for surgical treatment of GER. There is not much discussion anymore as to the superiority of these minimal-access techniques; they have proven to be as good as the classic open techniques as far as treatment results are concerned but with shorter hospital stays, quicker recovery, and a better cosmetic result [20].

In contrast, the discussion regarding the most optimal surgical technique is still a matter of debate. It leaves little doubt that the experience of the surgeon with one particular technique is of utmost importance. In Utrecht we changed in 1988 from the open Nissen fundoplication to the open anterior fundoplication as described by Ashcraft and Holder, because of a relatively high complication rate with the former technique [1, 2]. We were more satisfied with the results of the Thal procedure, especially in mentally retarded patients [14, 16].

With the explosive development of minimally invasive techniques, many surgeons went back to the Nissen fundoplication to the open anterior fundoplication as described by Ashcraft and Holder, because of a relatively high complication rate with the former technique [1, 2]. We were more satisfied with the results of the Thal procedure, especially in mentally retarded patients [14, 16].

With the explosive development of minimally invasive techniques, many surgeons went back to the Nissen fundoplication to the open anterior fundoplication as described by Ashcraft and Holder, because of a relatively high complication rate with the former technique [1, 2]. We were more satisfied with the results of the Thal procedure, especially in mentally retarded patients [14, 16].

28.2 Preoperative Work-Up

All patients undergo initial contrast studies of the esophagus, stomach, and duodenum in order to demonstrate concomitant hiatal herniation and to exclude distal obstruction. A preoperative pH study is performed on all patients for quantitative evaluation of GER. An enema is given the evening before the operation in order to avoid a feces-loaded transverse colon obscuring the laparoscopic view.
28.3 Technique

28.3.1 Anesthesia

General anesthesia is used in all patients, often in combination with a regional anesthesia. During the procedure full muscle relaxation is maintained. A urine catheter is only inserted when epidural anesthesia is given as well. No nasogastric tube is inserted. An 8–10 mm diameter stent is kept at hand to be inserted through the distal esophagus during the narrowing of the posterior hiatus.

28.3.2 Positioning of Patient, Crew, and Equipment

The patient is placed in the supine head-up position at the lower end of the operating table. In smaller children, the legs are put in a frog-like position (Fig. 1). The lower table sheet is folded as an envelope over the legs and clipped together on both sides in order to prevent slipping of the patient. In older children, the legs are placed in slight flexion and abduction on the leg rests of the operating table and fixed with bandage. In younger children, the surgeon stands at the lower end of the table, in the older child in between the legs. In severely scoliotic children, the position is adapted to the possibilities. It may be necessary to operate entirely from the right in these children. Limitations in joint movements in patients, especially of the hip, may interfere with the movement of the endoscopic instruments. Alternative positions for these instruments should be kept in mind.

One monitor suffices but we use always two monitors. They are placed to the right and to the left of the head of the patient. The video tower usually stands at the right side, and all cables come from that same side onto the operating table. There are usually seven different cables [camera, light, CO2, outside monopolar high frequency electrocoagulation (MHFE), inside monopolar HFE, suction, and irrigation].

28.3.3 Telescope

Irrespective of age, we always use a 6-mm cannula for a 5-mm 30° telescope.

28.3.4 Instruments

In larger children, classic 5-mm instruments are used. In smaller children we use 3.5-mm instruments of either 30 or 20 cm length, depending on the size of the child. For suturing, however, we always use a 6-mm cannula.

As a liver retractor, either an Allis type instrument with ratchet is inserted below the xiphoid process underneath the left lobe of the liver and grabbing the anterior hiatus underneath the liver. This instrument usually does not need any holding. Alternatively, a Dia-