

Use of Electrical Bioimpedance in Determining the Cause of Hypotension in Hemodialysis Patients

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Purpose

Hemodynamic instability is a major problem in hemodialysis patients. It can be caused by either a decrease in cardiac output (CO) or systemic vascular resistance (SVR).

Methods

We therefore used an electrical bioimpedance device from Cardiodynamics to determine the cause of hypotension in our hemodialysis patients. This is a non-invasive technique which measures a change in impedance using an electrical current through sensors on the neck and thorax.

A group of ten patients were identified whose MAP decreased >10 mm Hg over the course of a dialysis treatment (Group I). A second group of ten patients had a decrease of <10mm Hg or an increase in MAP (Group II). We obtained measurements pre and post dialysis of CO, SVR, and thoracic fluid content (TFC). The two groups did not significantly differ in the ages of the patients, amount of ultrafiltration, or pre-dialysis CO, SVR, or TFC.

Results

The following results are expressed as means \pm S.E.M.:

Group	[Delta] CO L/min	[Delta] SVR dyn-sec-cm ⁻⁵	[Delta] TFC kohm ⁻¹
I	-0.940 \pm 0.209	-99.9 \pm 91.2*	-6.67 \pm 1.68
II	-0.600 \pm 0.293	174.0 \pm 78.7	-4.31 \pm 1.18

*p<0.05 when compared to group II n=10 for each group

Conclusion

- 1) During hemodialysis treatments in 10 patients whose MAP decreased >10mmHg there was a significant decrease in mean SVR post dialysis as compared to a similar group whose MAP decreased <10mm Hg.
- 2) In both groups there was an overall decrease in CO and TFC post dialysis but there was no significant difference in these parameters between the two groups.
- 3) Utilizing an electrical bioimpedance device one could select patients who would potentially benefit from a peripheral vasoconstrictor such as midodrine or low temperature dialysis.