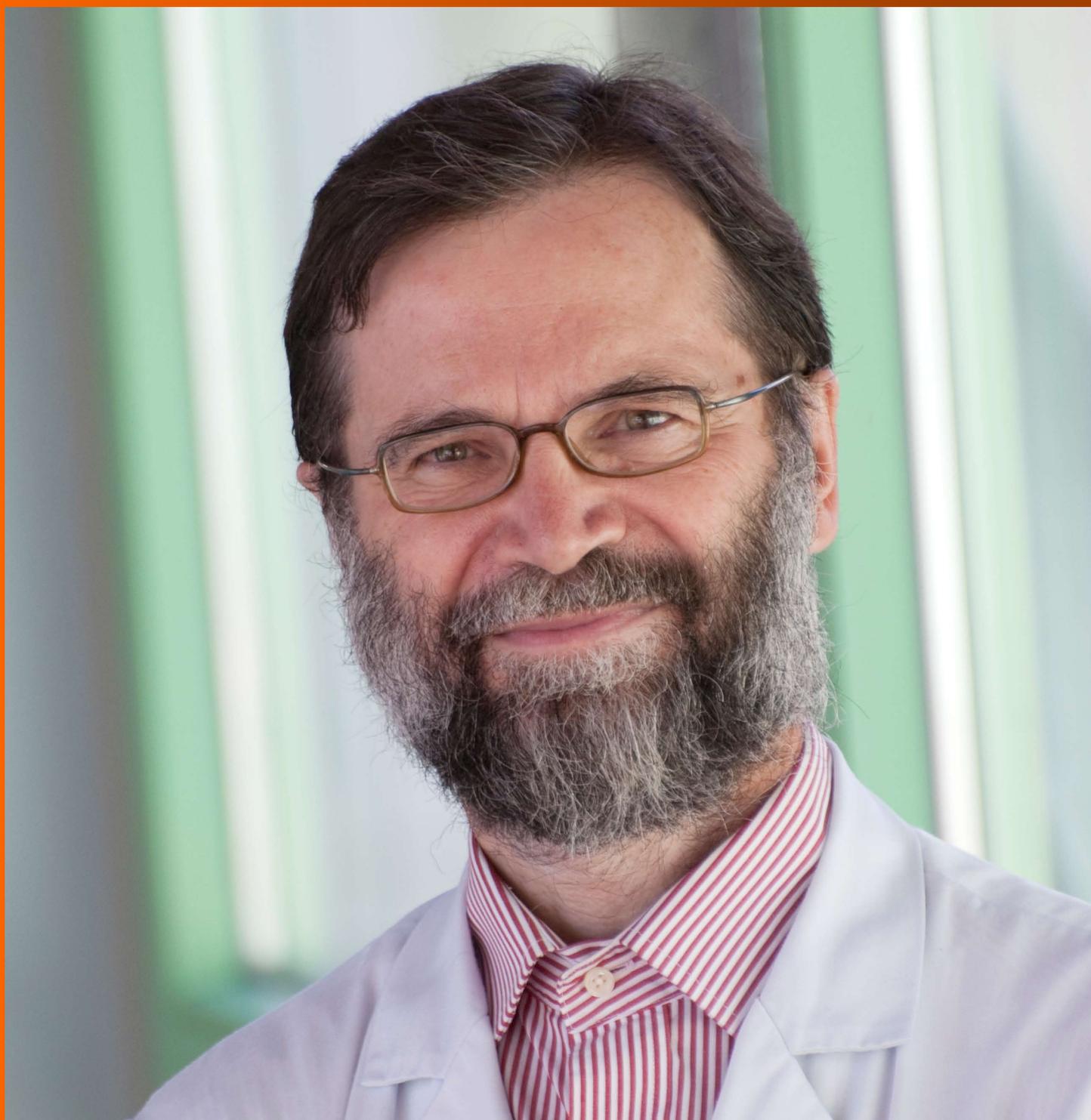


World Journal of *Transplantation*

World J Transplant 2017 April 24; 7(2): 103-160



REVIEW

- 103 Role of gastroesophageal reflux disease in lung transplantation
Hathorn KE, Chan WW, Lo WK
- 117 Intra-islet endothelial cell and β -cell crosstalk: Implication for islet cell transplantation
Narayanan S, Loganathan G, Dhanasekaran M, Tucker W, Patel A, Subhashree V, Mokshagundam S, Hughes MG, Williams SK, Balamurugan AN

MINIREVIEWS

- 129 Smoking in Renal Transplantation; Facts Beyond Myth
Aref A, Sharma A, Halawa A
- 134 Past, present and future of kidney paired donation transplantation in India
Kute VB, Patel HV, Shah PR, Modi PR, Shah VR, Rizvi SJ, Pal BC, Modi MP, Shah PS, Varyani UT, Wakhare PS, Shinde SG, Ghodela VA, Patel MH, Trivedi VB, Trivedi HL

META-ANALYSIS

- 144 Systemic meta-analysis assessing the short term applicability of early conversion to mammalian target of rapamycin inhibitors in kidney transplant
Kumar J, Reccia I, Kusano T, Julie BM, Sharma A, Halawa A
- 152 Living related and living unrelated kidney transplantations: A systematic review and meta-analysis
Simforoosh N, Shemshaki H, Nadjafi-Semnani M, Sotoudeh M

ABOUT COVER

Editorial Board Member of *World Journal of Transplantation*, Frieder Keller, MD, Doctor, Nephrology Division, Medical Department Innere 1, University Hospital, D-89070 Ulm, Germany

AIM AND SCOPE

World Journal of Transplantation (*World J Transplant*, *WJT*, online ISSN 2220-3230, DOI: 10.5500) is a peer-reviewed open access academic journal that aims to guide clinical practice and improve diagnostic and therapeutic skills of clinicians.

WJT covers topics concerning organ and tissue donation and preservation; tissue injury, repair, inflammation, and aging; immune recognition, regulation, effector mechanisms, and opportunities for induction of tolerance, thoracic transplantation (heart, lung), abdominal transplantation (kidney, liver, pancreas, islets), transplantation of tissues, cell therapy and islet transplantation, clinical transplantation, experimental transplantation, immunobiology and genomics, and xenotransplantation. The current columns of *WJT* include editorial, frontier, diagnostic advances, therapeutics advances, field of vision, mini-reviews, review, topic highlight, medical ethics, original articles, case report, clinical case conference (Clinicopathological conference), and autobiography.

AIM AND SCOPE

World Journal of Transplantation is now indexed in PubMed, PubMed Central.

FLYLEAF

I-IV Editorial Board

EDITORS FOR THIS ISSUE

Responsible Assistant Editor: *Xiang Li* **Responsible Science Editor:** *Fang-Fang Ji*
Responsible Electronic Editor: *Huan-Liang Wu* **Proofing Editorial Office Director:** *Xiu-Xia Song*
Proofing Editor-in-Chief: *Lian-Sheng Ma*

NAME OF JOURNAL
World Journal of Transplantation

ISSN
 ISSN 2220-3230 (online)

LAUNCH DATE
 December 24, 2011

FREQUENCY
 Bimonthly

EDITOR-IN-CHIEF
Maurizio Salvadori, MD, Professor, Renal Unit, Careggi University Hospital, Florence 50139, Italy

EDITORIAL BOARD MEMBERS
 All editorial board members resources online at <http://www.wjnet.com/2220-3230/editorialboard.htm>

EDITORIAL OFFICE
 Xiu-Xia Song, Director

World Journal of Transplantation
 Baishideng Publishing Group Inc
 7901 Stoneridge Drive, Suite 501, Pleasanton, CA 94588, USA
 Telephone: +1-925-2238242
 Fax: +1-925-2238243
 E-mail: editorialoffice@wjnet.com
 Help Desk: <http://www.f6publishing.com/helpdesk>
<http://www.wjnet.com>

PUBLISHER
 Baishideng Publishing Group Inc
 7901 Stoneridge Drive, Suite 501, Pleasanton, CA 94588, USA
 Telephone: +1-925-2238242
 Fax: +1-925-2238243
 E-mail: bpgoffice@wjnet.com
 Help Desk: <http://www.f6publishing.com/helpdesk>
<http://www.wjnet.com>

PUBLICATION DATE
 April 24, 2017

COPYRIGHT
 © 2017 Baishideng Publishing Group Inc. Articles published by this Open-Access journal are distributed under the terms of the Creative Commons Attribution Non-commercial License, which permits use, distribution, and reproduction in any medium, provided the original work is properly cited, the use is non commercial and is otherwise in compliance with the license.

SPECIAL STATEMENT
 All articles published in journals owned by the Baishideng Publishing Group (BPG) represent the views and opinions of their authors, and not the views, opinions or policies of the BPG, except where otherwise explicitly indicated.

INSTRUCTIONS TO AUTHORS
<http://www.wjnet.com/bpg/gerinfo/204>

ONLINE SUBMISSION
<http://www.f6publishing.com>

Smoking in Renal Transplantation; Facts Beyond Myth

Ahmed Aref, Ajay Sharma, Ahmed Halawa

Ahmed Aref, Department of Nephrology, Sur hospital, Sur 411, Sultanate of Oman

Ahmed Aref, Ajay Sharma, Ahmed Halawa, Faculty of Health and Science, Institute of Learning and Teaching, University of Liverpool, Liverpool L69 3GB, United Kingdom

Ajay Sharma, Royal Liverpool University Hospital, Liverpool L7 8XP, United Kingdom

Ahmed Halawa, Sheffield Teaching Hospital, University of Sheffield, Sheffield S5 7AU, United Kingdom

Author contributions: Aref A contributes by designing the work, data collection, writing the manuscript; Sharma A reviewed and edited the manuscript; Halawa A contributes by choosing the topic of our work, reviewing and final editing of the manuscript.

Conflict-of-interest statement: There is no conflict of interest associated with any of the senior author or other co-authors contributed their efforts in this manuscript.

Open-Access: This article is an open-access article which was selected by an in-house editor and fully peer-reviewed by external reviewers. It is distributed in accordance with the Creative Commons Attribution Non Commercial (CC BY-NC 4.0) license, which permits others to distribute, remix, adapt, build upon this work non-commercially, and license their derivative works on different terms, provided the original work is properly cited and the use is non-commercial. See: <http://creativecommons.org/licenses/by-nc/4.0/>

Manuscript source: Unsolicited manuscript

Correspondence to: Dr. Ahmed Halawa, Consultant Transplant Surgeon, Sheffield Teaching Hospital, University of Sheffield, Herries Road, Sheffield S5 7AU, United Kingdom. ahmed.halawa@sth.nhs.uk
Telephone: +44-77-87542128
Fax: +44-11-42714604

Received: September 30, 2016

Peer-review started: October 10, 2016

First decision: December 1, 2016

Revised: December 18, 2016

Accepted: February 28, 2017

Article in press: March 2, 2017

Published online: April 24, 2017

Abstract

Smoking is one of the preventable leading causes of death worldwide. Most of the studies focused on the association between smoking and cardiovascular disease, pulmonary diseases, malignancy and death. However, the direct effect of smoking on the renal system was undermined. There are emerging evidence correlating tobacco use with pathological changes in the normal kidneys. The effect is more obvious on the renal allograft most probably due to the chronic immune suppression status and the metabolic effect of the drugs. Several studies have documented a deleterious effect of smoking on the renal transplant recipients. Smoking was associated with lowering patient and graft survival. Smoking cessation proved to improve graft survival and to a lesser extent recipient survival. Even receiving a renal transplant from a smoker donor increases the risk of death for the recipient and carries a poorer graft survival compared to non-smoking donors. Most of the studies investigating the effect of smoking were based on self-reporting questionnaires, which may be misleading due to poor recall or the desire to give socially acceptable answers. This made the need of a reliable biomarker of ultimate importance. Cotinine was proposed as a promising biomarker that may help to provide objective evidence regarding the status of smoking and the dose of nicotine exposure, yet there are still some limitations of its use. The aim of this work is to review the current evidence to improve our understanding of this critical topic. Indeed, this will help to guide better-designed studies in the future.

Key words: Smoking; Kidney donor; Kidney recipient; Renal transplantation

© **The Author(s) 2017.** Published by Baishideng Publishing Group Inc. All rights reserved.

Core tip: There are several studies addressing the effect

of smoking on different body systems, yet, there are only few exploring the effect of smoking on the outcome of renal transplantation. Our present article summarizes all the available data published over the past 2 decades for better understanding of this topic and may also guide future studies.

Aref A, Sharma A, Halawa A. Smoking in Renal Transplantation; Facts Beyond Myth. *World J Transplant* 2017; 7(2): 129-133 Available from: URL: <http://www.wjgnet.com/2220-3230/full/v7/i2/129.htm> DOI: <http://dx.doi.org/10.5500/wjt.v7.i2.129>

INTRODUCTION

Smoking is a challenging health care problem; it has a well-established correlation with many serious medical conditions like cardiovascular diseases, pulmonary diseases, malignancy and death^[1]. Cigarette smoking assumes to have a role in atherosclerosis, endothelial dysfunction, progression of vascular disease progression of proteinuria, as it contains large amounts of free radicals^[2]. This makes smoking a significant renal risk factor, with considerable consequences on health care budget^[3].

The effect of smoking is aggravated in renal transplant recipients due to the effect of immune suppression medications on carcinogenesis, in addition to the effect of chronic kidney disease itself on cardiovascular risk and mortality^[1].

Despite the extensive smoking-related research, yet studies that investigated this phenomenon in the transplant populations are relatively few, and most of them are retrospective, poorly randomised or small sample size^[2].

EFFECTS OF SMOKING ON THE KIDNEY

The hazards of smoking were investigated thoroughly in association with cardiovascular disease, lung disease and oncogenesis. However, the effect of smoking on healthy kidney and progression of primary kidney diseases did not attract great attention^[3]. Indeed, many studies confirmed the role played by smoking in the progression of many intrinsic renal diseases (e.g., diabetic nephropathy, IgA nephropathy and autosomal dominant polycystic kidney disease)^[3].

Ritz *et al*^[4] studied the effect of smoking on healthy normotensive volunteers. They reported a significant increase in arginine vasopressin levels (from 1.27 ± 0.72 to 19.9 ± 27.2 pg/mL) and serum epinephrine (from 37 ± 13 to 140 ± 129 pg/mL). There was an increase in renal vascular resistance by 11% and a decrease in the glomerular filtration rate (GFR) by 15%. They assumed these effects are secondary to nicotine itself as these findings were reproduced by using nicotine containing gum^[4].

Pinto-Sietsma *et al*^[5] performed a leading cross-sectional study on 7476 participants to evaluate the effect of smoking on the development of albuminuria and abnormal kidney functions in non-diabetic population. They documented the presence of a dose-dependent association between smoking and development of both microalbuminuria and renal impairment in this screening. These findings were less obvious or absent in former smokers^[5].

RECIPIENT SMOKING AND TRANSPLANTATION OUTCOME

Smoking is strongly correlated to some of the potentially fatal outcomes, and there is some evidence that these complications are aggravated in solid organ transplant recipients^[6].

Smoking is a well-known risk factor for cardiovascular disease. Ponticelli *et al*^[7] have addressed the role of cardiovascular disease as the leading cause of death in renal transplant recipient. The development of de novo cardiovascular insult in the first year post-transplant was associated with pre-existing cardiovascular disease, older age, pre-transplant hypertension, smoking and duration of dialysis^[7].

The second leading cause of death post-transplantation was malignancy^[2,7] with a clear association between smoking and increased risk for certain types of malignancy^[1].

The effect of smoking on renal transplant recipients was investigated in relatively few studies, and most of them are retrospective. Table 1 summarises the results of most of these studies^[1,8-20].

It worth to mentioning that Zitt *et al*^[16] had a unique approach by studying the relation between smoking and renal biopsy findings of 76 kidney transplant recipients. Current smokers had an increase in the severity of vascular intimal fibrous thickening ($P = 0.004$). While the degree of chronic sclerosing nephropathy ($P = 0.05$) and arteriolar hyalinosis ($P < 0.001$) were associated with the duration of time post-transplantation^[16].

Most of these studies have revealed a clear benefit of smoking cessation on graft survival, but the effect on patient survival is less clear possibly reflecting the permanent atherosclerotic effect on the vascular system^[20].

EFFECT OF SMOKING HABIT OF KIDNEY DONOR ON THE OUTCOME OF TRANSPLANTATION

It may be logic that the recipient smoking will affect his own survival, but surprisingly, even the donor smoking will affect the recipient survival years after transplantation^[21,22].

Lin *et al*^[21] have analysed data from the United Network for Organ Sharing from 1994 to 1999, and

Table 1 The impact of smoking on kidney transplant recipient

Ref.	Year	Study design	No. of cases		Results	Conclusion
			Total	smokers		
Arend <i>et al</i> ^[8]	1997	Retrospective analysis	916	394	RR 2.2 of mortality after the first year of transplantation (95%CI)	The risk of mortality after the first year was higher in older patients, men, diabetics, hypertensive and smokers
Cosio <i>et al</i> ^[9]	1999	Retrospective analysis	523	147	Patient survival shorter in smokers by Cox regression ($P = 0.0005$), univariate and multivariate analysis ($P = 0.0004$)	History of smoking correlates with decreased patient survival, the effect of smoking on transplant recipient is quantitatively similar to the effect of diabetes
Kasiske <i>et al</i> ^[10]	2000	Retrospective analysis	1334	330	RR 1.3 of graft loss with smoking more than 25 pack/yr at transplantation (95%CI) and increase the risk of death (RR = 1.42, 95%CI)	The effect of smoking dissipates after five years from quitting
Doyle <i>et al</i> ^[11]	2000	Retrospective analysis	206	155	RR 8.1 for graft loss ($P < 0.001$) and RR 7.9 for mortality ($P < 0.001$)	Tobacco use was associated with worse patient and graft survival compared to those who never smoked or those who quit smoking at least two months before transplantation
Matas <i>et al</i> ^[12]	2001	Retrospective analysis	2540	Not mentioned	Pre-transplant smoking has RR 2.1 for graft loss	Pre-transplant smoking, peripheral vascular disease or dialysis more than one year were all associated with worse long-term outcome
Sung <i>et al</i> ^[13]	2001	Retrospective analysis	645	156	RR 2.3 for graft loss, graft survival in smokers vs non-smokers were (84% vs 88%) at 1 yr, (65% vs 78%) at 5 yr and (48% vs 62%) at 10 yr follow up ($P = 0.007$)	Smoking significantly affects graft survival, an effect that is not explained by increases in rejection or patient death. Smoking cessation has beneficial effect on graft survival
Yavuz <i>et al</i> ^[14]	2004	Retrospective analysis	226	97	There was no significant relation between pre-transplant smoking and graft loss ($P = 0.129$), or mortality ($P = 0.138$)	They suspected that the non-significant effect of smoking might be attributed to the limited number of cases included
Kheradmand <i>et al</i> ^[15]	2005	Retrospective analysis	199	41	Pre-transplant smoking was associated with reduced overall graft survival ($P = 0.01$)	Smoking contributes to graft loss but has no significant relation with rejection episodes
Zitt <i>et al</i> ^[16]	2007	Retrospective analysis	279	62	Smokers had higher serum creatinine levels. Transplant biopsy was indicated more often in smokers compared to non-smokers (39% vs 24%, $P = 0.02$)	Smoking was associated with vascular fibrous intimal thickening in transplanted kidneys so that it may have a role in the development of chronic allograft nephropathy and graft loss
Gombos <i>et al</i> ^[17]	2010	cross-sectional study	402	102	In spite that kidney functions in smokers were not affected after one month of transplantation, yet, there was significant lower kidney function in smokers after three years ($P < 0.05$). This correlates with the intensity of smoking ($P < 0.05$)	Smoking is common following kidney transplantation in Hungary, and this may be a risk of a poor long-term outcome
Nogueira <i>et al</i> ^[18]	2010	Retrospective analysis	997	329	Patient and graft survival were worse in smokers (AHR for patient survival was 1.6, 95%CI, $P = 0.02$, and graft survival AHR 1.47, 95%CI, $P = 0.01$). Glomerular filtration rate after one year was lower in smokers	History of smoking will negatively affect patient and graft survival. Also, it increases the risk of early rejection
Hurst <i>et al</i> ^[19]	2011	Retrospective analysis	41705	5832	New onset smokers have increased risk of graft failure (AHR = 1.46, $P < 0.001$) and death (AHR = 2.32, $P < 0.01$) compared with never smokers	New onset smoking post-transplant associated with lower patient and graft survival
Agarwal <i>et al</i> ^[20]	2011	Prospective observational study	604	133	Current smokers have increased risk of graft failure compared to recipients who never smoke (HR = 3.3, $P = 0.002$). While past smokers had an almost similar risk of graft failure compared to non-smokers (HR = 1.1, $P = 0.7$) On the other hand, current and past smokers were at higher risk of mortality compared to non-smoker recipients (HR = 2.1, 95%CI: 1.1-3.8, $P = 0.016$, and HR = 2.4, 95%CI: 1.4-4.0, $P = 0.001$, respectively)	Current smoking is a risk factor for graft failure and mortality Despite the finding that smoking cessation may not alter the risk of mortality, but at least it will improve the graft survival

Opelz <i>et al</i> ^[1]	2016	Retrospective analysis	46548	15086	Patients who quit smoking before transplantation had clear benefits regarding patient and graft survival when compared to those who continues to smoke (all-cause graft failure (HR 1.1 vs 1.5, $P < 0.001$), all-cause mortality (HR 1.1 vs 1.6, $P < 0.001$) and death with functioning graft due to malignancy (HR 1.4 vs 2.6, $P = 0.001$)) However, they still have a higher risk for graft loss, malignancy and death compared to those who never smoke before	Smoking cessation before transplantation improve patient and graft survival. There is also a substantial reduction in certain types of malignancy compared to those who continued to smoke (lower incidence of respiratory, urinary tract, female genital organs, lips and oral cavity tumours)
-----------------------------------	------	------------------------	-------	-------	---	---

AHR: Adjusted hazard ratio.

they declared that smoking habit of the donor has mild, yet statistically significant effect on recipient survival (HR = 1.06, $P < 0.05$), and graft survival (HR = 1.05, $P < 0.05$).

Underwood *et al*^[22] studied a retrospective analysis of 602 kidney transplant recipients and their living donors. The effect of donor smoking on graft survival was statistically insignificant (HR = 1.19, $P = 0.515$), unlike the recipient smoking which proved to be significant (HR = 1.74, $P = 0.05$). However, the recipient survival was negatively correlated to donor smoking (HR = 1.93, 95%CI: 1.27-2.94, $P = 0.002$) and recipient smoking (HR = 1.74, 95%CI: 1.01-3.00, $P = 0.048$)^[22].

Heldt *et al*^[23] evaluated GFR of 100 living donors and their recipients, the recipients of smoking donors had lower calculated GFR (37.0 mL/min per 1.73 m² vs 53.0 mL/min per 1.73 m²; $P < 0.001$) at a mean follow-up of 38 mo.

SMOKING BIOMARKER AND RENAL TRANSPLANTATION

Smoking exposure and analysis of dose of smoking depends on self-reporting in most of the studies^[24], which we strongly believe it lacks accuracy. A proper estimation of the risks associated with tobacco use depends on accurate measurement of exposure, which may be difficult in certain population such as pregnant women and parents of young children, where smoking considered socially unaccepted^[24]. Some patients may not recall the number of cigarettes accurately (digit bias)^[25], and finally the tobacco dose differs between individuals due to the difference between cigarettes as well as the difference in inhaling habits (passive smoking)^[25]. All these factors made the development of a valid and accurate biomarker for tobacco smoking of ultimate importance.

Cotinine is the major metabolite of nicotine. It has a relatively constant level due its long half-life (16 h vs 2-3 h for nicotine), which can be measured in plasma or urine. For these reasons, cotinine is considered a promising biomarker of smoking exposure^[25].

Hellemons *et al*^[25] studied 603 renal transplant recipients for a mean follow-up of 6.9 years. The aim was to investigate the relation of self-reporting and cotinine exposure in transplant population and to

evaluate the use of cotinine as an alternative for self-report^[25]. They concluded that active smoking had a negative impact on patient and graft survival, while former smokers had increased the risk of mortality but not graft failure. They documented that cotinine measurement (especially plasma cotinine) provides a valid alternative to self-reported smoking exposure, and it may even be preferred over self-reporting in epidemiological studies^[25].

The use of cotinine also has its limitations. Cotinine level is a reflection of smoking over the past few days, and this may be misleading if the patient is smoking occasionally (like in weekends) or if the patient was smoking less due to a period of illness. The second limitation lies in its inability to differentiate between never-smoking and former-smoking^[25]. Differentiating never-smoking from former-smoking is clinically relevant as former-smoking was proved to be associated with increasing risk of recipient mortality^[20,25].

We believe that the combination of cotinine measurement and self-reporting of smoking exposure will be the most reliable approach in evaluating renal transplant population.

CONCLUSION

Smoking remains a major modifiable health care challenge; it is the leading cause of variable morbidities and mortality. The use of smoking biomarkers proved to be reliable in evaluation and quantification of smoking exposure in the transplant population. Donor smoking and recipient former smoking proved to have a negative impact on survival. Transplant community should pay more attention to donor and recipient smoking cessation programs.

REFERENCES

- 1 Opelz G, Döhler B. Influence of Current and Previous Smoking on Cancer and Mortality After Kidney Transplantation. *Transplantation* 2016; **100**: 227-232 [PMID: 26102616 DOI: 10.1097/TP.0000000000000804]
- 2 Nourbala MH, Nemati E, Rostami Z, Einollahi B. Impact of cigarette smoking on kidney transplant recipients: a systematic review. *Iran J Kidney Dis* 2011; **5**: 141-148 [PMID: 21525572]
- 3 Orth SR, Ogata H, Ritz E. Smoking and the kidney. *Nephrol Dial Transplant* 2000; **15**: 1509-1511 [PMID: 11007813 DOI: 10.1093/ndt/15.10.1509]

- 4 **Ritz E**, Benck U, Franek E, Keller C, Seyfarth M, Clorius J. Effects of smoking on renal hemodynamics in healthy volunteers and in patients with glomerular disease. *J Am Soc Nephrol* 1998; **9**: 1798-1804 [PMID: 9773780]
- 5 **Pinto-Sietsma SJ**, Mulder J, Janssen WM, Hillege HL, de Zeeuw D, de Jong PE. Smoking is related to albuminuria and abnormal renal function in nondiabetic persons. *Ann Intern Med* 2000; **133**: 585-591 [PMID: 11033585 DOI: 10.7326/0003-4819-133-8-200010170-00008]
- 6 **Corbett C**, Armstrong MJ, Neuberger J. Tobacco smoking and solid organ transplantation. *Transplantation* 2012; **94**: 979-987 [PMID: 23169222 DOI: 10.1097/TP.0b013e318263ad5b]
- 7 **Ponticelli C**, Villa M, Cesana B, Montagnino G, Tarantino A. Risk factors for late kidney allograft failure. *Kidney Int* 2002; **62**: 1848-1854 [PMID: 12371988 DOI: 10.1046/j.1523-1755.2002.00612.x]
- 8 **Arend SM**, Mallat MJ, Westendorp RJ, van der Woude FJ, van Es LA. Patient survival after renal transplantation; more than 25 years follow-up. *Nephrol Dial Transplant* 1997; **12**: 1672-1679 [PMID: 9269647 DOI: 10.1093/ndt/12.8.1672]
- 9 **Cosio FG**, Falkenhain ME, Pesavento TE, Yim S, Alamir A, Henry ML, Ferguson RM. Patient survival after renal transplantation: II. The impact of smoking. *Clin Transplant* 1999; **13**: 336-341 [PMID: 10485376 DOI: 10.1034/j.1399-0012.1999.130410.x]
- 10 **Kasiske BL**, Klinger D. Cigarette smoking in renal transplant recipients. *J Am Soc Nephrol* 2000; **11**: 753-759 [PMID: 10752535]
- 11 **Doyle SE**, Matas AJ, Gillingham K, Rosenberg ME. Predicting clinical outcome in the elderly renal transplant recipient. *Kidney Int* 2000; **57**: 2144-2150 [PMID: 10792636 DOI: 10.1046/j.1523-1755.2000.00066.x]
- 12 **Matas AJ**, Payne WD, Sutherland DE, Humar A, Gruessner RW, Kandaswamy R, Dunn DL, Gillingham KJ, Najarian JS. 2,500 living donor kidney transplants: a single-center experience. *Ann Surg* 2001; **234**: 149-164 [PMID: 11505060 DOI: 10.1097/00000658-200108000-00004]
- 13 **Sung RS**, Althoen M, Howell TA, Ojo AO, Merion RM. Excess risk of renal allograft loss associated with cigarette smoking. *Transplantation* 2001; **71**: 1752-1757 [PMID: 11455254 DOI: 10.1097/00007890-200106270-00009]
- 14 **Yavuz A**, Tuncer M, Gürkan A, Demirbaş A, Süleymanlar G, Ersoy F, Yakupoğlu G. Cigarette smoking in renal transplant recipients. *Transplant Proc* 2004; **36**: 108-110 [PMID: 15013315 DOI: 10.1016/j.transproceed.2003.11.051]
- 15 **Kheradmand A**, Shahbazian H. The role of pretransplant smoking on allograft survival in kidney recipients. *Urol J* 2005; **2**: 36-39 [PMID: 17629894]
- 16 **Zitt N**, Kollerits B, Neyer U, Mark W, Heininger D, Mayer G, Kronenberg F, Lhotta K. Cigarette smoking and chronic allograft nephropathy. *Nephrol Dial Transplant* 2007; **22**: 3034-3039 [PMID: 17517794 DOI: 10.1093/ndt/gfm275]
- 17 **Gombos P**, Langer RM, Korbely R, Varga M, Kaposi A, Dinya E, Müller V. Smoking following renal transplantation in Hungary and its possible deleterious effect on renal graft function. *Transplant Proc* 2010; **42**: 2357-2359 [PMID: 20692480 DOI: 10.1016/j.transproceed.2010.05.143]
- 18 **Nogueira JM**, Haririan A, Jacobs SC, Cooper M, Weir MR. Cigarette smoking, kidney function, and mortality after live donor kidney transplant. *Am J Kidney Dis* 2010; **55**: 907-915 [PMID: 20176427 DOI: 10.1053/j.ajkd.2009.10.058]
- 19 **Hurst FP**, Altieri M, Patel PP, Jindal TR, Guy SR, Sidawy AN, Agodoa LY, Abbott KC, Jindal RM. Effect of smoking on kidney transplant outcomes: analysis of the United States Renal Data System. *Transplantation* 2011; **92**: 1101-1107 [PMID: 21956202 DOI: 10.1097/TP.0b013e3182336095]
- 20 **Agarwal PK**, Hellemons ME, Zelle DM, van Ree RM, van den Born J, van der Heide JJ, Gans RO, van Son WJ, Navis G, Bakker SJ. Smoking is a risk factor for graft failure and mortality after renal transplantation. *Am J Nephrol* 2011; **34**: 26-31 [PMID: 21659736 DOI: 10.1159/000328903]
- 21 **Lin SJ**, Koford JK, Baird BC, Hurdle JF, Krikov S, Habib AN, Goldfarb-Rumyantzev AS. Effect of donors' intravenous drug use, cigarette smoking, and alcohol dependence on kidney transplant outcome. *Transplantation* 2005; **80**: 482-486 [PMID: 16123722 DOI: 10.1097/01.tp.0000168154.14458.28]
- 22 **Underwood PW**, Sheetz KH, Cron DC, Terjimanian MN, Englesbe MJ, Waits SA. Cigarette smoking in living kidney donors: donor and recipient outcomes. *Clin Transplant* 2014; **28**: 419-422 [PMID: 24617506 DOI: 10.1111/ctr.12330]
- 23 **Heldt J**, Torrey R, Han D, Baron P, Tenggardjaja C, McLarty J, Lindler T, Baldwin DD. Donor Smoking Negatively Affects Donor and Recipient Renal Function following Living Donor Nephrectomy. *Adv Urol* 2011; **2011**: 929263 [PMID: 21912540 DOI: 10.1155/2011/929263]
- 24 **Florescu A**, Ferrence R, Einarson T, Selby P, Soldin O, Koren G. Methods for quantification of exposure to cigarette smoking and environmental tobacco smoke: focus on developmental toxicology. *Ther Drug Monit* 2009; **31**: 14-30 [PMID: 19125149 DOI: 10.1097/FTD.0b013e3181957a3b]
- 25 **Hellemons ME**, Sanders JS, Seelen MA, Gans RO, Muller Kobold AC, van Son WJ, Postmus D, Navis GJ, Bakker SJ. Assessment of Cotinine Reveals a Dose-Dependent Effect of Smoking Exposure on Long-term Outcomes After Renal Transplantation. *Transplantation* 2015; **99**: 1926-1932 [PMID: 25710609 DOI: 10.1097/TP.0000000000000636]

P- Reviewer: Botha P, Salvatore SP, Yueh CY **S- Editor:** Gong ZM
L- Editor: A **E- Editor:** Wu HL





Published by **Baishideng Publishing Group Inc**
7901 Stoneridge Drive, Suite 501, Pleasanton, CA 94588, USA
Telephone: +1-925-223-8242
Fax: +1-925-223-8243
E-mail: bpgoffice@wjgnet.com
Help Desk: <http://www.f6publishing.com/helpdesk>
<http://www.f6publishing.com>

