**Appendix 3 (supplemental digital content)**

**Surgical procedure**

WHO-Checklist Sign In  
First, a general anaesthesia takes place and the French bedding with splayed legs is performed. For an improved exposition of the gallbladder during surgery, the table is tilted laterally towards the feet and to the left.

A single-shot iv antibiotic is given 30 minutes preoperatively with a cephalosporin and metronidazole. In cases of acute cholecystitis, a 5-7-day course of antibiotics is given.

The screen for the surgeon and the assistant is positioned at the level of the chest to the right of the patient.

The instrumentation consists of a laparoscopy sieve, a 10 mm HD camera with 30 degree lens, a monopolar scissors, a 10 mm titanium clip forceps and a retrieval pouch.

After correct positioning of the patient, the antiseptic skin preparation and covering with sterile drapes is done.

WHO-Checklist Team Time Out

The optic trocar (10 mm) is routinely placed in a supraumbilical mini-laparotomy. After creating a pneumoperitoneum of 12 mm Hg exploratory inspection of the abdomen with the camera is performed. The further positioning of working trocars is now under direct vision. The first step is placing a 10 mm trocar in the upper abdomen and subsequently another two 5 mm trocars in the right hemi-abdomen.

The gallbladder is then taken with a short forceps and pulled laterocranially over the right lobe of the liver to the right. This manoeuvre leads to tensed structures of Calot triangle. The surgeon now grasps the gallbladder with another forceps just above the gallbladder neck and pulls it laterally to the right, thus better exposing the structures of Calot triangle. With monopolar scissors the cystic duct and cystic artery are now circularly exposed with a combination of blunt and electrical preparation.

After performing the critical view of safety according to Strasberg and crosschecking with assistive surgeons, the cystic duct and cystic artery are closed with titanium clips. Two clips are placed distally and one proximally onto the cystic duct. The same procedure is carried out at the cystic artery. Subsequently, both structures are severed.

Now the infundibulum is dislocated cranial and the gallbladder is dissected with the monopolar scissors from the liver bed. Minor bleeding can be coagulated using monopolar current. If there is an area with a stronger bleeding a collagen fleece is used.

After complete dissection of the gall bladder from its bed it is placed in a retrieval pouch and retrieved via the epigastric incision under direct vision.

Subsequently, a check of the clips on the cystic duct and cystic artery and the gallbladder bed to blood dryness is undertaken. If necessary, another lavage of the right upper abdomen is administered and an Easy-Flow drainage is deposited under the right lobe of foramen Winslow.

The remaining trocars are removed under laparoscopic vision and then the pneumoperitoneum is drained. The surgical procedure is completed with the closures of the muscular fascia supraumbilical and epigastral muscular fascia with non-resorbable sutures and if required attachment by suture drainage.

WHO-checklist Sign out

**Conversion indications**

● Uncontrollable bleeding

● Injury to the common bile duct (type B2, C2 and D) according to Neuhaus

● Adhesion Abdomen (by severity)

● Anatomy of Calot triangle unsure displayed

**Incident Management**

**Generally**

● CIRS (Critical incident report system)

● Mortality and morbidity conference 2 x monthly

**Operation**

● Bleeding

Information of the next senior physician respectively head of department who assumes control over the surgery.

Haemostasis using monopolar current, suture or haemostatic collagen fleece, possible conversion to open surgery. Intraoperative laboratory acceptance respectively BGA, crossing EK`s, catecholamines, volume or blood products (FFP`s, EK`s) depending on circuit behaviour. Postoperative monitoring IMC / ITS

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● Injury of common bile duct

Information of the next senior physician respectively head of department who assumes control over the surgery.

If necessary, conversion to open surgery. Suture of the lesion if it is focal or less than half circumference and the edges are smooth and vital. Otherwise, creation of a biliodigestive anastomosis.   
Obligatory placement of a T-drainage. Postoperative monitoring IMC / ITS.

● Calot`s triangle cannot be displayed with certainty after 60 minutes

Crosscheck with next senior physician respectively head of department   
Conversion to open surgery in case of uncertainty.

Drainage routines

● Acute cholecystitis (optional)

● Operative bleeding (optional)

● Operative lesion of the gallbladder with losing bile and stones (optional)

Team composition

● Senior physician + resident