Adopting a simpler method to attain quicker result

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Outlines

- Conventional method to measure Adequacy of Haemodialysis (HD)
- On-line Clearance Monitoring (OCM) to measure Adequacy of Haemodialysis
- Our study to compare the above 2 methods
Adequate for your tummy?
Adequacy can be assessed by:

- **Clinical**: Patient well being

- **Nutrition**: reflected by albumin level, Protein Catabolic Rate

- **Dose of dialysis** (various dialysis indexes, especially: Kt/V)
National Cooperative Dialysis Study (NCDS)

• NCDS - evidence of positive correlation between morbidity & mortality rate of patients on HD & the monitoring of the dose of dialysis

• The dose of dialysis should be monitored at least monthly
Daugirdas 2nd generation formula

- $e^{Kt/v} = -\ln (R_{eq} - 0.008 \times t) + (4 - 3.5R_{eq}) \times UF/W$

- $Kt/V = \text{scientific index of adequacy}$
  
  - $K = \text{dialyzer clearance of urea (ml/min)}$
  - $t = \text{duration of dialysis (minutes)}$
  - $v = \text{volume of Urea distribution (litres)}$
Laboratory tests for the formula

- **May 6, 2008**
  - Tuesday

- **May 7-8, 2008**

- **May 9, 2008**
  - Friday
# Calculation of the result

**UREA KINETIC STUDY FOR HAEMODIALYSIS**

- **Basic data**

<table>
<thead>
<tr>
<th>Name</th>
<th>Height</th>
<th>cm</th>
<th>TBW =</th>
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<tbody>
<tr>
<td>Sex</td>
<td>( M=1 ; F=2 )</td>
<td>IBW</td>
<td>kg</td>
</tr>
<tr>
<td>Age</td>
<td>B.S.A.</td>
<td>#NUM! sq m</td>
<td>IBW - TBW =</td>
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<table>
<thead>
<tr>
<th>Date</th>
<th>Dialyzer</th>
<th>No. of use</th>
<th>Bld flow (ml/min)</th>
<th>K, in vitro (ml/min)</th>
<th>Duration (min)</th>
<th>weight (kg)</th>
<th>peri-HD urea (mmol/L)</th>
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Online Clearance Monitoring (OCM)

- Integrated into Haemodialysis machine

- Automatic intra-dialytic measurement of in-vivo urea clearance, & calculation of Kt/V throughout the treatment
Estimated anthropometric V according to the Watson formula or direct entry of a measured V

- Dry weight
- Height
- Age
- Gender

Male: \( V_{\text{urea}} = 2.447 - 0.09516 \times \text{age} + 0.1074 \times \text{height} + 0.3362 \times \text{weight} \)

Female: \( V_{\text{urea}} = -2.097 + 0.1069 \times \text{height} + 0.2466 \times \text{weight} \)

Fig. 12: A calculator to estimate the urea distribution volume V according to the anthropometric Watson formula is integrated in the OCM®
Measurement of OCM® Kt/V

- UF Volume: 2392 ml
- UF Time Left: 1:35 h
- UF Rate: 700 ml/min
- UF Goal: 3500 ml
- Eff. Blood Flow: 227 ml/min
- Cum. Blood Vol.: 46.5 ml

OCM Data:
- Kt/V: 1.08
- Plasma Na: 142 mmol/l
- Goal in K: 0.35
- K: 192 mmol/l
OCM® Kt/V Study

Comparison of Urea Kinetic Modelings by the non-invasive On-line Clearance Monitor (OCM®) Kt/V with the conventional Kt/V by Daugirdas second generation formula
OCM® Kt/V Study

- 54 subjects were recruited

- Monitored with OCM® HD Machine

- Pre & post HD blood urea, inter-dialytic urine & the next pre RFT were taken for Daugirdas 2nd generation formula

- The results of OCM and conventional Kt/V were compared with Student t-test
OCM® & Daugirdas Kt/V results

N=54
Result of the study

Mean Kt/V result of OCM is $1.68 \pm 0.30$ and the Mean of Daugirdas Kt/V is $1.66 \pm 0.33$
Results of the study

• Pearson correlation coefficient was 0.872

• Paired T-test on the 2 sets of data showed non significant differences with $p = 0.746$

• no significant difference between OCM® and conventional Kt/V
Conclusion

• OCM® is a simpler, quicker, non-invasive & reliable method for close monitoring of haemodialysis patient adequacy with immediate result

• No extra cost & manpower required

• Timely adjustment of dialysis dose to improve patient’s quality of life
Acknowledge

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- Tang Wing Chung Anthony,
- Ho Yiu Wing

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This dog is having HD, how do you measure Kt/V for it?

Thank you!