Therefore an oesophageal obturator with an inflatable cuff should be used to isolate the oesophagus from the trachea. An effective obturator can be fashioned quickly from a tracheal tube by blocking its connector end using a rubber bung from blood sample tubes, bone wax, or waterproof tapes etc. After introduction, the pilot balloon and its conduit should be left outside the mouth and taped to the patient's cheek. This home-made device has one advantage over manufactured obturators that have blind distal ends: the connector end can be unblocked outside the mouth at the conclusion of the procedure and the stomach emptied by a Levine-type tube first before its removal. This is not possible with commercial obturators, and gastric contents built up behind the blind end can well into the pharynx following removal, leading to aspiration.

IPPV using mask and cricoid pressure combination is regarded by many as an acceptable method to proceed with anaesthesia and surgery in a fail-to-intubate-but-able-to-ventilate situation. In my opinion it is not a practical alternative because (a) cricoid pressure tends to flex the head and neck and force the tongue to lie flat against the posterior pharyngeal wall, causing airway obstruction, and (b) steady cricoid pressure cannot be maintained for any length of time due to muscle fatigue. The best alternative is to use the oesophageal obturator described earlier as an adjunct to IPPV via a face mask.

David C. Chung MD FFARCS FRCPC
Department of Anaesthesia,
The Mississauga Hospital,
Mississauga, Ontario.

REFERENCES

1 *Davies JM, Weeks S, Crone LA, Pavlin E.* Difficult intubation in the parturient. Can J Anaesth 1989; 36: 668–74.

2 *Smith RB, Babinski M, Klain M, Pfaeffle H.* Percutaneous transtracheal ventilation. J Am Coll Emerg Physicians 1976; 5: 765–70.

Respiratory arrest following interpleural block in a narcotized patient

To the Editor:

There is considerable interest in the technique of interpleural (intrapleural) infusion of local anaesthetics to provide analgesia following surgery. However, an incident occurred in our recovery room which may have been due to the technique.

A 72-yr-old male, ASA physical status II, was scheduled for right adreno-nephrectomy. Ninety minutes before surgery he received temazepam 30 mg and metoclopramide 10 mg by mouth. Anaesthesia was induced with thiopentone. Muscle relaxation was achieved with vecuronium, and anaesthesia was maintained with enflurane, N_2O, and morphine. The total dose of morphine administered IV was 45 mg, with the last dose of 6 mg being given 45 min before the end of surgery. Enflurane was discontinued 60 min before the surgery was completed.

Operating time was four hours. After surgical closure, the anaesthetist introduced a 16-gauge Portex epidural catheter into the pleural space. Neostigmine 2.5 mg and atropine 1.2 mg were given IV which produced full return of neuromuscular function. When the patient then awoke he gestured that he was "OK" and shook his head when questioned about pain. The trachea was then extubated. Bupivicaine 0.5 per cent 20 ml was injected through the interpleural catheter and the patient was transferred to the neighboring recovery room where oxygen 6 $L \cdot min^{-1}$ were administered via face mask. The patient appeared drowsy but again made a hand gesture to indicate that he felt "OK." Heart rate and blood pressure were within normal limits. Approximately two minutes later, the recovery room nurse reported that the patient was apnoeic and cyanotic. Naloxone was prepared but withheld as the patient continued to breathe adequately. Eighty minutes after the respiratory arrest, an interpleural infusion of bupivicaine 0.5 per cent was started at 7 $ml \cdot hr^{-1}$ and the patient was discharged from the recovery room. The infusion was continued for three days at rates of 5–7 $ml \cdot hr^{-1}$ and subsequent recovery was uneventful.

We have found that the onset of analgesia is rapid when a 20 ml bolus of bupivicaine 0.5 per cent is administered interpleurally following abdominal surgery. On occasion, pain has been alleviated within ten minutes. This appears more rapid than in Strömskag's experience, who reported that 30 minutes is usually required before most patients experience complete pain relief.[1] Following selected abdominal operations, an interpleural catheter is introduced before the patient is awake but the first dose of local anaesthetic is withheld until the patient is breathing spontaneously and is responsive; and after tracheal extubation. In the case described here, the patient was responding to verbal command and breathing well. However, in the absence of surgical pain, it was probably unwise to administer local anaesthetic in a patient with residual "narcotization." The interval between administration of interpleural local anaesthetic and the respiratory arrest was between five and ten minutes. We suspect that there was a rapid and complete onset of analgesia which upset the balance between the residual effect of the narcotic and the surgical stimulus from the wound. With further experience in this technique of postoperative

analgesia, including a similar event occurring several weeks later, we now use reduced amounts of narcotics intraoperatively in an attempt to reduce the possibility of postoperative apnoea.

Richard H. Riley MB BS
Department of Anaesthesia
Fremantle Hospital
Fremantle, WA 6160
Australia

Address for correspondence: Department of Anaesthesia, Royal Perth Hospital, Box X2213 GPO, Perth, W.A. 6001, Australia.

REFERENCE

1 *Strömskag KE, Reiestad F, Holmqvist ELO, Ogenstad S.* Intrapleural administration of 0.25%, 0.375%, and 0.5% bupivicaine with epinephrine after cholecystectomy. Anesth Analg 1988; 67: 430–4.

Autonomic hyperreflexia

To the Editor:

We read with interest the article on autonomic hyperreflexia during extracorporeal shock-wave lithotripsy (ESWL) in quadriplegic patients by Chen and Castro (Can J Anaesth 1989; 36: 604–5).

It is well known that a hypertensive crisis in quadriplegic patients is precipitated by distension of the urinary bladder, dilatation of the anorectum, and during childbirth.[1,2] The most probable cause of hypertension might be distention of the bladder. I have witnessed two cases of hypertensive crisis in quadriplegic patients who required catheterization of the bladder for operations not related to the bladder. In the first, the catheter became kinked and in the second the catheter was clamped by mistake and distension of the bladder ensued. Therefore distension of the bladder should be considered in their report.

Yukio Kubota MD
Yoshiro Toyoda MD
Hiroshi Kubota MD
Department of Anesthesia
Osaka Kohseinenkin Hospital
4-2-78, Fukushima, Fukushima-Ku, Osaka 553, Japan

REFERENCES

1 *Ciliberti BJ, Goldfein J, Rovenstine EA.* Hypertension during anesthesia in patients with spinal cord injuries. Anesthesiology 1954; 15: 273–9.

2 *Rocco AG, Vandam LD.* Problems in anesthesia for paraplegics. Anesthesiology 1959; 20: 348–54.

REPLY

We agree that autonomic hyperreflexia may be provoked in quadriplegic patients by bladder distension, rectal distension and other gastrointestinal stimuli. It may also be triggered by exposure to cold, high temperature, decubitus formation, sunburn, thrombophlebitis, and pulmonary infarction, as well as tight clothing, supports, shoes, leg back strapping, and child birth.

Each patient undergoing extracorporeal shock-wave lithotripsy (ESWL) treatment for renal and ureteral calculi has bladder catheterization or urostomy drainage established prior to the procedure. Quadriplegic patients frequently have a urostomy drainage catheter in place. The bladder catheter monitors both the amount of hematuria and the discharge of stone fragments. Obstruction by the stone or gravel is more likely to result in ureteral or renal pelvic distention rather than bladder distention. Bladder distension caused by an obstructed or improperly functioning bladder catheter certainly can occur and should be prevented in the quadriplegic patient.

Linda Chen MD
Angelina D. Castro
Center for Research in Anesthesia
7 Dulles
Hospital of the University of Pennsylvania
3400 Spruce Street
Philadelphia, PA 19104

Atrial natriuretic factor and cardiopulmonary bypass

To the Editor:

Kharasch *et al.* reported a decrease in plasma concentration of atrial natriuretic factor (ANF) during cardiopulmonary bypass (CPB). Their study, as well as other initial studies in cardiac surgical patients,[2,3] is descriptive in nature evaluating plasma ANF levels, but not the relationship between ANF and the biological effects of this peptide. To preserve renal function, diuretics are commonly administered during CPB.[1,4,5] Although urine flow and urinary sodium excretion are well preserved, or even increased, by this means during CPB,[4] decreased renal function is occasionally found after CPB.[6] Therefore, the observation of Kharasch and coworkers[1] that CPB decreases plasma ANF level raises the question of the possible contribution of ANF to the renal function of cardiac surgical patients. An analogy seems to exist to other situations where decreases in plasma ANF level and renal water and sodium excretion are observed simultaneously.[7] Administration of ANF enhances diuresis and