

# NEW DIALYSIS TECHNOLOGY DESIGNED TO IMPROVED PATIENT COMFORT AND QUALITY OF DIALYSIS TREATMENT

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## INTRODUCTION

In spite of the technological advances in the improvement of the dialysis treatment, a many dialysis patients still experience haemodynamic instability during dialysis. Treatment of hypotension is part of the patient care activity of any haemodialysis centre. Published works report that it occurs in about twenty percent of all extracorporeal elimination procedures. The risk of hypotension increases significantly with the increasing rate of ultrafiltration.

## OBJECTIVE

How can haemodynamic stability be ensured in dialysis patients? The introduction of an innovative system that allows for the automatic adjustment of therapy based on biological feedback, thereby achieving better treatment outcomes and increased patient comfort. It affects the patient's subjective perception of the course of dialysis.

## METHODS

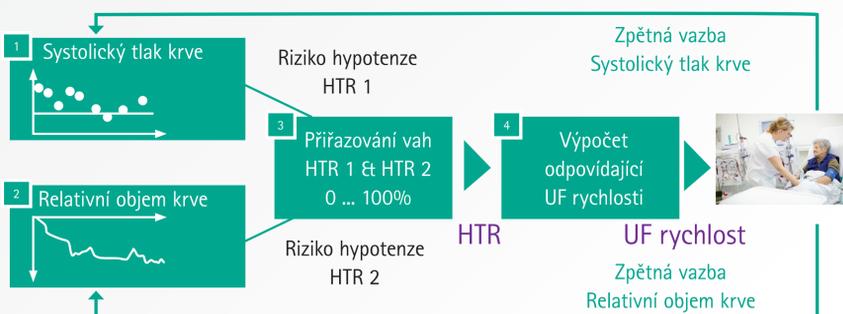
Intradialytic hypotension is the most common clinical problem that occurs during routine haemodialysis and is associated with many other symptoms, such as weakness, nausea, vomiting, muscle cramps, or chest pain, which compromise the comfort of the dialysis patient.

The new bioLogic Fusion system facilitates the calculation of a suitable ultrafiltration rate, allowing for the continuous monitoring of the parameters, early detection of the development of a hypotensive episode, and management of ultrafiltration rate while still achieving the desired volume of ultrafiltration.

This is the first system with biological feedback. The function enables us to stabilize the patient's cardiovascular status and reduce the incidence of hypotensive episodes.

A combination of two physiological parameters is used to calculate the appropriate ultrafiltration rate for individual treated patients:

1. Systolic blood pressure (SYS) – Measurements take place every 20 minutes until the volume of 65% ultrafiltration is reached. Long regular intervals prevent serious impairment of patient comfort caused by frequent measurements.
2. Relative Blood Volume (RBV) – The system monitors the RBV slope limit for the previous 10 minutes.



BioLogic Fusion mode may be activated using an icon within five minutes of the initiation of treatment; after this period, the mode cannot be activated any more. Deactivation is possible at any time during treatment. After deactivation, the Dialog IQ dialysis system calculates the mean UF rate for the rest of the treatment time.

The user has the choice of the following trends:

The trends are evaluated over 5-minute intervals and the results are used to calculate and set the corresponding ultrafiltration rate for the next 5 minutes of treatment. Blood pressure changes from up to 100 prior treatments are stored in the memory designated for the patient and saved in the patient's card. If the patient's card is not present or no waveforms are stored in the

card (first treatment), a template based on the first three waveforms measured at the beginning of the treatment is used.

The Guideline Technique tool searches the saved patient's waveforms to find the waveform with the best correlation to the current blood pressure measurements, and this identified waveform is then used as a guideline to adjust the ultrafiltration rate.

Up to 100 waveforms can be stored. If more than 100 waveforms are stored, the oldest waveform is deleted and the last treatment waveform is stored instead. In order for the current waveform to be stored, a minimum treatment duration of 3 hours is set.



## RESULTS DEMONSTRATION CASE REPORTS

### CASE REPORT I

Patient A.B., born in 1955, dialysis was initiated 6/2015, dry weight 86.5 kg

- The treatment is carried out 3 times per week for 5 hours each.
- Average intradialytic weight gains are around 3000 ml
- Hypotension occurs most often at the end of the dialysis session
- With BioLogic Fusion, we managed to achieve the required ultrafiltration without the occurrence of a hypotensive episode at the end of the treatment

An example of a graph of the ultrafiltration rate in a patient during treatment using bioLogic Fusion.

In the first three hours of treatment, 65% of the desired ultrafiltration volume was achieved and at the end the treatment was carried out with minimal ultrafiltration.

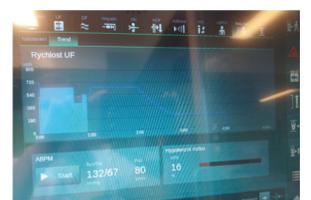
Sample graph for the same patient: In the third hour of treatment, there was an increased risk of hypotension and the ultrafiltration rate was automatically reduced.



### CASE REPORT II

Patient C.D., born in 1931, dialysis was initiated 6/2017, dry weight 75 kg

- The treatment is carried out 3 times per week for 4 hours each
- Average intradialytic weight gains are around 2000 ml
- Hypotension occurs most often at the beginning of the dialysis session
- Thanks to the bioLogic Fusion system and the use of recorded waveforms, the elimination of hypotensive episodes at the beginning of treatment has been achieved, while still achieving the desired values of ultrafiltration
- The patient's comfort and cooperation have improved significantly



## CONCLUSION

Thanks to this innovative system, we are capable of providing better comfort to patients during dialysis treatment. The physiological parameters of individual patients are continuously monitored. System with two biological inputs gives improved information on the patient's haemodynamic condition. The system has been proven in patients suffering from intradialytic hypotension. Hypotension episodes are eliminated and cardiovascular stabilization is improved.

### PRACTICAL RECOMMENDATIONS

Achieving and maintaining dry body weight it is important for setting the appropriate ultrafiltration rate. The impact of proper patient education in the area of fluid intake and the regulation of intradialytic weight gains also plays an important role. In general, the smaller the intradialytic weight gain, the lower the ultrafiltration and the significantly lower risk of complications during treatment.