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Kidney donor nephrectomy: open, lap, robotic. What, why and who?

Open donor nephrectomy (ODN) was the standard technique for the first 40 yrs. of renal transplantation. It was performed via an extraperitoneal loin incision often times combined with resection of the 12<sup>th</sup> rib, which was the standard technique at that time for any type of kidney surgery. The kidneys lie posteriorly in the extraperitoneal space and this approach does not violate the intraabdominal cavity and so there is no danger of damage to intraabdominal organs. It was however associated with a longer hospital stay, prolonged convalescence period and time off from work, cosmetic issues and potential for development of hernias all of which were disincentives for live donation.

Laparoscopic donor nephrectomy (LDN) was introduced in 1995. This is an intraperitoneal approach which requires a pneumoperitoneal pressure of 12 mm Hg. There is a potential for injury to intraabdominal organs and the pneumoperitoneum has the potential to decrease renal blood flow. LDN requires special training and equipment with increased hospital costs.

LDN was superior to ODN in terms reduced morbidity, reduced analgesic requirement, shorter convalescence and time off work and this generated a lot of consumer enthusiasm. There was also an element of commercial promotion of individual transplant programmes that offered this new technique despite unresolved concerns of donor safety, technical complications and graft outcomes. So, although surgeons were very enthusiastic about LDN the nephrologist were understandably less so

A 2007 review of 5 RCTs comparing LDN with ODN demonstrated level 1 evidence of superiority of LDN in reducing morbidity. LDN was associated with reduced analgesic requirements, increased warm ischaemia times (although without impact on graft function) and longer operative times. There was no difference in major complications and no difference in vascular thrombosis or ureteric complications seen in the early series of LDN. However, the majority of these trials involved young healthy donors with normal weight and left kidney donation with a single renal artery so these results cannot be extrapolated to all comers. The other issue was that because death and major complications occur so infrequently, safety had never been studied as an endpoint in these trials as the sample size would be too large

Another review that looked at all studies from 1995 till 2006 reported 8 deaths and 15 graft losses from LDN. Deaths with LDN are largely due to catastrophic events related to securing of the vascular pedicle. The review concluded that live organ registries are needed to determine combined experiences of complications and conversion to ODN rather than reports from single institutions. In response to the popularity of LDN, the open surgeons have modified their technique to develop a mini-incision donor nephrectomy (MIDN). This technique has greatly reduced the morbidity of the previous loin incision and is now widely offered in many centres as an alternative to LDN.

Different centres have different preferences as to the particular technique of donor nephrectomy based on the individual surgeon's or institution's preference. In the literature there is sufficient level I evidence to show that LDN is preferred over ODN for left donor nephrectomies. The open approach is still used for right sided donors, multiple renal arteries, abnormal renal anatomy and patients with previous abdominal surgeries.