Doctoral School of Information and Biomedical Technologies
Polish Academy of Sciences (TIB PAN)

SUBJECT: Synchronized registration of instantaneous values of chosen physiological parameters during therapeutic thoracentesis, and their mathematical and physiological analysis.

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DESCRIPTION:

Pleural effusion is relatively frequent affliction, e.g., about 1.5 million patients with pleural effusions are diagnosed each year in US, and the annual number of therapeutic thoracenteses (TT), i.e. effusion withdrawal, performed in US was reported between 124,000 and 178,000. Although TT is profitable in the long term (hours, days), it is associated with the risk of various complications, e.g., too extensive pleural pressure fall leading to life threatening re-expansion pulmonary edema [1]. Additionally, some phenomena observed during TT are still not fully understandable. Thus, both for scientific and practical reasons, investigations of organism responses to effusion withdrawal has significant meaning (e.g., [2,3]) and looking for the procedures that enable to avoid complications (e.g., [4]). Our medical-engineering team working as a scientific consortium composed of IBBE PAS and Warsaw Medical University is rather an exceptional team in the world since we can do more than a purely medical or purely engineering team (e.g., [2-6]).

PhD student tasks:

- Technical assistance (in particular: signal registration) during TT performed in the hospital of the Warsaw Medical University.
- Processing of original signals, creation of data records being ready to be analyzed.
- Analyses of relationships between changes of particular physiological parameters, also in relation to the patient state, and biomedical interpretation.

The student will gain a wide spectrum of experience in biomedical engineering: from construction of medical devices and measurement systems, through collaboration with physicians and direct contact with patients, to mathematical and physiological analysis of medical data (including analysis supported by computer simulations (e.g., [2,3,7]).

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