

# Kolloquium

## Biomedizinische Technik und verwandte Gebiete

**Wintersemester 2019/2020**

**Dienstag, 07.01.2020, 10:00 – 11:30 Uhr**

**Herr Abdul Hamid Ismail, M.Sc.**

*vom Lehrstuhl für Medizinische Informationstechnik, RWTH Aachen*

(Moderation: Univ.-Prof. Dr.-Ing. Dr. med. Steffen Leonhardt,  
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### „Future Optimization of Hemodialysis Procedure by Application of Electrical Impedance Spectroscopycations“

#### **Abstract:**

Years of advances in dialysis technologies have increased the safety and efficacy of treatment. Nevertheless, the improved patient care has not translated into a clear improvement of survival rates.

This work unites three aspects of significant clinical inquiry: the underlying mechanism(s) of intradialytic hypotension (IDH), the measurement of calcification inhibition capacity (CIC) in biological fluids, and the importance of physiological modelling. Focus has been giving to integrate impedance spectroscopy into routine dialysis. This was combined with several sensors (for measuring of body position, temperature, and electrocardiography) and a software for data acquisition.

In terms of IDH, results revealed that transcellular fluid shifts as well as potassium shift into intracellular body compartment play a vital role in the development of IDH. Impedance measurements could enable earlier detection of IDH as well.

With respect to CIC, an electrochemical assay was established that allows real-time tracking of the calciprotein particle (CPP) formation, a critical determinant of inhibition capacity. A two-step growth of CPP was also observed.

Finally, a physiological model to mimic the dynamics of fluid and solutes during dialysis was developed. The model enables the rational choice of some operative parameters and the pre-planning of treatment with the target of reducing intradialytic symptoms

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