



Surgical complications of open nephrectomy in living related donors in Yemen: a prospective study

Yemen'de canlı akraba donörlerde açık nefrektominin cerrahi komplikasyonları: prospektif bir çalışma

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ABSTRACT

Objective: Renal transplantation from living related donor is the best treatment option for chronic renal failure with experience for more than 50 years. However, this procedure may expose the health and even the life of otherwise normal individuals to risk. In this prospective study we described the surgical complications of open donor nephrectomies by Clavien grading system.

Material and methods: Between May 2002 and December 2014, one hundred and seventy-two potentially healthy kidney donors were admitted to Althawrah General Hospital, Ibn-Sina Hospital and Military Hospital. The median age was 34 years (19-60 years) with male predominance in 64.5% of the cases. This prospective descriptive study reviews intra-, and post-operative surgical complications using Clavien grading system for surgical complications.

Results: The procedure was done via supracostal lumbotomy incision (above 12th rib) in 112 cases (65.1%) and transcostal incision with resection of 11th rib in 60 cases (34.9%). Left kidney was taken in most of the cases (68%) while right kidney in the remaining 42% with an average warm ischemia time of 31 seconds (range, 22-34 seconds). Surgical complications by Clavien grading system were observed in 18.6% of the cases (32 cases). Grade 1 in 28 (16.4%); Grade 2 in 2 (1.2%) and Grade 3 in 2 cases (1.2%) were detected. There was no grade 4 or 5 cases in our series. Median postoperative hospital stay was 3 days (range: 2-4 days).

Conclusion: We found that most of the complications of open living donor nephrectomy are of grade I and higher grade complications are negligible compared to the advantages for the recipients.

Keywords: Living related donor; nephrectomy; surgical complications.

ÖZ

Amaç: Canlı akraba donörlerden böbrek nakli 50 yılı aşkın deneyimle kronik böbrek yetmezliğinin en iyi tedavi seçeneğidir. Ancak aksi durumlarda bu cerrahi normal kişilerin sağlığını hatta yaşamını riske atabilmektedir. Bu prospektif çalışmada Clavien derecelendirme sistemine göre açık donör nefrektomisinin cerrahi komplikasyonlarını tanımladık.

Gereç ve yöntemler: Mayıs 2002 ile Aralık 2014 arasında lthawrah Hastanesi, Ibn-Sina Hastanesi ve Asker Hastanesine 172 potansiyel olarak sağlıklı böbrek donörü kabul edilmiştir. Hastaların yaş ortalaması 34 yıl (19-60 yıl) olup erkek hastalar çoğunlukta (%64,5) Bu prospektif tanımlayıcı çalışmada cerrahi komplikasyonlar için Clavien derecelendirme sistemini kullanarak intra- ve postoperatif cerrahi komplikasyonlar gözden geçirilmiştir.

Bulgular: Cerrahi girişim 112 (%65,1) olguda 12. kostanın üstünden suprakostal lumbotomi kesisinden, 60 (%34,9) olguda 11. kostayı keserek transkostal yolla uygulanmıştır. Olguların çoğunda (68%) sol böbrek, geri kalan %42'sinde ise sağ böbrek alınmış olup ortalama sıcak iskemik süresi 31 (22-34) saniyeydi. Olguların %18,6'sında (n=32) Clavien derecelendirme sistemine göre komplikasyonlar gözlemlenmiştir. Bu komplikasyonlar 1. (n=28; %16,4), 2. (n=2; %1,2) ve 3. (n=2; %1,2) derecede idi. Serimizde 4. veya 5. derecede komplikasyon yoktu. Ortalama postoperatif hastanede kalış süresi 3 (2-4) gün idi.

Sonuç: Canlı vericilerde açık cerrahi nefrektomi komplikasyonlarının çoğunlukla 1. derecede olduğunu, daha yüksek derecede komplikasyonların ihmal edilebilir düzeyde olduğunu saptadık.

Anahtar Kelimeler: Canlı akraba verici; nefrektomi; cerrahi komplikasyonlar.

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Introduction

Shortage of organs for organ transplantation is an increasing problem worldwide. The unavailability of adequate organs for transplantation to meet the existing demand has resulted in major organ shortage crises.^[1] One of the solutions to overcome this shortage is encouragement of organ donation by living donors. Now living renal donors are important sources of renal grafts representing between 20-50% of renal grafts in industrialized countries.^[2] Although the mortality rate of living donor nephrectomy is reported to be only around 0.02%^[3], the procedure is not 100% safe and it is associated with certain morbidity.^[3,4]

Surgical complications of living donor nephrectomy are essential criteria in establishing a construct for monitoring and reporting the outcomes of this procedure.^[5] It is also helpful in informing potential donors about the inherent risks of the donor operation. Although the laparoscopic techniques for harvesting the kidneys are prevailing nowadays in most of the centers^[6], open technique still has a place in many centers for several reasons.^[7,8] In this prospective study we described the surgical complications of open donor nephrectomies by Clavien grading system.

Material and methods

This is a prospective and descriptive study reporting about peri-operative surgical complications of open living donor nephrectomy using Clavien grading system.^[9] Between May 2002 and December 2014, 172 cases were admitted to urology and nephrol-

ogy department in Althawrah, Ibn-Sina and Military Hospitals as living renal donors. The median age of the patients was 34 years (range 19-60) with the majority (64.5%) of them were male (Table 1). The relationships between the donor and recipient varied with brother to brother was the highest (18.8%) and the husband to the wife was the lowest 0% (Figure 1).

Preoperative evaluation was done by history and physical examination, urine analysis and culture, blood grouping, CBC, renal & liver function test, viral markers, histocompatibility testing (HLA, DR and cross-matching), renal ultrasonography (USG) and computed tomography (CT) angiography. Descriptive statistics were used in the study.

Results

The basic open surgical approach for harvesting the kidney was either through supracostal lumbotomy incision (above 12th rib) utilized in 112 cases (65.1%) or through transcostal lumbotomy incision with resection of 11th rib used in the remaining 60 (34.9%) cases. Left nephrectomy was performed more frequently in 68% of the cases while right nephrectomy was performed in the remaining 42%. The average warm ischemia time was 31 seconds (range 22-34 seconds). Surgical complications by Clavien grading system were noted in 32 (18.6%) cases as follows (Table 2). Grade 1; pleural injury in 12.8% (n=3) of the patients requiring insertion of a chest tube, wound infection in 3.4%; Grade 2; bleeding from drain more than 250 cc in one case (0.58%) and post-operative frank hematuria in another case and all needed

Table 1. Demographics of 172 living renal donors

Criteria	n	%
Male	111	64.5
Female	61	35.5
Age category (years)		
19-30	76	44.2
31-40	49	28.4
41-50	34	19.8
51-60	13	7.6
Total	172	100

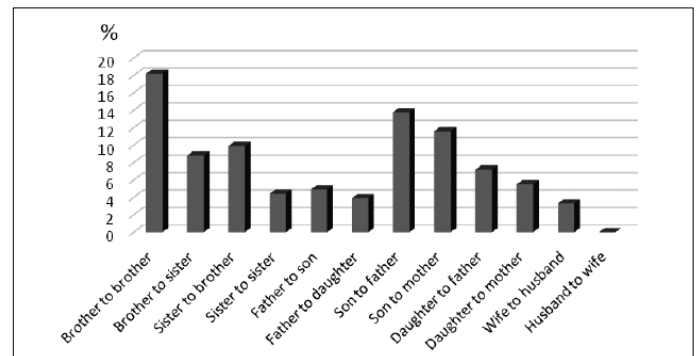


Figure 1. The relationships between the donor and recipient

Table 2. Surgical complications in 172 renal donors by Clavien grading system

Complication	Grade	n	%	Treatment
Pleural injury	1	22	12.8	Repair in 19 and chest tube in 3 cases
Wound infection	1	6	3.5	Dressing
Bleeding and hematuria	2	2	1.2	Exploration
Aortic laceration	3	1	0.58	Repair
Avulsion of renal vein from IVC	3	1	0.58	Repair

reoperation; Grade 3; abdominal aorta laceration in one case and avulsion of renal vein from inferior vena cava in another case. There was no mortality in our series. Median postoperative hospital stay was 3 days (range: 2-4 days).

Discussion

Shortage of organs for renal transplantation is one of the major concerns in the field.^[1] With increasing number of patients waiting for renal transplantation, several measures have been undertaken to increase the pool of organ donation including encouraging the population for related and unrelated live organ donation.^[10-12] Thus, live donors continue to be one of the important sources for kidney donation approaching up to 50% in some centers.^[2] In some countries including ours where harvesting of organs from cadaveres or brain death patients is not legalized, the live donors are the sole source for renal donation.

On the other hand, live kidney donation exposes the health and rarely even the life of otherwise normal individuals to risk.^[13] This risk is the major concern of the donors and kidney transplant surgeons all the time and all efforts are done to reduce this risk to a minimum. Mortality and morbidity are the criteria that can measure the threat to the live and health of the donors.^[14] The reported mortality rate of the live kidney donors is very low (0.02%)^[3] and it was mainly reported in the early open and laparoscopic donor nephrectomies.^[5] In recent series^[15,16] and our series there is no mortality. Lack of a unifying grading system of complications was one of the obstacles for precise definition, recording and reporting about morbidity of live donor nephrectomies which was underestimated and underreported in some series.^[5]

Introduction of Clavein grading system for surgical complications made the recording and reporting of the perioperative complications more objective.^[9] Implementation of this system or its modification was emphasized by many reports. Kocak et al suggested specific modification of Clavein system specially for the live donor nephrectomy complications.^[14] We found this modification more complex and preferred to utilize the classic Clavien grading system which is more simple. Open donor nephrectomy was the classic approach for harvesting the kidneys from live donors with different morbidity rates ranging between 7% and 21%.^[17,18] In our series we had 18% complication rate which is not different from that reported in the literature.

Since the mid 90s, the minimally invasive laparoscopic techniques were introduced with the aim to benefit from the advantages of laparoscopic surgery. This actually was achieved in many reports either by using conventional laparoscopy, hand- assisted or robotic technique. The main reported advantages of laparoscopic technique include lower perioperative morbidity, and analgesic requirements, shorter hospital stay, and convalescence period with faster return to work and better cosmetic outcomes. All these advantages encourage more people for kidney donation and thus increasing the pool of kidneys for transplantation. Therefore, it has

become the standard of care in many centers.^[6,16,19] Nevertheless, despite all reported advantages of laparoscopic technique, some authors and institutions still have a lot of concerns about it mainly due to longer operative and warm ischemia times, the need for long learning curve and its high cost. Thus, open technique is still preferred and predominant in some centers worldwide.

Shokeir in 2007 conducted systematic review of 69 studies comparing open versus laparoscopic live donor nephrectomies. He concluded that analgesic requirements, pain data, hospital stay and time to return to work are significantly in favor of the laparoscopic procedure. On the other hand, laparoscopic technique has the disadvantages of increased operative and warm ischemia times and increased major complications requiring reoperation. Regarding graft function, rejection rate, urological complications, patient and graft survival both techniques showed equivalent outcomes.^[5]

In a more recent review, Serrano et al.^[8] also showed that laparoscopic techniques are not totally advantageous over the open technique. In a large series of 4286 donor nephrectomies they compared open approach with 3 different laparoscopic techniques as for their short- and long- term outcomes. They concluded that although different laparoscopic donor nephrectomy techniques were associated with decreased intraoperative complications and less hospital stay, there were higher rates of short and long- term readmissions and long-term complications.

Regardless from the debates about the advantages and disadvantages, laparoscopic technique remains an attractive approach preferred by the surgeons and the patients and it is gaining more and more popularity and recommendation. However, in our country a lot of factors are not in favor of laparoscopic techniques. These include the high cost of laparoscopic equipment, lack of sufficient experience in laparoscopic surgery and lack of steady transplantation programs which are very important for progression of learning curve in laparoscopic surgery. For all that, open technique is still the used approach in our transplantation programs.

To minimize the morbidity of the lumbotomy incisions, many modifications have been proposed for open live donor nephrectomies.^[2,20] In meta-analysis of 9 studies, Antcliffe et al.^[21] compared mini-open versus standard open versus laparoscopic donor nephrectomies. They found that mini-incision techniques were superior to standard open technique in terms of analgesic requirement, overall complication rate, hospital stay and time to return to work while operative time, blood loss and warm ischemia time were not significantly different.^[21] Despite all these advantages of modified approaches, we didn't try any of them in our series and prefer to practice the standard open technique because as was mentioned above renal transplantation surgery is not performed in regular basis in our hospitals.

We found that most of the complications of open living donor nephrectomy are of Grade I and higher grades complications are negligible compared to the advantages for the recipients.

Ethics Committee Approval: Ethics committee approval was received for this study from the ethics committee of Ibn-Sina Specialist Hospital.

Informed Consent: Written informed consent was obtained from the parents of the patients who participated in this study.

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