Optical Needle Holder

Intraluminal repair of posterior tracheal rupture
Endotracheal suture of an iatrogenic laceration of the posterior tracheal wall

Trachea rupture is a rare complication of intubation and percutaneous tracheostomy. Early surgical treatment is recommended as iatrogenic injury to the membranous wall may cause severe mediastinal emphysema or mediastinal prolapse as well as other respiratory complications.

Complete endotracheal suturing is a new and anatomically friendly method of surgical repair. We developed a new needle holder consisting of a HOPKINS® telescope in a fixed attachment to an endoscopic needle holder.

This allows endotracheal suturing of an iatrogenic laceration of the posterior tracheal wall without additional surgical access in an anatomically friendly manner. Patients are thus spared a surgical intervention and associated postoperative pain. There is no scarring and early extubation is possible. Even if prolonged ventilation is necessary, endoluminal suturing can prevent a tube dislocation at the injury site and associated life-threatening respiratory complications.

This method is suitable for patients who are able to tolerate jet ventilation during an intervention and where rupture is limited to the trachea.

There are some technical limitations to this method: If the tracheal tear has no rim of membranous wall; if the rupture extends into the right main bronchus; and if the patient cannot tolerate jet ventilation due a functional limitation.

References


1 Courtesy of PD Dr. Stefan Welter, Ruhrlandklinik, Essen, Germany
Endoscopic technique for the intraluminal repair of a posterior tracheal rupture

In the preparation phase, a clip is applied to the suture loop so that the thread is grasped twice. The first stitch is secured with this clip. After suturing is complete, the proximal clip is inserted through the tracheoscope under direct visualization. The open clip is guided along the thread until the forceps is positioned dorsal to the membranous wall and the thread is directed caudally. The use of two clips is recommended.

Clips: PDS clip Absolok 100 (Ethicon)

This image shows a posterior tracheal rupture after complete intraluminal repair using the endoscopic technique.

The rigid tracheoscope is visible at the bottom of the image. The tracheal rupture can be seen on the left-hand side and the optical needle holder with needle in the center (2.0 Vicryl UCLX needle, 70 cm; Ethicon) during piercing of the right rim.

The endotracheal suture is performed with a shortened, rigid 14 mm tracheoscope and an optical needle holder. Using a 2/0 Vicryl thread and a UCLX needle (Ethicon), the rim of the ruptured membranous wall is re-adapted under jet ventilation.

After each stitch, it is necessary to suction blood and secretions and to re-align the camera head to restore the horizon line. The thread is held under tension to offset any turbulence caused by jet ventilation.

Information on the OR technique and OR images provided with the kind permission of PD Dr. Stefan Welter, Ruhrlandklinik, Westdeutsches Lungenzentrum, am Universitätsklinikum Essen gGmbH, Universitätsklinik, Tüscher Weg 40, 45239 Essen, Germany.
Features and Properties at a Glance

The newly developed optical needle from KARL STORZ allows the user to perform minimally invasive and safe intraluminal repair of a tracheal rupture under visual control without requiring surgical access. This method is more gentle on the patient than previous methods of tracheal rupture repair.

The new set from KARL STORZ consists of a shortened tracheoscope in size 14 mm and a needle holder with a 4 mm HOPKINS® endoscope.

The distal tip features a robust, movable and fixed jaw.

Tungsten carbide inserts in both jaws ensure a firm and secure hold of the needle while maintaining high material resistance.

The needle holder is used in conjunction with a 4 mm HOPKINS® Endoscope 10105 FA with a direction of view of 12° and a working length of 30 cm. The endoscope provides optimal visualization and thus allows targeted suturing under continuous visual control.
To use the needle holder, a 14 mm Tracheoscope 10318 GK with a working length of 20 cm is recommended. In contrast to standard tracheoscopes, this shorter tracheoscope offers a greater freedom of movement that simplifies suturing.

The ergonomic handle design allows comfortable and precise work. The needle holder is lighter in weight thanks to titanium handles.

The special needle blocker provides safe and precise positioning of the needle in the jaws. The disengageable ratchet mechanism on the handle enables effortless unlocking of the needle blocker at any time.
Set from KARL STORZ
for the intraluminal suture of a posterior tracheal wall rupture

10130 N Optical Needle Holder, for endoscopic treatment of trachea ruptures, for use with HOPKINS® Telescope 10105 FA

10105 FA HOPKINS® Telescope 12°, diameter 4 mm, length 30 cm, autoclavable, fiber optic light transmission incorporated, color code: black

10318 GK Tracheoscope, size 14, length 20 cm
12067 TR **Clip Forceps**, applicator for absorbable ligating clips, jaw curved to right, with cleaning connector, working length 30 cm

10367 S **Scissors**, straight, single action jaws, with cleaning connector, sheath diameter 2.5 mm, length 35 cm
TC 200EN*  IMAGE1 S CONNECT, connect module, for use with up to 3 link modules, resolution 1920 x 1080 pixels, with integrated KARL STORZ-SCB and digital Image Processing Module, power supply 100-120 VAC/200-240 VAC, 50/60 Hz including:
- Mains Cord, length 300 cm
- DVI-D Connecting Cable, length 300 cm
- SCB Connecting Cable, length 100 cm
- USB Flash Drive, 32 GB
- USB Silicone Keyboard, with touchpad, US

TC 300  IMAGE1 S H3-LINK, link module, for use with IMAGE1 FULL HD three-chip camera heads, power supply 100-120 VAC/200-240 VAC, 50/60 Hz, for use with IMAGE1 S CONNECT TC 200EN including:
- Mains Cord, length 300 cm
- Link Cable, length 20 cm

* Also available in the following languages: DE, ES, FR, IT, PT, RU
**IMAGE1 S Camera Heads**

**TH 100**

**IMAGE1 S H3-Z Three-Chip FULL HD Camera Head**, progressive scan, soakable, gas- and plasma-sterilizable, with integrated Parfocal Zoom Lens, focal length $f = 15-31$ mm (2x), 2 freely programmable camera head buttons, for use with IMAGE1 S and IMAGE 1 HUB™ HD/IMAGE1 HD

**TH 104**

**IMAGE1 S H3-ZA Three-Chip FULL HD Camera Head**, autoclavable, progressive scan, soakable, gas- and plasma-sterilizable, with integrated Parfocal Zoom Lens, focal length $f = 15-31$ mm (2x), 2 freely programmable camera head buttons, for use with IMAGE1 S and IMAGE 1 HUB™ HD/IMAGE1 HD
KARL STORZ Monitors

9826 NB  **26" FULL HD Monitor**, color systems PAL/NTSC, max. screen resolution 1920 x 1080, image format 16:9, video inputs: DVI, 3G-SDI, VGA, S-Video, Composite, video outputs: DVI, 3G-SDI, Composite, power supply 100-240 VAC, 50/60 Hz, 5 V DC output (1 A), wall mount with VESA 100 adaptor including:
- **External 24 VDC Power Supply**
- **Mains Cord**

9627 NB  **27" FULL HD Monitor**, color systems PAL/NTSC, max. screen resolution 1920 x 1080, image format 16:9, Interface: RS 232, power supply 85-264 VAC, 50/60 Hz, wall mount with VESA 100 adaptor including:
- **External 24 VDC Power Supply**
- **Mains Cord**

Optional Accessories:

9826 SF  **Monitor Stand**, basic monitor stand, tiltable, rotation +/-30, disinfectable, color white, VESA 100 adaptor, for use with 26" FULL HD Monitor 9826 NB, 26" 3D Monitor 9826 NB-3D and other monitors

9626 SF  **Monitor Stand**, with integrated cable channel, for use with Monitors 9619 NB, 9626 NB, 9626 NB-2, 9627 NB, 9627 NB-2
Light Source

**20161420-1 Cold Light Fountain Power LED 175 SCB**, with integrated KARL STORZ-SCB, high-performance LED and one KARL STORZ light outlet, power supply 100-240 VAC, 50/60 Hz

**533 TVB Adaptor**, with ergonomic swivel, **autoclavable**, permits telescope changing under sterile conditions (optional)

**040112-40 Camera Cover**, folded inside out, 13 x 242 cm, sterile, for single use, package of 40, for use with all standard endoscopic video camera systems

**040112-160 Camera Cover**, folded inside out, 13 x 242 cm, sterile, for single use, package of 160, for use with all standard endoscopic video camera systems

It is recommended to check the suitability of the product for the intended procedure prior to use.