

Pediatric Patients after Heart Surgery

Crit Care Med.

Simplified Abstract

Bioelectrical impedance analysis for assessment of severity of illness in pediatric patients after heart surgery

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OBJECTIVE

To investigate whether perioperative changes in bioelectrical impedance reflect the severity of illness in pediatric patients after heart surgery

DESIGN

Prospective, controlled study

SETTING

University-affiliated children's hospital

PATIENTS

A total of 107 patients admitted to a pediatric intensive care unit after congenital heart surgery.

INTERVENTIONS:

None

MEASUREMENTS AND MAIN RESULTS

Single frequency (50 kHz) bioelectrical impedance was measured in the lower extremities before surgery and immediately, 16 hrs, and 40 hrs after admission (D0, D1, D2) to the pediatric intensive care unit. Postoperative changes in bioelectrical impedance were assessed by calculating values relative to the preoperative data (bioelectrical impedance ratio). These bioelectrical impedance ratios at D0 in both the nonsurviving and surviving patients were 0.84 +/- 0.06 and 0.85 +/- 0.01 (mean +/- SE), respectively, indicating that the initial decrease caused by surgical stress itself was not directly related to the prognosis. The bioelectrical impedance ratio showed an increase toward preoperative values in surviving patients (0.94 +/- 0.02) at D1, and they showed a sustained decrease (0.70 +/- 0.06) in nonsurviving patients. Patients with a bioelectrical impedance ratio at D1 of < 0.8 showed a higher mortality (25%) compared with those patients with a day-1 bioelectrical impedance ratio of > or = 1.0 (0%). The duration of the stay in the pediatric intensive care unit, mechanical ventilation, and inotropic support were all significantly longer in the patients with the lower bioelectrical impedance ratio.

CONCLUSIONS:

Measurement of the relative changes in postoperative bioelectrical impedance, which reflects perioperative alterations in body composition, provides a quantitative estimation of the critical illness in pediatric patients after heart surgery.