Laparoscopy in Children

Second Edition
Preface

Laparoscopy in children is special.

Children come in all sizes. The small size of children is an important technical aspect. Also, there are characteristic paediatric indications for laparoscopy. The most typical ones are described in this booklet.

This booklet is written for colleagues – adult and paediatric surgeons alike – wishing to profit from the experience of authors who have performed numerous laparoscopies in children of all sizes, many of them newborns.

The authors are aware of the fact that current medical progress may appear ridiculous in 100 years. Laparoscopy in children began 20 years ago, and techniques are constantly changing. Laparoscopic surgery may historically be the transition from conventional “open” surgery to a surgery without scars. Reader should thus see our comments as preliminary ones. Any suggestions for improvements would be very welcome.

We also have omitted the “troubleshooting” section of the first edition. That section was needed at the beginning of laparoscopic surgery, but not now anymore.

Humans have a natural inhibition about inserting sharp instruments into a small child’s abdomen. However, once they have cut through the abdominal wall and can find their bearings, surgeons usually feel comfortable.

This booklet contains no statistics and no comparisons with open approaches. Instead, it concentrates on the practical steps involved.

Applying the techniques described, the reader may also master procedures not mentioned here. The principles are covered in this booklet.

Do not use 10-mm instruments in children. Complete sets of instruments of 3 and 2 mm in diameter or even less are available. They enable us to operate virtually without scars and can also be used in adults.

This 2nd edition covers more indications. They were still experimental at the time of the 1st edition but have entered general practice in the meantime. It also displays a different drawing style and reflects the fact that we have changed in the meantime to optics of 2-mm diameters (in the 1st edition we were using 5-mm optics).

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Standard equipment is used: monitor, video equipment, insufflator, light source, etc., as in adult patients.

Indeed, there is no difference to the equipment used for adult patients—except that insufflators for adult patients insufflate at high rates, too high for small children. They cannot go below 1 l/min.

All other technical characteristics of the minimally invasive technique are identical in adult and children.

Most procedures in children can be performed with 2- or 3-mm instruments. Instruments do not need to be larger.

Children do not need urinary catheters. True, there is reduced intraabdominal space, but most procedures do not need an empty bladder, except for sigmoid resections, rectopexies, and procedures at the inner genitalia.

Similarly, the anesthesia for minimally invasive procedures in children is not significantly different from adults.

Surgeons and anesthesiologists should realize that the rare event of a gas embolus will first be noticed by the anesthesiologist, not the surgeon.
1.1 Equipment

Two pieces of equipment need special attention:

- The insufflator has to be capable of delivering CO$_2$ volumes of less than 0.5 l/min. Some insufflators will deliver only rates of 1 l/min or more. A small child may only have an abdominal capacity of 150 ml. In those children, insufflation might be completed in seconds.

  CO$_2$ does not need to be heated. Temperature loss is only a concern if trocars fall out and instruments are changed excessively often, which would require re-insufflation with cool CO$_2$.

- The light source needs to be powerful. As much as possible light needs to be squeezed through narrow trocars.

  All the remaining equipment is standard, as in adult laparoscopy.

  The cautery is the piece of equipment that most often malfunctions.

  The trolley should be placed on the other side of the patient, with the patient between the surgeon and the trolley.

  In contrast to conventional commercial arrangements, we place the monitor low in order to close the angle between working and viewing directions (Fig. 1.1).
Fig. 1.1 Trolley with monitor placed low
1.2 Children

A urinary catheter is unnecessary, as a full bladder seldom obstructs the view. If it does, a large needle can be inserted through the abdominal wall in order to empty the bladder. Children should go to the toilet before laparoscopy.

Enemas are unnecessary. They will not necessarily empty the colon and may even distend it.

Padding below the patient is risky, as it lifts up the endangered vessels and brings the structures upward into the reach of the trocars (Fig. 1.2).

Laparoscopy is easier if the patient is fully relaxed.

The bowel is often dilated in small children, making visualization difficult. Wait and continue dissecting, the situation will improve by itself.

The child should be prepared such that conversion to an open approach is possible at any time.

A neutral electrode is placed in order to save time if a conversion becomes necessary.

The ether screen is adjusted to a low position in order to reach the pelvis with the laparoscope.

Prior to introducing the first trocar, the laparoscope is readied in order to be able to see immediately after the trocar is inserted. Furthermore, the cautery is checked whether it is functioning properly by coagulating a wet sponge prior to inserting the first trocar.
Fig. 1.2  No urinary catheter. Padding brings the aorta closer to the reach of the trocar tip.