Post renal transplantation closure of A-V fistula ;a matter of debate

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Agenda

- Opinions suggesting closure of A-f fistula after renal transplantation; Why to close?
- Why not to close?
- Conclusion

- Renal transplantation is the most common organ transplanted worldwide.

- Immunosuppressive drugs have improved the results of renal transplantation dramatically in recent years**:,The incidence of acute rejection within the first year is around 7.9%, *however, there is still no consensus on the treatment of arteriovenous (A-V) fistula after successful transplantation***


With closure

Avoidance of complications of A-V Fistula after renal transplantation

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Prophylactic Ligature of AV Fistula Prevents High Output Heart Failure after Kidney Transplantation

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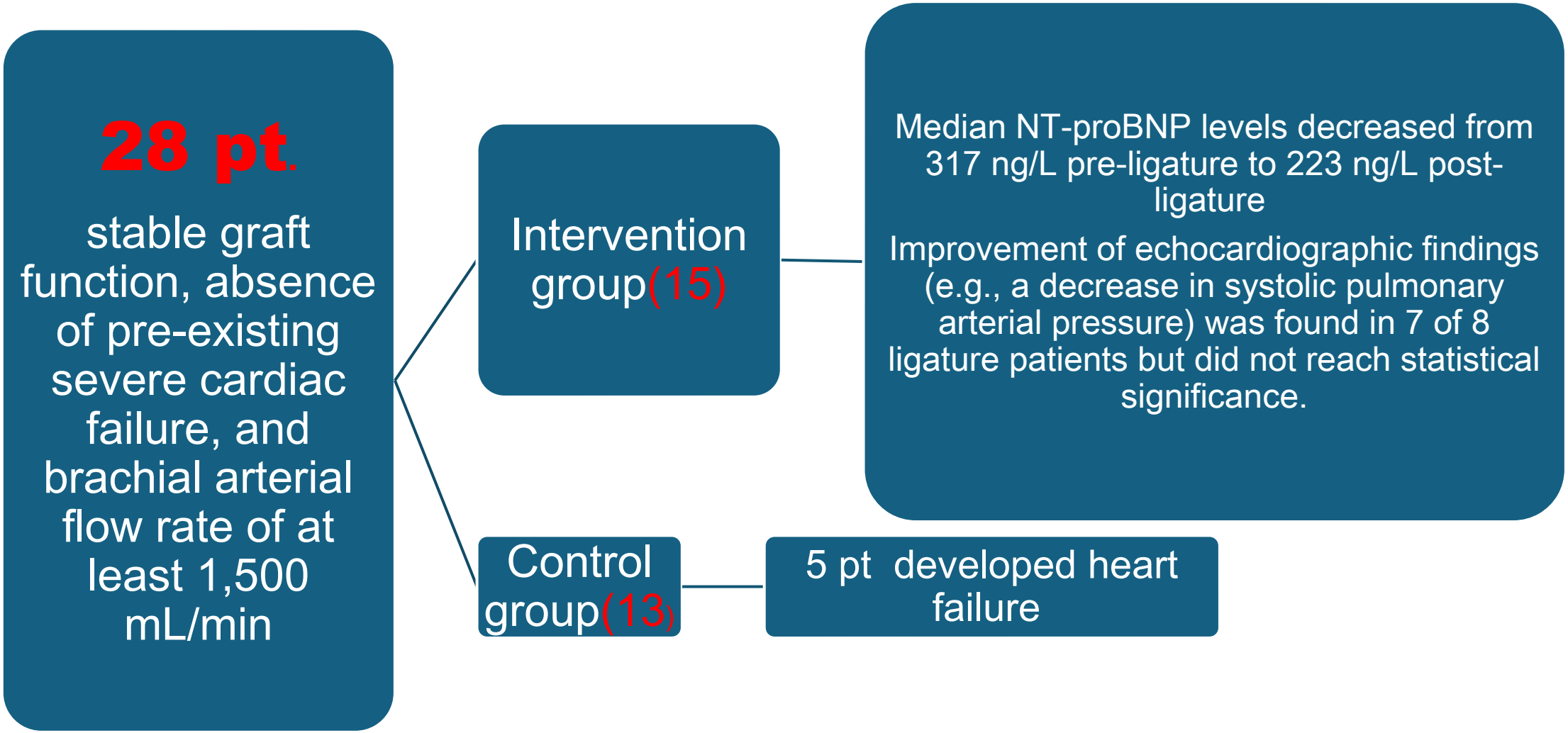
28 pt.
stable graft function, absence of pre-existing severe cardiac failure, and brachial arterial flow rate of at least 1,500 mL/min
Intervention group(15)
Median NT-proBNP levels decreased from 317 ng/L pre-ligature to 223 ng/L post-ligature
Improvement of echocardiographic findings (e.g., a decrease in systolic pulmonary arterial pressure) was found in 7 of 8 ligature patients but did not reach statistical significance.
Control group(13)
5 pt developed heart failure

Conclusion

- Prophylactic ligature of high-flow AV fistulas after kidney transplantation **can avoid high-output heart failure**, and a more liberal approach to close AV fistulas might be justified.

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Hemodialysis arteriovenous fistula ligation after renal transplantation: Impact on graft resistive index

Marica Magnetti, Gianluca Leonardi, [...], and Luigi Biancone +8 View all authors and affiliations

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Abstract

Background:

Kidney allograft resistive index (RI) is prognostic for graft and recipient survivals. Recipient hemodynamics could influence RI. In particular, dialysis arteriovenous fistula (AVF) has been involved in heart function changes, reversible after AVF ligation. Knowledge about AVF and RI is lacking. In this study, we prospectively evaluated RI changes after AVF ligation in kidney transplanted patients.

Methods:

pressure (mBP), heart rate (HR), serum creatinine (sCr), estimated glomerular filtration rate (eGFR), 24 h proteinuria (24 h-P), immunosuppressive drug blood levels (IS) and antihypertensive drugs were also recorded.

Results:

AVF ligation was performed 3.1 years (IQR: 2.1–3.8) after transplantation. Median AVF flow (Qa) was 1868 mL/min (IQR: 1538–2712) and 8 AVF were classified as high flow (Qa ≥ 2 L/min). At baseline, median sCr was 1.32 mg/dL (IQR: 1.04–1.76) and median eGFR was 57.1 mL/min. Median RI was 0.71 at T0, 0.69 at T1, 0.66 at T6. RI reduction at T1 and T6 was statistically significant ($p < 0.05$ and $p < 0.001$ respectively); in particular, 90.4% of patients had persistently improved values at T6. Furthermore, mBP increased while HR decreased. These changes were independent from sCr, 24 h-P, IS, antihypertensive drugs number, Qa and AVF type.

Conclusions:

AVF ligation improves kidney allograft RI; it may reflect better kidney perfusion.

Annals of Vascular Surgery

CLINICAL RESEARCH | VOLUME 53, P128-132, NOVEMBER 2018

Removal of Noninfected Arteriovenous Fistulae after Kidney Transplantation is a Safe and Beneficial Management Strategy for Unused Dialysis Access

Charles D. Fraser III • Joshua C. Grimm • Rui Han Liu • ...
Faris Azar • Robert J. Beaulieu • Thomas Reifsnyder • ...
Show all authors

Published: June 07, 2018 •

DOI: https://doi.org/10.1016/j.avsg.2018.04.020 •

All patients who underwent AVF excision at a single institution from 2006 to 2016 were retrospectively reviewed. Within that cohort, those undergoing removal after renal transplantation were included for analysis. Baseline patient characteristics, including renal function at the time of removal, reason for excision, and age of the AVF, were examined. The primary outcome was the need for dialysis after AVF removal.

Results

A total of 114 patients, of which 36 (31.6%) were recipients of renal transplants, underwent fistula removal during the study period. Within the transplant cohort, the median fistula age at the time of excision was 1,903 days (interquartile range: 556–3,394 days). The most common indications for excision included aneurysmal degeneration ($n = 9$, 25%), pain ($n = 6$, 16.7%), upper extremity steal syndrome ($n = 5$, 13.9%), thrombosis ($n = 5$, 13.9%), high cardiac output heart failure ($n = 4$, 11%), and extremity swelling secondary to venous hypertension ($n = 2$, 5.6%). Most patients (30, 83.3%) had intact graft function. Average creatinine

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Conclusions

Removal of symptomatic, unused AVFs can be performed safely in renal transplant recipients. Considering the morbidity associated with large AVFs (including high output cardiac failure), the current paradigm of maintaining asymptomatic hemodialysis access in patients with normally functioning renal transplants should be reconsidered.


Against closure

RESEARCH ARTICLE

Effect of arteriovenous access closure and timing on kidney function in kidney transplant recipients

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Abstract

This study aimed to determine whether the closure of a functioning arteriovenous (AV) access affects the estimated glomerular filtration rate (eGFR) and to compare outcomes according to the timing of AV access closure after kidney transplantation (KT). From 2009 to 2015, medical records were retrospectively reviewed for 142 kidney transplant recipients (KTRs) who underwent AV access closure. The 142 KTRs were categorized into three groups: AV access closure was performed within 6 months after KT in Group 1 (n = 45), at 6–12 months after KT in Group 2 (n = 49), and at 12–24 months after KT in Group 3 (n = 48). The baseline (at the time of AV access closure) and follow-up eGFR values during the 3-year follow-up period were compared. Linear mixed model analysis revealed no significant association between longitudinally observed eGFR values and the amount of time elapsed after AV access closure in the study population (P = 0.36). There was no significant association between 3-year eGFR values and the timing of AV access closure (P = 0.58). In conclusion, after successful KT, AV access closure did not affect the eGFR significantly, and the timing of AV access closure was not significantly associated with outcomes.

Introduction

Controversy exists regarding the decision of whether to close or preserve a functioning arteriovenous (AV) access for successful kidney transplant recipients (KTRs) [1–6]. Surgical closure is usually performed for patients with specific conditions, including high-flow fistulas, a high-risk cardiovascular status, or cosmetic reasons [3]. Although a functioning AV access for hemodialysis burdens the cardiovascular system with increased cardiac output and pulmonary artery pressure, increasing cardiovascular risk [1], many patients need to return to dialysis, and the physiologic effect of AV access on these patients does not strongly favor routine closure following kidney transplantation (KT) with stable kidney allograft function [2, 3]. Moreover, the effects of a functioning AV access on the estimated glomerular filtration rate (eGFR) and kidney allograft survival are unclear. Concerning the evolution of kidney allograft

Abstract

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JOURNAL ARTICLE

The closure of arteriovenous fistula in kidney transplant recipients is associated with an acceleration of kidney function decline

FREE

Laurent Weekers, Pauline Vanderweckene, Hans Pottel, Diego Castanares-Zapatero, Catherine Bonvoisin, Etienne Hamoir, Sylvie Maweja, Jean-Marie Krzesinski, Pierre Delanaye, François Jouret

Nephrology Dialysis Transplantation, Volume 32, Issue 1, January 2017, Pages 196–200,
https://doi.org/10.1093/ndt/gfw351
Published: 17 October 2016 **Article history**

Background. The creation of arteriovenous fistula (AVF) may retard chronic kidney disease progression in the general population. Conversely, the impact of AVF closure on renal function in kidney transplant recipients (KTRs) remains unknown.

Methods: From 2007 to 2013, we retrospectively categorized 285 KTRs into three groups: no AVF (Group 0, n = 90), closed AVF (Group 1, n = 114) and left-open AVF (Group 2, n = 81). AVF closure occurred at 653 ± 441 days after kidney transplantation (KTx), with a thrombosis:ligation ratio of 19:95. Estimated glomerular filtration rate (eGFR) was determined using the Modification of Diet in Renal Disease equation. Linear mixed models calculated the slope and intercept of eGFR decline versus time, starting at 3 months post-KTx, with a median follow-up of 1807 days (95% confidence interval 1665–2028).

Results: The eGFR slope was less in Group 1 (−0.081 mL/min/month) compared with Group 0 (−0.183 mL/min/month; P = 0.03) or Group 2 (−0.164 mL/min/month; P = 0.09). Still, the eGFR slope significantly deteriorated after (−0.159 mL/min/month) versus before (0.038 mL/min/month) AVF closure (P = 0.03). Study periods before versus after AVF closure were balanced to a mean of 13.5 and 12.5 months, respectively, with at least 10 observations per patient (n = 99).

Conclusions: In conclusion, a significant acceleration of eGFR decline is observed over the 12 months following the closure of a functioning AVF in KTRs.

Keywords: GFR; MDRD; arteriovenous fistula; graft function; kidney transplantation.

Results

We included 626 patients. Median AVF follow-up was 4.9 years. One month after kidney transplantation estimated AVF patency rate was 90%, at 1 year it was 82%, at 3 years it was 70% and at 5 years it was 61%; median estimated AVF patency was 7.9 years. The main cause of AVF failure was spontaneous thrombosis occurring in 76% of AVF failure cases, whereas 24% of AVFs were ligated or extirpated. In a Cox multivariate model female sex and grafts were independently associated with more frequent AVF thrombosis. AVF was used in about one third of our patients. AVF-related complications occurred in 29% of patients and included: growing aneurysms, complicated thrombosis, high-flow AVF, signs of distal hypoperfusion, venous hypertension, trauma of the AVF arm, or pain in the AVF/arm.

Conclusions

AVFs remain functional after kidney transplantation in the majority of patients and are often re-used after graft failure. AVF-related complications are common and require proper care.

JAHA
Journal of the American Heart Association

REVIEW ARTICLE | Originally Published 15 February 2019

Effects of Arteriovenous Fistula on Blood Pressure in Patients With End-Stage Renal Disease: A Systematic Meta-Analysis

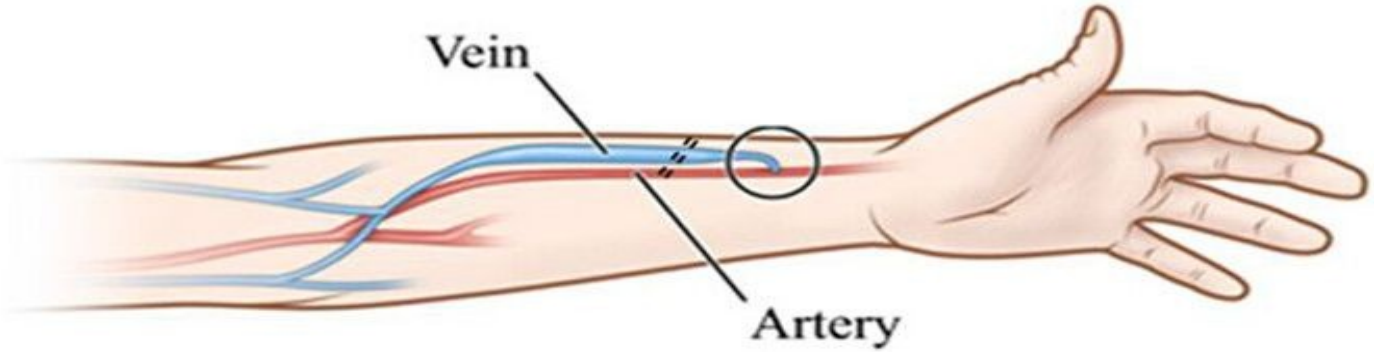
Sean S. Scholz, MD, Davor Vukadinović, MD, Lucas Lauder, MD, Sebastian Ewen, MD, Christian Ukena, MD, Raymond R. Townsend, MD, Stefan Wagenpfeil, PhD, Michael Böhm, MD, and

Conclusions

Creation of AVF significantly decreases blood pressure in patients with end-stage renal disease, whereas blood pressure tends to increase after ligation. These findings illustrate the hemodynamic consequences of AVF which are under investigation for severe hypertension.

Pros

Cons



- LV mass reduction
- Potential reduced CV risk
- Minimization of rupture risk
- Cosmetic benefits

- Loss of access site
- Post-ligation hypertension
- Peri-operative complications
- Cost

Conclusion

Should a functioning fistula be ligated after renal transplantation?

Thank you