



Recommendations for courses and organization

Dear Organizer/Tutor,

the Luebeck EUS Trainer (LET) is a water-perfused, biological, almost artifact-free biological model on which endosonographically controlled, invasive procedures (EUS-FNA) and interventions (pseudocyst drainage, bile duct drainage and entero-enteric anastomosis) can be performed.

Smooth presentation of the courses requires meaningful planning in order to make the training period with a training model as long and effective as possible. Usually, one organ package per training day and case is sufficient. This also applies to pure interventional courses in which the training of pseudocysts and entero-enteric anastomosis are practiced.

The training times should be at least 90 minutes per training block, during which 4 participants should use the model.

The following variations are possible, depending on the course type (basic, advanced, interventional):

- I. **EUS-FNA of integrated puncture objects:** all-day puncture training with different needle types (19-25 G) is possible due to the high stability of the objects. Depending on the course (basic or advanced course), different puncture objects are placed around the esophagus and stomach: Large spheres, similar in echogenicity to the liver, which have echogenic roundish inclusions as 'focal lesions'. These inclusions are colored red, so that the puncture cylinder is red if successful - colorless if unsuccessful. The same applies to the small puncture objects arranged in the matrix.
- II. **EUS-FNA of integrated bladders (pseudocysts):** The 'pseudocysts' stored next to the esophagus, stomach and rectum are filled with liquids of different viscosities by the attending staff, e.g. to imitate cleaned, liquid pseudocysts or infected, purulent pseudocysts. Due to the possibility of refilling the pseudocysts via the corresponding valves on the outside of the case, puncture and aspiration of the contents is possible

several times, as experience has shown that there is no relevant leakage after the EUS-FNA once the needle has been removed from the puncture channel. However, please ensure that the urinary bladder is always sufficiently refilled from the outside in order to minimize the distance between the bladder and gastrointestinal wall under suction.

III. **EUS-guided pseudocyst drainage:** All bladders (pseudocysts) integrated into the model are accessible for intervention (also under X-ray); this also concerns the bladder cranially to the prostate gland in the rectum, which has been provided for rectal ultrasound. The 'pseudocysts' stored next to the esophagus, stomach and rectum are filled with liquids of different viscosities by the attending staff, e.g. to imitate cleaned, liquid pseudocysts or infected, purulent pseudocysts. Due to the possibility of refilling the pseudocysts via the corresponding valves on the outside of the case, puncture and aspiration of the contents is possible several times, as experience has shown that there is no relevant leakage after drainage. However, this presupposes that the drainage is also removed again, after which the channel closes again. However, please ensure that the urinary bladder is always sufficiently refilled from the outside in order to minimize the distance between the bladder and gastrointestinal wall under suction. As experience has shown that the participants need a very long time for these interventions, it is advisable to divide the drainage steps among the participants. Possible steps would be:

- a. Participant 1: EUS-FNA with 19 G needle and insertion of a guide wire
- b. Participant 2: Removal of the needle while leaving the guide wire in place as well as extension of the fistula, e.g. with Will knife/cystotome (8.5 F)
- c. Participant 3: Insertion of a positioner over the guide wire and placement of a straight plastic prosthesis (8.5 F), alternatively SEMS (self-expanding metal stent). Direct puncture is possible when inserting a Hot LAMS
- d. Participant 4: Removal of the inserted stent and starting with a)

IV. **EUS-guided bile duct drainage/entero-enteric anastomosis:**

A modification of the case is required for this training, as it is necessary to replace the matrix. Bile duct drainage should be performed in several steps, similar to pseudocyst drainage, whereby multiple punctures of the plastic bile duct model are possible:

- a. Participant 1: EUS-FNA with 19 G needle and insertion of a guide wire
- b. Participant 2: Removal of the needle while leaving the guide wire in place as well as extension of the fistula, e.g. with Will knife/cystotome (8.5 F)
- c. Participant 3: Insertion of a positioner over the guide wire and placement of a straight plastic prosthesis (8.5 F), alternatively SEMS (self-expanding metal stent). Direct puncture is possible when inserting a Hot LAMS
- d. Participant 4: Removal of the inserted stent and starting with a)

Entero-enteric anastomoses are usually formed by direct puncture with a Hot LAMS stent, which is also retrieved for reuse after placement.

By dividing the work steps among the participants, waiting times are avoided so that the 5 pseudocysts contained in the model are usually sufficient for a one-day course.

For *combined* courses consisting of EUS-FNA of the puncture objects and interventions, e.g. as part of a basic and advanced course, the puncture/drainage of the pseudocysts should be placed at the end of the training day, as the pseudocysts may collapse completely depending on the type of drainage and type of filling.

For *purely interventional* courses (pseudocyst drains/entero-enteric anastomoses), it may be necessary to replace the drained urinary bladders or drained bowel with new ones. However, please bear in mind that the exchange takes approx. 60 minutes and that this must be taken into account when ordering. Alternatively, a 2nd equipped LET can be provided to ensure that the course runs smoothly.

When using HF, the settings specified in the manual must be observed (e.g. VIO3 ERBE EndoCut I 2/3/3). Please be sure to contact the sales representative responsible for your HF devices. Advise them that the setting of the HF generator must take into account a one-piece neutral electrode. To improve conductivity, liquid containing saline should be filled into the urinary bladders. Also ensure that the HF current is only applied when the instruments are outside the working channel of the EUS veterinary device - otherwise the EUS veterinary device may be severely damaged.

Please bear in mind that the LET must be cleaned thoroughly after the end of the course and the animal organs must be disposed of properly. Please provide our supervising staff with large washbasins to rinse the material with water. Find out how the animal organs are to be disposed of in your organization. Disposal of the veterinary tested animal organ material is always carried out at the clinic/institution organizing the course.

If you have any questions, contact burmester.buc@t-online.de or +49-160 17 393 17

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CHECK list of recommended accessories for invasive and interventional EUS/per LET

(Non-sterile, expired accessories can be used - it is recommended to clean the accessories after use and use them for subsequent courses)

| Items | OK |
|---|----|
| 1 x large wipeable table or washable examination table | |
| 1 x large table for accessory storage | |
| 10 x absorptive sheets for tables | |
| Power connections with extension cable and multiple sockets if necessary (connection for ultrasound device, endoscope tower, HF device, suction pump) | |
| 1 x ultrasound machine | |
| 1 x longitudinal therapeutic EUS endoscope for veterinary use with a working channel of $\geq 3,7$ mm | |
| 1 x video processor with monitor | |
| 1 x suction pump with corresponding tubes | |
| 1 x HF-device (setting "single-piece") with corresponding cables | |
| EUS-FNA/FNB needles – all commercial available needles (can be used several times during and after training) – 19G, 22G, 25G | |
| 5 x guide-wire 0.035" à 4 m | |
| 5 x ring knife (e.g. Will-Messer MTW, 8.5 F/10 F) and/o cystotome | |
| 5 x bile duct dilation balloons (6 mm) <i>alternatively</i> 2 x bile duct bougie in different diameters | |
| 10 x straight and short (5 cm) bile duct plastic prostheses 8.5 F | |
| 10 x positioner for 8.5 F bile duct prosthesis | |
| 10 x pusher for 8.5 F prostheses | |
| 10 x SEMS (self-expanding metal stents) for pseudocysts and – bile duct drainage (diameter 6 - 10 mm, 6 cm total length) | |
| HOT LAMS Stent for pseudocysts, bile duct drainage and entero-enteric anastomosis | |
| 3 x small polypectomy snares for prosthesis removal | |
| 1 x paket of microscope slides | |
| 10 x 10 ml syringes | |