Aims

To ensure adequate oxygen supplies are carried for the duration of all retrievals.
To ensure knowledge of how long oxygen supply lasts.

Application

EMRS Team Members
SAS Airwing Paramedics

Background

It is the paramedic and retrieval consultant’s responsibility to ensure that there are adequate oxygen supplies for the duration of a retrieval.

The retrieval team lightweight cylinder (ZA; weight 1.9kg) is stored in the side pocket of the monitor pack, and in the long side pocket of the yellow paramedic bag. It contains 300 litres when full. This cylinder should only be used as a last resort when other oxygen supplies are exhausted. Note that the new black car bag does not contain oxygen.

Paramedics should ensure the cylinders on the EC135 and King Air aircraft are sufficiently full. If tasked to a retrieval from another job where oxygen has been used then the air wing paramedics should let the retrieval consultant know that there is reduced oxygen supply on board so that other arrangements can be made if necessary.

It is important to note that the oxygen supply carried by the RN Sea King is variable and usually not sufficient for prolonged transfers.
Anticipating oxygen requirements

- The accepted standard is to carry twice the amount of oxygen which is anticipated to be required for a transfer, in order to deal with unexpected delays.
  - Equation: \(2 \times \text{transport time in minutes} \times ((\text{MV} \times \text{FiO}_2) + \text{ventilator driving gas})\)
  - Ventilator driving gas for the Oxylog 3000 is 0.5l/min
  - So for a minute volume of 6l/ min at an \(\text{FiO}_2\) of 0.6 for retrieval from Skye, \(\text{O}_2\) required = \(2 \times 60 \text{ (mins)} \times ((6 \times 0.6) + 0.5) = 120 \text{ mins} \times 4.1 \text{ l/min} = 492 \text{ litres}\)
    - i.e. One E (or ZD) size cylinder or 2 D size cylinders.
- Remember transport times between helipad and hospital, significant for example in Mull or Shetland (up to 60mins).
- Now that apnoeic preoxygenation is part of the RSI protocol, there is a point during intubation when 30 litres/min will be used. This will drain two ZDs in 40 minutes if flow not racked back once intubation completed.

Oxygen supplies on Retrieval Team transport modalities

<table>
<thead>
<tr>
<th>Transport platform</th>
<th>Cylinders Carried</th>
<th>Capacity (Litres)</th>
<th>Duration of supply at 15l/min when cylinders full</th>
<th>Duration of Supply using Oxylog 3000 at TV 500ml, RR 12, (\text{FiO}_2) 1.0</th>
</tr>
</thead>
<tbody>
<tr>
<td>Helimed 2 &amp; 5</td>
<td>3 x ZD 1 x ZA</td>
<td>3 x 605 1 x 300</td>
<td>3 x 40 = 120 mins 1 x 20 = 20 mins</td>
<td>3 x 93 = 280min 1 x 46 = 46min</td>
</tr>
<tr>
<td>King Air</td>
<td>Two large on-board cylinders 2 x D</td>
<td>2 x 3500 2 x 340</td>
<td>2 x 233 = 466 mins 2 x 22 = 44 mins</td>
<td>2 x 538 = 1076min 2 x 52 = 104min</td>
</tr>
<tr>
<td>Sea King</td>
<td>2 x CD 2 x ZD</td>
<td>2 x 460 2 x 605</td>
<td>2 x 30 = 20 mins 2 x 40 = 80 mins</td>
<td>2 x 70 = 190min 2 x 93 = 186 min</td>
</tr>
<tr>
<td>S92</td>
<td>4 x CD 2 x ZA 2 x ZX</td>
<td>4 x 460 2 x 300 2 x 3040</td>
<td>4 x 30 = 30 mins 2 x 20 = 40 mins</td>
<td>4 x 70 = 280min 2 x 46 = 92min 2 x 467 = 934mins</td>
</tr>
<tr>
<td>Land ambulance</td>
<td>1 x ZX 3 x ZD Old ambulance: 2 x F</td>
<td>1 x 3040 3 x 605 2 x 1360</td>
<td>1 x 202 = 202 mins 3 x 40 = 120 mins</td>
<td>1 x 467 = 467min 3 x 93 = 280min</td>
</tr>
<tr>
<td>RRU</td>
<td>2 x LWD</td>
<td>2 x 300</td>
<td>2 x 20 = 40 mins</td>
<td>2 x 226 = 452mins</td>
</tr>
</tbody>
</table>

LWD = Lightweight D

If using less than 100% oxygen, operation time will be increased accordingly.

Note that the Oxylog 3000 does give an indicator of oxygen consumption on the analogue display.
On arrival at referring hospital,

Check O₂ supply. If cylinders in hospital incompatible with Schrader valve and no piped supply, land ambulance O₂ will need to be requested for the duration of the time spent on the ground.

If O₂ supplies on aircraft thought to be insufficient for return journey, request D or E cylinders from land ambulance crew at the referring site.

During transfer

On Helimed, make sure both fitted cylinders are turned on prior to loading patient, and third cylinder carried in rear of aircraft is accessible if it is required. Swap ventilator over onto the on board oxygen supply.

Monitor oxygen consumption during flight. On Helimed check contents gauge on Aerolite panel (above). Anticipate cylinder changeovers.

On return to base

During equipment checks make arrangements for EMRS cylinder to be changed if it has been partially used.

Reference