POST-OESOPHAGECTOMY ANALGESIC REGIMES: A 15-YEAR REVIEW OF 90 CASES AT UNIVERSITY HOSPITAL, KUALA LUMPUR

A. E. DELILKAN
R. VIJAYAN SANNASI

SUMMARY

The relief of pain is of crucial importance in the management of patients undergoing a total three-stage oesophagectomy. Respiratory problems as a result of inadequate or overzealous analgesic regimes can ruin all pre-operative and per-operative efforts.

90 patients who underwent a total oesophagectomy over a 15-year period (1967–1982) at University Hospital Kuala Lumpur, were reviewed (36 for benign stricture and 54 for carcinoma of the oesophagus).

Four post-operative analgesic regimes were used: immediate extubation and parenteral analgesics; 24–48 hour IPPV and timed dose/continuous infusion of parenteral narcotics; 24–48 hour IPPV plus extradural catheter analgesia; intra-operative direct intercostal nerve blocks, extubation and parenteral analgesics. Morbidities and mortalities are analysed.

A. E. Delilkan, KMN, MBBS (S'pore), FFARCS (Eng), FFARACS
Professor and Head
Department of Anaesthesiology
Faculty of Medicine
University of Malaya
Kuala Lumpur, Malaysia

R. Vijayan Sannasi, MBBS (Osmania), FFARCS (Eng), FFARCS (I)
Associate Professor
Department of Anaesthesiology
Faculty of Medicine
University of Malaya
Kuala Lumpur, Malaysia

INTRODUCTION

Total oesophagectomy with either oesophogastrostomy or colonic interposition for carcinoma or benign stricture is a formidable operation. The generally poor nutritional pre-operative status of the patients, the extensive (abdominal, thoracic and cervical surgery), and prolonged surgery/anaesthesia, the post-operative pain[1,2] with its effects on the respiratory system[3] in particular, make it one of the most hazardous of surgical undertakings. The pre-operative and intra-operative efforts can be ruined by respiratory problems in the immediate post-operative period contributed to by inadequate or overzealous post-operative analgesic regimes.

This paper reviews 90 cases of oesophagectomy (36 for benign strictures, 54 for carcinoma) done in the University Hospital Kuala Lumpur, during the period 1967–1982.

15-YEAR REVIEW

Retrospective study of the 90 case records revealed that of the 54 cancer cases (Table I), 10 were

operated on by one surgeon (surgeon X) and 44 by 11 other surgeons. Of the benign stricture cases (Table II), the figures were seven (surgeon X) and 29 (other surgeons). This division in the analysis was done because there was a particular difference employed by surgeon X in the positioning of the patient during anaesthesia which was done to cut down on operative time (Tables I and II).

Pre-operatively, most of the patients underwent a period of respiratory physiotherapy, nutritional build up, electrolyte, hydration and anaemia correction when indicated; of the total 90 cases, 64 were managed from the anaesthetic point of view by the authors; personal pre-anaesthetic interview with the patient included explanation to the patient regarding the entire procedure with particular reference to the 24–48 hour immediate post-operative period regarding respiratory support, and pain relief in the Intensive Care Unit.

Intra-operatively, the standard technique was barbiturate induction, N_2O/O_2/relaxant with IPPV *via* a single-lumen tube or a double-lumen tube and intravenous narcotic supplementation/epidural bupivacaine for maintenance anaesthesia. 44 cancer and 26 benign stricture cases were managed with double-lumen tubes which facilitated one-lung anaesthesia during thoracic surgery. Post-operatively, four regimes were used and the patients have been divided into four groups accordingly (Table III).

TABLE I
OESOPHAGECTOMY FOR CARCINOMA OESOPHAGUS. DATA, DISTRIBUTION AND MEAN OPERATIVE TIME OF CASES DONE BY SURGEON X AND BY OTHER SURGEONS

	Surgeon X	Other surgeons
Number of cases	10	44
Average age (years) (range)	59.2 (44–75)	57.6 (31–82)
Average weight (kg) (range)	38.4 (31.5–49.3)	39.5 (32.7–71.0)
Mean operative time (hrs) (S.D.)	3.382 (0.327)	5.09 (1.102)

TABLE II
OESOPHAGECTOMY FOR BENIGN STRICTURES. DATA, DISTRIBUTION AND MEAN OPERATIVE TIME OF CASES DONE BY SURGEON X AND BY OTHER SURGEONS

	Surgeon X	Other surgeons
Number of cases	7	29
Average age (years) (range)	32.4 (16–44)	20.6 (1–59)
Average weight (kg) (range)	39.2 (27.1–46.2)	32.6 (8.2–48.4)
Mean operative time (hrs) (S.D.)	3.487 (0.673)	5.733 (1.134)

Group 1 patients (10 cases – seven cancer, three benign stricture) were managed intra-operatively with single-lumen endotracheal tubes and post-operatively with parenteral analgesics following immediate post-anaesthesia extubation. Four cases (40%) developed respiratory complications within the first 48 hours (Table IV). By 'respiratory complications' in this review, is meant that within 48 hours of extubation inadequate respiration developed requiring re-intubation or eventually tracheostomy.

TABLE III
PATIENTS GROUPED ACCORDING TO INTRA-OPERATIVE AND POST-OPERATIVE MANAGEMENT

	Intra-operative management	Post-operative management
Group 1 (10 cases)	Single-lumen endotracheal tube	Extubation, parenteral analgesics
Group 2 (37 cases)	Single-lumen/ double lumen tube	Nasotracheal tube, IPPV for 24–48 hours. Parenteral analgesics (timed doses/ continuous infusion)
Group 3 (22 cases)	Double-lumen tube	Nasotracheal tube, IPPV for 24–48 hours Extradural (catheter) analgesia plus sedation
Group 4 (21 cases)	Double-lumen tube, direct intercostal nerve block	Extubation, parenteral analgesics

Group 2 patients (37 cases – 19 carcinoma, 18 benign stricture) were managed with double-lumen/single-lumen tubes intra-operatively and post-operatively with IPPV using neuro-muscular blockers for 24–48 hours *via* nasotracheal tube with timed doses/continuous infusion of parenteral narcotic analgesics. 12 cases (32.4%) developed 'respiratory complications' (Table IV).

Group 3 patients (22 cases – 14 carcinoma, eight benign stricture) were managed intra-operatively with double-lumen tubes and post-operatively similarly as Group 2 patients, except that extradural (catheter) bupivacaine analgesia was used instead of parenteral narcotic analgesics. Five cases (22.7%) developed 'respiratory complications' (Table IV).

Group 4 patients (21 cases – 14 carcinoma, seven benign stricture) were managed with direct intercostal nerve bupivacaine block just before closure of thoracotomy for post-operative analgesia. Double-lumen tubes were used intra-operatively, immediate post-anaesthesia extubation was carried out and parenteral narcotic analgesic used if and when required. There were two patients who developed 'respiratory complications' (Table IV). These patients developed anastomotic breakdowns leading to empyema and subsequent respiratory inadequacy. Tables V and VI show the incidence of 'respiratory complications' in the benign stricture and cancer patients respectively.

TABLE IV
INCIDENCE OF POST-OESOPHAGECTOMY MORBIDITIES AND MORTALITIES

Regime	Patients	Morbidity (Respiratory complications)	Mortality
Group 1	10	4 (40%)	3 (30%)
Group 2	37	12 (32.4%)	5 (13.5%)
Group 3	22	5 (22.7%)	4 (18.1%)
Group 4	21	2 (9.5%)*	1 (4.8%)

* These patients developed an anastomotic breakdown leading to an empyema, and then respiratory inadequacy.

TABLE V
OESOPHAGECTOMY FOR BENIGN STRICTURES: POST-OPERATIVE MORBIDITIES/MORTALITIES

Regime	Patients	Morbidity (Respiratory complications)	Mortality
Group 1	3	1	0
Group 2	18	6	1
Group 3	8	1	0
Group 4	7	0	0

TABLE VI
OESOPHAGECTOMY FOR CARCINOMA OESOPHAGUS: POST-OPERATIVE MORBIDITIES/MORTALITY

Regime	Patients	Morbidity	Mortality
Group 1	7	3	3
Group 2	19	6	4
Group 3	14	4	4
Group 4	14	2	1

DISCUSSION

Post-operative analgesia is a vital aspect of patients presenting for oesophagectomy (for carcinoma or benign strictures of the oesophagus) and as with patients after upper abdominal surgery,[4,5,6] they have an increased incidence of pulmonary complications.

In this review there were 90 cases who were managed post-operatively with four different post-operative analgesic regimes (Table IV).

From the experience gained in the management of this series, it is felt that if pre-operatively there are no respiratory complications, routine post-operative controlled IPPV is not necessary; direct intercostal nerve block with bupivacaine is simple and safe to perform, and provides excellent post-operative analgesia. The efficient analgesia provided often outlasts the known duration of action of the local analgesic drug and allows the patient unimpeded respiration and respiratory physiotherapy to tide the patient safely through the crucial first 24–48 hours.

The duration of the operation is variable due to the multiplicity of contributory factors. Patient factors include the stage of the lesion and consequent technical difficulty in performing the operation. The general condition of the patient tends to influence the speed of surgery with reminders by the anaesthetist regarding the condition of the patient during surgery and anaesthesia.

The experience and skill of the surgeon can be a contributory factor to the duration of the operation. This includes the calibre of the surgical assistants, and whether one position (and draping) is used or whether different positions with separate drapings are used for the different stages of the operation. Surgeon X employed one position on the table requiring one draping for the three stages of the operation. The patient was placed in a slight tilt to the left (sand-bags under the right hip and shoulder) and the laparotomy thoracotomy and cervical incisions were done in this position (lateral rotation of the table was used accordingly to facilitate the different stages). The other surgeons employed three separate drapings for the three different positions (supine for laparotomy, lateral for thoractomy and supine again for cervical surgery). The use of double-lumen tubes during the thoracic part of the operation (collapse of one lung) is not absolutely necessary, but it can make surgery technically easier (thus cutting down on time) with less post-operative respiratory morbidity.

The experience and skill of the anaesthetist are more pertinent to the safety of the patient than to shortening the duration of the procedure. However, safe and smooth anaesthesia utilising one lung anaesthesia safely might contribute to time-saving because any problems arising on the table will be more efficiently and speedily dealt with.

Patients managed with parenteral analgesics post-operatively (Group 1) always present with the problem of how much narcotics should be used; inadequate dosage can lead to limited chest expansion because of pain and inability to withstand respiratory physiotherapy; overdosage can lead to central depression of respiration.

Group 2 patients (controlled IPPV with timed doses/continuous infusion of parenteral narcotic analgesics) can present with cumulative effects of the narcotic analgesics and residual effects of the neuro-muscular blockers when coming off the ventilator.

Group 3 patients (controlled IPPV and extradural catheter analgesia plus sedation) have efficient post-operative analgesia, but the need to place the catheter in the thoracic region always carries a technical problem plus the possibility of complications of extradural blockade; these are rare but may be serious. Dawkins[7] noted the following side effects: accidental dural puncture, total spinal analgesia, intravascular injection and substantial hypotension. The possibility of introducing infection *via* the avenue of the extradural catheter must be always borne in mind.

Group 4 patients are those managed with direct intercostal blocks have efficient analgesia and respiratory-wise do well,[8,9] and it is felt that controlled IPPV is unnecessary unless there are specific pre-operative indications or operative problems.

However, the most number of patients (37) fall into Group 2 with its high incidence of respiratory complications: *i.e.*, they have been managed with post-operative IPPV *via* a nasotracheal tube using parenteral intravenous narcotics and neuromuscular blockade, if necessary. Up to 1979, timed dose parenteral narcotics were used. Since 1980, the trend has been towards a continuous infusion of intravenous narcotics. Clinical experience with Patient Controlled Analgesic Therapy (PACAT) regimes have shown that patients have good pain relief with the maintenance of plasma levels of narcotics with low dose continuous infusions.[10]

The main reason for this large number in Group 2 is that surgeon X and other senior surgeons have left University Hospital. In the last three years, our surgeons have ben taking much longer with a total oesophagectomy. As a result, patients are hypothermic at the end of the surgery with its

attendant problems of metabolic acidosis; longer operative time also means surgery terminating much later in the day and with much larger blood losses. Therefore, in the interests of patient safety, we have been using regime 2 rather than regime 4 which was popular prior to 1979. Regime 2 is thus being currently followed at University Hospital Kuala Lumpur.

We would like to add that there has been a renewed interest among our anaesthetists (1983) to use epidural analgesia *via* a catheter, but using low dose buprenorphine (2 μg/kg of the drug in 10 ml of water) instead of bupivacaine, to make use of the 'opiate receptors' in the spinal cord for post-operative pain relief.[11,12] The results have been encouraging.

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