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# Post-transplant Anemia: Treatable Multifactorial Pathogenesis and Negative Impact on Graft and Possibly Patient Survival

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## *Dear Editor,*

The prevalence of post-transplantation anemia (PTA) ranges between 20 and 60% depending on the criteria used for defining anemia, not only that, it is also a common problem in pediatric studies (1, 2). The three recent surveys enrolling the largest number of patients reported a prevalence of 30-40%. Severe anemia, requiring treatment based on current guidelines is less frequent with prevalence rate of 10-15% (3). Einollahi *et al.* (4), reported lower prevalence of late PTA in their pediatric patients (15.4%) possibly owing to two reasons: the first is the definition of anemia, as they used KDOQI guidelines to categorize PTA as Hb < 11 g/dL (5) which may lead to underestimation of the frequency of anemia; and the second reason is the difference in the immunosuppression protocols used in different studies.

Females have similar susceptibility to have PTA as males and have equal chance of having severe anemia after renal transplantation (2, 6). Conversely, Mitsnefes *et al.* (1) reported a higher prevalence of PTA in girls (32.6% *vs.* 20.6% in boys) which could be due to difference in the mean ages in different studies. The pathogenesis of post-transplant anemia PTA is multifactorial, but declining renal function and failing erythropoietin synthesis are suggested to play an important role. Late PTA has been attributed to renal dysfunction, immunosuppressive drugs, antiviral agents, infections, blood loss, autoimmune hemolytic anemia, chronic inflammatory state and the use of angiotensin-converting enzyme inhibitors (7) and or angiotensin II receptor blockers (8).

Gheith *et al.* 2009 (6) reported that patients who were receiving CsA based protocols were associated with lower Hb levels especially if associated with antiproliferative agents -MMF or azathioprine- which could be explained by their suppressive effect on bone marrow and this was matched with similar findings among children (8, 9). Anemia lead to hyperkinetic circulation, thicker left ventricular wall and congestive heart failure which represent independent predictors of mortality in transplant population (10). Given the high frequency of

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PTA and that cardiovascular disease is the leading cause of death with a functioning renal allograft; persistent anemia might be an important contributor to mortality in this population (11).

Conflicting views had been published regarding the association between anemia and outcome in kidney-transplanted patients. Winkelmayer *et al.* (12) reported no significant association between anemia and outcome (mortality or graft failure). However, Heinze *et al.* (13) suggested that anemia may be associated with mortality in the kidney-transplanted patients. Moreover, anemia which is a treatable complication was significantly and independently associated with mortality and graft failure in kidney-transplanted patients (14)**.** Higher rates of acute rejection were found in anemic when compared with non-anemic recipients (3, 6). Moreover, cases with chronic allograft nephropathy was significantly higher in the anemic group ($P = 0.001$) and cases with graft failure increased significantly with advancement of anemia. This also was matched with that reported by Molnar *et al.* (3) as they concluded that each 1 g/L decrement in hemoglobin increased the odd ratio of graft failure by 1.9% during 4-years follow-up period. In transplant recipients, anemia induced hypoxic damage might be potentiated by the use of immunosuppressive agents, particularly calcineurin inhibitors, and by the concomitant presence of congestive heart failure, which reduces renal blood flow (11).

Post-transplant anemia is a prevalent, treatable risk factor for many of the post-transplant co-morbidities such as rejection, and cardiovascular complications.

## References


1. Mitsnefes MM, Subat-Dezulovic M, Khoury PR, Goebel J, Strife CF. Increasing incidence of post-kidney transplant anemia in children. *Am J Transplant*. 2005;**5**(7):1713-8.
2. Gheith O, Wafa E, Hassan N, Mostafa A, Sheashaa HA, Mahmoud K, *et al.* Does posttransplant anemia at 6 months affect long-term outcome of live-donor kidney transplantation? A single-center experience. *Clin Exp Nephrol*. 2009;**13**(4):361-6.
3. Molnar MZ, Novak M, Ambrus C, Kovacs A, Pap J, Remport A, *et al.* Anemia in kidney transplanted patients. *Clin Transplant*. 2005;**19**(6):825-33.
4. Einollahi B, Rostami Z, Teimoori M, Beiraghdar F. Late anemia in pediatric kidney transplant recipients: Prevalence and risk factors. *Nephro-Urol Mon*. 2011;**3**(3):172-6.
5. Wald R, Tentori F, Tighiouart H, Zager PG, Miskulin DC. Impact of the Kidney Disease Outcomes Quality Initiative (KDOQI) Clinical Practice Guidelines for Bone Metabolism and Disease in a large dialysis network. *Am J Kidney Dis*. 2007;**49**(2):257-66.
6. Gheith O, Wafa E, Refaie A, Hassan N, Mostafa A, Sheashaa H, *et al.* Post-transplant anemia in pediatric patients and its impact on patient and graft survival: single center experience. *Africa J Nephrol* 2009;**13**:31-8.
7. Winkelmayer WC, Chandraker A. Pottransplantation anemia: management and rationale. *Clin J Am Soc Nephrol*. 2008;**3** (Suppl 2):S49-55.
8. Karakus S, Kanbay M, Koseoglu HK, Colak T, Haberal M. Causes of anemia in renal transplant recipients. *Transplant Proc*. 2004;**36**(1):164-5.
9. Lorenz M, Winkelmayer WC, Horl WH, Sunder-Plassmann G. Anaemia after renal transplantation. *Eur J Clin Invest*. 2005;**35** (Suppl 3):89-94.
10. Imoagene-Oyedeji AE, Rosas SE, Doyle AM, Goral S, Bloom RD. Posttransplantation anemia at 12 months in kidney recipients treated with mycophenolate mofetil: risk factors and implications for mortality. *J Am Soc Nephrol*. 2006;**17**(11):3240-7.
11. Iaina A, Silverberg DS, Wexler D. Therapy insight: congestive heart failure, chronic kidney disease and anemia, the cardio-renal-anemia syndrome. *Nat Clin Pract Cardiovasc Med*. 2005;**2**(2):95-100.
12. Winkelmayer WC, Lorenz M, Kramar R, Horl WH, Sunder-Plassmann G. Percentage of hypochromic red blood cells is an independent risk factor for mortality in kidney transplant recipients. *Am J Transplant*. 2004;**4**(12):2075-81.
13. Heinze G, Mitterbauer C, Regele H, Kramar R, Winkelmayer WC, Curhan GC, *et al.* Angiotensin-converting enzyme inhibitor or angiotensin II type 1 receptor antagonist therapy is associated with prolonged patient and graft survival after renal transplantation. *J Am Soc Nephrol*. 2006;**17**(3):889-99.
14. Molnar MZ, Czira M, Ambrus C, Szeifert L, Szentkiralyi A, Beko G, *et al.* Anemia is associated with mortality in kidney-transplanted patients--a prospective cohort study. *Am J Transplant*. 2007;**7**(4):818-24.