

Healthcare industry BW

The ablation of nerves along the renal artery – a novel treatment option in the field of cardiology

High blood pressure can normally be treated effectively with medicines. However, some patients do not respond to medicinal treatment despite several different drugs being used. Renal denervation (RDN), a novel catheter-based procedure, seems to have become a promising alternative to controlling hypertension with drugs. Professor Dr. Axel Bauer from the Tübingen University Hospital believes that this method can even be used for a much wider range of applications.



Prof. Dr. Axel Bauer
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Deutsche Hochdruckliga e.V., the German Association for Hypertension and Prevention, estimates that around 35 million people suffer from high blood pressure (hypertension) in Germany alone. In minor cases, physical exercise and a change in lifestyle (e.g. dietary changes) are often sufficient to lower the blood pressure to normal values. Serious forms of hypertension usually require drugs. "In

around 15 percent of people, blood pressure remains persistently high despite at least three or more prescription blood pressure medications or preventive lifestyle changes,” said Professor Dr. med. Axel Bauer from the German Heart Competence Centre at the Tübingen University Hospital explaining that a type of high blood pressure that does not respond well to traditional medical therapy is referred to as resistant or therapy-refractory hypertension.

“This form of hypertension is challenging to manage and sufferers run a high risk of myocardial infarction or stroke,” said Professor Bauer, senior physician in the Department of Cardiology and Cardiovascular Diseases at Tübingen University Hospital. A new method of treatment known as renal denervation, which is also a major area of Professor Bauer’s research, has been shown to have the ability to effectively reduce blood pressure in therapy-resistant patients. This catheter-based procedure involves the denervation of nerves along the renal arteries using radiofrequency ablation to reduce sympathetic drive.

Autonomic nervous system plays a crucial role in controlling the blood pressure

“It has been known for quite a long time that the elevated activity of the sympathetic nerves, which are part of the autonomic nervous system, plays a significant role in the development of hypertension,” said Bauer. This knowledge was already being used in the mid-20th century in the treatment of hypertension and involved the surgical transection of some of the sympathetic nerves in the abdomen. This intervention was relatively successful in controlling hypertension,” Bauer said. However, as the autonomic nervous system is also involved in the regulation of numerous other body functions, this type of treatment was often associated with severe side effects, including functional disorders of the bladder and intestines.

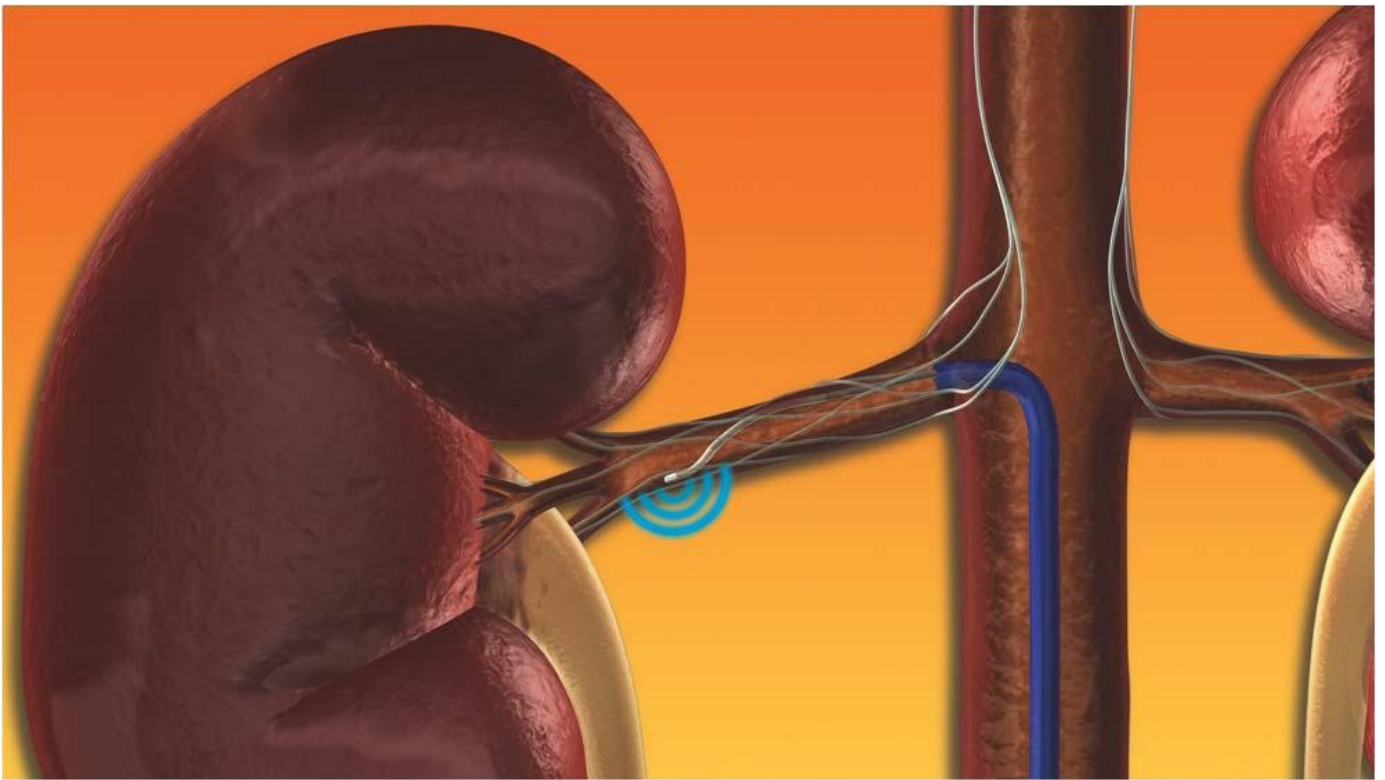
This is why such interventions quickly dwindled in importance when the first blood pressure medicines became available. However, they have not completely sunk into oblivion, particularly as not all pharmacological therapeutic approaches were aimed at reducing elevated sympathetic activity, but rather at dilating the blood vessels. In order to also treat patients with resistant hypertension or who are intolerant to blood pressure medications, the idea of sympathetic denervation was once again picked up a few years ago.

Ideal targets: the kidneys

“Thanks to the huge progress made in catheter technologies, it is now possible to specifically turn off the sympathetic nerves along the renal arteries,” said Bauer. It is not by chance that the kidneys were chosen as the target for denervation. “The kidneys play a key role in the regulation of blood pressure as they control a person’s fluid balance and the so-called renin-angiotensin-aldosterone system (RAAS). And this is exactly what the new procedure takes advantage of,” said Bauer.

Renal denervation is a minimally invasive procedure using radiofrequency energy emitted by a catheter that is inserted into the two renal arteries through the groin. Tiny electrodes give off short electric pulses. The resulting heat leads to the disruption of the sympathetic nerves that run along the outside of the arteries. The outcome of clinical studies is rather promising and has led to a reduction of the office systolic blood pressure (OSBP) by an average of 32 mmHg in therapy resistant hypertension patients. “This is a remarkable result,” said Bauer.

Additional treatment potential



Renal denervation involves the use of a catheter to ablate the sympathetic nerves along the renal arteries.
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The effect of the minimally invasive procedure usually sets in a few weeks or months after treatment, but then the blood pressure seems to remain at a low level for quite a long time. "In theory, reinnervation is of course possible. However, in the three years that research has been carried out, there has been no sign that this actually happens," said Bauer. In addition, the procedure is associated with very few complications. During this period, doctors at Tübingen University Hospital have treated more than 60 patients with renal denervation and have not observed any notable complications. Moreover, the procedure does not affect kidney function.

Despite the promising results, Bauer does not believe that renal sympathetic denervation will replace medicinal treatment in the future. "Nevertheless, the procedure seems to be a promising alternative for treating patients with a type of hypertension that cannot be lowered with traditional drugs." It cannot be excluded that the method may also have a positive effect on the progression of diseases that are triggered by elevated sympathetic activity. "There is substantial evidence that renal denervation has a positive effect on the glucose metabolism," said Bauer highlighting that the procedure has also been shown to significantly reduce the fasting blood glucose level in diabetes patients.

Another positive effect has also been seen in patients with cardiac insufficiency and cardiac arrhythmia. "We recently used renal denervation to treat a patient suffering from severe arrhythmia and found that the patient's situation improved significantly after treatment," said Bauer whose team at the University Hospital of Tübingen is now investigating the effects of renal sympathetic denervation on autonomic heart function. Bauer is quite optimistic. "It is quite feasible that the treatment of patients with certain cardiac disorders will in future become a completely new field in which the method of renal denervation can be applied."

Further information:

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