

The Wearable Artificial Kidney

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Abstract—Researchers have developed an artificial kidney that can be worn around the patient’s belt. This invention will give the patient the ability to receive dialysis treatment while also being able live and everyday life like a normal human. This invention is still in its first clinical trial in Seattle, Washington but is hoping to get approved in the future.

I. INTRODUCTION

MODERN technology has done a lot from patients with many diseases and conditions. These types of advances help people live with diseases that would be lethal to them without the care they are receiving from these people or technology. A specific example of these advances is the wearable artificial kidney for those who have chronic kidney disease and have renal failure. This type of portable dialysis could change many peoples lives allowing them to receive dialysis while completing normal everyday activities.

II. METHODS

The wearable artificial kidney could change many people’s lives and the way they would be treated if a patient would need dialysis treatment. This would allow the patient to live and everyday life while still receiving the treatment that they needed. The artificial kidney is about 10 pounds and is like a belt that would be strapped onto the patient with all the necessities that are needed to perform the dialysis treatment. The components to this portable treatment include a mineral resource to replenish nutrients, a battery to keep the machine running, and places for the water to get recycled and continually used for the dialysis treatment.



This belt is connected to the patient via a catheter and will draw blood from the human body and filter the blood of waste, while replenishing the nutrients that are lacking in the body.

III. RESULTS

The wearable artificial kidney is still in clinical trials in the United States, while many trials have been done all over the world. The leader of the project in the United States Victor Gura, has conducted trials in Vicenza, Italy and London, England. End stage renal failure patients were treated in both trials and both trials were conducted successfully. In Vicenza, Italy the patients were treated for 6 hours; and in London England the patients were treated for 8 hours. In the United States the clinical trial is for 24 hours continuously for the invention to pass this current trial. Up to 16 patients will be selected for the safety trial of the artificial kidney while up to ten will be selected for the full protocol trial.

IV. DISCUSSION

The artificial kidney seems like it will be very beneficial to help patients receiving dialysis treatment. Although this seems like a very good idea there are a few flaws. The weight of the dialysis belt could be difficult to older patients to have 10 pounds hanging off their waist. Also the belt itself is very big and bulky and could be a hassle to patients. Further advances with the size of the belt could be the size and a battery that last longer and would need less changing or charging.

Although the wearable artificial kidney is still in the very first stages of the clinical trials it is hard to estimate when this will be available for actual patient use. There is still a lot of room for improvement and will probably not be available for a while. The price of the device is still currently unknown because there still needs to be changes to the design and technology being used.

As for future direction the wearable artificial kidney will need to pass the clinical trials. The device will probably get less bulky and smaller to be more convenient for the patient with better plastics and filtration. Hopefully the clinical testing can be done on more patients and then be available for patients that need treatment for dialysis. This device could revolutionize a way of life and bring mobility back into a patient’s life that is currently being treated with dialysis. This could also help the mortality rate of those patients with chronic kidney disease.

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