#1729 - Correlation between Neutrophil Gelatinase-Associated Lipocalin (NGAL) And Iron Status.	
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Body	**Background:** NGAL, in other words lipocalin 2, is a stress protein situated on some cell membranes involved mainly in iron transportation through them. Firstly, in 2005, it was described as a new biomarker to identify chronic renal diseases since is detectable faster than BUN and creatinine. This marker has had minimal false results due to age, gender, blood cell count and other various factors which normally affect ferritin and TSAT in IDA diagnosis. This study headed to evaluate the correlation between iron profile and NGAL concentration in serum among patients suffering from chronic renal diseases in end stage (ESRD) and chronic dialysis in order to find its diagnostic value in terms of IDA. **Materials and Methods:** 47 sufferers from chronic hemodialysis in end stage renal disease and 15 healthy people were evaluated to find the correlation between serum NGAL concentration and IDA characteristics. **Results:** Controls were all free of IDA, interestingly in this study. On the contrary, the majority of patients suffered from IDA and a great direct correlation was seen between IDA (TSAT<20%) and NGAL serum concentration with a spearman’s coefficient equal to 0.314. serum NGAL concentration was also in a good direct correlation with both serum ferritin and TIBC. Serum NGAL also directly correlated with uric acid, creatinine and blood sugar whereas a reverse relationship with albumin, total cholesterol and LDL was found. **Conclusion:** Despite the findings were not suitable to be generalized, the study showed a great correlation which is comparable with other recent studies.

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Key words: ESRD, Hemodialysis, IDA, NGAL

References

1. Kjeldsen L, Bainton DF, Sengeløv H, Borregaard N. Identification of neutrophil gelatinase-associated lipocalin as a novel matrix protein of specific granules in human neutrophils. Blood 1994; 83: 799-807
2. Flo TH, Smith KD, Sato S, Rodriguez DJ, Holmes MA, Strong RK, Akira S, Aderem A. Lipocalin 2 mediates an innate immune response to bacterial infection by sequestrating iron. Nature 2004; 432: 917-921
3. Jang HR, Rabb H. The innate immune response in ischemic acute kidney injury. Clin Immunol 2009; 130: 41-50.
4. Kinsey GR, Li L, Okusa MD. Inflammation in Acute Kidney Injury. Nephron Exp Nephrol 2008; 109: 102–107
5. Colpaert K, Hoste EA. Acute kidney injury in burns: a story of volume and inflammation Crit Care 2008; 12: 192-193
6. Cowland JB, Muta T, Borregaard N. IL-1□-specific up-regulation of neutrophil gelatinase-associated lipocalin is controlled by IKB-□ . J Immunol 2006; 176: 5559-5566
7. Rosner MH. Urinary biomarkers for the detection of renal injury. Adv Clin Chem 2009; 49: 73-97
8. Bolignano D, Donato V, Coppolino G, Campo S, Buemi A, Lacquaniti A Buemi M Neutrophil gelatinase-associated lipocalin (NGAL) as a marker of kidney damage. Am J Kidney Dis 2008; 52: 595-605
9. Haase M, Bellomo R, Devarajan P, Schlattmann P, Haase-Fielitz A. Accuracy of neutrophil gelatinase-associated lipocalin (NGAL) in diagnosis and prognosis in acute kidney injury: a systematic review and meta-analysis. NGAL Meta-analysis Investigator Group. Am J Kidney Dis 2009; 54: 1012-1024.
10. Soni SS, Ronco C, Katz N, Cruz DN. Early diagnosis of acute kidney injury: the promise of novel biomarkers. Blood Purif 2009; 28:165-174.

11. Bolignano D, Coppolino G, Lacquaniti A, Nicocia G, Buemi M. Pathological and prognostic value of urinary neutrophil gelatinase-associated lipocalin in macroproteinuric patients with worsening renal function. Kidney Blood Press Res 2008; 31: 274-279.
12. Bolignano D, Coppolino G, Lombardi L and Buemi M: NGAL: A New Missing Link between Inflammation and Uremic Anemia? Renal Failure 2009a, 31:622–623.
13. Bolignano D, Lacquaniti A, Coppolino G, Donato V, Campo S, Fazio MR, Nicocia G, Buemi M. Neutrophil gelatinase-associated lipocalin (NGAL) and progression of chronic kidney disease. Clin J Am Soc Nephrol. 2009b Feb;4(2):337–344.
14. Bolignano D, Coppolino G, Romeo A, De Paola L, Buemi A, Lacquaniti A, Nicocia G, Lombardi L and Buemi M. Neutrophil gelatinase-associated lipocalin (NGAL) reflects iron status in haemodialysis patients. Nephrol Dial Transplant (2009c) 24: 3398–3403.
15. Bolignano D, Coppolino G, Romeo A, Lacquaniti A, Buemi M. Neutrophil gelatinase-associated lipocalin levels in chronic haemodialysis patients. Nephrology (2010a) Feb;15(1):23-6.
16. Malyszko J, Malyszko JS, Koc-Zorawska E, Kozminski P, Mysliwiec M. Neutrophil gelatinase-associated lipocalin in dialyzed patients is related to residual renal function, type of renal replacement therapy and inflammation. Kidney Blood Press Res.2009;32(6):464-9.
17. Schmidt-Ott KM, Mori K, Li JY, Kalandadze A, Cohen DJ, Devarajan P, Barasch J. Dual action of neutrophil gelatinase-associated lipocalin. J Am Soc Nephrol 2007; 18: 407-413.
18. KDOQI; National Kidney Foundation. KDOQI Clinical Practice Guidelines and Clinical Practice Recommendations for Anemia in Chronic Kidney Disease. Am J Kidney Dis 2006; 47(Suppl 3): S11–S145
19. DavideBolignano, Giuseppe Coppolino, Adolfo Romeo, Luciano De Paola. Neutrophil gelatinase-associated lipocalin (NGAL) reflects iron status in haemodialysis patients. Nephrol Dial Transplant (2009) 24: 3398–3403.
20. Rambod M, Kovesdy CP, Kalantar-Zadeh K. Combined high serum ferritin and low iron saturation in hemodialysis patients: the role of inflammation. Clin J

Am SocNephrol 2008; 3: 1691–1701
21. Fernandez-Rodriguez AM, Guindeo-Casasus MC, Molero-Labarta T et al. Diagnosis of iron deficiency in chronic renal failure. Am J Kidney Dis 1999; 34: 508–513
22. Yang, J., et al. An iron delivery pathway mediated by a lipocalin. Mol. Cell.2002 10:1045–1056.
23. Mori K, Lee HT, Rapoport D, et al., Endocytic delivery of lipocalin- siderophore- iron complex rescues the kidney from ischemia- reperfusion injury, J Clin Invest, 2005; 115: 610-21.
24. Jiang W, Constante M, Santos MM. Anemia upregulateslipocalin 2 in the liver and serum. Blood Cells Mol Dis 2008; 41:169-74.
25. BoliganoD., and Coppolino G. Neutrophil gelatinase-associated lipocalin in the cardio- renal axis pathogenic factor or just a risk biomarker? European Nephrology 2011; 5(2): 112-5.
26. SulimanME, Johnson RJ, Garcia-Lopez E, Qureshi AR, Molinaei H, Carrero JJ, Heimburger O, Barany P, Axelsson J, Lingholm B, Stenvinkel P. J- shaped mortality relationship for uric acid in CKD. Am J Kidney Dis 2006; 48: 761-71.
27. Lee SM, Lee Al, Winters TJ, Tam E, Jaleel M, Stenvinkel P, Johnson RJ. Low serum uric acid level is a risk factor for death in incident hemodialysis patients. AM J Nephrol 2009; 29: 79-85.
28. Hsu SP, Pai ME, Peng YS, Chiang CK, Ho TI, Hung KY. Serum uric acid levels show a J-shaped association with all-cause mortality in haemodialysis patients. Nephrol Dial Transplant 2004; 19: 457-62.

References

References

1. Kjeldsen L, Bainton DF, Sengeløv H, Borregaard N. Identification of neutrophil gelatinase-associated lipocalin as a novel matrix protein of specific granules in human neutrophils. Blood 1994; 83: 799-807

2. Flo TH, Smith KD, Sato S, Rodriguez DJ, Holmes MA, Strong RK, Akira S, Aderem A. Lipocalin 2 mediates an innate immune response to bacterial infection by sequestrating iron. Nature 2004; 432: 917-921
3. Jang HR, Rabb H. The innate immune response in ischemic acute kidney injury. Clin Immunol 2009; 130: 41-50.
4. Kinsey GR, Li L, Okusa MD. Inflammation in Acute Kidney Injury. Nephron Exp Nephrol 2008; 109: 102–107
5. Colpaert K, Hoste EA. Acute kidney injury in burns: a story of volume and inflammation Crit Care 2008; 12: 192-193
6. Cowland JB, Muta T, Borregaard N. IL-1□-specific up-regulation of neutrophil gelatinase-associated lipocalin is controlled by IKB-□ . J Immunol 2006; 176: 5559-5566
7. Rosner MH. Urinary biomarkers for the detection of renal injury. Adv Clin Chem 2009; 49: 73-97
8. Bolignano D, Donato V, Coppolino G, Campo S, Buemi A, Lacquaniti A Buemi M Neutrophil gelatinase-associated lipocalin (NGAL) as a marker of kidney damage. Am J Kidney Dis 2008; 52: 595-605
9. Haase M, Bellomo R, Devarajan P, Schlattmann P, Haase-Fielitz A. Accuracy of neutrophil gelatinase-associated lipocalin (NGAL) in diagnosis and prognosis in acute kidney injury: a systematic review and meta-analysis. NGAL Meta-analysis Investigator Group. Am J Kidney Dis 2009; 54: 1012-1024.
10. Soni SS, Ronco C, Katz N, Cruz DN. Early diagnosis of acute kidney injury: the promise of novel biomarkers. Blood Purif 2009; 28:165-174.
11. Bolignano D, Coppolino G, Lacquaniti A, Nicocia G, Buemi M. Pathological and prognostic value of urinary neutrophil gelatinase-associated lipocalin in macroproteinuric patients with worsening renal function. Kidney Blood Press Res 2008; 31: 274-279.
12. Bolignano D, Coppolino G, Lombardi L and Buemi M: NGAL: A New Missing Link between Inflammation and Uremic Anemia? Renal Failure 2009a, 31:622–623.
13. Bolignano D, Lacquaniti A, Coppolino G, Donato V, Campo S, Fazio MR, Nicocia G, Buemi M. Neutrophil gelatinase-associated lipocalin (NGAL) and progression of chronic kidney disease. Clin J Am Soc Nephrol. 2009b

Feb;4(2):337–344.
14. Bolignano D, Coppolino G, Romeo A, De Paola L, Buemi A, Lacquaniti A, Nicocia G, Lombardi L and Buemi M. Neutrophil gelatinase-associated lipocalin (NGAL) reflects iron status in haemodialysis patients. Nephrol Dial Transplant (2009c) 24: 3398–3403.
15. Bolignano D, Coppolino G, Romeo A, Lacquaniti A, Buemi M. Neutrophil gelatinase-associated lipocalin levels in chronic haemodialysis patients. Nephrology (2010a) Feb;15(1):23-6.
16. Malyszko J, Malyszko JS, Koc-Zorawska E, Kozminski P, Mysliwiec M. Neutrophil gelatinase-associated lipocalin in dialyzed patients is related to residual renal function, type of renal replacement therapy and inflammation. Kidney Blood Press Res.2009;32(6):464-9.
17. Schmidt-Ott KM, Mori K, Li JY, Kalandadze A, Cohen DJ, Devarajan P, Barasch J. Dual action of neutrophil gelatinase-associated lipocalin. J Am Soc Nephrol 2007; 18: 407-413.
18. KDOQI; National Kidney Foundation. KDOQI Clinical Practice Guidelines and Clinical Practice Recommendations for Anemia in Chronic Kidney Disease. Am J Kidney Dis 2006; 47(Suppl 3): S11–S145
19. DavideBolignano, Giuseppe Coppolino, Adolfo Romeo, Luciano De Paola. Neutrophil gelatinase-associated lipocalin (NGAL) reflects iron status in haemodialysis patients. Nephrol Dial Transplant (2009) 24: 3398–3403.
20. Rambod M, Kovesdy CP, Kalantar-Zadeh K. Combined high serum ferritin and low iron saturation in hemodialysis patients: the role of inflammation. Clin J Am SocNephrol 2008; 3: 1691–1701
21. Fernandez-Rodriguez AM, Guindeo-Casasus MC, Molero-Labarta T et al. Diagnosis of iron deficiency in chronic renal failure. Am J Kidney Dis 1999; 34: 508–513
22. Yang, J., et al. An iron delivery pathway mediated by a lipocalin. Mol. Cell.2002 10:1045–1056.
23. Mori K, Lee HT, Rapoport D, et al., Endocytic delivery of lipocalin- siderophore- iron complex rescues the kidney from ischemia- reperfusion injury, J Clin Invest, 2005; 115: 610-21.
24. Jiang W, Constante M, Santos MM. Anemia upregulateslipocalin 2 in the liver and serum. Blood

Cells Mol Dis 2008; 41:169-74.
25. BoliganoD., and Coppolino G. Neutrophil gelatinase-associated lipocalin in the cardio- renal axis pathogenic factor or just a risk biomarker? European Nephrology 2011; 5(2): 112-5.
26. SulimanME, Johnson RJ, Garcia-Lopez E, Qureshi AR, Molinaei H, Carrero JJ, Heimburger O, Barany P, Axelsson J, Lingholm B, Stenvinkel P. J- shaped mortality relationship for uric acid in CKD. Am J Kidney Dis 2006; 48: 761-71.
27. Lee SM, Lee Al, Winters TJ, Tam E, Jaleel M, Stenvinkel P, Johnson RJ. Low serum uric acid level is a risk factor for death in incident hemodialysis patients. AM J Nephrol 2009; 29: 79-85.
28. Hsu SP, Pai ME, Peng YS, Chiang CK, Ho TI, Hung KY. Serum uric acid levels show a J-shaped association with all-cause mortality in haemodialysis patients. Nephrol Dial Transplant 2004; 19: 457-62.