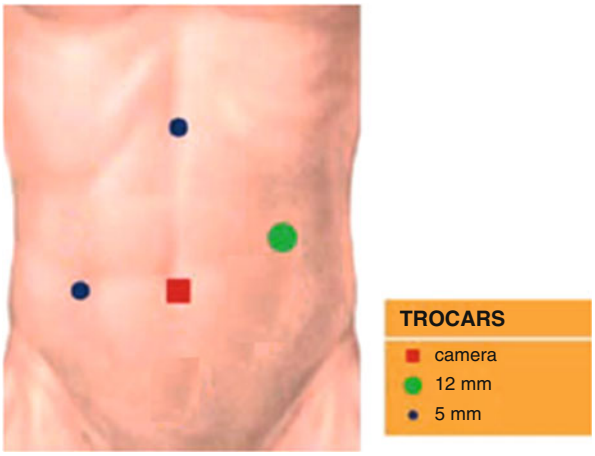

Fig. 7.3 The position of the optical and operating ports on the abdominal wall used to repair perforated peptic ulcer

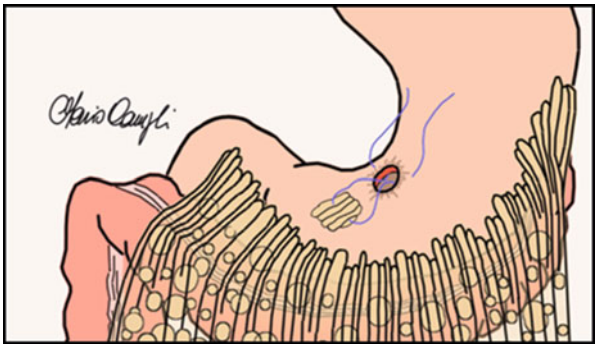

Fig. 7.4 Graham omentoplasty: a free graft of epiploon is used to repair the perforation

of laparoscopy may be lost if the complexity exceeds the level of technical ability or diminish the performance of a safe procedure.

The closure of perforation, probably, represents the most demanding moment of surgery and together with the subsequent extensive washing of the abdominal cavity is responsible for the increase of the operative time of laparoscopy compared to the traditional technique.

The choice of the method of closure depends fundamentally on the characteristics of the lesion: if the margins are infiltrated, friable, and less mobile, the repair must be performed only by applying an omental patch; for easily joined margins without any tension, just a simple suture with an omental flap is sufficient. In the latter 2–3 stitches are suggested to close the lesion to which in the second moment an omental patch is secured. Figs. 7.4, 7.5, and 7.6 show the techniques of laparoscopic closure of PPU [35].

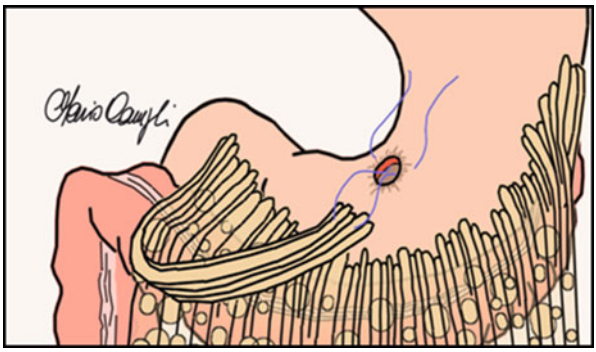

Fig. 7.5 Cellan-Jones repair: a strand of omentum is drawn over the perforation and held in place by full thickness sutures placed on either side of the perforation

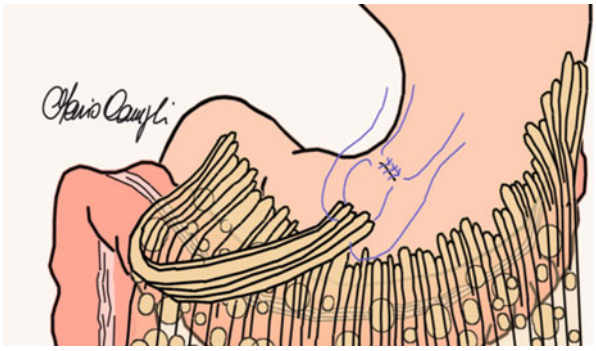

Fig. 7.6 Primary suture of the perforation overlapped by a pedicle omentum flap

As an alternative to classical suturing, several changes have been proposed to simplify the method: "single-stitch laparoscopic repair" [22]; use of a clip to tighten the suture (avoid a knot in the suture) [2]; use of clips full thickness self-locking [36]; use of staplers ("stapled omental patch repair") [37]; and use of combined laparoscopic–endoscopic technique ("gastroscopy-aided repair") [38].

In order to make the repair of the PPU less complex and, consequently, reduce operating time, techniques have been proposed so-called suture-less, which avoids the suture of the perforation (particularly laborious in the case of the edge of the friable and edematous perforation) [39]. The lesion can be repaired by means of an omental flap secured in situ by the affixing of fibrin glue (as in the first case described by laparoscopic Mouret in 1990) [6], or by using a plug to close the perforation, dimensioned on the size of the lesion [39, 40]. Nevertheless, there is still an open question whether the reduction of operating time made possible by simpler procedures does not reduce the safety of the laparoscopic technique at the expense of the patient, favoring a higher incidence of postoperative sequelae (in particular leakage) [5, 24].

The Consensus 2012 states: "The choice of perforation closure technique depends on lesion characteristics: if margins are edematous, friable, and/or difficult to mobilize, repair can be limited to an omental patch, eventually associated with

successful laparoscopic-assisted NOTES omental and falciform ligament patch closure, respectively. Postoperative radiographic contrast studies showed no leak and patients were discharged home on postoperative days 3 and 4. The third patient had undergone enterocutaneous fistula repair with herniorrhaphy 6 weeks prior; a transluminal endoscopic approach was feasible; however, the omentum was under too much tension to be secured. This procedure was converted to an open omental-patch repair.

After induction of general anesthesia, pneumoperitoneum (12–14 cm H_2O) has been established using a periumbilical trocar in Hasson technique. This served to confirm the diagnosis of ulcer perforation and for surveillance of the endoscopic procedure. A standard diagnostic upper endoscope with CO_2 insufflation has been introduced through the oro-pharynx into the stomach and duodenum. The site of perforation was identified and measured. The endoscope was carefully advanced through the perforation when possible. Once in the peritoneal cavity, the endoscopist proceeded with inspection and irrigation. A viable mobile piece of omentum was identified and pulled intraluminally through the site of perforation. The omentum was then fixed to the mucosa of the luminal wall with several endoscopic clips (Figs. 7.7 and 7.8).

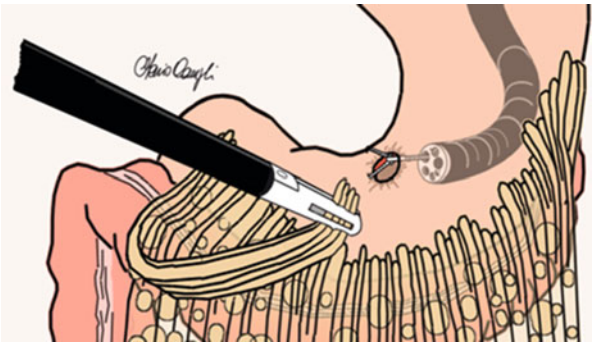

Fig. 7.7 A viable mobile piece of omentum pulled intraluminally through the site of perforation

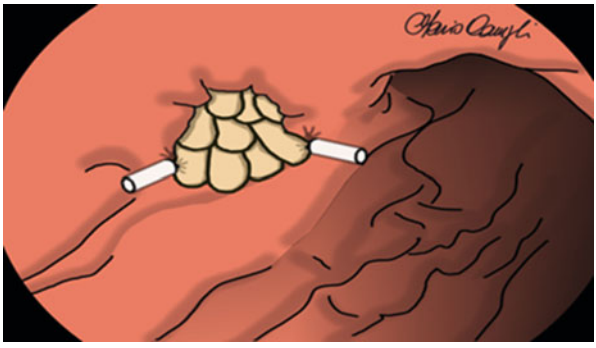

Fig. 7.8 The omentum is fixed to the mucosa of the luminal wall with several endoscopic clips