Calculating Volume of Gadolinium Based Contrast Agents

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Calculating the volume of GBCA

\[ V = \frac{D \times W}{C} \]

\begin{align*}
V &= \text{Volume (ml)} \\
D &= \text{dose by weight (mmol/kg)} \\
W &= \text{weight (kg)} \\
C &= \text{concentration (mmol/ml)}
\end{align*}

Notes:
1. Recommend rounding to the nearest ml, except for small doses, eg. for children*
   - eg. 12.4 ml should be 12ml
   - 13.9 ml should be 14ml
   - *1.2 ml should be 1.2ml
2. OK to round down to nearest vial size in many circumstances to save opening new vial
   - eg. if calculated dose of Eovist is 11ml, use 10ml instead
Typical Doses and Concentrations of GBCA’s used at UW-Madison

<table>
<thead>
<tr>
<th>Agent</th>
<th>Typical Dose (mmol/kg)</th>
<th>Concentration (mmol/ml)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Multihance (gadobenate dimeglumine)</td>
<td>0.10</td>
<td>0.50</td>
</tr>
<tr>
<td>Omniscan (gadodiamide)</td>
<td>0.10</td>
<td>0.50</td>
</tr>
<tr>
<td>Eovist (gadoxetic acid)</td>
<td>0.05</td>
<td>0.25</td>
</tr>
<tr>
<td>Ablavar (gadofosveset trisodium)</td>
<td>0.03</td>
<td>0.25</td>
</tr>
</tbody>
</table>
Example Calculations

1. Volume of 0.1 mmol/kg of Multihance or Omniscan for 79kg patient
   
   \[ V = 0.1 \times 79 \div 0.5 = 16 \text{ ml} \]

2. Volume of 0.05 mmol/kg of Eovist for 52kg patient
   
   \[ V = 0.05 \times 52 \div 0.25 = 10 \text{ ml} \]

3. Volume of 0.03 mmol/kg of Ablavar for 72kg patient
   
   \[ V = 0.03 \times 72 \div 0.25 = 9 \text{ ml} \]
Volume calculation trick for Multihance, Omniscan and Eovist only

- Approximate $W$ (lbs) to be $2 \times W$ (kg)
- For 0.1 mmol/kg of Multihance or Omniscan
  \[ V = \frac{0.1 \times W \text{ (kg)}}{0.5} \approx \frac{W \text{ (lbs)}}{10} \]
- For 0.05 mmol/kg of Eovist
  \[ V = \frac{0.05 \times W \text{ (kg)}}{0.25} \approx \frac{W \text{ (lbs)}}{10} \]
Summary

• Know the formula
• Know differences in concentrations and dose
• Approximation only for Eovist, Multihance and Omniscan: Volume (ml) = W (lbs) / 10
• When in doubt, use the formula
• When still in doubt, ask for help
• Contrast is a drug and proper dosing is essential

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