Handheld Indirect Calorimetry in the Burns Unit: a feasibility study

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Study background

Figure 15-1 Percent resting metabolic rate. (From Kinney JM et al.: Nutrition and metabolism in patient care, Philadelphia, 1988, WB Saunders.)
Study background

How much should we feed?

- Under/ over feeding

Indirect Calorimetry

- Expensive
- Cumbersome
- Expertise


Study background

How much should we feed?
- Under/over feeding

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Predictive Equations
- Use with caution

Leung J et al. Predictive energy equations are inaccurate for determining energy expenditure in adult burn injury: a retrospective observational study. *ANZ J Surg* 2019;89:578-583
Predictive equations in burn injured patients

- Studies comparing the predictive equations in burns injured patients with IC all recommend different equations.

Original Communications

Accuracy of Predictive Methods to Estimate Resting Energy Expenditure of Thermally-Injured Patients

Roland N. Dickman, PharmD; Jane M. Germaine, PharmD; Marty L. Riley, MS, RD; James B. Murrell, ORT; William L. Hickerson, MD; Kenneth A. Kundik, MD; and Rex O. Brown, PharmD

From the Departments of Clinical Pharmacy and Surgery, University of Tennessee, and Department of Laboratory Services and Nutrition, Baptist Medical Center at Memphis, Tennessee

Determination of Resting Energy Expenditure After Severe Burn

Beth A. Shields, MS, RD,* Kevin A. Dory, MS,* Kevin K. Chung, MD,* Charles E. Wade, PhD,† James K. Aden, PhD,* Steven E. Wolf, MD*†

(J Burn Care Res 2013;34:e22-e28)
Indirect Calorimetry

- Machine which measures the volume of expired gas and the inhaled and exhaled concentrations of $O_2$ and $CO_2$

- Resting energy expenditure (REE) determined by
  - $O_2$ consumption
  - $CO_2$ production

- Only assesses the EE for that particular time.

Indirect Calorimetry
What makes up energy expenditure

Total Energy Expenditure

- Basal metabolic rate: 60-75%
- Diet induced thermogenesis: 10-15%
- Physical activity: 12-30%

Resting Energy Expenditure

NSW Health Sydney Local Health District
Study Aims

- feasibility of implementing regular use of the handheld calorimeter (FitMate®) into regular dietetic practice in the Burns Unit
- how the results compare with the predictive equations currently in use
Methods

- All patients ≥ 75yo with any burn size and patients ≥ 18yo with a burn injury ≥ 10%
- Resting energy expenditure measured by the FitMate
- Goal of 5-10mins steady state
Methods

- Feasibility of implementing IC
  - Patient questionnaire about their experience
  - Impact on nutrition management and dietitian time
- Comparison of measured REE with predictive equations
  - Toronto Equation
  - Modified Schofield with injury factors
Preliminary Findings

- 6 patients met the criteria
  - 3 female
  - 19-89yo
  - 1-80% TBSA (flame, scald, electrocution)
  - 2 patients had multiple measurements
- 3 questionnaires completed
Preliminary Findings

Kcal

Patient No.

Equations

Measured EE
Preliminary Findings

Patient 5 – 67% TBSA

Measured EE vs. Equations
Preliminary Findings

Patient 6 – 80% TBSA

kcal

Post Burn Day

Measured EE

Equations
Preliminary Findings – Patient Questionnaire (n=3)

Instructions and information about IC
- Purpose and instructions “very clear” n=3

Comfort during procedure
- Comfortable, able to breathe, relax and remain still n=3
- Would repeat test n=3

IC results
- IC Results clear n=3
- Information motivating and useful n=3
Preliminary Findings – Nutritional Management

- Time taken per patient 50-120mins
- Enteral feeds and/or oral nutrition support increased in 3/6
- Nutrition support duration extended in 3/6 patients
Considerations

- Providing valuable information
- Impacting our nutritional management
- Potential to improve outcomes as nutrition management individualised
- Issues with timing of the procedure
Future Directions

- Complete the study as planned
- If results continue to provide value, ensure IC remains routine care
- Investigate impact on clinical outcomes
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