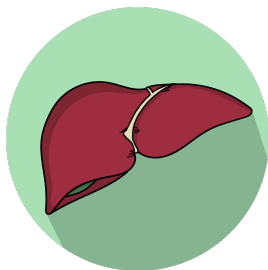


EUPEMEN PROTOCOL

LIVER RESECTION

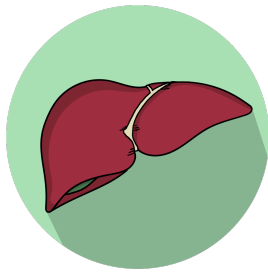
1	Before Admission Anaesthetist, Surgeon, Nurse, Nutritionist
1.1	Preoperative counselling The patient should be fully informed on procedure and perioperative course both verbally and in writing. Signed informed consent should be obtained.
1.2	Comprehensive medical assessment This should include medical history, physical examination, chest X-ray, blood tests (coagulation parameters, biochemical profile and full blood count) and electrocardiogram.
1.3	Compensation of chronic diseases All chronic diseases should be optimised before surgery. All cases of recent onset or active cardiovascular diseases should be evaluated by a cardiologist.
1.4	Evaluation of Diabetes Mellitus Blood glucose and HbA1c levels should be investigated. All cases of poorly controlled or previously undiagnosed diabetes should be referred to primary care or endocrinology before surgery.
1.5	Evaluation and management of anaemia and iron deficiency Iron deficiency anaemia should be ideally managed by parenteral iron administration.
1.6	Nutritional screening Nutritional screening should be done by using the <i>Malnutrition University Screening Tool (MUST)</i> .
1.7	Abandon tobacco and reduce alcohol consumption
1.8	Cardiovascular exercises Cardiovascular and respiratory exercises tailored to the physical state of the patient.
1.9	Psychological counselling Any psychological issues the patient may be facing should be fully addressed.
1.10	Frailty Assessment For patients over 65 years of age a frailty assessment should be performed.
1.11	Apfel score The risk for postoperative nausea and vomiting should be assessment with the Apfel score.
1.12	ASA assessment As part of the preoperative anaesthesiologic assessment the ASA score should be obtained.



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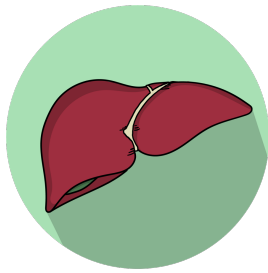
2	Perioperative
2.1	Immediate Preoperative Anaesthetist, Surgeon, Nurse
2.1.1	Preoperative hygiene The patient is instructed to take a full shower or bath the evening or morning before the surgery.
2.1.2	Compression stockings or intermittent pneumatic compression Compression stockings or intermittent pneumatic compression should be worn from admission to hospital.
2.1.3	Low Molecular Weight Heparin Low Molecular Weight Heparin should be administered 2-12 hours before surgery (depending on whether neuraxial anaesthesia is to be performed or not).
2.1.4	Carbohydrate drink A drink high in carbohydrates (12.5% maltodextrins) 800 ml should be given in the evening before surgery and another one 400 ml in volume 2 hours prior to anaesthesia. For diabetic patients administer this together with antidiabetic medication.
2.1.5	Preoperative fasting Fasting of 6 hours for solids and 2 hours for clear liquids.
2.1.6	Shaving with electric razor The site where the incision will be performed should be shaved with an electric razor, if necessary.
2.1.7	Prophylactic antibiotics Prophylactic administration of antibiotic 30-60 minutes before incision. In prolonged procedures repeat doses according to the half-life of the drugs
2.2	Intraoperative Anaesthetist, Surgeon, Nurse
2.2.1	WHO Surgical Safety Checklist The WHO Surgical Safety Checklist should be completed before incision is made.
2.2.2	Routine intraoperative monitoring Vital functions, FiO ₂ , anaesthesia depth, neuromuscular blockade and glycemia should be monitored during the procedure. Non-invasive hemodynamic monitoring is also recommended.



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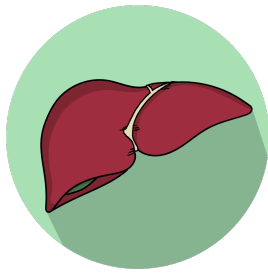
2.2.3	<p>Minimally invasive surgery Minimally invasive approaches are preferred and should be used as much as possible.</p>
2.2.4	<p>Avoid routine bladder catheterization</p>
2.2.5	<p>Invasive monitoring Invasive arterial catheter is not routinely required. Although it should be used for patients with severe cardiorespiratory disorders.</p>
2.2.6	<p>Central venous catheter Central venous catheters are not routinely required for minor resections and in the absence of risk factors for postoperative renal failure.</p>
2.2.7	<p>Induction and maintenance of anaesthesia Short-acting agents should be used for induction and maintenance of anaesthesia.</p>
2.2.8	<p>Oxygenation Patients should receive oxygen with a FiO₂ of more than 50%.</p>
2.2.9	<p>Fluid therapy During the resection phase maintenance of central venous pressure below 5 cmH₂O is recommended. Otherwise, hemodynamic optimization using goal-guided fluid therapy with validated devices is recommended. If these are not available, restrictive fluid therapy is recommended based on ideal weight in continuous perfusion, balanced solution (1-3 ml/kg/h for laparoscopy; 3-5 ml/kg/h for laparotomy). Blood loss should be compensated with 1:1 colloids.</p>
2.2.10	<p>Avoid nasogastric tube Nasogastric tubes should not be routinely used.</p>
2.2.11	<p>Prevention of hypothermia Temperature should be monitored and normothermia should be maintained by active heating (heated infusions, heated blanket).</p>
2.2.12	<p>Prophylaxis of postoperative nausea and vomiting Give antiemetic therapy according to the Apfel score.</p>
2.2.13	<p>Epidural analgesia Thoracic epidural analgesia should be used in open surgery. In laparoscopic surgery it is not routinely recommended. Patients with contraindication for epidural analgesia and who have a risk for postoperative renal failure or coagulopathy could benefit from bilateral transverse abdominis plane block or other alternatives to epidural analgesia.</p>
2.2.14	<p>Intravenous analgesic adjuvants Recommended adjuvant analgesics are non-steroidal anti-inflammatory drugs, lidocaine, ketamine, magnesium sulphate and dexmedetomidine.</p>
2.2.15	<p>Blood glucose monitoring</p>



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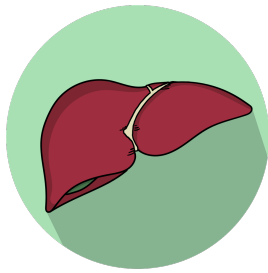
	Avoid blood glucose levels > 180 mg/dl in patients at risk of developing insulin resistance.
2.2.16	Skin disinfection Skin should be disinfected centrally to peripherally with chlorhexidine in a 2% alcohol solution.
2.2.17	Avoid drains Abdominal drains should be avoided as much as possible.
2.3	Immediate Postoperative (Post-anaesthesia Care Unit / Intermediate Care Unit in selected cases) Anaesthetist, Nurse
2.3.1	Maintenance of normothermia Temperature should be regularly measured and normothermia should be maintained.
2.3.2	Opioid sparing analgesia Active or preventive multimodal analgesia should be used. Restrict the use of opioids. Aim for a VAS score of less than 3.
2.3.3	Restrictive fluid therapy
2.3.4	Early feeding Beginning of oral fluid intake from 3 hours after the surgery.
2.3.5	Respiratory physiotherapy
2.3.6	Early mobilisation Mobilization should begin 3 hours after surgery and should begin with sitting up in bed.
2.3.7	Thromboembolic prophylaxis Low Molecular Weight Heparin should be given 12 hours after surgery.
2.3.8	Treatment of nausea and vomiting
2.3.9	Maintenance of FiO₂ 0.5% for 2 hours after surgery
3	Postoperative Day 1 (Ward) Surgeon, Nurse
3.1	Protein-rich nutritional supplementation



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	Nutritional supplements rich in protein should be given to patients with oral intake <60% of energy requirements or preoperative malnutrition.
3.2	Early feeding A semi-solid or normal diet should be given.
3.3	Early mobilization Patients should be encouraged to move from bed to bed-side chair.
3.4	Removal of drains Assess removal of drains, if present.
3.5	Opioid sparing analgesia Ensure good pain control. Aim for a VAS score of less than 3.
3.6	Withdraw intravenous fluids Withdraw intravenous fluids if patient tolerates peroral fluids.
3.7	Remove urinary catheter Assess the withdrawal of urinary catheterization if present.
3.8	Respiratory physiotherapy
3.9	Post-operative nausea and vomiting prophylaxis
3.10	Anti-ulcer prophylaxis
3.11	Thromboembolic prophylaxis
3.12	Assess hospital discharge For patients who underwent laparoscopic procedures assess discharge criteria.
4	Postoperative Day 2 Surgeon, Nurse
4.1	Early feeding A normal diet should be given.
4.2	Early mobilisation Patients should be able to walk short distances.
4.3	Opioid sparing analgesia Ensure good pain control. Aim for a VAS score of less than 3.
4.4	Thromboembolic prophylaxis
4.5	Laboratory tests Blood tests including C-reactive protein and procalcitonin should be performed.



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4.6	Assess discharge criteria Consider discharge if there are no surgical complications that cannot be managed in an outpatient setting, no fever, pain controlled with oral analgesia, full ambulation, tolerance of oral intake of food and acceptance by the patient.
5	At discharge Surgeon, Nurse, Primary Care
5.1	Discharge documentation On discharge patients should be given personalized, understandable and complete information about hospital stay and recommendations for further postoperative care at home.
5.2	Follow-up Patients should be followed-up by telephone or in an outpatient setting after discharge. Check-up should be arranged within a week after discharge and then at 1, 3 and 6 months. A visit to the primary care physician should be arranged and if necessary, home support should be coordinated.