

# REPORT ON POST-OPERATIVE ELECTIVE VENTILATION IN UNIVERSITY HOSPITAL, KUALA LUMPUR, 1970-1980

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## SYNOPSIS

The practice of continuing ventilation into the post-operative period in certain poor risk patients resulted in a reduction in morbidity and mortality. So much more surgery can be performed on many patients which otherwise would not be justified without this back-up services provided by the intensive therapy unit. From 1970 — 80, 763 patients were electively ventilated following surgery (both elective and emergency) of which 115 died, giving a mortality incidence of 15.01%

## INTRODUCTION

Experience of management of patients in intensive therapy units has demonstrated the value of I.P.P.V. (intermittent positive pressure ventilation) in the maintenance of gas exchange in critically ill patients. It is therefore logical to continue to control ventilation for the first 12-48 hours following major surgery or in patients with minimal respiratory reserve. Recognition of this has permitted major surgery (including cardiac and neurosurgery) to be carried out, even in ill, poor risk patients, with a reduction in morbidity and mortality.

It has been recognised for some years that arterial hypoxaemia occurs following major surgery (1, 2). The aetiology is multifactorial. Following anaesthesia/surgery the efficiency of ventilation and gas exchange is often reduced (3, 4). Surgery interfering with the mechanics of respiration (thoracotomy, upper abdominal surgery) can lead to hypoventilation of parts of the lung — leading to segmental alveolar collapse (4, 5). This results in ventilation/perfusion inequality and thus to arterial hypoxaemia. Fall in lung compliance due to pulmonary congestion and increased airway resistance due to retention of secretions, further aggravates the ventilation/perfusion inequality.

Added to the above there is an increased oxygen consumption following surgery caused by the metabolic response to stress. Hypercarbia, hypoxia per se, pain and fear result in an increased catecholamine release which in turn adds to the oxygen demand. The compromised circulation, following extensive surgery (especially cardiac) may not be able to raise the cardiac output to overcome the dual problems of arterial hypoxaemia and increased oxygen needs in a spontaneously breathing patient.

Respiratory support in the form of I.P.P.V. helps to overcome/prevent hypoxia while the patients' other problems can be sorted out e.g. an unstable cardiovascular system; metabolic and electrolyte imbalances. The excessive and unproductive work of spontaneous respiration can be spared in the first crucial hours of the post-operative period.

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Total No. of Patients			
on I.P.P.V. in I.C.U.	1933		
1970 - 1980			
No. admitted for		Males	433
Post-op Ventilation	763 (39.47%)	Females	320
Mortality	115 (15.07%)	Males	62
		Females	53

Fig. 1

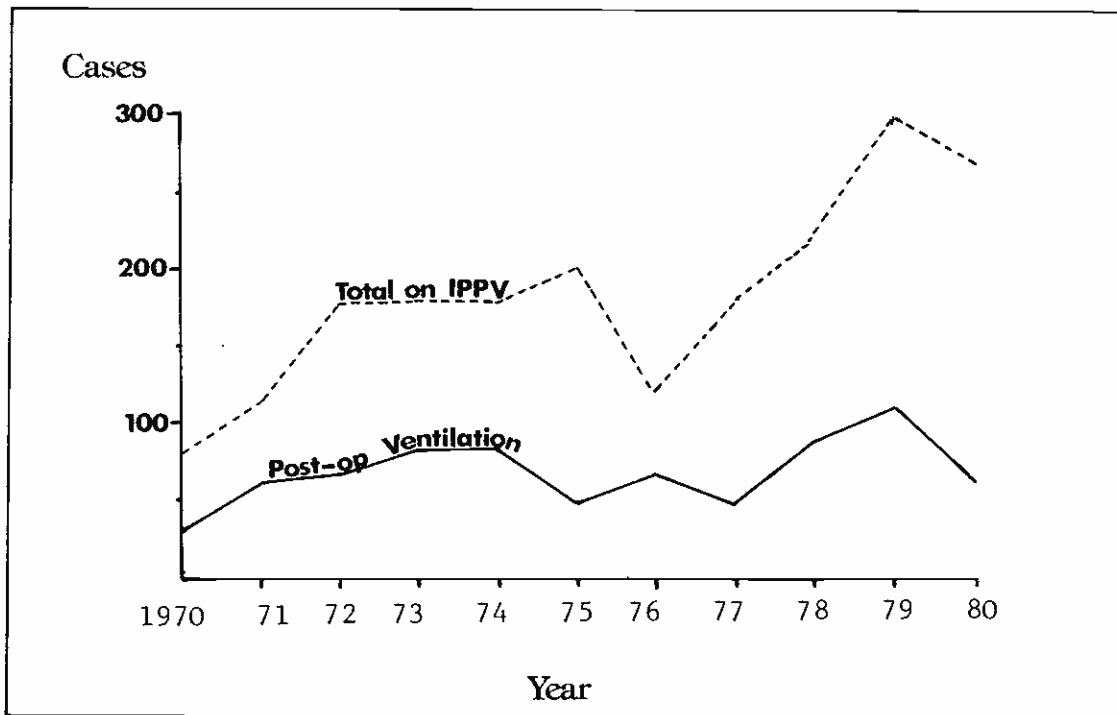


Fig. 2. Total number of patients on IPPV and those electively ventilated post-operatively.

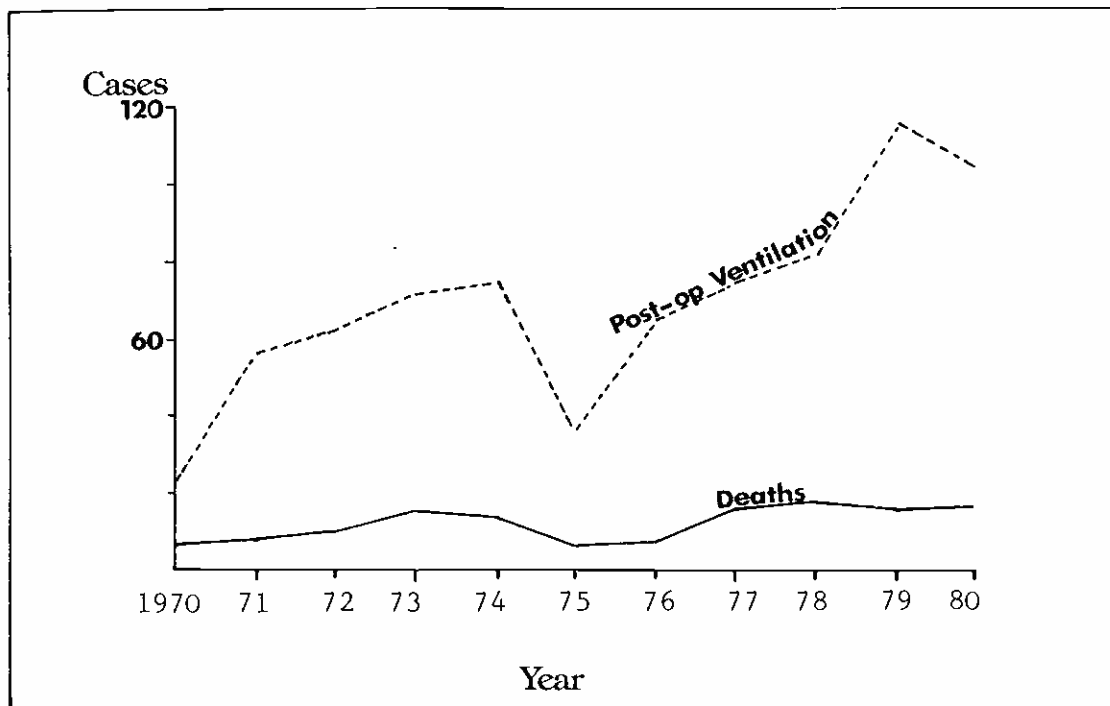


Fig. 3. Mortality figures of post-operatively ventilated cases.

In addition, elective ventilation allows the generous use of narcotic analgesics in the management of post-operative pain. Pain relief is a basic human requirement. Providing adequate analgesia without respiratory depression has always been a problem for surgeons and anaesthetists. This problem of respiratory depression does not occur if the patient is being ventilated. Adequate pain relief and sedation can be a tremendous boom to a patient just emerging from an extensive surgery.

Patients who undergo prolonged surgery/anaesthesia, extensive surgery in critically ill patients ending late at night and patients undergoing surgery with the potential of upper airway compromise do well with "overnight ventilation". These patients are taken up to the intensive care ward, ventilation continued for a few hours and extubated when their general condition has stabilised and when more staff is available. This practice of "overnight ventilation" has contributed significantly to patient safety. It has allowed more surgery to be performed which otherwise would not have been possible.

#### MATERIAL AND METHOD

From 1970 — 1980, 763 patients were electively ventilated following surgery (both elective and emergency) of which 115 died giving a mortality incidence of 15.01%. (See Fig. 1, 2 and 3).

The decision to ventilate depended on:-

- (1) Type of surgery
- (2) Length/extent of surgery
- (3) General condition of the patient
- (4) Incidence of any intra-operative problems/catastrophe.

In general the following groups of patients qualified for post-operative elective ventilation:-

#### A. Cardiac and Vascular Surgery

- both open and closed heart surgery
- aortic aneurysm surgery

#### B. Neurosurgery

- elective
- emergency — where head injury is part of the general problems.

#### C. Thoracic Surgery

- e.g. oesophagectomy with gastro-oesophagostomy/colo-oesophagostomy
- lung surgery
- crushed chest
- tracheo-oesophageal fistula

#### D. Prolonged Operations

- complicated abdominal surgery e.g. Whipple's.
- massive and multiple trauma.

#### E. Head and Neck Surgery

- surgery for oral and nasopharyngeal carcinoma when upper airway compromise is expected.

- F. Patients in shock, sepsis, multiple (massive) blood transfusion, cardiorespiratory arrest.

#### Management of Ventilation

I.P.P.V. with muscle relaxation, as required, has been used with various regimes for post-operative analgesia.

- afferent sensory blockade e.g. intercostal block for thoracotomy. Epidural block with catheter.
- parenteral narcotic analgesic with sedatives/tranquillisers on a timed schedule.
- low dose continuous infusion of potent narcotic analgesic.

Current management is basically according to the following principles:-

1. I.P.P.V. via an endotracheal tube (Portex tube preferably passed nasotracheally).
2. I.V. slow infusion of potent narcotic analgesic

— Morphine	0.6 mg/kg/24 hours
— Papaveratum	1.2 mg/kg/24 hours
— Pethidine	3-4 mg/kg/24 hours

with the addition of small bolus doses of the drug as required.

**3. Neuromuscular Blockade**

- Pancuronium, di-tubocurarine and alcuronium given liberally as required.

**4. Review within 24 hours**

- if deficits have been corrected and vital system stability is achieved, extubation might be done after reversal of the neuromuscular blockade, with atropine and neostigmine, continuing the I.V. narcotic drip if necessary. If pain is not prominent, the analgesic regime is changed to an I.M. route.

5. If after review, the decision is made to continue support for another 12 — 24 hours, the regime is continued using less neuromuscular blocking drugs. (Experience has shown that patients on I.V. narcotic drips require less muscle relaxants as time goes on).

6. If the regime is required for longer periods (essentially in those with pre-operative respiratory problems) weaning off the ventilator is slower, using I.M.V. (intermittent mandatory ventilation and C.P.A.P. (continuous positive airway pressure).

In situations when A.R.D.S. (adult respiratory distress syndrome) is possible, because of known pre-existing conditions, P.E.E.P. is instituted with I.P.P.V. early more as a

prophylaxis.

It is our firm belief that, based on our experiences with Malaysian patients, the use of elective post-operative ventilation has made a significant contribution to reduce morbidity and mortality in the post-operative period. So much more surgery can be performed on many patients which otherwise would not be justified without the back-up service provided by the intensive therapy unit (7).

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