THE ROLE OF SERUM miRNA IN LEPTOSPIROSIS-ASSOCIATED ACUTE KIDNEY INJURY

P. Kusirisin [a,b,c,d*] , U. Limothai [b,c] , P. Kaewdoungtien [a,b,c] , S. Peerapornratana [a,b,c,e] , N. Srisawat [a,b,c,f,g]

[a] Division of Nephrology, Department of Medicine, Faculty of Medicine, Chulalongkorn University, Bangkok, Thailand;
[b] Excellence Center for Critical Care Nephrology, King Chulalongkorn Memorial Hospital, Bangkok, Thailand;
[c] Critical Care Nephrology Research Unit, Faculty of Medicine, Chulalongkorn University, Bangkok, Thailand;
[d] Division of Nephrology, Department of Internal Medicine, Faculty of Medicine, Chiang Mai University, Chiang Mai, Thailand;
[e] Department of Laboratory Medicine, Faculty of Medicine, Chulalongkorn University, Bangkok, Thailand;
[f] Academy of Science, Royal Society of Thailand, Bangkok, Thailand;
[g] Tropical Medicine Cluster, Chulalongkorn University, Bangkok, Thailand

Background and Objective

Leptospirosis, a global tropical zoonotic disease, has wide-ranging clinical manifestations from mild symptoms to multiple organ dysfunction syndrome, including acute kidney injury (AKI). This study aimed to identify circulating microRNA (miRNA) as biomarkers for predicting AKI in patients with leptospirosis.

Method

A total of 115 leptospirosis patients were recruited and divided into two groups, AKI and non-AKI. In the discovery phase, 14 serum samples were used for microtranscriptome analysis using the NanoString nCounter miRNA expression assay. Top candidate miRNAs were selected and further examined by quantitative RT-PCR technique in the validation phase using serum samples of 31 and 84 individuals with and without AKI, respectively.

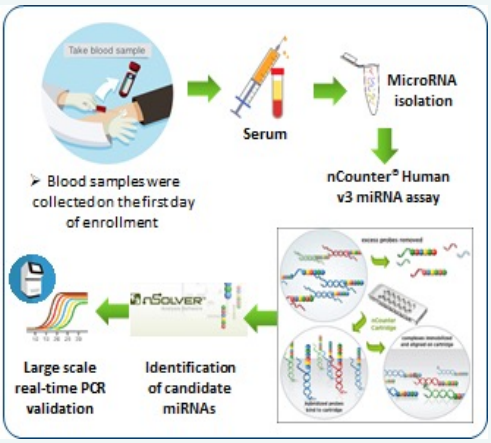

Figure 1. Study design and workflow

Results

We identified 91 significantly differential expression miRNAs between the two groups [$\log_2$ (fold change) ≥1.5 and p-value <0.05]. Among these, miR362-3p and miR502-5p were selected as the top two up-regulated expressed in the AKI group. In the validation phase, serum miR362-3p and miR502-5p levels were significantly higher in the AKI group compared with the non-AKI group (p = 0.001 and p = 0.011, respectively). An area under the receiver operating curve of miR362-3p and miR502-5p for predicting AKI were 0.70 (p = 0.001) and 0.65 (p = 0.012), respectively.

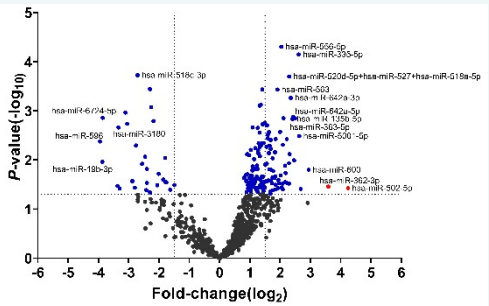

Figure 2. Expression profiling of microRNAs in serum

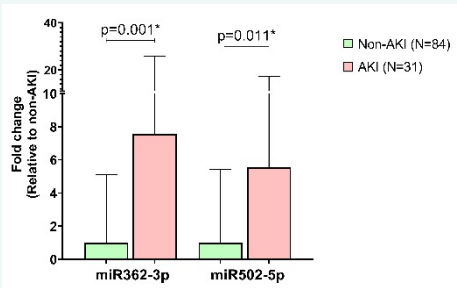

Figure 3. Relative fold change of candidate miRNAs in serum of patients with AKI and non-AKI

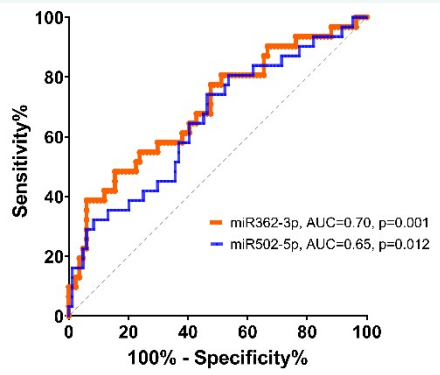

Figure 4. Receiver operating characteristic (ROC) curves of the serum miRNAs in differentiating patients with AKI and non-AKI

Conclusion

This study demonstrated a difference in microtranscriptome profiles in patients with leptospirosis who did and did not experience AKI. Serum miR362-3p and miR502-5p levels could potentially serve as novel biomarkers for predicting AKI in leptospirosis.

Contact e-mail: jingprit@hotmail.com (PK); drnattachai@yahoo.com (NS)