPEC delivered	☐	☐
Consent for transfusions delivered	☐	☐
Check for participation in trials	☐	☐
Fix a date for anesthesiological counseling	☐	☐
Fix a date for further diagnostics	☐	☐
Fix a date for CRS/HIPEC	☐	☐

46.17 Checklist Surgical Ward

	Ordered	Executed
Detailed anamnesis and examination	☐	☐
Preparation for surgery		
Blood type + pRBCs	☐	☐
Bowel preparation	☐	☐
…	☐	☐
Intraoperative antibiotics		
Drug 1	☐	☐
Drug 2	☐	☐
Others…	☐	☐
Intraoperative antiemetics		
Drug 1	☐	☐
Drug 2	☐	☐
Drug 3	☐	☐
DVT prophylaxis		
Drug 1	☐	☐
Compression devices	☐	☐
Others…	☐	☐
Final check		
Documents complete?		☐
Tumor board counseling		☐
Counseling the hospital social service team		☐
Psycho-oncological counseling		☐