ANAESTHESIA FOR HEMIMANDIBULECTOMY IN PATIENTS WITH MALIGNANT DISEASE

BY

M. J. BASCOMBE AND C. B. LEWIS

SUMMARY

An account is given of fifty cases of hemimandibulectomy, thirty-three of whom had block dissection of the neck. Problems which the anaesthetist is likely to meet in patients with malignant disease undergoing this operation are: respiratory and cardiovascular disease, poor nutrition and hypovolaemia, the local sequelae of intensive pre-operative radiotherapy, and intra-oral and pharyngeal suppuration. A suitable method of anaesthesia and controlled hypotension is described. Complications occurring during the operation were few, but included two cases of parasympathetic reflex disturbance. Postoperative complications included respiratory obstruction, persistent hypotension and reactionary haemorrhage following the use of controlled hypotension. The indications for tracheostomy in these patients are discussed.

The Commando operation, i.e. hemimandibulectomy with radical block dissection of the neck, is an uncommon operation. Within recent years fifty patients have been treated by hemimandibulectomy performed by one surgeon using the same technique at the Royal Marsden Hospital. Thirty-three of these patients had either suprathyroid or Crile* block dissections, usually with removal of part of the tongue or other tissues of the mouth, cheek or lip. Of the remainder, two had previous Crile block dissection.

In view of the scarcity of literature on the subject and the low mortality in this series the opportunity has been taken to review the fifty cases with special reference to anaesthesia. In 88 per cent the lesion was a primary squamous-celled carcinoma of the buccal cavity, oropharynx or lower lip. The remainder suffered from primary malignant tumours of the nose, mandible or sub- mandibular salivary gland (table I).

ANAEHNSTHIC CONSIDERATIONS

Anaesthesia for radical surgery of the head and neck has been discussed frequently (Noble, 1960; Martin and Gould, 1963; Wester, 1964). Problems particularly associated with malignant disease of the buccal cavity in this series were:

1. The sequelae of intensive pre-operative radiotherapy (received by all but two patients). These are: a high incidence of trismus, brawny induration of the soft tissues of the neck, and limitation of movement of the cervical spine.

2. Intra-oral and pharyngeal suppuration.

3. Extensive tissue exposure and dissection during the operation.

Adequate pre-operative preparation minimized the problems of poor nutrition and hypovolaemia.

The age distribution is shown in figure 1. The average age was 60 years; 86 per cent were over 50 years; 72 per cent were male; 74 per cent had some other disease, the commonest being associated with the respiratory and cardiovascular systems (table II).

<table>
<thead>
<tr>
<th>Lesion</th>
<th>Percentage of cases</th>
</tr>
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<tbody>
<tr>
<td>Carcinoma of buccal cavity or lower lip</td>
<td>88</td>
</tr>
<tr>
<td>Squamous cell carcinoma of nose, spread to regional nodes</td>
<td>4</td>
</tr>
<tr>
<td>Malignant tumours of mandible</td>
<td>6</td>
</tr>
<tr>
<td>Carcinoma of submandibular salivary gland</td>
<td>2</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
</tr>
</tbody>
</table>

* Dissection and removal from the supracleavicular region upwards of the stern-mastoid, internal jugular vein, fat, fascia, lymph nodes and submandibular salivary gland en bloc. The vagus nerve and carotid artery are preserved.
One patient had a history of cardiac infarction 15 years before operation; one had gross aortic incompetence; three had left ventricular hypertrophy. One male aged 79 years who died 13 months after operation was found postmortem to have a bronchogenic carcinoma, bronchiectasis, emphysema, left ventricular hypertrophy, chronic duodenal ulcer and an aneurysm of the circle of Willis. It was not possible to determine the incidence of sub-clinical cardiovascular disease.

Length of operation varied from 60 to 240 minutes (average 123 minutes).

FIG. 1
Age distribution of fifty cases of hemimandibulectomy.

Operating conditions.
Operating conditions were generally good. Blood replacement varied from nil to 2.5 l. (average 1.1 l.); 8 per cent needed 2 l. or more. In one case copious bleeding occurred and 2.5 l. was needed. Another had troublesome bleeding from divided muscles near the base of the skull.
Complications during anaesthesia.

Parasympathetic reflex disturbance was observed in two cases. In one patient the blood pressure suddenly fell when the carotid sheath was opened, and in the other when traction was applied to the right vagus nerve. Controlled hypotension was in use in both patients; neither had pre-operative hypertension. This incidence (4 per cent) is comparable with the four episodes reported by Noble (1960) in 125 cases of maxillofacial and radical neck surgery. We have not seen parasympathetic reflex disturbance following the use of diathermy near the vagus nerve.

Other possible complications, such as air embolism (Martin and Gould, 1963) or pneumothorax (Schweizer, 1955) were not observed.

Early postoperative complications.

Fourteen per cent developed respiratory obstruction in the early postoperative period. Persistent hypotension (systolic blood pressure more than 40 mm Hg below the pre-operative level for more than 6 hours) occurred in 6 per cent of cases. These will be discussed later. Other complications included wound haematoma (one case) which needed evacuation, one instance of morphine overdose and two of minor haemorrhage from tracheostomy wounds during the first postoperative 24 hours.

Pneumothorax or pneumomediastinum were not observed though cases may have occurred and not been diagnosed.

Thomas and Hux (1957), commenting on four cases in thirty-seven radical neck dissections, state that these complications are probably more frequent than is realized, because with minimal to moderate involvement there may be no obvious clinical manifestations. Partial respiratory obstruction, by increasing the negative intrathoracic pressure during inspiration, is an important factor in the production of pneumomediastinum during dissection in the neck (Schweizer, 1955). The absence of clinically obvious pneumomediastinum and pneumothorax in our cases may be due partly to the care taken in maintaining a free airway during the operation.

DISCUSSION

This group of patients had a high average age and high incidence of pre-operative disease. Some were in poor general condition. All but two had recently completed a 3-month course of radiotherapy. There was one death.

This occurred in a woman of 65 years who smoked heavily. The pre-operative chest X-ray showed some consolidation below the right hilum and partial collapse at the left base. In April 1961 a well differentiated squamous-cell carcinoma in the anterior part of the floor of the mouth was excised together with the adjacent mandible under hypotensive anaesthesia. No block dissection was performed. One litre of blood was replaced.

Twelve hours after operation she became restless and complained of difficulty in breathing. She was given a benzedrine nasal spray and improved. On the third postoperative day she repeatedly stated that she was unable to breathe. She was not cyanosed; her pulse was 96 beats/min and regular. She became confused during the following night, and collapsed and became cyanosed early next morning. Respiratory efforts were weak and her pulse rapid and feeble. Pharyngeal suction slightly improved her respiration but she died before more active treatment was possible. Postmortem examination showed a large amount of mucus in the left bronchial tree, a large plug causing collapse of the left lower lobe. Death might have been prevented had more active treatment (including tracheostomy) been instituted when signs of respiratory insufficiency first became apparent.

Anaesthesia.

The method commonly used at present is to induce anaesthesia with thiopentone 200–500 mg and to pass an endotracheal tube with the aid of suxamethonium 50–100 mg. A cuffed nasotracheal tube is used and a pharyngeal pack inserted. Anaesthesia is maintained with 50 per cent nitrous oxide in oxygen, halothane 0.5–2 per cent from a Fluotec vaporizer, respiration being spontaneous. A Magill attachment (Mapleson type A) is used, the total fresh gas flow being 6–8 l./min. In this series it has proved a safe and simple method, producing, with controlled hypotension, acceptable operating conditions.

Controlled hypotension.

Some dissections would have been extremely difficult without the aid of controlled hypotension. A trimetaphan drip together with halothane and head-up tilt gave good and reasonably consistent results. The average blood replacement of 1.1 l. 

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### Table III

<table>
<thead>
<tr>
<th>Complication</th>
<th>Percentage of cases</th>
</tr>
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<tbody>
<tr>
<td>Persistent hypotension</td>
<td>6</td>
</tr>
<tr>
<td>Respiratory obstruction</td>
<td>14</td>
</tr>
<tr>
<td>Other</td>
<td>12</td>
</tr>
<tr>
<td>Total</td>
<td>32</td>
</tr>
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</table>
is high when compared with that in a similar
group of 100 major head and neck procedures
reported by Conley, Hicks and Jasaitis (1965), in
which, using a 0.1 per cent trimetaphan drip,
the systolic arterial pressure was reduced to a
minimum of 55 mm Hg. The average blood
replacement was slightly more than 1 unit
(500 ml). In their series two patients suffered
cerebrovascular accidents with resultant paresis
and in a third cardiac arrest occurred during the
operation; this was treated successfully.

Though blood loss was high in our series,
operating conditions were acceptable and no
major complications occurred. For these reasons
the higher minimum systolic B.P. (80-90 mm Hg)
would seem to be preferable.

Complications of controlled hypotension.

Persistent postoperative hypotension. Table IV
indicates that the incidence of postoperative hypo-
tension following the use of trimetaphan (3 per
cent) was no more than that following the use of
a non-hypotensive technique.

| TABLE IV |
| Postoperative complications related to controlled hypotension. |
| Trimetaphan | Hexamethonium | No hypotension |
| No. of cases | 32 | 2 | 16 |
| Persistent postoperative hypotension | 1 | 1 | 1 |
| Reactionary haemorrhage | 2 | 0 | 0 |

Reactionary haemorrhage. This occurred in two
cases. In both it followed the use of trimetaphan.
In one patient tracheal compression by a haema-
toma caused respiratory obstruction for which
emergency tracheostomy was required 2 hours
after operation.

There were no other major complications
which could be attributed to controlled hypo-
tension. The low incidence helps to justify the
careful use of controlled hypotension during
hemimandibulectomy and radical neck dissection.

Postoperative respiratory obstruction.

The causes and treatment of postoperative res-
piratory obstruction in this series are shown in
table V. In all patients except case 7 the operation
performed was hemimandibulectomy with block
dissection. Suprathyroid block dissection was per-
formed in five cases and Crile block dissection
in one.

Table VI shows the number of patients sub-
jected to either Crile or suprathyroid block dis-
section and indicates:

1. The relative infrequency of elective
tracheostomy after suprathyroid block dis-
section.

2. The high incidence (38 per cent) of post-
operative respiratory obstruction following
suprathyroid dissection without tracheos-
tomy.

3. The absence of postoperative respiratory
obstruction in those patients on whom
elective tracheostomy was performed.

| TABLE V |
| Postoperative respiratory obstruction. |
| Case | Operation | Cause of obstruction | Postoperative interval | Treatment |
| 1 | L. hemimandibulectomy; suprathyroid dissection | Kinked, blocked or displaced nasotracheal tube | 14 hours | Removal of tube and aspiration |
| 2 | R. hemimandibulectomy; R. Crile dissection | Removal of nasotracheal tube | 5 hours | Nasotracheal tube replaced |
| 3 | L. hemimandibulectomy; suprathyroid dissection | Removal of nasotracheal tube | 6 hours | Tube replaced; tracheostomy; next a.m. |
| 4 | R. hemimandibulectomy; suprathyroid dissection | Pressure on trachea from gross oedema | 12 hours | Emergency tracheostomy |
| 5 | L. hemimandibulectomy; suprathyroid dissection | Pressure on trachea from haematoma | 2 hours | Emergency tracheostomy; evacuation of clot |
| 6 | R. hemimandibulectomy; suprathyroid dissection | Mucus in pharynx | First postoperative night | Aspiration |
| 7 | Excision medial part of mandible plus adjacent floor of mouth | Tenacious mucus in trachea and bronchi; L. lower lobe collapse | 3.5 days | Died before treatment possible |
Though morbidity (Davis, Kretchmer and Bryce-Smith, 1953; Meade, 1961; Glas, King and Lui, 1962; Watts, 1963) and mortality (Head, Bryce-Smith, 1953; Meade, 1961; Glas, King and Lui, 1962; Watts, 1965), are high, the data in tables V and VI suggest that elective tracheostomy should be performed in all patients undergoing hemimandibulectomy with Crile or suprahoid block dissection. If a tracheostomy is not performed, efforts to maintain a clear airway should be particularly energetic during the first 12 hours after operation.

In the early days of this series the avoidance of a tracheostomy was considered something of a challenge by the anaesthetist and surgeon. Had the indications been more fully appreciated, especially with regard to suprahoid block dissection, the postoperative morbidity might have been reduced and the one death avoided.

ACKNOWLEDGEMENT

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REFERENCES


ANÄSTHESIE WÄHREND DER HEMIMANDIBULEKTOMIE BEI PATIENTEN MIT EINEM BÖSARTIGEM TUMOR

ZUSAMMENFASSUNG