

# THE PROGRESSION OF DIABETIC NEPHROPATHY BASED ON THE APPROPRIATE PROCESS MEASURES

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Diabetic nephropathy is the primary cause (25%–44%) of end-stage renal disease.<sup>1</sup> The only way to prevent diabetic nephropathy from being so prevalent is to control blood sugar and blood pressure and to take the recommended medications. According to the JNC-7, the recommended blood pressure for those who already have diabetes is 130/80 mm Hg,<sup>2</sup> and if they have significant proteinuria ( $\geq 1$  g) the blood pressure goal is 125/75 mm Hg. If the blood pressure of a type 2 diabetic stays at or below 130/80 mm Hg, the possibility of nephropathy occurring is limited. Controlling diabetes also means keeping hemoglobin A1C levels at or below 7%. If the A1C level stays in this healthy range, the possibility of diabetic nephropathy is also reduced. To control blood pressure in the diabetic population, doctors prescribe two classes of antihypertensive medications: ACE inhibitors or angiotensin II receptor blockers (ARBs). According to the American Diabetes Association guidelines, these medications may reverse kidney damage.<sup>3</sup> With proper physician care and medications, the progression of diabetic nephropathy can be decreased or halted.

For our study, we conducted a retrospective chart review of diabetics with high blood pressure. We abstracted process measures including disease-specific medications, weight, blood pressure, creatinine, lipids, blood sugar, and hemoglobin A1C. We studied the correlation between the appropriateness of these process measures and progression of diabetic nephropathy found within 16 patient charts.

## WHAT IS DIABETIC NEPHROPATHY?

Diabetic nephropathy is a serious complication that takes place in a diabetic that has uncontrolled blood glucose levels. Over time, the high blood glucose levels harm the filtering system in the kidneys and causes the kidneys to begin to fail. Diabetic nephropathy is the leading cause of end-stage renal failure in America.

Diabetic nephropathy is almost always joined by other complications such as retinopathy and vascular diseases, but the number one complication secondary to nephropathy is hypertension. When a diabetic develops hypertension, the chances of developing nephropathy is almost doubled. If medications are administered to keep blood glucose levels and blood pressures under control, the likelihood of developing diabetic nephropathy can be reduced.

## METHODS

Approximately 16 patient charts were reviewed based on medical history. Patients eligible for inclusion in this retrospective chart review had diabetes and hypertension secondary to diabetes. We abstracted the interventions being made to reduce the chance of developing diabetic nephropathy. This abstraction included disease-specific medications and measurements of weight, blood

pressure, creatinine, lipids, blood sugar, and hemoglobin A1C. Once the information was gathered and analyzed the Cockcroft-gault of each patient was obtained to gauge the kidney function of each patient.

## RESULTS

We found that 8 out of 16 patients followed at least six measures that would prevent the progression of diabetes. However, these 8 patients still had low glomerular filtration rates, indicating that the aggressiveness of the process measures were not enough. In addition, 7 out of 16 patients had high creatinine levels which can lead to low filtration rates and increased risk of nephropathy. See Figure 1 for more details.

## CONCLUSION

We concluded that process measures can help to slow down the progression of diabetic nephropathy, if the measures are in a healthy target range. It is the achievement of maintaining target levels for all six process measures that influences the delay of progression of diabetic nephropathy and hypertension.

## REFERENCES

1. [www.americandiabeticassociation.com](http://www.americandiabeticassociation.com).
2. [www.NationalKidneyFoundation.com](http://www.NationalKidneyFoundation.com).
3. [www.HealthWise.com](http://www.HealthWise.com).
4. [www.AmericanFamilyPhysician.com](http://www.AmericanFamilyPhysician.com).

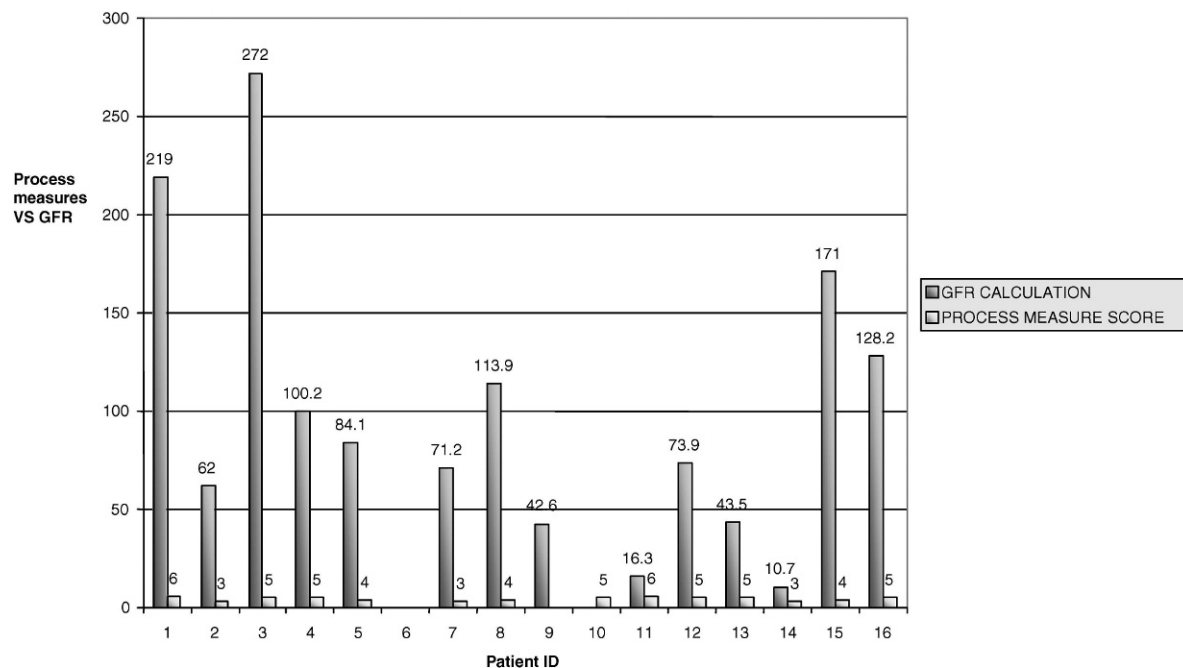


Fig 1. Relationship of process measures to glomerular filtration rates