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Gasless Laparoscopy-Assisted Live Donor Nephrectomy

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Since September 2000, laparoscopy-assisted live donor nephrectomies were performed on 70 donors. We selected a retroperitoneal approach because of less invasiveness and fewer perioperative bowel complications than a transperitoneal approach. Moreover, a gasless procedure was chosen to achieve good urine output by donors, since pneumoperitoneum reduces both renal blood flow and urine output during CO₂ insufflation. The donor was placed in the kidney position. After creation of retroperitoneal working space using the balloon dissection technique through the flank small skin incision (1st trocar port), a 6cm para-rectus incision is made from just above the costal arch. An atraumatic incision retractor (Alexis™), which provides maximum circumferential window while minimizing the incision size, was attached on this incision. Then the abdominal wall is lifted using a self-made retractor attached to the margin of this incision. A trocar for the camera port (2nd trocar port) is inserted inside the iliac crest. The kidney was dissected using the open surgical and laparoscopic techniques under both the direct and magnified monitor visions. Mean operative time, WIT and EBL were 229 min, 5.6 min and 370 g, respectively. Two donors required open surgical repair with enlargement of para-rectus incision due to bleeding from lumbar vein and remnant renal artery. All donated kidneys achieved immediate function after transplantation. A small para-rectus skin incision without transsection of muscle does not cause postoperative pain with results of an improved cosmetic appearance. In case of accidental vascular injury, enlargement of the para-rectus incision quickly provides a wide operative field around renal pedicle. As our operative method is hybrid of the conventional open donor nephrectomy and basic laparoscopic techniques, most surgeons can perform it successfully.

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Hand-Assisted Retroperitoneoscopic Donor Nephrectomy

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We have employed a new living-donor nephrectomy involving a retroperitoneal approach combined hand-assistance and gas inflation since July 2001. Total 67 living donors aged 27-79 years underwent nephrectomy (left 67, right 10) until December 2004. The donors were placed in a modified decubitus position, and all the laparoscopic procedures were performed retroperitoneally using 3 port sites and a sealing device under a pressure of 10 mmHg by carbon dioxide insufflation. The sealing device was placed through a para-rectal abdominal skin incision of approximately 7 cm in length into the retroperitoneal cavity and used as a route for instrumental as well as hand-assisted manipulations during the surgery. After complete exposure of the renal pedicle, the surgeon held the kidney in one hand to secure quick extraction. The renal artery was secured with triple proximal clips and divided. The renal vein was transected with an endovascular GIA stapler, and the kidney was easily removed through the sealing device by hand. Mean operating time, estimated blood loss, and WIT were 260 min, 249 ml, and 22 min, respectively. The conversion to open nephrectomy for bleeding occurred in 2 donors, pneumothorax in 1, and subcutaneous hemorrhage at the sealing device port site in 1. The advantage of the retroperitoneal approach compared with the abdominal approach is the prevention of intra-abdominal complications. There are no definitive disadvantages for pneumoretroperitoneum in terms of graft function. Hand-assistance makes endoscopic dissections at the renal pedicle considerably easier and the reduced warm ischemic time. An additional advantage of this procedure is the quick conversion to open surgery. The retroperitoneal approach provides a limited operating cavity, however, a retroperitoneal cavity large enough for nephrectomy can be secured by balloon dilation.