

Renal Impairment in Type 2 Diabetes

Media Fact Sheet

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1. Facts & figures

- Renal impairment is a common and serious complication of type 2 diabetes, responsible for increasing levels of patient morbidity and mortality¹
- Approximately 65 percent of type 2 diabetes patients are at risk of, or have some degree of renal impairment²⁻⁴
- Type 2 diabetes is the most frequent cause of severe renal impairment in countries of the Western world⁵
- Renal impairment significantly increases healthcare costs associated with managing type 2 diabetes⁶ and has been linked with increased mortality⁷

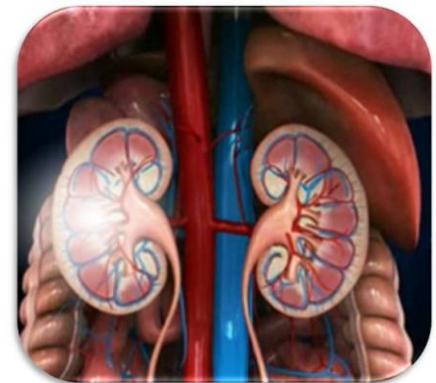
2. The role of the kidneys

Normal, functioning kidneys are essential to maintain good health. The most important functions of the kidneys are to remove toxins, excess salt and water from the body in the form of urine.⁸ The kidneys also have an important role to play in the management of blood pressure⁹ and maintaining the number of circulating red blood cells (erythrocytes) in a narrow range.⁸

3. Renal impairment in type 2 diabetes

High levels of blood glucose can damage the kidneys' filters. This leaves people with type 2 diabetes at risk of developing renal impairment.

When the kidneys are damaged, albumin leaks out of the kidneys into the urine. This is one of the first signs of early stage renal disease.⁹



Diabetic kidney disease is a result of damage caused to the kidney cells due to elevated blood glucose levels.¹⁰ It is associated with a lower than average life expectancy⁸ and an increased risk of other diabetic complications, including a greater risk of cardiovascular disease.⁹

Many people show no symptoms until their kidney disease becomes advanced, resulting in delayed diagnosis and treatment.¹¹ Even when diabetes is controlled, the disease can lead to chronic kidney disease and kidney failure.¹² Type 2 diabetes patients with any degree of renal impairment have limited treatment options as not all anti-diabetes treatments are appropriate for this patient population.¹³

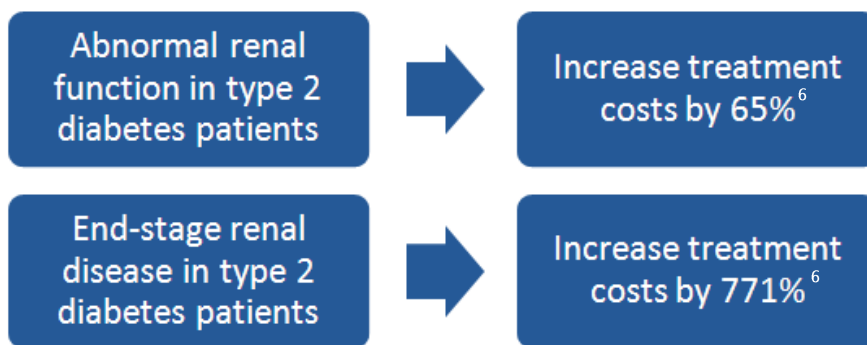
4. Renal impairment and cardiovascular risk

There is a proven link between renal impairment and increased risk of cardiovascular disease.⁹ The relationship between high blood pressure and renal impairment is complex and interrelated: renal impairment can cause high blood pressure and, in turn, high blood pressure is a risk factor for developing renal impairment.⁸

High blood pressure is very common in people with type 2 diabetes at diagnosis, which means that even small increases in blood pressure can be significant.⁹ All people with type 2 diabetes are at a greater risk of cardiovascular disease, but the risk is up to three times higher for those patients with renal impairment.⁹

5. The economic burden of renal impairment

Renal impairment has been shown to have a significant impact on the treatment costs associated with managing type 2 diabetes.⁶ As renal function declines, the total cost of type 2 diabetes treatment increases.⁶



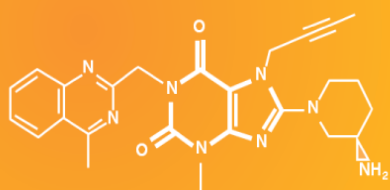
Renal complications related to diabetes not only have an immediate impact on treatment costs, but pose a continued long-term financial burden and significant challenges to both diabetes patients and physicians.¹⁴

6. Treatment implications

As diabetic kidney disease progresses, diabetes treatment choices become more and more limited.¹³

Many currently available type 2 diabetes treatments are mainly eliminated via the kidney and therefore are not recommended in patients with renal impairment.¹⁵ Others may require dose adjustment as kidney function declines or are contraindicated for this patient population.¹³





The investigational compound linagliptin, a DPP-4 inhibitor in late-stage phase III development for the treatment of type 2 diabetes, has a primarily non-renal route of excretion (only five percent of the oral administered dose is eliminated via the kidneys),¹⁶ which is a unique characteristic among this novel class of anti-diabetes treatments.¹⁷

Data to date support the assumption that no dose adjustment of linagliptin may be required in type 2 diabetes patients with any degree of renal impairment.^{18,19}

Related links:

More information about type 2 diabetes, associated complications and DPP-4 inhibitors can also be found at www.boehringer-ingelheim-webcast.com/diabetes, www.diabeteshealthlounge.com and www.youtube.com/diabetismatters.

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Please be advised: Linagliptin is an investigational drug and not yet approved for the treatment of type 2 diabetes. The information provided in this document is from Boehringer Ingelheim Corporate Headquarters in Germany. There may be national differences between countries regarding specific medical information included here. Please take account of this when referring to the information provided in this document. This document is for non-US healthcare media only.

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