

Proteinuria

What is proteinuria?

Proteinuria is the condition where the urine contains an abnormal amount of protein.

How protein leaks in the urine?

Protein is found in the blood and usually is not present in the urine. Protein is a long chain molecule made up of amino acids. Proteins have different functions; they can help digestion, fight infections, carry substances around the body and aid in blood clotting.

There are millions of tiny filters called glomeruli in the kidneys. As blood passes through healthy kidneys, the glomeruli filter the waste products. Proteins are large molecules and are unable to pass through the glomeruli into the urine. However, when the glomeruli are damaged by a disease process, proteins are then able to pass through them and escape into the urine.

Why is proteinuria dangerous?

Proteinuria is not a disease. However, it is an indicator that the kidneys have been damaged in some way. Protein should not appear in the urine in large quantities. Doctors usually say there is proteinuria if more than 150 mg per day is detected in the urine.

What causes proteinuria?

Some of the causes of proteinuria are:

- Primary kidney disease called nephritis
- Secondary kidney diseases due to:
 - Diabetes
 - Hypertension or high blood pressure
 - Cancers
 - Pregnancy
 - Medications
- Others:
 - Excessive weight gain
 - Heart failure

Slightly higher excretion of protein may occur normally in certain circumstances such as pregnancy, during

fever and after strenuous exercise. These are not clinically significant if the amount is only minimally raised and returns to normal levels soon after.

Are there different types of proteinuria?

There are essentially two types of protein: albumin which is a smaller molecule and globulin which is larger. When the disease is minor or early, albumin leaks out first. The quantity is then small and not detected by conventional methods used for detecting protein. This is called microalbuminuria implying that the amount leaked out is in small amounts. When the disease is more advanced, larger molecules other than albumin leaks out and we term this state collectively as "proteinuria".

Who are at risk of proteinuria?

People with diabetes, hypertension, or certain family backgrounds are at risk for proteinuria. In both type 1 and type 2 diabetes, the first sign of deteriorating kidney function is the presence of small amounts of albumin in the urine (microalbuminuria). As kidney function declines, the amount of albumin in the urine increases, and microalbuminuria becomes full-fledged proteinuria.

What are the signs and symptoms of proteinuria?

By itself, proteinuria causes a foamy or frothy urine. Patients may also say they see bubbles in the urine. If loss of protein is in very large quantities (more than 3 grams per day), a patient may have the nephrotic syndrome where he complains of swelling of legs, abdominal distention and breathlessness especially when lying down.

If a patient also has kidney failure, the complaints will be that experienced by other renal failure patients.

How can I test for proteinuria?

Urine dipstick: This is a simple method using a test strip immersed into a urine sample to detect presence of protein in the urine. However, it only measures the concentration in that specific specimen. The concentration of urine passed throughout the day actually varies so this is not very accurate.

24hrs urine collection for protein or microalbumin:

This test is used to assess how much protein or microalbumin is passed into the urine over 24 hours.

We can grade proteinuria as follows:

	mg/day
1. Microalbuminuria	30-150mg
2. Mild proteinuria	150- 500mg
3. Moderate proteinuria	500-1000mg
4. Heavy proteinuria	>1000mg

Because the methods used for albumin and protein are different, there will be some difference in the amounts when albumin and protein are tested on the same sample.

The amount of proteinuria may also be reported as a ratio of protein to creatinine in the urine – urine protein/creatinine ratio. If both are measured in grams, it will parallel the 24 hour results. The urine microalbumin/creatinine ratio (both measured in mg) will also be closely related to the 24 hour urine microalbumin result.

Investigating proteinuria

There are many reasons for having protein in the urine and the treatment will depend on the cause and amount of protein leak. The doctor will perform a series of investigation which include:

- Blood test to check on the kidney function.
- Urine test to determine amount of protein present in the urine.
- Ultrasound of the kidney and bladder to determine cause of proteinuria.
- Kidney biopsy may be indicated in some cases for more specific diagnosis and prognosis.

Natural course and prognosis of proteinuria

If left untreated, proteinuria on occasion could disappear or could remain stable for many months and years. It could also get worse and cause kidney failure especially:

- If it is associated with high blood pressure.
- If the proteinuria is heavy (more than 1 gm/day). The higher the proteinuria is the greater the risk of kidney failure.

- If medications that are not 'kidney friendly' are used indiscriminately.

Treating Proteinuria

Other than treatment for specific kidney diseases, the following needs to be observed to prevent deterioration to / of kidney failure:

- Good blood pressure control with any class of anti-hypertensive suited to the patient. In cases of heavy proteinuria, the target blood pressure is 125/75.
- Use of medications to specifically reduce proteinuria and stabilize the kidney function such as the Angiotensin Converting Enzyme (ACE) inhibitors or Angiotensin Receptor Blockers (ARBs).
- Diet modifications for a low salt diet as recommended by the dietitian and if appropriate, a low protein diet for renal failure.

Some Useful Hints:

- Proteinuria may be a sign that your kidneys are damaged and that you are at risk of kidney failure.
- It is recommended that people in the high risk group be regularly checked for proteinuria so that kidney disease can be detected and prevented from progressing.
- Those at risk of proteinuria and kidney failure include people who have diabetes or hypertension and who have a family history of kidney disease.
- If you have diabetes or high blood pressure or both, the first goal of treatment will be to control your blood glucose and blood pressure.

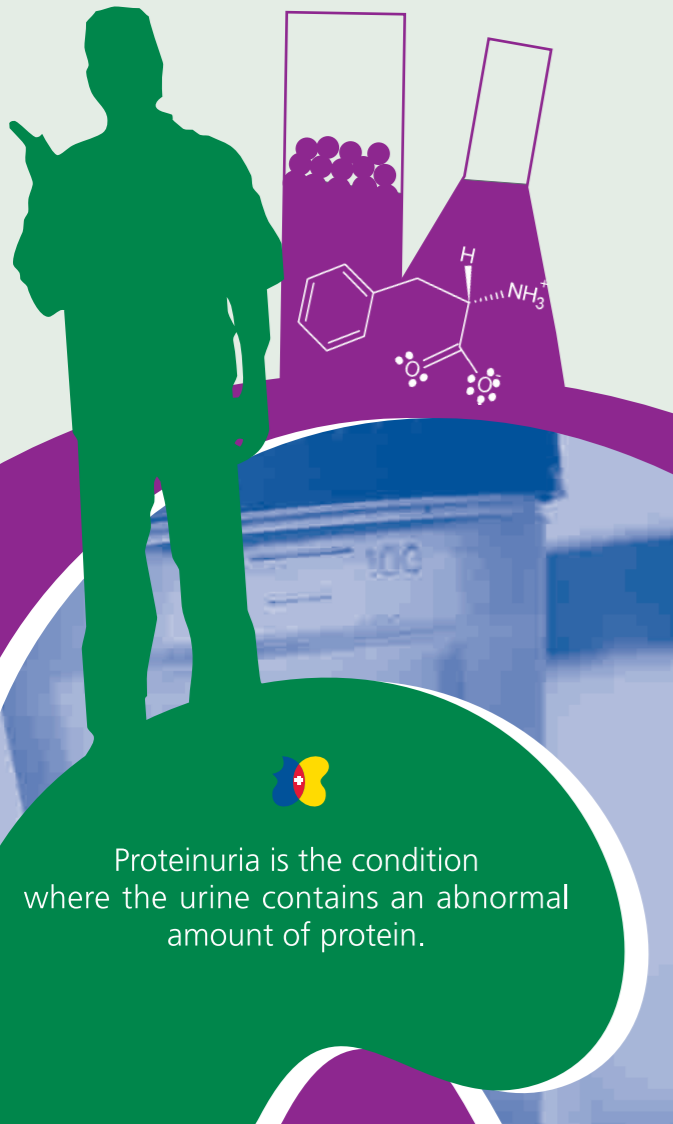


You may visit these websites for more information:

<http://www.kdf.org.sg/health.aspx>
<http://www.davita.com>
<http://www.uptodate.com/patients/index.html>

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PROTEINURIA



蛋白尿

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什么是蛋白尿？

尿液中的蛋白质含量异常。

蛋白质是如何渗漏到尿液中？

通常蛋白质不存在于尿液中而是存在于血液中。蛋白质是维持人体正常运作的分子，它协助酶分泌和血液凝结，帮助抗感染（是我们体内抗体的一个成分），也能在人体内携带其他物质。

肾脏中有成千上万个很微小的滤过器，叫肾小球。当血液通过健康的肾脏时，肾小球会将废物过滤。由于蛋白质属大分子，一般不会通过肾小球而进入尿液中。然而当肾小球因疾病受损时，蛋白质就能穿过这个防线而渗漏到尿液中。

为什么蛋白尿是危险的？

蛋白尿不是一种疾病，但它是显示肾脏在某种程度上已经受损的一种症状。蛋白质不应该大量出现在尿液中。如果一天的尿液中蛋白质超过150毫克，医生就会诊断为蛋白尿。

蛋白尿是怎么造成的？

以下是一些造成蛋白尿的因素：

- a) 原发性肾疾病，称为“肾炎”。
- b) 由以下疾病所引发的继发性肾疾病：
 - 糖尿病
 - 高血压
 - 癌症
 - 妊娠
 - 药物
- c) 其他：
 - 体重过重
 - 心脏衰竭

蛋白质的排出量在一些情况下会稍微提高，例如：妊娠，发烧或做激烈运动后。若尿液里的蛋白含量只有微量能提高且能在过后迅速回复正常，这种情况是不能被诊断为蛋白尿。

蛋白尿有哪些不同的种类？

蛋白质本身可分为两种：小分子的“白蛋白”和大分子的“球蛋白”。在病症初期，“白蛋白”会先渗漏入尿液中。但其数量少，普通的检验方式不容易验得出，这种病症称为微量白蛋白尿意味着渗漏出的蛋白量很小。但当病症加剧时，“球蛋白”也会跟着一起渗出，这种症状即可称为“蛋白尿”。

哪些人是属于蛋白尿的高风险群？

那些患有糖尿病、高血压或拥有家族史的人士都有患蛋白尿的风险。

对于一型和二型糖尿病患者，少量的白蛋白出现在尿液中是显示肾功能逐渐衰竭的最早症状。随着肾功能进一步衰竭，蛋白渗漏量就会增加，微量白蛋白尿就会进而成为蛋白尿。

蛋白尿有哪些征兆与症状？

蛋白尿会使尿液产生泡沫，病患也许会形容说尿液中出现泡沫。如果蛋白质大量的流失（一天超过3克），病患也可能会随即患上“肾变病综合症”，出现足部水肿，腹部膨胀以及呼吸困难（尤其是在躺着时）的一些症状。

如果病患同时也患有肾衰竭，其症状也将如同其他肾衰竭病患者的一样。

如何检验蛋白尿？

验尿棒：这是简单的检测方式，只须将检测条浸入尿液样本就能测知尿液中是否含有蛋白。但是，它只能测量该样本的蛋白质的浓度。一天里，不同时

段所排出的尿液的浓度是不一样的，所以这检测方式还不够准确。

收集24小时内所排放的尿液：这个检测方式可检测出24小时中蛋白或微量白蛋白渗漏的总量。

我们可将蛋白尿分为以下级别：

	毫克/日
1. 微量白蛋白尿	30–150毫克
2. 少量蛋白尿	150–500毫克
3. 中量蛋白尿	500–1000毫克
4. 重度蛋白尿	>1000毫克

由于白蛋白和蛋白质的检验方式有所不同，同样一个尿液样本所得的白蛋白和蛋白质数量会有所差别。

蛋白尿的量也能够根据尿液中蛋白质与肌酐的含量比值来表示：尿蛋白 / 肌酐。若是以“克”为计算单位，两者比值可与24小时尿液检验结果相对应。微量白蛋白对肌酐（以“毫克”为计算单位），其比值也与24小时尿液的微白蛋白检验结果有较密切的关系。

如何鉴定其严重性？

造成蛋白尿的因素很多，严重性是根据其因素及蛋白渗漏的数量而定。医生通常会进行如以下一系列的检验：

- 血液检验 — 检测肾脏的功能
- 尿液检测 — 确定蛋白质的渗漏量
- 超音波扫描肾脏和膀胱 — 确定蛋白尿的起因肾脏活组织检查 — 对某些病历可更精确的诊断和判断预后。

蛋白尿的自然进程和预后

如果不接受治疗，蛋白尿的症状可能会消失或可能数月甚至几年继续保持稳定。它也可能恶化，并导

致肾衰竭，尤其是当患者：

- 患有高血压。
- 有大量蛋白尿（一天超过一克）。渗漏率越高，患肾衰竭的风险就越大。
- 任意服用一些对肾脏有害的药物。

蛋白尿的治疗

为了预防或延缓肾衰竭的进度，除了接受肾脏疾病的治疗，还需要注意以下的措施：

- 使用各种不同适合病患的抗压药物，很好的血压控制。除非是严重蛋白尿，病患理想的血压标准是125/75。
- 使用特定药物，降低蛋白渗漏的数量和稳定肾功能。例如血管紧张素转换酶抑制剂（ACE抑制剂）或血管紧张素 II 受体拮抗剂（ARBs）。
- 根据饮养师的建议改善饮食习惯，限制钠（盐）的摄取。肾衰竭病患最好也能适量地减少蛋白质的摄取。

忠告

- 蛋白尿可能是显示肾脏已受损的征兆，病患会有肾衰竭的风险。
- 属于高风险者需定期作蛋白尿检验，以及时检定肾疾病并预防及延缓其发展进度。
- 那些患有糖尿病、高血压或有肾脏疾病家族史的人士，都是蛋白尿及肾衰竭高风险发病人群。
- 若患有糖尿病或高血压或两者兼有的病患，治疗的首要目标是良好地控制血糖和血压水平。



欲知详情，可参阅以下的网址：

<http://www.kdf.org.sg/health.aspx>

<http://www.davita.com>

<http://www.uptodate.com/patients/index.html>

尿液中的蛋白质含量异常。