PORTABLE EQUIPMENT FOR INTENSIVE THERAPY

R. M. A. McCLELLAND, M.B. (LOND.), F.F.A.R.C.S.
Senior Registrar, Nuffield Department of Anaesthetics, Oxford

R. H. SALT, F.I.B.S.T.
Chief Technician, Nuffield Department of Anaesthetics, Oxford

Certain technical procedures, such as venepuncture, endotracheal intubation and artificial respiration are performed routinely by the anaesthetist. Additionally, he should be in the habit of making rapid assessment of the severely ill patient and instituting supportive therapy, particularly where there may be cardio-vascular or respiratory failure. As a natural consequence anaesthetists are no longer confined only to the anaesthetic room and operation theatre, but may be asked to help in the management of disease throughout hospital practice.

Respiratory obstruction, chest and head injuries, poliomyelitis and similar conditions, barbiturate intoxication, eclampsia, post-operative chest complications and intractable pain are all examples when a move is indicated from the conventional and limited sphere of pure anaesthesia, into the broader field of medicine in its widest sense.

Problem

This expanding role of the anaesthetist is leading to many problems. One is the difficulty to find enough time to see and supervise adequately patients who may be scattered in different wards of a large hospital. Another is that a wide range of equipment may be required at short notice, for cases of differing pathology.

The use of a recovery room has solved the problem concerning the immediate post-operative phase. Here all patients can be nursed together for the first few hours following surgery. And should an untoward incident occur, or extra care be required, then staff and apparatus are instantly available.

In America and Scandinavia this principle of concentration of staff and equipment has been extended to include the management of the severely-ill patients, and intensive-therapy units have been established for this purpose. Of the many obvious advantages of this system that of particular importance is the availability of apparatus, expert medical and highly-skilled nursing staff where they will be most valuable, instead of being dispersed throughout the hospital.

In Great Britain, at a few centres this ideal has been employed with the formation of special units where all cases of a similar nature are collected. For example, in Oxford, patients with poliomyelitis, polynueiritis, tetanus, myasthenia gravis and porphyria, who require tracheostomy and intermittent positive pressure respiration are nursed together in the Respiration Unit at the Churchill Hospital. But this only represents one aspect of the problem, respiratory failure; and unfortunately in this country where tradition, finance, and other matters play a dominant role, we are not able at present to offer the advantages of an intensive therapy unit to many patients.

However, there is no excuse for allowing a patient, who requires more than the average amount of care and attention, to lie almost unnoticed in the far corner of a ward. And to overcome some of the difficulties, with the concept of concentration in mind, we have made a portable unit for the emergency treatment of the severely ill.

In the past ten months the portable unit has been used on 23 occasions, and some details are included in Table 1.

Description of Portable Intensive Therapy Unit

The equipment, except an underwater seal drain, is housed in a 'Revelation' type of suitcase measuring 70 x 45 x 20 cm., and of total weight 19 kg.

Modifications to the suitcase include:

(1) A pair of 5 cm. diameter wheels mounted by means of metal plates at one corner, and near the diametrically opposite corner an extra handle attached to the side. This allows the unit to be wheeled at an angle from one location to another.
Table 1
Uses in Chronological Order of the Portable Intensive Therapy Unit

<table>
<thead>
<tr>
<th>Occasion</th>
<th>Location</th>
<th>Patient's Condition</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Casualty department</td>
<td>Barbiturate intoxication</td>
<td>Intubation and ventilation</td>
</tr>
<tr>
<td>2</td>
<td>Ward</td>
<td>Fractured jaw</td>
<td>Bronchoscopy</td>
</tr>
<tr>
<td>3</td>
<td>Ward</td>
<td>Post-operative chest complication</td>
<td>Toilet of chest</td>
</tr>
<tr>
<td>4</td>
<td>Casualty department</td>
<td>Head injury</td>
<td>Pharyngeal toilet</td>
</tr>
<tr>
<td>5</td>
<td>Ward</td>
<td>Head injury</td>
<td>Passage of stomach tube</td>
</tr>
<tr>
<td>6</td>
<td>Ward</td>
<td>Cerebral abscess</td>
<td>Bronchoscopy, had inhaled food</td>
</tr>
<tr>
<td>7</td>
<td>Ward</td>
<td>Peptic ulceration, haematemesis</td>
<td>Bronchoscopy</td>
</tr>
<tr>
<td>8</td>
<td>Ward</td>
<td>Fractured jaw</td>
<td>Intubation and toilet of chest</td>
</tr>
<tr>
<td>9</td>
<td>Ward</td>
<td>Chest injury</td>
<td>Bronchoscopy</td>
</tr>
<tr>
<td>10</td>
<td>Anesthetic room</td>
<td>Chest injury</td>
<td>Relief of tension pneumothorax</td>
</tr>
<tr>
<td>11</td>
<td>Operating theatre</td>
<td>Chest injury</td>
<td>Relief of tension pneumothorax</td>
</tr>
<tr>
<td>12</td>
<td>Ward</td>
<td>Esophageal varices, haematemesis</td>
<td>Toilet</td>
</tr>
<tr>
<td>13</td>
<td>Ward</td>
<td>Head injury</td>
<td>Intubation and toilet of chest</td>
</tr>
<tr>
<td>14</td>
<td>X-Ray department</td>
<td>Cerebral tumour</td>
<td>Cardiac massage following thiopentone induction for angiogram</td>
</tr>
<tr>
<td>15</td>
<td>Ward</td>
<td>Post-operative chest complication</td>
<td>Toilet of chest and I.V. therapy</td>
</tr>
<tr>
<td>16</td>
<td>Ward</td>
<td>Cerebral tumour</td>
<td>Toilet of chest</td>
</tr>
<tr>
<td>17</td>
<td>Casualty department</td>
<td>Head injury</td>
<td>Passage of stomach tube</td>
</tr>
<tr>
<td>18</td>
<td>Ward</td>
<td>Cerebral tumour</td>
<td>Bronchoscopy, inhaled food</td>
</tr>
<tr>
<td>19</td>
<td>Ward</td>
<td>Head injury</td>
<td>Intubation—respiratory obstruction due to palatal oedema after angiogram</td>
</tr>
<tr>
<td>20</td>
<td>Ward</td>
<td>Post-operative chest complication</td>
<td>Toilet of chest and I.V. therapy</td>
</tr>
<tr>
<td>21</td>
<td>Casualty department</td>
<td>Carbon monoxide poisoning</td>
<td>Intubation and ventilation</td>
</tr>
<tr>
<td>22</td>
<td>Ward</td>
<td>Cor pulmonale</td>
<td>Change of tracheostomy tube</td>
</tr>
<tr>
<td>23</td>
<td>Ward</td>
<td>Tetanus</td>
<td>Intubation, ventilation and curarization</td>
</tr>
</tbody>
</table>
(2) The expanding mechanism fixed in a permanent position, so as to prevent apparatus in the lid damaging the contents of the base.

(3) On the hinge side of the base a steel bar bolted parallel to the upper edge to reinforce the side when the case is open.

(4) A sheet of white painted hardboard with diagrams of the individual items, attached to the lid allows a rapid check that everything is available (see Fig. 1).

(5) Transparent plastic luncheon boxes fixed to the base hold other items and drugs (the container for Magill endotracheal tubes was made in the Department's workshop). The labels on the under surface of the box lids, other than the drug box, are small so that their contents can be seen.

(6) Equipment that must be sterilized after use is kept in aluminium containers suitable for autoclaving.

(7) Various sizes of 'Terry clips' maintain the larger items and containers in position, and specially modified clips retain uneven-shaped apparatus.

The contents of the suitcase are listed in Table 2, the base is shown in Fig. 2, and a general view of the equipment in Fig. 3. The size of the underwater-seal drainage bottle precludes its inclusion, but it is kept wrapped in a sterile towel beside the case.

Discussion

In the absence of a fully-equipped permanent unit to which a severely-ill patient may be admitted directly this portable equipment has been found to be of value. In the event of an emergency call the suitcase can be collected from a central location, and wheeled immediately to any part of the hospital. No time is wasted in gathering items of equipment required for an individual case, and precious minutes which may be vital for the patient are saved.

Criticism obviously can be levelled at the choice of individual items, but the equipment is intended for use in a busy hospital. The omission of intravenous fluids and a transfusion set was deliberate, as they are always at hand, but modifications could be made profitably under different geographical circumstances. Local flavour favours certain items, for example, the Oxford inflating
Table 2

EQUIPMENT

The Lid:
- Syringes, 2 × 2 ml., 2 × 10 ml.
- Spare batteries + bulbs (A)
- Tracheostomy tube (B)
- Bronchoscope
- Fergusson’s mouth gag with Acland jaws, × 2
- 4% lignocaine for topical use
- Macintosh laryngeal spray
- Macintosh laryngoscope
- Bryce-Smith infant’s straight blade
- Mayo tongue forceps
- Scissors
- Spencer Wells clip
- Mitchell intravenous needle × 2
- Magill intubating forceps
- Suction catheters

The Base:
- Oxford inflating bellows
- Elephant corrugated tubing
- Ruben non-return valve
- Everseal face masks, sizes 1,2,3
- Catheter mount
- Selection of drugs (C)

The Base—cont.:
- Drilled Rowbotham connectors × 5 (D)
- Water’s airways × 3 (E)
- Stomach tube (F)
- Rubber tourniquet (G)
- Selection of Magill endotracheal tubes (H)
- Gum elastic bougies
- Trocar, cannula, catheter + 2 clamps (I)
- Clean cotton wool swabs
- Sterile surgical spirit (J)
- ½% lignocaine with 1/100,000 adrenaline for local infiltration (K)
- Thiopentone 0.5 gm, 2 packs
- Ambu suction apparatus
- Selection of Oxford non-kinking endotracheal tubes (K)
- Mitchell endotracheal tube cuff inflator (L)
- Pharyngeal pack (M)
- Crepe bandage
- Adhesive strapping (N)
- Hypodermic needles, 1 drawing up, 3 × 1 S.W.G., 2 × 14 S.W.G., 2 × 16 S.W.G.
McCLELLAND: Portable Equipment for Intensive Therapy

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A B

Fig. 3.—General view of the equipment.

Bellows (Macintosh, 1953) is familiar equipment, but an ‘Ambu bag’ would serve equally well. Both have the merits of simplicity and utilizing air, thus eliminating the need for heavy cylinders.

Summary

The problem of the expanding role of the anaesthetist in medicine is mentioned, and the principle of intensive therapy considered. Equipment for a portable intensive therapy unit is described, and its use over a ten-month period considered.

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REFERENCE

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R. M. A. McClelland and R. H. Salt

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