

## Transhepatic Drainage

### 1 Application

The purpose of transhepatic drainage is to drain fluids from the liver.

### 2 Product Components and Properties

FEHLING transhepatic drainages consist of two components.

#### 2.1 Guide Probes

Guide probes are made of NiTi with shape memory and can be supplied in 7 sizes. In the temperature range between 15°C and 40°C the probes can undergo plastic deformation. At temperatures above 80°C the probes regain their original straight shape. This activation of shape memory occurs usually when the probes are processed in washing machines and autoclaves. There is no time limit on reusing these guide probes.

FEHLING SUPERPLAST instruments are manufactured according to DIN EN ISO 13485 / DIN EN ISO 9001 and Directive 93/42 EEC for medical devices.

#### 2.2 Drainage Tubes

Drainage tubes are silicon tubes of 1 m length supplied in 3 different diameters. Cut into every tube near the middle are 5 oval apertures.

These drainage tubes are single use products that must not be reused.

### 3 Preparation and Use

#### 3.1 Initial Condition

Guide probes must be cleaned and sterilized by user. They are thermoresistant. Autoclaving is recommended for sterilization.

Regarding sterile drainage tubes, care must be taken to assure that the expiration date has not been exceeded and packaging materials are undamaged.

#### 3.2 Combining the Two Components

The guide probes have at their proximal end a profiled connector and a stop that holds the distal end of the tube. To suit the two different interior diameters of the three types of drainage tubes, the tube connectors have a diameter of either 2 or 4 mm. To assure a tight fit for the three different exterior diameters of the drainage tubes, the tube stops measure 3, 4 and 7 mm. Both interior and exterior diameter sizes of the drainage tubes are shown on the package. The Table below lists the guide probes that must be paired with the correct drainage tubes.

DRAINAGE TUBE	GUIDE PROBE
PBA-7 (2 x 3 mm)	PBA-0 PBA-1 PBA-2
PBA-8 (2 x 4 mm)	PBA-3 PBA-4
PBA-9 (4 x 7 mm)	PBA-5 PBA-6

Only when the matching drainage tubes and guide probes are correctly connected, is it assured that the tubes sit tight on the guide probes and that the tubes are aligned with the tube stops.

### 3.3 Guide Probe Deformation

Probe deformation is limited by the bending radius. Rule of thumb is that the bending radius should not be less than ten times the material strength. For the practice: Guide probes with item numbers PBA-0 to PBA-4 have a guide wire diameter of 2 mm. Thus the bending radius should be  $\geq 20$  mm. The diameter of guide probes PBA-5 and PBA-6 is 2.5 mm and their bending radius  $\geq 25$  mm.

## 4 Intraoperative Use

The preformed guide probe should be held at the shortest possible distance from the tissue that is to be penetrated and pushed forward into it. This will minimize the forces of leverage that act on the guide probe and prevent unintended deformation. As soon as the olive of the guide probe has emerged from the tissues, further forward travel of both guide probe and drainage tube may also be achieved by pulling on the distal side of the guide probe.

The drainage tube must be pulled through the tissue until all 5 apertures in the tube are inside and covered by the tissues.

## 5 Postoperative Procedure

As soon as the drainage is positioned in the tissues, the guide probe may be separated from the drainage tube by pulling. It is not necessary to return the guide probe to its original shape, because this happens automatically during cleaning and sterilization.