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EVALUATION OF HEMOGLOBIN IN URINE AS A BIOMARKER OF KIDNEY DAMAGE: IMPLEMENTATION OF CALIBRATION CURVES OBTAINED BY PHOTOACOUSTIC SPECTROSCOPY. TEST PILOT.

The kidney damage present in septic shock is one of its most serious and irreversible symptoms. One of the key biomarkers of kidney damage is the presence of hemoglobin in the urine, which can indicate hematuria and acute kidney injury. Photoacoustic spectroscopy has shown its capacity and sensitivity as an alternative tool for the detection of hemoglobin in biological samples, including urine.
With this context, this work uses hemoglobin calibration curves obtained by photoacoustic spectroscopy. Hemoglobin has absorption bands at certain wavelengths (Soret band, 412nm and β and α peaks at 550nm and 580nm respectively), generating a photoacoustic signal that is proportional to the optical absorption spectrum and its concentration. The calibration curves were constructed using reference samples with known concentrations of hemoglobin (Sigma Aldrich hydrolyzed hemoglobin), which allowed establishing a relationship between the absorption of the measured photoacoustic signal and the concentration of hemoglobin in the sample, by using these specific calibration curves, the concentration of hemoglobin in urine of an animal group of Male Wistar rats, induced into septic shock at 0 and 6 hours of this, can be quantified, detecting an increase in said concentration. The above will facilitate early detection and monitoring of kidney damage in patients with septic shock.

Keywords

photoacoustic spectroscopy, Urine, Damage, Hemoglobin, Kidney

Reference

Chvojka, J., Sykora, R., Karvunidis, T., Radej, J., Krouzecky, A., Novák, I., & Matejovic, M. (2010). New developments in septic acute kidney injury. Physiological Research, 59(6), 859-69.

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