in group 2 patients [2]. Under these circumstances, any increase in $\dot{V}O_2$ would normally be preceded by a rise in $\dot{V}O_2$; however, our patients failed to show such a rise, having possibly reached their maximum level of cardiac output. Similar results were reported by Beach and colleagues [3], who found falls in CI and $\dot{V}O_2$ upon switching over from CMV to SB in patients with low cardiac output. Many patients evolved favorably after extubation in both this study and in ours.

Yours sincerely,

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Acute diaphragmatic paralysis after chest tube placement

Dear Sir,

Unilateral and reversible phrenic palsy is a very uncommon complication in the course of a chest tube placement, specially in the pediatric age group [1]. The most likely cause is an injury to the intrathoracic segment of the phrenic nerve which runs close to the mediastinal pleura. Recently, we observed a case of iatrogenic diaphragmatic palsy following the placement of a chest tube. Diaphragm function reversed "ad integrum" shortly after tube withdrawal. The patient was a girl, 26 month-old with no past medical or family history, referred to our center from another hospital because of multiple trauma following a road traffic accident. She required mechanical ventilation. After a subclavian puncture physical examination showed hypoventilation of the right hemithorax, and the chest X-ray showed a right pneumothorax. This was treated by means of the insertion of a chest tube (Pleurcath®) introduced through mid-axillary line at the level of the 5th intercostal space. The patient's condition improved and she was weaned from the ventilator eight hours after the admission. Twenty-four hours later, a repeat chest-x-ray demonstrated resolution of the pneumothorax but there was elevation of the right hemidiaphragm which was immobile on screening with fluoroscopy. The chest tube had formed a loop at the right costophrenic angle. After the chest tube was removed 30 h after insertion, the elevation of the right hemidiaphragm disappeared and respiratory motion recovered.

Phrenic unilateral injury has been well documented in association with several pleural disorders and lung diseases with pleural involvement (pneumonia, viral infections, trauma). In our patient, a clear time-sequence followed from the insertion of the chest tube and the presence of unilateral diaphragmatic palsy. Likewise, when the chest tube was removed, the palsy rapidly resolved. It is likely that a direct irritation of the phrenic nerve by the chest tube was responsive.

We have found only one previous report of isolated hemidiaphragmatic palsy associated with the insertion of a chest tube in a newborn baby [1]. Four cases have been reported with diaphragmatic palsy oc-

curing after the insertion of a chest tube, requiring plication of diaphragm [2, 3, 4]. A review of a pediatric series by Greene [5] did not report similar complications to ours.

This case illustrates that a reversible hemidiaphragmatic palsy may occur as a consequence of the placement of a chest tube. This complication must also be considered in patients under pleural drainage who have an elevated or motionless hemidiaphragm. The case also reinforces the point that any chest tube must be pulled back and removed as soon as possible when no longer needed.

Yours sincerely,

A. Palomeque, D. Canadell and X. Pastor

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Delivering CPAP with a Siemens Servo 900B ventilator

Dear Sir,

The Servo 900B ventilator is thought to have too high an internal resistance to permit spontaneous respiration without a deleterious increase in the work of breathing. The machine may be employed as a flow generator to drive a CPAP circuit, either with an underwater "blow

Fig. 1. CPAP via 900B

off", or a CPAP valve. If the IMV selection knob is set to F/O and the trigger control is set to greater than the required CPAP level, with the maximum flow rate set to infinity, then the ventilator will deliver a flow of more than 50 l/min. This seems to be independent of the trigger setting, providing it is above the CPAP level and is also independent of the CPAP required. If the patient's peak inspiratory flow rate exceeds 50 l/min then a reservoir bag can be included in the inspiratory limb of the circuit. This circuit has the advantages of (i) inbuilt "over-pressure" alarm on the Servo, (ii) an oxygen mixture valve and (iii) convenience. The ventilator is likely to be kept in the bed space anyway and may well be required again if the patient fails to maintain his ventilation. The figure shows the circuit used for delivering CPAP via the Servo 900B ventilator.

The level of CPAP is determined by the resistance of the CPAP valve and the ventilator is used merely as a source of humidified heated gas

with a known oxygen concentration. Expiration occurs through the CPAP valve and so the spirometer of the ventilator does not register any flow. This means that the expired minute volume alarm should be set to zero whilst the ventilator is used in this way. This is a versatile way of providing CPAP and is popular with nursing staff when compared to current alternatives. This method has been used on all our patients who have required CPAP (and were being ventilated with Servo 900B ventilators) for the past 4 months.

Yours sincerely,

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Book reviews

J.B. Löfström, U. Sjöstrand (eds). Local anaesthesia and regional blockade. Amsterdam, Elsevier

This book in the Monograph in Anaesthesiology series sets out in 325 pages and 18 chapters to cover the new developments in local and regional anaesthesia. The authors are, with two exceptions, based in Scandinavia where anaesthesia has always been fruitful in the field of local anaesthetics (LAA) and regional blockade. Recently there have been several excellent books covering the field of regional anaesthesia and the present book does not try to review the totality of this vast subject but focuses on original aspects which have been investigated, often by the authors themselves. Most authors are acknowledged experts in the subjects they review. All subjects are not covered with equal bias. Some aspects are over-emphasized whereas others are brief or even omitted. This book cannot pretend to cover all subjects and thus cannot be considered as a textbook, but rather as a mixture of reviews of recent advances in local anaesthesia and of the authors' own experience. Chapters are well presented, titles of paragraphs are often built as questions, the review of investigations is followed by considerations about clinical implications as well as by summaries. The first chapter deals with recent advances in the chemistry and pharmacology of LAA based on their chemical structure and methods of improving their efficacy. In the chapter devoted to tissue uptake, the jump over to pharmacokinetics is deliberate in order to focus upon tissue penetration of LAA and opiates into the brain and the spinal cord. Early lung extraction, for example, was particularly studied by the author of this chapter. The effects of LAA on circulation are considered in a rather original way. There are several chapters dealing with toxicity due to LAA or to techniques which are clearly developed. Another original aspect concerns the anatomical relations of the lumbar epidural and sub-arachnoid spaces which have been examined by epiduroscopy of autopsy subjects. The existence of dorso-median connective bands in the epidural space may explain some of the difficulties in epidural catheter placement or uneven anaesthesia. Factors affecting the spread of sensory and sympathetic blockade after intradural and epidural block are reviewed. Sympathetic blockade may in fact achieve inferior results compared to a lower limit sensory blockade. In the chapter devoted to motor blockade the author refers repeatedly to his own experience about the assessment of motor blockade using strain gauges. Another approach to clinical research in local and regional anaesthesia is shown by investigating bladder function after spinal anaesthesia. The chapter about obstetric anaesthesia offers a classic review of this subject. More original again is the consideration about the effects of epidural

anaesthesia on venous blood flow in the legs, which can be exploited for prevention of deep vein thrombosis. Other rather original subjects concern psychological aspects of regional anaesthesia and local anaesthesia in difficult environments. This book will be of particular interest to anaesthetists who are already trained in local anaesthetic techniques.

P. Duvaldestin (Créteil)

D.M. Thys, J.A. Kaplan (eds). The ECG in anaesthesia and critical care. London, Churchill Livingstone, 1987. 267 pages, paperback. £19.95. ISBN 0-443-08426-2

This really is an excellent book. Euphemism and innuendo are not required by your reviewer in order to placate the authors and publishers. In their preface the authors muse as to whether another book on electrocardiography is really needed. They go on to suggest that their contribution attempts to fill a void in this particular aspect of anaesthetic and perioperative literature. They have certainly attempted and have succeeded admirably. This volume is a collection of the views of clinical and research staff from Mount Sinai School of Medicine, New York and it has been edited by Daniel Thys and Joel Kaplan who are two of the most active of cardiovascular anaesthesia experts in the USA. I am sure many will enjoy the clear and concise way that the authors describe the different ECG lead systems which includes a detailed account of their derivation, collection and clinical application. Early chapters also concentrate on the normal ECG, conduction defects and dysrhythmias with a refreshing approach to the electrocardiographic consequences following acute and chronic change in chamber size. The field of normal cellular electrophysiology is dealt with in some depth with attention to the mechanisms of actions of antiarrhythmia agents and the role of ischemia and the action potential. The electrophysiological effects of anaesthesia agents follows with particular detail being played to the interaction of the halogenated agents and local anaesthesia with the action potential. Two very good chapters on the detection and evaluation of pre- and intraoperative myocardial ischemia then precede a very worthwhile update on dysrhythmia analysis. Those who seek knowledge on electrolyte disturbances and the ECG should look no further than the chapter dealing with this very relevant clinical problem. Pharmacological effects of non-anaesthetic agents are now conveniently covered. The final chapters are extremely informative guides through the maze of changes in the paediatric electrocardiograph and the ECG following