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Contents

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Guide for Authors
The Bulletin of the Hong Kong College of Anaesthesiologists

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About the Bulletin of the Hong Kong College of Anaesthesiologists
The Bulletin is an official publication of the Hong Kong College of Anaesthesiologists (HKCA). Acceptance of manuscripts submitted to *Bull HK Coll Anaesthesiol* is based on significance, originality, and validity of the material presented. Types of submissions accepted include reviews, clinical and laboratory investigations, case reports, technical communications, letter to the editor and other special articles describing the historic, social and current trends in anesthesia, intensive care and pain medicine.

Manuscript Preparation and Submission
Manuscripts must be prepared and submitted in the manner described in "Uniform Requirements for Manuscripts Submitted to Biomedical Journals, www.icmje.org. The manuscript cover letter must stipulate that all persons listed as authors have contributed to preparing the manuscript. Authors will be asked to transfer copyright of articles accepted for publication to the Hong Kong College of Anaesthesiologists. A Copyright Transfer form, signed by the authors, may be faxed or mailed to the Editorial Office at the time of submission. The form can be downloaded from the College's website.

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Ethics approval
No manuscripts describing investigations performed in humans will be accepted for publication unless the text states that the study was approved by the authors' institutional human investigation committee and that written informed consent was obtained from all subjects or, in the case of minors, from parents. This statement should appear at the beginning of the Methods section. Human subjects should not be identifiable. Do not use patients' names, initials, or hospital numbers. Similarly, manuscripts describing investigations in animals will not be accepted for publication unless the text states that the study was approved by the authors' institutional animal investigation committee.

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The title page should contain the title of the article, which should be concise but informative. First and last name of each author, with all relevant academic degree(s) including fellowship and affiliations.

Name of department(s) and institution(s) to which the work should be attributed. Disclaimers, if applicable; Name, address, telephone and Fax number, and email address of author responsible for correspondence about the manuscript.

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Summary and Key Words
The second page should have an abstract. All articles (except editorials) must include unstructured abstracts consisting of one complete paragraph. Summary should be no more than 300 words for all articles including case reports and reviews.

The summary should state the purposes of the investigation, basic procedures, main findings and the principal conclusions. Emphasize new and important aspects of the study or observations. Below the abstract, provide (and identify as such) 3 to 10 key words that will assist indexers in cross indexing the article.

The Text
The text of observational, experimental, and general articles is usually but not necessarily divided into sections with the following headings: Introduction, Methods, Results, and Discussion.

Introduction: State the purpose of the article. Summarize the rationale for the study or observation.
Methods: Describe the selection of observational or experimental subjects (patients or experimental animals, including controls). Identify the methods, apparatus (manufacturer's name and address in parentheses), and procedures in sufficient detail to allow other workers to reproduce the results. Give references to established methods, including statistical methods; provide references and brief descriptions for methods that have been published but are not well known; describe new or substantially modified methods, give reasons for using them, and evaluate their limitations. Identify precisely all drugs and chemicals used, including generic name(s), dosage(s), and route(s) of administration.
Results: Present the results in logical sequence in the text, tables, and illustrations.
Discussion: Emphasize the new and important aspects of the study and conclusions that follow from them. Include in the Discussion the implications of the findings and their limitations and relate the observations to other relevant studies. Link the conclusions with goals of the study but avoid unqualified statements and conclusions not completely supported by the data.

Abbreviations and Units of Measurement
Units of measurement: Measurements of distance/length and weight must be expressed in metric units only. Clinical laboratory and hematologic data must be expressed in SI units with, if desired, present conventional metric units in parentheses. Continue using abbreviations consistently; do not revert to the spelled-out term.

References
All references must be available to all readers. Cite only references to books and articles or abstracts published in peer-reviewed journals. Number references consecutively in the order in which they are first mentioned in the text. Double-space between all lines of each reference and between references when typing the reference page. Identify references in text, tables, and legends by arabic numerals. References must be verified by the author(s) against the original documents, and the entire list must be checked for nonduplication. Use the style of the examples below:
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Standard journal articles (List all the authors when four or less; when five or more, list only the first three and add *et al*.): Lam DW, Chui PT. A prospective evaluation of a microcoagulation analyzer. Bull HK Coll Anaesthesiol 2005;14:9-12.
Personal author(s) of books and monographs: Myles PS, Gin T. Statistical Methods for Anaesthesia and Intensive Care. Oxford: Butterworth Heineman, 2000.
Chapter in a book: Chui PT, Low JM. Acute hypotension and vasodilators. In: Oh TE, ed. Intensive care manual. Oxford: Butterworth Heineman, 1997:153-62.

Tables
Type each table double-spaced on a separate sheet. Number tables consecutively and supply a brief title for each. Give each column a short or abbreviated heading. Place explanatory matter in footnotes, not in the heading. In footnotes, define all abbreviations that are used in each table. Repeat definition if the abbreviation is used in a subsequent table. For footnotes, use lower-case italicized letters in alphabetical order. Cite each table in the text in consecutive order.

Illustrations
Computer generated figures are satisfactory for publication but authors should be aware that most figures will be reduced in size and should design their illustrations accordingly. Each figure should be identified by number. Color figures may be published at the discretion of the Editor-in-Chief. Figures should be cited in the text in consecutive order. If a figure has been published, acknowledge the original source and submit written permission from both the author and the publisher to reproduce the material. Define all abbreviations used in each illustration. Repeat definition if the abbreviation is used in a subsequent legend.

From the President…

Welcome speech delivered by the president at the 20th congregation of the College, Hong Kong Convention and Exhibition Centre, 27th August, 2005:

Distinguished guests, Ladies and Gentleman, thank you for coming to the Congregation. This is a very special weekend as it is the 20th congregation of the College and also a celebration of the 50th anniversary of Society of Anaesthetists of Hong Kong.

To the new fellows, I wish to congratulate you on your success in obtaining your fellowship. I hope you feel the College has been a help to you rather than a hindrance during your training and study. We hope that we can continue to help you with your professional development and also hope that you might be interested to assist the College with its academic activities.

I wish to share with you some of the recent events of the College. This year we have participated in the inaugural International Conference on Anesthesia and Analgesia organized by the Peking Union Medical College, the Conference of International Reciprocating Examination Boards in Anaesthesia, hosted by the Royal College of Anaesthetists, and the Congregation of the Australian and New Zealand College of Anaesthetists. We have also worked closely with the Australian and New Zealand College for accreditation of training and establishment of the Effective Management of Anaesthetic Crisis Courses (EMAC). International exposure is very important for the development of our College and specialty. In particular, we will have increasing collaboration with anesthesiologists from China, and we will do our best to assist them in developing a system for professional training. Locally, the College believes there is still substantial demand for anesthetists in both the public and private sectors. In this regard, the College will work hard to meet the expectations of the community and its own members and fellows. Hopefully some of you would like to participate in this exciting future.

Congratulations again to the new fellows and welcome to our community.

Tony Gin
President
Hong Kong College of Anaesthesiologists

Congratulations!

Professor Cindy Aun was awarded the Robert Orton Medal by the Australian and New Zealand College of Anaesthetists, for her distinguished services to anesthesia.

Outside Qualified Anaesthesiologists Working In China (2)

[1]Anne KWAN

Department of Anaesthesia, United Christian Hospital, Hong Kong Special Administrative Region

Bull HK Coll Anaesthesiol 2005;14:124-7

In my previous article, I have described the physical setup of hospitals in China.[1] Generally speaking the operating theatres in most hospitals I visited are not as well equipped as those in Hong Kong. If one is interested in the history and development of anesthesia, a walk through the different operating theatre suites is an exciting experience as it is like traveling back in time. I have seen pictures of *ether bottles* and *Schimmelbusch masks* in the anesthetic books before I started working in China (Figure 1). I certainly regard these pieces of equipment as part of the history of anesthesia. Without the opportunity of touching them and taking them apart, I find it hard to appreciate how one can use them easily to anesthetize patients. However, seeing them in the operating theatres I visited in China certainly make me understand how a simple general anesthetic could be given many years ago before sophisticated anesthetic equipment was available. It also helps me to understand the meaning of the frequently quoted old saying, "anesthesia is an art rather than science".

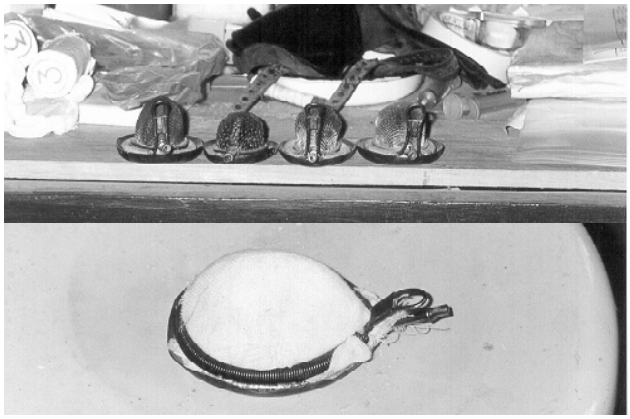

Figure 1. *Schimmelbusch masks* of different sizes

The operating theatres

The impression I got after working in about six different hospitals is that while a lot of the operating theatres tended to be run down, some operating theatres with modern equipment could still be found. I noted that most of the modern operating theatres were built within the past four years or so. Their major source of funding for the improvement came from bank loan to the hospital which has to be repaid over a period of time, most commonly 10 years or so. With that arrangement, one could easily understand why the patients were charged such a lot for the health care services they received. The operating theatre design was similar in most hospitals in Mainland at which I have worked. All the operating theatres were usually located on the same floor. The older ones had windows which could be opened whereas the newer ones tended to have no window and were air-conditioned. There were usually no anesthetic induction rooms or preparatory rooms. A small reception area behind locked door was the usual entrance to the operating theatre suite. A couple of call rooms were

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usually found immediately behind the entrance. Only a few operating theatres had recovery areas adjacent to the operating rooms. Most of these operating theatres were reasonably illuminated but the corridor was usually dark. There was air conditioning in most places but the system could break down easily because of the unsteady electrical current. The unsteady current was still a problem despite recent major improvements in electricity supply. With that limitation, one would wonder whether these operating theatres could have an air change of at least 12 times per hour which was one of the recommended international standards for maintenance of operating theatre sterility. I noticed that there was usually no central scavenging system. At best, activated charcoal absorbers were attached to the expiratory pipes of the anesthetic machines to cut down theatre pollution by the anesthetic gases. Most of the scrub area was centralized for efficiency purpose. Food was normally allowed to be brought up to the sitting rooms inside the operating theatre suites. It was very common for all the operating theatres to be fully utilized in the morning. After the 2 hour lunch break, there might be only one or two emergency theatres running. This arrangement effectively only allowed one case to done in each theatre per day. This pattern of practice was certainly inefficient in terms of operating theatre utilization management. However, this arrangement was preferred as I was made to believe that it was the way surgeons liked to make use of the operating theatre. The main reason was that most patients wanted to be operated first on the list. With such unusual custom there was no pressure to clean up the operating theatre after the case was finished. Each day, after cleaning up, the operating theatre was sterilized by shinning ultra-violet light through for a few hours.

In these hospitals, in addition to the heavy reliance on ultra-violet light sterilization only, other infection control practices also contributed to operating theatre sterilization problems. One of them is to allow patients to go into the operating theatre while he / she was still wearing his / her own street clothes. In line with the outside practices, staff got to change into theatre uniforms and shoes at the adjacent changing rooms when he/she entered the operating theatre premises. This practice of allowing patient coming to the operating suite in his / her clothes might save some hospital resources for purchasing clothes for patients. This is perhaps not a good idea as one often found patient's clothes rather soiled. Apart from the infection control issue, one had to be very careful in trying not to contaminate patient's clothes with blood or other bodily fluids as he / she may need to wear the same set of clothes for the whole period of hospital stay.

Anesthetic machine and drugs

In all the operating theatres in China where I have worked, I did not use nitrous oxide (N_2O) as there was no supply. I was told that transporting gas cylinders from the manufacturing plants of N_2O in China to the local hospitals could be troublesome and costly. I did not see medical air being used in the operating theatres either. The carrier gas for the anesthetic vapor tended to be just pure oxygen. More than half of the hospitals I went to still used oxygen from large cylinders. One had to periodically change the cylinders in order to maintain the supply. Although the local anesthetists and nurses were quick in changing cylinders, the constant watch on the pressure gauge of the oxygen cylinders was definitely an additional source of stress. In terms of anesthetic machines, there were many different models. Some machines were so old that one wondered whether they were safe to be connected to patients. Some newer models I sighted were Excel 210 and Narkomed 2C machines (Figure 2). One of the most popular models was the Shanghai made anesthetic machine which looked very similar to the older Aestiva model. There were numerous choices of locally made anesthetic machines. The price tag of one of these machines could vary from RMB $20,000 to almost RMB $400,000. The locally manufactured anesthetic machines certainly were not well constructed compared to the imported models. However, they were widely used as their cost was about a fraction of the price of the imported ones. Almost all of the anesthetic machines used

electrically driven ventilators and closed circuits with the soda lime absorbers. The soda lime absorber was a lot smaller and often one could find only one canister instead of two. The locally produced soda lime tended to get exhausted easily. It was interesting to note that the local anesthetists even used closed circuit for the small children and babies. T-piece was seldom available or used. Although both sevoflurane and isoflurane were available in China, some operating theatres still used enflurane. Most anesthetic machines did not have a dedicated suction apparatus. One had to share the suction device with the surgeons. The suction source could be from a central vacuum but most commonly electrically created. The basic monitors were electrocardiography, noninvasive arterial pressure and pulse oximetry. End-tidal carbon dioxide monitoring was not compulsory and was not widely available. It was rare to have end-tidal gas concentration monitoring. This again made titration of anesthetic gas via a closed circuit an art. There were imported models such as the Philips and Siemens monitors. But there were a lot of Philips-like locally made color monitors. The waveform displays and controls were very similar to the Philips monitors. The only difference was that the readings were written in simplified Chinese characters. The similarity between the two models made the local monitor very "user friendly". Other anesthetic equipment such as the neuromuscular stimulators were available, however they were not routinely used. In fact, one often found that the total number of anesthetic machines and monitors were far less than the total number of operating theatres. Due to limited resources, some of the patients while having regional anesthesia, which were normally epidural rather than spinal, were left in operating theatres without an anesthetic machine and they were connected to very basic monitoring (mainly blood pressure device) only.

One could find most of the commonly used anesthetic drugs in China. The imported anesthetic drugs such as anesthetic vapors, propofol, vecuronium and rocuronium were very expensive and one needed to order them

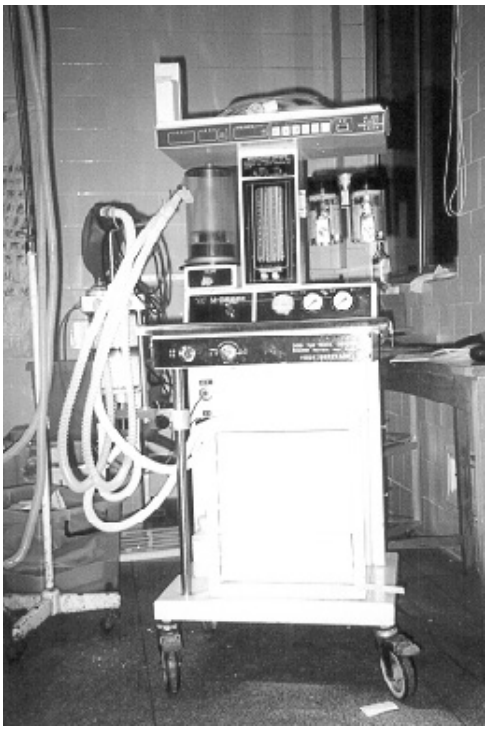

Figure 2. A re-conditioned imported anesthetic machines

from Shanghai or other larger cities beforehand. The locally made ones are inexpensive but the quality may not be of high standard (Figure 3). Most of the labels were written in simplified Chinese and could be easily rubbed off. There was usually no expiratory date shown on the ampoule. The content of the drug could be 10% off by volume. The glass ampoules were hard to break and it was an almost impossible task without a filing knife. At my last working trip, I discovered some locally made atracurium in powder form. I guess the powdered drug is easier to keep without the need for refrigeration. Because of the poor quality control, one had to

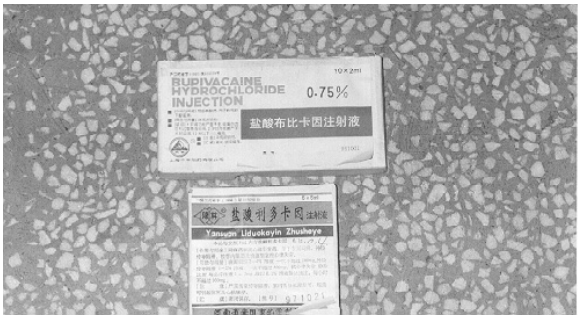

Figure 3. Anesthetic drugs manufactured in China.

be very careful in order to avoid medication

error while using these locally manufactured drugs.

Up until a few years ago, all the intravenous (IV) fluids were in glass containers. Recently we could find some IV fluid in plastic bottles. The sizes of the plastic bottle range from 250 to 1000 ml. The labels of the fluids for intravenous use and irrigation were very similar and one had to be very vigilant in order not to get the two types of fluids mixed up. The IV fluids used to be given via a small and soft IV giving set which usually has a butterfly needle attached at the end. Recently IV cannulae were more easily available and they were being used for fast fluid administration. The practice of avoiding needle stick injury was still not well accepted. One often could not find a three-way tap for drug administration. In fact simple thing like sharp boxes were often not available. Glass ampoules and needles could be found in the plastic garbage bags. One had to be extremely careful as hepatitis B was still a common transmitted disease among Chinese. Recently the noticeable improvement in blood related infection is the condemnation of selling of blood. Blood and blood products used to be purchased by patients for use. If patient did not have sufficient funding for the purchase, relatives of the patients had to donate back similar amount of blood to the hospital blood bank after each use. About three years ago blood donation was made voluntary and free blood or products could be obtained. By the way IV access was mostly established by the nursing staff. The medical staff considered IV cannulation not part of his/her clinical duty. In fact, some medical staff could not cannulate well as they never acquire the skill. Strangely enough, one seldom found a nurse taking multiple attempts to secure an IV access. It was the clinical duties of the nursing staff and they acquire the skill very early on during their training. After a short period of observation, one had to admit that the statement of "practice makes perfect" is very true.

Generally speaking the distinction between medical and nursing staff duties tended to be not so noticeable in China. The nursing staff spent a lot of time on paper work. Many basic caring tasks were left to the relatives. It was common to find at least a few relatives attending to one patient. The ward tended to be over crowed because of the large number of accompanying relatives or friends. This culturally accepted practice put a lot of stress on the hygiene of the ward as the hospital normally did not provide a place for showering or bathing. It was very common to find bathing pools very close to the hospitals (and all over the place for the basic need of the local people). A couple of dollars per person were charged for each bathing session. It was rather common for the not so well off people to have a bath once in a couple of months. As part of the pre-operative preparation, patients were usually instructed to have a bath before the operation.

Only until recently that the medical and nursing staff earned very similar wage. The basic salary would be somewhere around one thousand dollars RMB. As more expensive drugs and equipment were used on patients, additional bonuses were given to the medical staff and that began to pull the salaries of the doctors and nurses apart. As the bonuses were calculated on the cost of the drug consumed by the patients, expensive drugs tended to be favoured by the medical team. As far as anaesthetic drugs were concerned, one often found propofol which cost around $160 RMB in general use instead of the less than $ 1 RMB thiopentone. For the same reason, prophylactic antibiotics were frequently prescribed.

In my next issue, I would like to talk about the hospital administration and the billing system. Also, I would like to help the outsiders understand the unique Chinese social culture which is important in adapting one's life style in China.

References

1. Kwan A. Outside qualified anaesthesiologists working in China (1). Bull HK Coll Anaesthesiol 2005;14:67-70.

An Automated Critical Incident Reporting System

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SUMMARY

This paper presents our experience following the implementation of an automated anesthesia critical incident reporting system in an acute general hospital. The utility of the system in capturing and analyzing anesthetic mortality and morbidity is discussed.

We found it useful and recommend that electronic automated critical incidents reporting should be implemented for clinical auditing of intraoperative anesthetic incidents in facilities that utilize electronic anesthesia recording system.

Keywords: Clinical audit; Anesthesia; Critical incidents; Electronic recording system; Automated record

Bull HK Coll Anaesthesiol 2005;14:128-32

Critical incident is an event that, when uncorrected, could or did lead to adverse outcome.[1] Drawing from the experiences in aviation industry, critical incident reporting has been used as a measure for quality assurance in anesthesiology for many years. However, using critical incident reports as a tool for auditing clinical anesthesia has two potential problems. First of all, we must be able to identify and preferably quantify the critical incidents that relate to the performance of the anesthetists and hence the quality of care. Many of the technical problems in anesthesia (e.g. difficult spinal puncture) are however, difficult to quantify or be subjected to scientific analysis. Therefore, it is difficult to define an acceptable standard of care reliably and consistently. Secondly, it is difficult to ensure that all critical events are captured as the system has often been reported on a voluntary basis. It has been previously reported that a significant number of critical events are often unreported in a voluntary critical reporting system.[1]

In order to be useful as an indicator for quality improvement, a critical event should be associated with an error. In a quality assurance circle, that error must be rectifiable after recognition of its root cause. There have been several published reports analyzing critical incidents. However, different reports examined different parameters and emphasized on

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different aspects of the anesthetic process, with very little agreement between them.[2,3] The outcome indicators of the Australian and New Zealand College of Anaesthetists have been used as a measure of quality in anesthesia in many hospitals in Hong Kong.[4] However there are logistic problems of its use.[5] In fact, most hospitals in Hong Kong still rely on the critical incident self reporting forms, with variable compliance and dubious success. The reliability of voluntary reporting of critical incidents have been previously questioned and disputed by other studies.[6,7]

We describe an automated system that captures anesthetic "critical events" in the operating theatres. Correlation between these events and postoperative mortality was also examined.

Method

We have been using *The Electronic Anesthetic Record system* (TEAR) at the North District Hospital since the year 2000. Physiologic parameters during anesthesia were downloaded every 2.5 minutes to a dedicated server as permanent records. An *Automated Critical Incident Reporting System* (ACIRS) was incorporated into the TEAR system. The ACIRS was designed to capture deviations from a set of predetermined parameters including oxygen saturation (SpO_2), non-invasive arterial pressure and heart rate. Initially we found that our ACIRS was corrupted with a lot of artifacts, especially with SpO_2 readings. Furthermore, since the "acceptable" range of arterial blood pressure and heart rate under anesthesia may be very different among the diverse patient population in our clinical practice (e.g. pediatrics patients), we found it difficult to determine a range of normal values for all patients. Following a period of testing, we defined 'critical incident' as systolic arterial pressure < 90 mmHg for > 30 minutes, a pulse rate > 110 beats per minute for > 7.5 minutes, SpO_2 reading < 75% for any instant, < 80% for > 2.5 minutes, or < 90% for > 7.5 minutes.

If one of these criteria is violated, a copy of the anesthetic record (with names of anesthetists unidentified) will be automatically generated and printed. A reference to the timing and type of abnormality detected was also noted (Figure 1). An electronic copy also goes to a separate ACIRS file in the server. The duplicate hard copy (may include comments from the attending anesthetist) will go to a sealed box for auditing.

The ACIRS files are reviewed every two months, and cases are chosen by the Quality Assurance Officer for discussion as part of departmental clinical review activity. At the end of the year, postoperative mortality file of the hospital is compared with the ACIRS file for any correlation and the audit report presented to the department.

Results

Over a period of four years, 1,733 ACIRS files were captured (Table 1). We have identified 523 cases that were suitable for discussion at departmental clinical review sessions. Of those excluded, the main reason was due to artifact resulting in hypoxemia or patient movement. Patients with cardiovascular shock (with low blood pressure and tachycardia) represented a major proportion of the ACIRS captures. Some cases were due to severe laryngospasm and possible air embolism. Indeed, many of these captures were obtained from sick patients with American Society of Anesthesiologists physical status IV or V.

Table 1. Number of ACRIS capture from 2001-4.

Year	Number of Anesthetics provided	Number of ACIRS captured	% Captured
2001	5,430	588	10.8
2002	5,450	430	7.9
2003	5,479	390	7.1
2004	6,586	335	5.1

ACIRS=automated critical incident reporting system

Figure 1. A sample file of the automated critical incident reporting system (ACIRS). This file was captured because of persistent tachycardia (> 110 beats per minute) for > 7.5 minutes. The case was discussed in the departmental meeting to review the performance of intraoperative resuscitation.

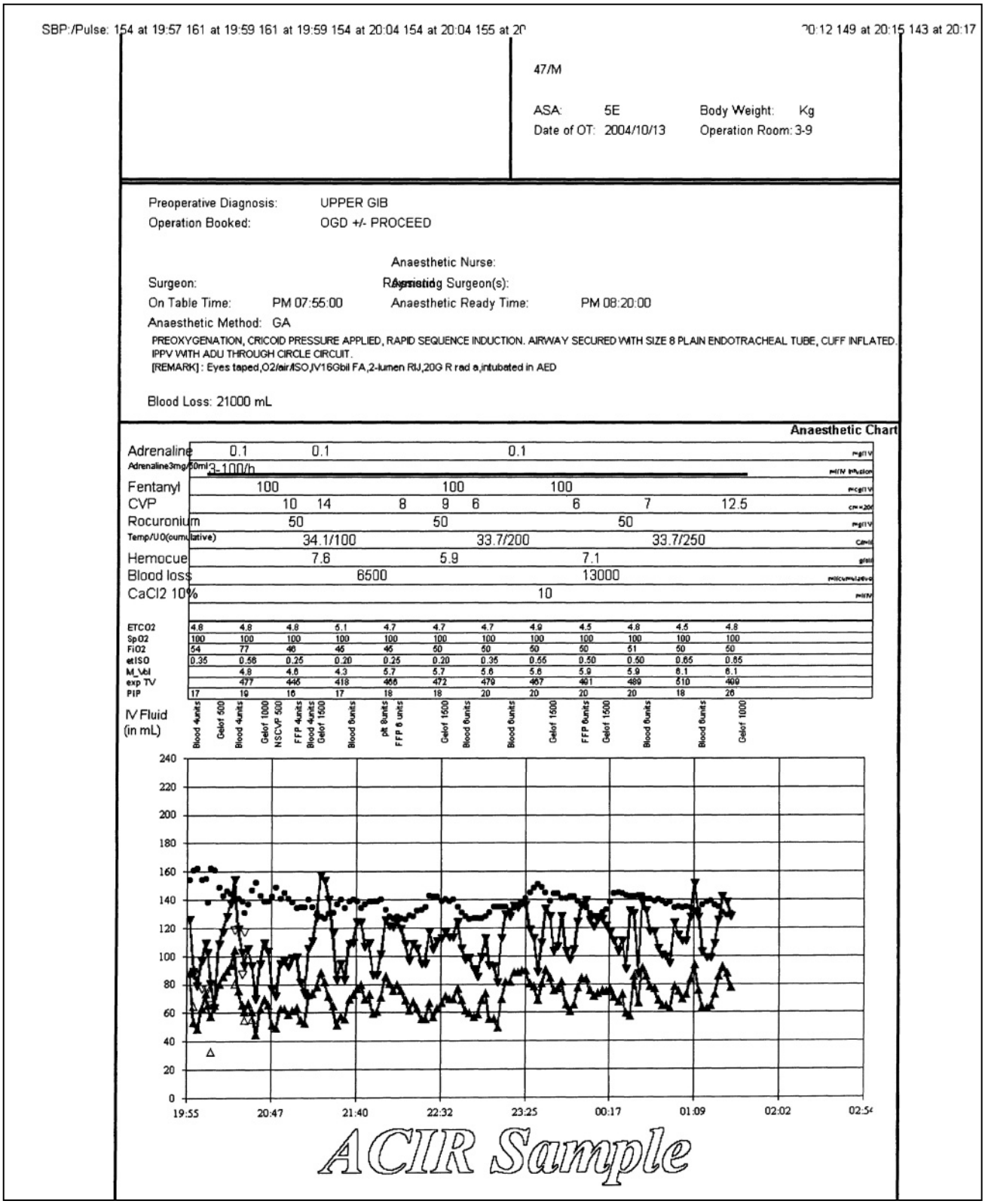

Table 2. Correlation with postoperative mortality and ACIRS capture in the year 2001-3.

	ACIRS capture	Failure of ACIRS capture	Total
Number of Anesthesia with 48 hour mortality	35	8	43
Number of Anesthesia survived	1,373	14,943	16,316
Total number of Anesthesia	1,408	14,951	16,359

ACIRS=automated critical incident reporting system

We found that there was a decreasing number of ACIRS captures over the four years, with 2004 capturing less than half that in 2001. We believe this is related to an improvement in our clinical management of poor risk patients, since we become more alert to critical events and act early to rectify the situations.

Table 2 shows the correlation between 48 hours postoperative mortality and ACIRS captures for period 2001-2003. All deaths in operating theatres are captured by the system. We found that postoperative mortality within 48 hours of anesthesia was mostly captured by the ACIRS. However, some cases still fall outside the ACIRS, indicating limitations of this system for comprehensive postoperative mortality reporting.

Discussion

Our results following the implementation of an automated critical incidents reporting system suggested that it may be a useful tool for clinical auditing. The ACIRS data file can generate interesting material for clinical review activities. When these data are reviewed at departmental discussion, staff especially trainees may learn from these incidents. It is possible that an improved compliance to proper monitoring and timely interventions have contributed to the reduction in ACIRS capture over the four years. The outcome of quality improvement using voluntary critical incident reporting has been previously reported.[8] If other hospitals use the same methodology, ACIRS data can become the basis for comparison between centers for quality assurance and improvement.

We also found that the ACIRS detected critically ill patients who eventually die after the operation. This highlights the likelihood of critically ill patients triggering the ACIRS during the intraoperative period and directs our attention to examine whether more aggressive intervention during the periooperative period will improve their outcome.

However, there are limitations to this system. About two-thirds of the ACIRS captures are in fact not clinical 'critical incidents'. The changes were due to artifacts or equipment failure. Time is therefore required by the quality assurance officer to sort out the useful and true critical incidents. Expertise in information technology is also required to back up the system and system failure may jeopardize the data collection. A reliable security system is essential to safeguard data lost. It is likely that further refinement to our current system will produce more reliable results. We hope by presenting this simple system we can stimulate interest and further development in this aspect of anesthesiology.

References

1. Cooper JB, Newbower RS, Kitz RJ. An analysis of major errors and equipment failure in anesthesia management: considerations for prevention and detection. Anesthesiology 1984; 60:34-42.
2. Van der Walt JH, Webb RK, Osborne GA, Morgan C, Mackay P. Recovery room incidents in the first 2000 incident reports. Anaesth Intens Care 1993; 21:650-2.

3. Fasting S, Gisvold SE. Statistical process control methods allow the analysis and improvement of anesthesia care. Can J Anesth 2003; 50:767-74.
4. Weeks A. Draft clinical indicators in anaesthesia. RACS Bulletin 1991 Nov. 28-29.
5. LL Lau, CT Hung, CK Chan, *et al*. Anaesthetic clinical indicators in public hospitals providing anesthetic care in Hong Kong: prospective study. HK Med J 2001; 7:251-60.
6. Sanborn KV, Castro J, Kuroda M, Thys DM. Detection of intraoperative incidents by electronic scanning of computerized anesthesia records: Comparison with voluntary reporting. Anesthesiology 1996; 85:977-87.
7. Cullen DJ, Bates DW, Leape LL, Adverse Drug Event Prevention Study Group. Adverse drug event prevention study group: Prevention of adverse drug events; a decade of progress in patient safety. J Clin Anesth 2000; 12:600-14.
8. Short TG, O'Regan A, Jayasuriya JP, *et al*. Improvement in anaesthic care resulting from a critical incident reporting programme. Anaesthesia 1996; 51:615-2.

ERRATUM

In the "2005 Report on the Final Fellowship Examinations in Intensive Care: A Historical Perspective" published in Bull HK Coll Anaesthesiol 2005;14(2):111-2, the successful candidate for the Final Fellowship Examination in Intensive Care November/December 2002 was Dr Chan King Chung, Kenny of AHNH. The editors apologize for the omission.

Perioperative Airway Complication in Children with Upper Respiratory Tract Infection

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SUMMARY

Anesthetists are concerned about the safety of pediatric patients with upper respiratory tract infection (URTI) because of the hypersensitive airways. The purpose of this study was to find out the incidence rate of adverse events, cancellation rate and symptoms progression after the operation of this group of patients in a regional hospital.

A total of 407 children scheduled for elective or emergency surgery were recruited in a three-month survey. The cancellation rate in children with active URTI was 17.8% and the relative risk of adverse events was 3 times higher in patients without symptoms compared with those patients with recent URTI. Most of the adverse events were due to an increase in cough during emergence from anesthesia. Major airway complications like laryngospasm and bronchospasm were rare. The overall number of patients with worsen symptoms postoperatively were similar among groups. However, severe cough and nasal congestion were noted more frequently in the active and recent URTI groups. Our study confirmed that active URTI was still the main cause leading to cancellation of elective surgery. The incidence rate of adverse event was higher but major airway complications were rare in appropriately selected patients.

We believe that URTI should not be viewed as an absolute contraindication for surgery and decision should be sought after careful assessment and explanation to the parents or guardians of the patients.

Keywords: Anesthesia; Pediatrics; Upper respiratory tract infection; Bronchospasm; Chest infection; Complication

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Upper respiratory tract infection (URTI) is a common problem in children and often leads to last-minute cancellation of operation. It has long been recognized that the incidence of perioperative airway complications in children with URTI is higher than those without symptoms.[1-3] The results of many of the perioperative outcome studies are controversial because of the difference in study designs.[1-4] It is generally believed that the bronchial airway is more sensitive early in the course of infection and normalized over the next 4-6 weeks after infection.[5-7] However, it is not certain whether the risks of perioperative airway complications in patients with active URTI are similar to those with recent URTI.[2] We therefore evaluated the outcome of children undergoing

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elective and emergency operations from June to August, 2002 in a regional hospital. We surveyed the perioperative airway complications and symptoms progression within one week after the surgery. Other important variables recorded were the cancellation rate and the anesthetic techniques used.

Methods

This study was approved by the Clinical and Research Ethics Committee of the NT West Cluster of Hospitals. Written consent was obtained from the parent or guardian of the patients. Patients classified as American Society of Anesthesiologists (ASA) physical status I or II, aged between one month and 18 years, undergoing elective or emergency surgery enter the study.

All the patients were seen by anesthetists either in the preoperative assessment clinics or in the wards before surgery. Patients were classified as having either (1) active URIT; (2) recent URTI; or (3) non-URTI according to the criteria by Tait *et al*.[2] Patients with active URTI reported two or more of the following symptoms within the last 24 hours: rhinorrhea, sore throat, sneezing, nasal congestion, cough, or fever > 38 ^{o}C. Patients with recent URTI do not have current symptoms but give a history of two or more URTI symptoms within four weeks prior to surgery. The non-URTI patients do not have active symptoms or recent history of URTI within the four weeks before surgery.

Decisions to cancel the surgery and types of anesthesia to be administered were determined by the attending anesthetists independent of the study. All anesthetics were provided by specialists or supervised trainees according to the guideline set out by the Hong Kong College of Anaesthesiologists. The three-part data collection form was specifically designed for the study. The first part on preoperative history and symptoms of URTI was recorded by trained ward nurses. The second part related to intraoperative anesthetic techniques provided and the occurrence of airway events was recorded by the attending anesthetists. Adverse respiratory events recorded were desaturation (defined as SpO_2 < 90% for > 5 min) severe cough (successive cough > 3 times within 1 min) breath holding, laryngospasm, bronchospasm and unanticipated intubation during induction, maintenance, emergence and recovery from anesthesia. The third part was completed after a telephone interview conducted by two of the authors (YHC and IL) within one week after the surgery. Patients were asked to report any symptom of the URTI and its progression.

Sample size was calculated using Sample Power v2.0 (SPSS Inc., Chicago, IL). Based on the data reported by Cohen, it was estimated 180 patients were sufficient to detect a 7-fold increase in complication rate with 80% power, at a 0.05 level of significance. We anticipated that 400 patients will be surveyed during the 3-month study period and should provide sufficient power to detect a smaller difference. Incidence data were analyzed by χ^2 test. Nonparametric data were analyzed using Kruskal-Wallis test and parametric data by one way analysis of variance. Post-hoc analysis was performed to compare the results among groups when necessary.

Results

Four hundred and seven patients were recruited within 3 months of survey. Forty five patients reported active URTI, 104 had recent URTI and 258 had no URTI symptoms. Elective surgery was postponed in 8 patients, all from the active URTI group; three (37.5%) were found to have high fever (> 38.5 ^{o}C), three (37.5%) were 'tired looking', two (25%) with ongoing URTI symptoms and recent history of pneumonia. No patients were cancelled in the other groups giving an overall cancellation rate of 1.9%. The cancellation rate in patients with active URTI was 17.8%.

Demographic data in the remaining 399 patients are shown in the Table 1. Children in the active and recent URTI groups were younger than those in the non-URTI group (P = 0.006). More children in active and recent URTI group belong to the ASA II than in non-URTI group (P < 0.001). No significant differences were found in allergic rhinitis, asthma, prematurity and types of operations (32.4% *versus* 32.7% *versus* 24%) among groups.

Table 1. Demographic data

	Active URTI *n* = 37	Recent URTI *n* = 104	Non-URTI *n* = 258	*P* value
age (year)	7.8 ± 4.6[#]	7.1 ± 4.34[#]	8.7 ± 4.29	0.01
body weight (kg)	32.9 ± 19.3	33.2 ± 58.6	32.1 ± 15.5	0.96
gender M/F (n)	31/6	72/32	185/73	0.23
ASA I/II (n)	23/19[#]	67/37[#]	215/44	<0.001
Elective/emergency (*n*)	31/6	86/18	220/36	0.72
Type of operations (%)				
ENT/dental/eyes	40.5	34.6	39.2	0.40
Other head & neck	8.1	8.7	7.0	
Intra-abdominal	8.1	8.7	9.7	
Extremities	42.3	45.2	50	
Others	1	2.9	7	

URTI=Upper respiratory tract infection
[#]*P* < 0.05 *versus* non-URTI group

In the active group, rhinorrhea was the commonest symptoms (54%). The other URTI symptoms in decreasing order of frequency were nasal congestion (45.9%), sneezing (37.8%), cough (37.8%), sore throat (29.7%) and fever (21.6%). The average number of symptoms in active group was 2.6 ± 0.2.

Anesthetic techniques used are shown in the Table 2. There were significantly more patients in recent group receiving inhalational induction (40.4%) compared with the non-URTI group (24%, *P* = 0.002). The types of airway devices and volatile agents used were similar among groups.

Adverse airway events in different stages of general anesthesia are shown in the Table 3. We found that patients with recent URTI had significantly higher incidence of breath holding during induction. Severe cough was also more frequent during emergence from anesthesia in patients with active URTI. The overall incidences of patients with at least one adverse respiratory event in the active URTI, recent URTI and non-URTI groups were 16.2%, 8.7% and 5.8%, respectively. The relative risk for adverse airway events in the active URTI group was 2.8 times higher than that of the non-URTI group (95% confidence interval [CI]: 1.16 -6.74, *P* = 0.03).

Table 2. Anesthetic techniques used.

	Active URTI *n* = 37	Recent URTI *n* = 104	Non-URTI *n* = 258	*P* value
Induction				
Inhalation/intravenous	13/24	42/62[#]	62/196	0.01
Airway device				
Mask/ETT/LMA	1/15/21	2/57/45	8/118/132	0.49
Volatile agents				
Isoflurane / sevoflurane	4/33	19/85	53/204	0.35

URTI=Upper respiratory tract infection; ETT = endotracheal tube; LMA laryngeal mask airway
[#]*P* < 0.05 *versus* non-URTI group

Table 3. Perioperative adverse events.

	Active URTI *n* = 37	Recent URTI *n* = 104	Non-URTI *n* = 258	*P* value
Induction				
Desaturation	0%	0.96%	1.2%	0.80
Severe cough	0%	0.96%	0%	0.241
Breath holding	0%	3.8%[#]	0%	0.007
Laryngospasm	0%	0.96%	1.2%	0.801
Bronchospasm	0%	0%	0%	—
Reintubation	0%	1%	0%	0.241
Overall complication rate	0%	3.8%	1.6%	0.244
Intraoperative				
Desaturation	0%	0%	0%	—
Severe cough	0%	0%	0%	—
Breath holding	2.7%	0%	0%	0.12
Laryngospasm	0%	0%	0. 8%	0.57
Bronchospasm	0%	0%	0%	—
Reintubation	0%	0%	0%	0.241
Overall complication rate	2.7%	0%	0.8%	0.26
Emergence				
Desaturation	0%	0%	0.4%	0.76
Severe cough	8.1%[#]	2.9%	1.6%	0.02
Breath holding	2.7%	0%	0.8%	0.58
Laryngospasm	0%	0%	0.4%	0.76
Bronchospasm	0%	0%	0%	—
Reintubation	0%	0%	0%	—
Overall complication rate	8.1%	2.9%	2.7%	0.22
Recovery room				
Desaturation	2.7%	1%	0.04%	0.235
Severe cough	5.4%	1.9%	1.6%	0.417
Breath holding	0%	0%	0%	—
Laryngospasm	0%	1%	0.04%	1.000
Bronchospasm	0%	0%	0%	—
Reintubation	0%	0%	0%	—
Overall complication rate	8.1%	2.9%	1.9%	0.100

URTI=Upper respiratory tract infection; [#]$P < 0.05$ *versus* non-URTI group

Table 4. Percentage of patients with worsened symptoms after operations.

	Active URTI *n* = 37	Recent URTI *n* = 104	Non-URTI *n* = 258
Rhinorhea	10.8%	9.6%	6.2%
Cough	8.1%	12.5%#	5.8%
Sore throat	13.5%	15.4%	11.6%
Fever	2.7%	11.5%	6.2%
Nasal congestion	10.8%#	8.7%#	3.5%
Sneezing	2.7%	9.6%	4.7%
Overall rate#	29.7%	31.7%	22.9%

URTI=Upper respiratory tract infection; #$P < 0.05$ *versus* non-URTI group

The results of the telephone interviews are summarized in the Table 4. The percentages of patients with subjective feeling of deterioration in symptoms were similar among the three groups. However, more children developed cough and nasal congestion in the active and recent URTI groups than the non-URTI group.

Discussion

We found that children with active URTI behave differently from those with recent infection or entirely asymptomatic. Adverse respiratory events were about 3 times more common in the active URTI patients. The risk remains significant after exclusion of patients with high fever, "septic looking", or recent history of pneumonia. Majority of the adverse events were related to an increase in severe cough during emergency from anesthesia. The risk was however lower than those reported in other reports with similar study design. The pattern of adverse events was similar among groups, there was no increase in major airway complications like bronchospasm, laryngospasm, and unanticipated tracheal intubation.[2,8] Although there was a trend towards an increase in the incidence of desaturation and severe cough in the recovery room, the differences did not reach statistical significance. We are also concerned about the changes in postoperative respiratory symptoms after surgery. In our analysis, the number of patients with worsened symptoms was similar among groups. However, more patients in the active and recent URTI groups reported deterioration in nasal congestion and coughing. The major symptom in the non-URTI group was sore throat.

The cancellation rate in the active URTI group was 17.8%. The types of operations, elective or emergency surgery, anesthetic techniques did not influence the cancellation rate. We believe our anesthetic colleagues are more cautious in dealing with patients reporting active URTI. It is possible that anesthetists were willing to provide anesthetics to patients with a history of recent URTI within the last 4 weeks despite a possible risk of exaggerated bronchial airway reactivity. In this study, active URTI was the single cause leading to cancellation of elective operations and was similar to that reported by Tait *et al* (16.5%).[2]

The lower complication rate in our study might be related to the fact that all the anesthetics were provided by specialists or supervised anesthetic trainees. We also excluded patients who are "ill-looking". Mamie found that children anesthetized by non-pediatric specialist had 1.7 times increase in risk of adverse respiratory events.[9-11] In a case-control study involving over 15,000 pediatric patients. Schreiner found that children with URTI were more likely to develop laryngospasm (0.94%) if they were younger, had surgery involving the airways and anesthetized by less experienced anesthetists.[12]

Although the design of this study allowed us to examine the influence of many factors on

outcomes in children with URTI, there are limitations to our study. In particular, this is a non-randomized, unblinded study and may be subjected to selection or observer bias. Although we acknowledge the potential for bias, we believe that any effects would be minimized by the large sample size and the fact that observers had no interest in the study's outcome. Furthermore, details of the child's URTI symptoms were collected by nursing staff such that the anesthesia provider was not always fully aware of the symptoms recorded preoperatively.

In conclusion, the safety of anesthesia for pediatric patient with an upper respiratory tract infection is still a concern for many anesthetists as indicated by the higher rate of cancellation of surgery. Our data however, suggest that adverse events are less severe than initially reported and do not affect the immediate anesthetic outcomes.

It should be noted that the decision to operate is often affected by other factors like social or economic reasons. Once surgery is decided, the patient should be under the care of experienced anesthetists and surgeons. We believe active URTI should not be considered as an absolute contraindication to surgery.

References

1. Levy L, Pandit UA, Randel GI, Lewis IH, Tait AR. Upper respiratory tract infections and general anaesthesia in children. Peri-operative complications and oxygen saturation. Anaesthesia 1992; 47:678-82.
2. Tait AR, Malviya S, Voepel-Lewis T, Munro HM, Seiwert M, Pandit UA. Risk factors for perioperative adverse respiratory events in children with upper respiratory tract infections. Anesthesiology 2001; 95:299-306.
3. Van der Walt J. Anaesthesia in children with viral respiratory tract infections. Paediatr Anaesth 1995; 5:257-62.
4. Serafini G, Cavalloro F, Mori A, Rossi C, Tagliaferri C. Upper respiratory tract infections and pediatric anesthesia. Minerva Anestesiol 2003;69:457-9.
5. Empey DW, Laitinen LA, Jacobs L, Gold WM, Nadel JA. Mechanisms of bronchial hypersensitivity in normal subjects after upper respiratory tract infection. Am Rev Respir Dis 1976; 113:131-9.
6. Aquilina AT, Hall WJ, Douglas RG Jr. Utell MJ. Airway reactivity in subjects with viral upper respiratory tract infections: the effects of exercise and cold air. Am Rev Respir Dis 1980; 122:3-10.
7. Nandwani N, Raphael JH. Langton JA. Effect of an upper respiratory tract infection on upper airway reactivity. Br J Anaesth 1997; 78:352-5.
8. Cohen MM, Cameron CB. Should you cancel the operation when a child has an upper respiratory tract infection. Anesth Analg 1991; 72:282-8.
9. Tait AR, Reynolds PI, Gutstein HB. Factors that influence an anesthesiologist's decision to cancel elective surgery for the child with an upper respiratory tract infection. J Clin Anesth 1995; 7:491-9.
10. Malviya S, Voepel-Lewis T, Siewert M, Pandit UA, Riegger LQ, Tait AR. Risk factors for adverse postoperative outcomes in children presenting for cardiac surgery with upper respiratory tract infections. Anesthesiology 2003;98:628-32.
11. Mamie Chantal, Habre Walid, Delhumeau Cecile, Argiroffo CB, Morabia Alfredo. incidence and risk factors of perioperative respiratory adverse events in children undergoing elective surgery. Paediatr Anaesth 2004; 14:218-224.
12. Schreiner MS, O'Hara I, Markakis DA, Politis GD. Do children who experience laryngospasm have an increased risk of upper respiratory tract infection? Anesthesiology 1996; 85:475-80.

AHNH Recovery Room Discharge Criteria.
Development, Reliability and Validation

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SUMMARY

The investigators evaluated the reliability and validity of the Alice Ho Miu Ling Nethersole Hospital Recovery Room Discharge Criteria (AHNH RDC). The AHNH RDC recorded nine physical signs (activity, respiration, circulation, consciousness, oxygenation, nausea/vomiting, pain, bleeding, hypothermia). Each scored from 0 to 2. An expert panel of specialist anaesthesiologists from ten hospitals assessed the content validity of AHNH RDC. Criterion validity was evaluated by comparing the scores recorded by AHNH RDC and the modified Post Anaesthesia Recovery Score (PARS). Inter-rater reliability was also determined. All expert panel members agreed or strongly agreed that the AHNH RDC was a simple and objective measurement of recovery from anesthesia. Inter-rater reliability using Cohen's kappa (κ) statistic showed excellent agreement ($\kappa = 0.85$, $P < 0.001$) between observers. With regard to the criteria for discharge, there was good agreement between AHNH RDC and traditional clinical judgement ($\kappa = 0.63$, $P < 0.001$). Moderate agreement ($\kappa = 0.42$, $P < 0.001$) was observed between modified PARS and traditional clinical judgement. There was mild agreement between AHNH RDC and modified PARS ($\kappa = 0.28$, $P < 0.001$). When compared with traditional clinical judgement, AHNH RDC showed a sensitivity of 0.75, specificity of 0.94. Reliability and validity analysis of the AHNH RDC showed that it is a useful tool for evaluating patient discharge from the recovery room.

Keywords: Recovery; Emergence from anesthesia; Recovery scales; Inter-rater reliability; Criterion validity

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Since 1970, the Post-Anesthesia Recovery scale (PARS), has been used to evaluate patient recovery from anesthesia.[1] It has been adopted as the criteria for discharging patient from recovery room by the Joint Commission of Accreditation of Health Care Organization and has been implemented in many hospitals.[2-8] The PAR scale records activity, respiration, circulation, consciousness and color. Aldrete and others modified PARS by replacing the color index with pulse oximetry readings.[9] However; neither the original or modified PARS evaluate patient discomfort.

More recently, Chung incorporated vital signs, ability to ambulate, presence of nausea or vomiting, pain and surgical bleeding into the modified Postanaesthetic Discharge Scoring System (MPADSS).[10,11] While this scale appears

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Figure 1. Alice Ho Miu Ling Nethersole Hospital Recovery room discharge criteria (AHNH RDC). Patients are ready for discharge when the total score is 18 points, more than 15 minutes after the last dose of opioids, and a duration recovery room stay ≥ 20 minutes.

ACTIVITY			Score
Purposeful movement			2
Non-purposeful movement			1
Not moving			0
RESPIRATION			
Deep breathing	**AND**	Cough freely	2
Shallow breathing	**OR**	Respiratory rate ≥ 30	1
Dyspnea	**OR**	Respiratory rate < 8	0
CIRCULATION Baseline SBP _____ mmHg			
SBP ± 20% of preoperative level			2
SBP ± 20 - 40% preoperative level			1
SBP ± over 40% preoperative level **OR** SBP < 90mmHg			0
CONSCIOUSNESS			
Fully awake OR easily arousable on calling			2
Difficult to rouse on calling			1
Not responding			0
OXYGENATION			
SpO_2 ≥ 97% on room air **OR** 3 L/min nasal cannula O_2			2
91 ≤ SpO_2 ≥ 96% on 3 L/min nasal cannula O_2			1
SpO_2 ≤ 90% on 3 L/min nasal cannula O_2			0
NAUSEA	**OR**	**VOMITING**	
Minimal nausea		0-1 episode of vomiting	2
Moderate nausea		2-3 episodes of vomiting	1
Severe nausea		4 or more episodes of vomiting	0
#Document the worst score			
PAIN (recorded on a 100 mm visual analogue scale, VAS)			
0 ≤ VAS ≥ 39	**OR**	no or mild pain	2
40 ≤ VAS ≥ 69	**OR**	moderate pain	1
VAS ≥ 70	**OR**	severe pain	0
SURGICAL BLEEDING			
Minimal			2
Moderate			1
Severe			0
# Document according to type of surgery, if concern contact surgeon / anesthetist			
TEMPERATURE			
Temp ≥ 36 °C			2
35 ≤ Temp ≥ 35.9 °C			1
Temp ≤ 34.9 °C			0
TOTAL SCORE			

NOTE. If parameter cannot be measured, please document as "N/A" (i.e. Not Applicable) and reason.

to be more comprehensive, it has not undergone vigorous reliability and validity testing.[12] Therefore, it is uncertain whether MPADSS actually predicts recovery of anesthesia.

In the present study, we described a new recovery room discharge criteria to improve the flow of patients through the recovery process while maintaining patient safety and high standard of patient care.[13] The AHNH Recovery Room Discharge Criteria (RDC) was developed to achieve a uniform set of objective discharge criteria to ensure that all important physiological factors are optimized before patient discharge to the ward. We reported the content, concurrent criterion and construct validity of the RDC.

Method

The AHNH RDC was initially developed by combining factors listed in the modified PARS and MPADSS. The aim is to incorporate a list of relevant physiologic observations evaluation of patient recovery from general or regional anesthesia.[13] A total of nine factors were thought to be important:

(1) Muscle activity
(2) Respiratory efficiency
(3) Circulation:
(4) Consciousness:
(5) Oxygenation:
(6) The severity of nausea and vomiting
(7) Pain relief
(8) Surgical bleeding
(9) Hypothermia

Content validity

The content validity was evaluated based on the judgment by an expert panel of 10 specialist anesthesiologists from various hospitals in Hong Kong.

We asked the panel to indicate the physical and physiological parameters that are important for evaluating patient recovery from anesthesia. They then rated their agreement with each of the item listed in the AHNH RDC using Likert-type scale. Based on their responses, the AHNH RDC was revised (Figure 1).

Reliability

We determined inter-rater reliability of the RDC by comparing the scores recorded by paired assessors. A team of assessors, consisting of four anesthesiologists and four recovery room nurses evaluated each patient simultaneously at 20 minutes after arrival to the recovery room in a blinded fashion. All assessors were trained on the use of the AHNH RDC. We envisaged that at 20 minutes, there would be a mixture of patients who were ready for discharge and those who require additional care.

The recovery room nurse and the attending anesthesiologist managed all postoperative patients according to usual practice in the recovery room. Patients were discharged from the recovery room based on traditional clinical judgement of the anesthesiologist.[13-15]

The study was approved by the Local Ethics Committee between December 2001 and May 2002. Patients admitted to the recovery room of AHNH, receiving general and/or regional anesthesia for elective or emergence surgery were eligible for the study. Patients were excluded if they were less than 5 years of age, mentally incompetent, or if they were classified as American Society of Anesthesiologists physical status IV or V. We also excluded patients who experienced intraoperative complications.

Criterion validity

The criterion validity was evaluated by comparing the percentage of patient ready for discharge using the RDC, the modified PARS and the clinical judgment of the attending anaesthesiologist.

A third assessor recorded the modified PARS score at 20 minutes while the paired assessors were responsible for completing the RDC during reliability testing. All assessments were performed on individual forms without any communication between assessors.

Statistics

Sample size was calculated based on an unpublished audit on recovery room discharge time among 280 patients. In this survey, 40% of patients were discharged within 20 minutes. We have therefore estimated that 156 patients are required to produce a 99% confidence interval of 0.1 around a point estimate of 0.4.

Descriptive statistics was used to summarize the demographic, anesthetic and surgical characteristics of the patients.

Inter-rater reliability was analyzed by comparing the agreement among raters using Cohen's Kappa statistics. A κ value of 0.10-0.30 indicates mild agreement, 0.31-0.50 as moderate agreement and 0.51-0.70 as good agreement, and 0.71-1.00 as excellent agreement.[16]

The criterion validity of the AHNH RDC to readiness for recovery room discharge was compared with modified PARS and traditional clinical judgment. We calculated the sensitivity, specificity, positive predictive value (PPV), negative predictive value (NPV) and the likelihood ratio.

Results

A total of 200 patients undergoing elective and emergency surgery requiring the presence of an anesthesiologist were recruited over a period of 6 months. Patient characteristics are shown in Table 1.

Content validity

Fourteen clinical parameters were suggested by the ten specialist anesthesiologist from different major public hospitals in Hong Kong (Table 2). The majority of these parameters were included in the AHNH RDC except sensory level (40%) and heart rate (80%), sensory level (40%) and color (70%). All experts agreed or strongly agree with the AHNH RDC as measurement tool for discharge from recovery room (Table 3).

Table 1. Demographic data, anaesthetic details and surgical information.

	Number (%)	Median (interquartile range)
Age (years)		44(30.3 - 56.8)
Sex		
Male	77 (38.5)	
Female	123 (61.5)	
ASA classification		
1	123 (61.50)	
2	64 (32.00)	
3	13 (6.50)	
Surgical category		
Elective	179 (89.5)	
Emergency	21 (10.5)	
Surgical specialty		
General Surgery	59 (29.5)	
Orthopedics	52 (26.0)	
ENT	26 (13.0)	
Eye	12 (6.0)	
Gynecology	51 (25.5)	
Anesthesia		
General anesthesia	168 (84.0)	
Regional anesthesia	31 (15.5)	
Combined	1 (0.5)	
Recovery room stay duration (min)		35 (30 - 50)

Table 2. Clinical parameters as suggested by expert on the important items in the assessment of recovery from anesthesia. Number (proportion)

1. Respiration	10 (100)
2. Consciousness	10 (100)
3. Muscle power	9 (90)
4. Oxygen saturation	9 (90)
5. Pain score	8 (80)
6. Heart rate	8 (80)
7. Blood pressure	7 (70)
8. Color	7 (70)
9. Temperature	6 (60)
10. Nausea/Vomiting	4 (40)
11. Sensory level	4 (40)
12. Surgical bleeding	3 (30)
13. Verbalization	2 (20)
14. Limb movement	1 (10)

Table 3. Expert opinion on the Recovery room discharge criteria (RDC) as an overall measurement tool of recovery from anesthesia and the individual items with their respective scoring system. Number (proportion)

Items	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
Overall RDC				6 (60)	4 (40)
Individual items					
Activity			4 (40)	5 (50)	1 (10)
Respiratory			2 (20)	4 (40)	4 (40)
Circulation			3 (30)	3 (30)	4 (40)
Consciousness				4 (40)	6 (60)
Oxygenation			2 (20)	5 (50)	3 (30)
Nausea/vomiting		2 (20)	2 (20)	4 (40)	2 (20)
Pain		1 (10)		7 (70)	2 (20)
Surgical bleeding			4 (40)	5 (50)	1 (10)
Temperature	1 (10)		2 (20)	6 (60)	1 (10)

Inter-rater reliability

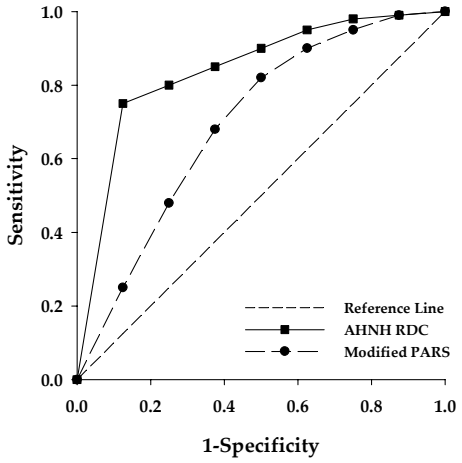
Inter-rater reliability testing showed excellent agreement ($\kappa = 0.85$) between assessors. Analysis of the individual items on the AHNH RDC showed excellent agreement with pain score ($\kappa = 0.79$) and temperature ($\kappa = 0.74$). There was good agreement among assessors with activity ($\kappa = 0.69$), circulation ($\kappa = 0.69$), and nausea/vomiting ($\kappa = 0.66$). Moderate agreement was found for consciousness ($\kappa = 0.59$), oxygenation ($\kappa = 0.55$), and surgical bleeding ($\kappa = 0.50$). There was however, poor inter-rater agreement for respiration ($\kappa = 0.14$).

Criterion validity

The receiver operating characteristics (ROC) curves for AHNH RDC, modified PARS and traditional clinical judgment are shown in Figure 2. The area under the curve of the AHNH RDC, 0.85 (95% CI: 0.80-0.91) was greater than the modified PARS, 0.70 (95% CI: 0.61-0.78), $P < 0.01$.

Table 4 shows the diagnostic test comparing AHNH RDC or modified PARS with clinical judgment for readiness of discharge from the recovery room. The AHNH RDC was more specific but less sensitive than modified PARS.

Figure 2. The Receiver Operator Characteristic (ROC) curve for the recovery room discharge criteria (RDC) and the modified post-anesthetic recovery scale (PARS).



Discussion

In this study, we have demonstrated that the reliability and validity of the AHNH RDC was acceptable.

Fourteen clinical signs were suggested by the expert panel as important assessments for recovery room discharge. We included nine of the fourteen items. Heart rate was excluded because it could be affected by medications. Furthermore, blood pressure was thought to be more appropriate measure for end organ perfusion. We have also excluded sensory level because a high neuroaxial block should result in hemodynamic instability and documentation of sensory block can be tedious. Color was not included because oxygen saturation from pulse oximetry is a more precise measure for oxygenation.

We found an excellent agreement among the assessors using the AHNH RDC for patient discharge from the recovery room. An analysis of individual items revealed a range of correlation, from good to moderate agreement. Items that demonstrated better agreement were pain score, temperature, activity, circulation, and nausea/vomiting. Items that were less correlated were consciousness, oxygenation, surgical bleeding and respiration. Items that showed better agreement were quantitative measurement, whereas qualitative measurement usually scored poorly. In these items, well-defined criteria and simple and clear instruction may improve accuracy of assessment.[12] Respiration scored poorly in this study, as it is currently scored as deep/shallow breathing and respiratory rate. Surgical bleeding was also difficult to describe; the assessment of severity may be defined by volume and the clinical

Table 4. Diagnostic test evaluation: the recovery room discharge criteria (RDC) and the modified post-anesthetic recovery scale (PARS) for readiness of discharge when compared to clinical judgment

	RDC		Modified PARS	
		95 % CI		95 % CI
Sensitivity	75%	67-82	88%	82-93
Specificity *	94%	89-100	51%	40-63
Positive Predicted Value *	96%	92-100	77%	70-84
Negative Predicted Value	67%	57-76	69%	57-82
Pre-test Probability	65%	58-72	65%	58-72
Likelihood Ratio *	13.06	5.0-34	1.81	1.4-2.3
Post-test Probability	96%		77%	
False Positive Ratio *	6%	3-9	49%	43-57
False negative Ratio	25%	19-31	14%	9-19

CI = confidence intervals; *$P < 0.05$

context, For instance, small amount of bleeding from enclosed space can be serious. We believe regular debriefing and performance audit are also important to improve measurement reliability.

Patients should be discharged from the recovery room in a safer and timely manner. Since the consequence and cost for discharging patients wrongly are serious, we choose a maximum score of 18 as cut-off value for recovery room discharge in the AHNH RDC. This achieved a specificity of 0.94. The corresponding specificity for modified PARS, was only 0.51. Because of its high specificity, AHNH RDC was more useful to confirm discharge readiness from the recovery room.[13]

The AHNH RDC provides a uniform and definitive account on the progress of the patient through the different stages during recovery from anesthesia. The AHNH RDC established a routine and a checklist for evaluation of patient's problems that should result in improved patient care.

In conclusion, the AHNH RDC is a simple and validated recovery room scoring system which is a potentially useful tool for assessing discharge readiness from the recovery room.

References

1. Aldrete JA, Kroulik D. A postanaesthetic recovery score. Anesth Analg 1970; 49:924-33.
2. Skirgaudas PS. Reliability and validity of the PAR score: a pilot study. J Post Anaesth Nurs 1986; 1:117-20.
3. Steward DJ. A simplified scoring system for the postoperative recovery room. Can Anaesth Soc J 1975; 22:111-13.
4. Thomas D, Davis AC. A postanaesthetic scoring system. Anaesth Intensive Care 1984; 12:125-26.
5. Quinn CL, Weaver JM, Beck M. Evaluation of a clinical recovery score after general anaesthesia. Anesth Prog 1993; 40:67-71.
6. Asbury AJ. Measuring immediate recovery from general anaesthesia using a scoring system. Can Anaesth Soc J 1981; 28:567-74.
7. Figueroa M. The postanaesthesia recovery score: a second look. South Med J 1972; 65:791 –795.
8. Soliman IE, Patel RI, Ehrenpreis MB, Hannallah RS. Recovery scores do not correlate with postoperative hypoxemia in children. Anesth Analg 1988; 67:53-6.
9. Aldrete JA. The post-anaesthesia recovery score revisited (letter to the editor). J. Clin. Anesth 1995; 7:89-91.
10. Chung F. Are discharge criteria changing? J Clin Anesth 1992; 5:64S-68S.
11. Chung F. Discharge criteria – a new trend. Can J Anaesth 1995; 42:1056-8.
12. Streiner DL, Norman GR. Health measurement scales: a practical guide to their development and use. Oxford University Press, New York 1991, pp 87-8.
13. Recovery room admission and discharge policies and procedures. AIO, AHNH, 1997.
14. The Hong Kong College of anaesthesiologists. Guidelines for postoperative recovery care, 1992.
15. ANZCA. Recommendations for responsibilities of the anaesthetist in the postoperative period (PS20) 2001.
16. Altman DG. Practical statistics for medical research. Chapman & Hall /CRC, USA, 1990.

Sevoflurane Induction for Laryngeal Mask Airway Insertion in Elderly Patients: A Comparison with Propofol

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SUMMARY

The objective of the study was to compare the feasibility and conditions for laryngeal mask airway (LMA) insertion, as well as the hemodynamic and respiratory responses of elderly patients with propofol and sevoflurane induction. Forty-two elderly patients, American Society of Anesthesiologists physical status I to III, were randomly assigned to receive either inhalational induction with sevoflurane 8% in oxygen or intravenous induction with propofol 2.4 mg/kg. The conditions for LMA insertion were assessed and graded on a 4 -point scale.

Despite the longer induction time with sevoflurane, LMA insertion was successfully accomplished during the first attempt in 20 patients (95%) receiving sevoflurane and 17 patients (81%) after propofol induction. Patients in the propofol group had a greater decrease in blood pressures after induction. In addition, patients in the propofol group had significantly longer period of apnea after LMA insertion compared with sevoflurane. In conclusion, sevoflurane induction provided similar condition during LMA insertion as compared with propofol. Patients had less hypotension and apnea when induced with sevoflurane.

Keywords: Anesthetics, inhalational, sevoflurane; Anesthetics, intravenous, propofol; Equipment, laryngeal mask airway; Patients, elderly.

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Elderly patients present commonly for orthopedic and urological procedures where general anesthesia can often be maintained with spontaneous respiration. The advantages of laryngeal mask airway (LMA) in maintaining a patent airway during general anesthesia is well documented. Successful insertion of the LMA requires an adequate depth of anesthesia and suppression of the upper airway reflexes. Propofol is considered the intravenous agent of choice to achieve the optimal conditions for LMA insertion.[1,2] However, the use of propofol may be associated with hypotension and respiratory depression in the elderly.[3] Sevoflurane is a safe agent that allow rapid and acceptable conditions for LMA insertion in healthy adult patients.[4-7] However, it is not known whether sevoflurane will also provide similar conditions for LMA insertion in elderly patients of whom hypotension and respiratory depression may be more common.

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The aim of this prospective randomized study was to evaluate the conditions for LMA insertion in elderly patients using inhalational induction with sevoflurane, compared with propofol.

Methods

The study was approved by the hospital ethics committee. Forty-two patients older than 60 years, American Society of Anesthesiologists physical status class 1 to 3, scheduled for general anesthesia for elective gynecological, orthopedic or general surgery entered the study. Patients who received sedative drugs or alcohol, or who reported allergy to general anesthetics, or having risk factors for regurgitation and aspiration were excluded. Patients were visited on the day before surgery. The procedures and risks of general anesthesia were explained and informed consents were obtained. Mouth-opening was measured as the inter-dental distance, between the upper and lower incisors or gum if edentulous.

A laryngeal mask airway was inserted and spontaneous respiration was maintained in all patients. Patients were randomly allocated to receive induction of anesthesia with propofol or sevoflurane. Randomization was achieved by using sealed envelopes which were opened immediately before induction. Premedication was not prescribed. Opioid or nitrous oxide was not used during induction.

On arrival to the operating room, standard monitoring devices (including electrocardio-gram (ECG), non-invasive blood pressure monitoring (NIBP) and oxygen saturation (SpO_2)) were applied. Oxygen was administered for 3 minutes at a fresh gas flow of 6 L/min from a face mask connected to a semi-closed anesthetic circuit. Baseline data were recorded at 1 minute intervals.

Immediately before induction of anesthesia, the face mask was removed and the anesthetic circuit was primed with either 100% oxygen (propofol group) or 8% sevoflurane in oxygen (sevoflurane group).

All patients were instructed to exhale maximally followed by a vital capacity breath. All patients were asked to hold their breath as long as possible. During this time, an intravenous injection of either propofol 2.4 mg/kg (propofol group) or an equal volume of normal saline (sevoflurane group) was administered by another anesthetist over 30 seconds via an indwelling 18 G cannula.

During induction, the investigator assessed the adequacy of anesthesia in terms of: (1) loss of response to verbal command (by calling the patient's name in a normal tone every *5* seconds after commencement of induction); (2) loss of eyelash reflex (after loss of response to verbal command) and (3) jaw relaxation (which was considered the desired endpoint for induction). The LMA was lubricated with water-soluble jelly and inserted according to the method described by Brain.

In patients who are inadequately anesthetized, with failure to open the jaws or severe airway reflexes preventing LMA insertion, anesthesia was deepened with intravenous bolus of propofol at 20 mg increments in the propofol group, or further mask ventilation with 8% sevoflurane in oxygen in the sevoflurane group. Insertion of LMA was re-attempted, 30 seconds after deepening of anesthesia.

The position of the LMA was confirmed with capnography and by observing respiratory movement. Air leaks around the LMA or obstruction to ventilation was considered as failure. Malpositioned LMA was removed and insertion reattempted after deepening of anesthesia as described above. The total number of attempts made until successful LMA insertion and positioning was recorded.

The condition for LMA insertion was assessed on a 4-point ease of insertion scale (1=successful, easy and smooth; 2=successful, easy with some manipulation; 3=difficult but successful with manipulation; 4=difficult and unsuccessful despite manipulation) on the first attempt of LMA insertion. Occurrence of

undesirable responses including coughing, gagging, breath holding, movement and laryngospasm (defined as presence of stridor requiring deepening of anesthesia) during induction and LMA insertion were also noted. We also recorded the induction times, the time to successful LMA insertion and the number of attempts made, and the end-apneic time (defined as commencement of settled regular spontaneous breathing after successful LMA placement). LMA insertions were performed by the first author (VMWN).

The primary endpoint of the study was the success rates of LMA insertion. An estimate of the sample size showed that 20 patients per group were required to detect a mean difference of 1 point in the ease of insertion score with an 80% power at an alpha error level of 0.05.

Data were expressed as mean ± standard deviation. Unpaired *t* test was used for comparison of hemodynamic values, induction times and end of apnoeic times between groups. Paired *t* test was used for comparing changes of blood pressure before and after induction within group. The proportion of successful LMA insertion in the two groups was compared with χ^2 test. The ease of LMA insertion was compared between groups using the Mann-Whitney test. A *P* value < 0.05 was considered as statistically significant.

Results

A total of 42 patients were studied. Patient characteristics are summarized in Table 1. The success rates and conditions for LMA insertion were summarized in Table 2. LMA insertion was successfully accomplished during the first attempt in 17 (81%) patients in propofol group and 20 (95%) patients in the sevoflurane group (*P* = 0.34). All LMA insertion and positioning were successfully accomplished within 2 attempts in both groups. The majority of LMA insertion was graded as easy and smooth. There was no difference in the ease of insertion score between the 2 groups *(P* = 0.58). Eighteen patients (propofol group 9 and sevoflurane group 9) had reported undesirable responses during LMA insertion. Most of these responses were minor and settled either spontaneously or with deepening of anesthesia. SpO_2 was well maintained in both groups. One patient in the propofol group was suspected to have regurgitation after LMA insertion and the trachea was intubated for airway protection.

The time from induction of anesthesia to the loss of verbal response, loss of eyelash reflex and jaw relaxation was shorter in the propofol group, compared with sevoflurane (Table 3). Despite the variation in induction times, LMA was successfully inserted during the first attempt in the majority of patients in both groups. The time interval from start of induction to successful LMA positioning was shorter in propofol group than that in the sevoflurane group (*P* < 0.001). However, the time interval from start of induction to return of regular breathing after LMA insertion (end of apnoeic time) was similar between groups (164 ± 72 s *vs* 173 ± 84 s, *P* = 0.73).

The mean apnea duration after LMA insertion was 73 ± 63 s in the propofol group and 7 ± 22 s in the sevoflurane group (*P* < 0.001,).

Table 1. Demographic data of patients. Results are expressed as mean ± SD.

	Propofol	Sevoflurane
Number of patients (M/F)	6 / 15	5 / 16
Age (years)	75.9 ± 8.2	70.0 ± 8.2
Weight (kg)	56.1 ± 12.6	51.3 ± 10.6
American Society of Anesthesiologists physical status class (I / II / III)	5 / 9 / 7	7 / 12 / 2
Inter-dental distance (cm)	3.7 ± 0.8	3.9 ± 0.7

Table 2. Condition for LMA insertion and undesirable responses (Some patients had > 1 undesirable responses)

		Propofol	Sevoflurane
Successful LMA insertion (overall)		21/21	21/21
No. of attempts made for successful insertion (1/2/3/4)		17 / 4 / 0 / 0	20 / 1 / 0 / 0
Ease of insertion:	1	12 (57%)	14 (67%)
	2	4 (19%)	5 (24%)
	3	4 (19%)	2 (9%)
	4	1 (5%)	0 (0%)
Undesirable events			
Movement		6	3
Coughing		3	1
Breath Holding		0	1
Laryngospasm		0	1
Gagging		1	2
Swallowing		0	3
Regurgitation		1	0

15 patients in the propofol group had apnea duration of more than 30 seconds, out of whom 9 had apnea of more than 60 seconds. One patient in the sevoflurane group had apnea longer than 30 seconds, while 16 patients had regular breathing immediately following LMA insertion.

The hemodynamic changes following induction are shown in Figure 1. Heart rates were well maintained after induction in both groups. Patients in sevoflurane group had similar mean arterial pressures after induction compared to their baseline value, whereas patients in the propofol group had significant reductions of mean arterial pressures after induction.

Discussion

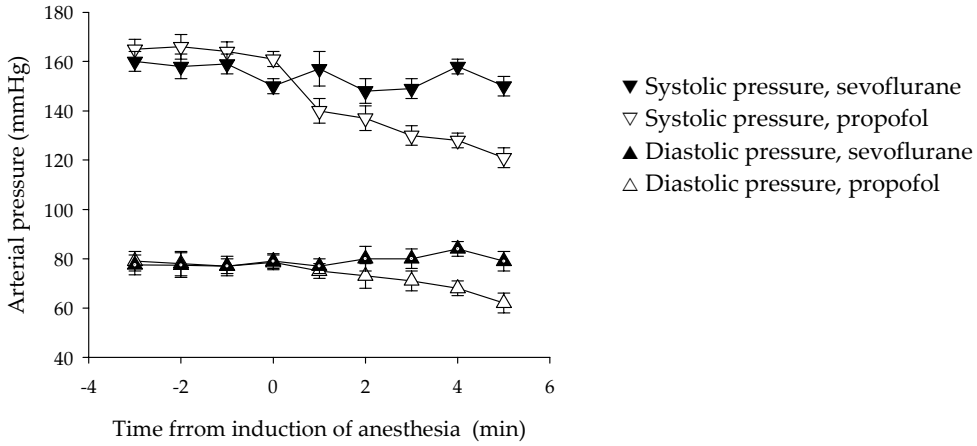
Inhalational induction with sevoflurane has been widely studied in children and adults especially in the settings of ambulatory surgery.[4-15] The vapor is non-pungent, it has a low blood-gas solubility and therefore induction and emergence are rapid, and there is a lack of major side effects. Sevoflurane has been accepted as a safe and useful agent for both induction and maintenance of anesthesia. However, there are only few randomized studies comparing sevoflurane and propofol for anesthetic induction in the elderly patients.

There was a high success rate during the first attempt in both groups (81-95%) and no major differences in the ease of LMA insertion between groups. Our data are comparable to previous study.[14] The overall incidence of undesirable responses during induction were similar between groups. Excitatory movements were more common in the propofol group while

Table 3. Induction times, time for successful LMA insertion and end-apneic times. *$P < 0.05$ between groups)

Time interval from start of induction to:	Propofol	Sevoflurane
Loss of verbal response	40 ± 18	74 ± 47*
Loss of eyelash reflex	45 ± 20	84 ± 57*
Jaw relaxation	76 ± 36	154 ± 78*
Successful LMA positioning	95 ± 45	166 ± 77*
End apneic time	164 ± 72	173 ± 84
Apneic duration	73 ± 63	7 ± 22*

Figure 1. Changes in systolic and diastolic blood pressure after propofol and sevoflurane.



pharyngeal and laryngeal reflexes were more common in patients receiving sevoflurane. This finding reflects the superior quality of propofol in suppressing the airway reflexes. Despite the occurrence of such responses, the influence on the success in LMA insertion was minor. The addition of opioids or nitrous oxide during induction might reduce the occurrence of such induction responses and further improve the conditions for LMA insertion.[4,15]

In the present study, we found the time to loss of consciousness and eyelash response was slower in the sevoflurane group. These findings were reported in young healthy patients.[4-7,14] The longer time to jaw relaxation with sevoflurane may be related to the lack of relaxant effect on the jaw muscles.[4,6,16]

There are several limitations in the study. Firstly, a true vital capacity breathing method is technically demanding and requires patient cooperation. This is difficult to achieve in the elderly patient. Therefore we accepted modified breathing techniques including tidal volume breathing. Although the vital capacity rapid inhalation induction technique is a well described fast inhalational induction technique,[17,18] Baker and Smith reported that no clinically significant differences in timings and complications for LMA insertion with either vital capacity or tidal volume breathing techniques.[19] Secondly, it is difficult to determine a suitable dosage of propofol for all patients. The anesthetic requirement may be different among the elderly patients who have variable physical status. The initial dosage of propofol was standardized at 2.4 mg/kg in order to produce loss of consciousness, jaw relaxation and suppression of significant airway reflexes for LMA insertion without any co-induction agents. A similar propofol dosage has been used in previous LMA studies in elderly patients.[4,6,11,12] Thirdly, the depth of anesthesia produced by the intravenous induction and inhalational induction was not standardized. Currently, this could be measured objectively by using the real time electroencephalo-graphic monitoring such as bispectral index.[20]

We concluded that inhalational induction of anesthesia with sevoflurane provided a smooth induction and satisfactory conditions for LMA insertion in elderly patients.

References:

1. Scanlon P, Carey M, Power M, *et al*. Patient response to laryngeal mask insertion after induction of anaesthesia with propofol or thiopentone. Can J Anaesth 1993; 40:816-8.
2. Brown GW, Patel N, Ellis FR, *et al*. Comparison of propofol and thiopentone for laryngeal mask insertion. Anaesthesia 1991; 46:771-2.

3. Blake DW, Dawson P, Donnan G, *et al*. Propofol induction for laryngeal mask airway insertion: Dose requirement and cardiorespiratory effects. Anaesth Intensive Care 1992; 20:479-83.
4. Hall SE, Stewart JIM, Harmer M. Single-breath inhalation induction of sevoflurane anaesthesia with and without nitrous oxide: a feasibility study in adults and comparison with an intravenous bolus of propofol. Anaesthesia 1997; 52:410-5.
5. Thwaites A, Edmends S, Smith I. Inhalation induction with sevoflurane: a double-blind comparison with propofol. Br J Anaesth 1997; 78:356-61.
6. Ti LK, Chow MY, Lee TL. Comparison of sevoflurane with propofol for laryngeal mask airway insertion in adults. Anesth Analg 1999; 88:908-12.
7. Molloy ME, Buggy DJ, Scanlon P. Propofol or sevoflurane for laryngeal mask airway insertion. Can J Anaeth 1999; 46:322-6.
8. Fredman B, Nathanson MH, Smith I, *et al*. Sevoflurane for outpatient anesthesia: a comparison with propofol. Anesth Analg 1995; 81:823-8.
9. Jellish WS, Lien CA, Fontenot HJ, Hall R. The comparative effects of sevoflurane versus propofol in the induction and maintenance of anesthesia in adult patients. Anesth Analg 1996; 82:479-85.
10. Lien CA, Hemmings HC, Belmont MR, *et al*. A comparison: the efficacy of sevoflurane-nitrous oxide or propofol-nitrous oxide for the induction and maintenance of general anaesthesia. J Clin Anesth 1996; 8:639-43.
11. Fleischmann E, Akca 0, Waliner T, et al. Onset time, recovery duration, and drug cost with four different methods of inducing general anesthesia. Anesth Analg 1999; 88:930-5.
12. Tang J, Chen L, White PF, *et al*. Recovery profile, costs, and patient satisfaction with propofol and sevoflurane for fast-track office-based anesthesia. Anesthesiology 1999; 91:253-61.
13. Philip BK, Lombard LL, Roaf ER, *et al*. Comparison of vital capacity induction with sevoflurane to intravenous induction with propofol for adult ambulatory anesthesia. Anesth Analg 1999; 89:623-7.
14. Joo HS, Perks WJ. Sevoflurane versus propofol for anesthetic induction: a meta-analysis. Anesth Analg 2000; 91: 213-9.
15. Sivalingam P. Kandasamy R, Madhavan G, Dhakshinamoorthi P. Conditions for laryngeal mask airway insertion: a comparison of prpofol versus sevoflurane with or without alfentanil. Anaesthesia 1999; 54:271-6.
16. Ummenhofer WC, Kindler C, Tschaler G, et al. Propofol reduces succinycholine induced increase of masseter muscle tone. Can J Anaesth 1998; 45:417-23.
17. Yurino M, Kimura H. Induction of anesthesia with sevoflurane, nitrous oxide, and oxygen: a comparison of spontaneous ventilation and vital capacity rapid inhalation induction (VCRII) techniques. Anesth Analg 1993; 76:598-601.
18. Yurino M, Kimura H. A comparison of vital capacity breath and tidal breathing techniques for induction of anaesthesia with high sevoflurane concentrations in nitrous oxide and oxygen. Anaesthesia 1995; 50:308-11.
19. Baker CE, Smith I. Sevoflurane: a comparison between vital capacity and tidal breathing techniques for the induction of anaesthesia and laryngeal mask airway placement. Anaesthesia 1999; 54:841-4.
20. Blake DW, Hogg MN, Hackman CH, Pang J, Bjorksten AR. Induction of anaesthesia with sevoflurane, preprogrammed infusion or combined sevoflurane/propofol for laryngeal mask insertion: cardiovascular, movement and EEG bispectral index responses. Anaesth Intens Care 1998; 26:360-5.

Anesthetic Management in a Patient with Somatostatinoma

A Review of Pathophysiology of the Endocrine Pancreas

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SUMMARY

We report a case on the anesthetic management of Whipple's procedure for somatostatinoma resection at the ampulla of Vater in a female adult. Somatostatinoma is an endocrine islet cell tumour which may be secretory or non-secretory. The patient was short and underweight with co-existing hyperthyroidism and neurofibromatosis. Islet cell tumors and thyroid disorders are features consistent with Multiple Endocrine Neoplasia Syndrome Type I (MEN I). She was rendered euthyroid with anti-thyroid drugs prior to the procedure. The anesthesia was carried out with general plus epidural anesthesia. She suffered massive blood loss and required massive blood transfusion. The patient was transferred to the intensive acre unit post-operatively and was ventilated overnight. She made a good recovery and was discharged 2 weeks after the procedure.

Key Words: Somatostatinoma, Islet Cell Tumor, Neurofibromatosis, Hyperthyroidism Anaesthetic techniques: combined general–epidural. surgery: Whipple's procedure

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Somatostatinoma is a rare endocrine tumor of the pancreas and the peri-ampullary region. It belongs to the group of tumors known as 'Islet cell tumors'. It may be secretory in nature. Somatostatin is a hormone secreted by the D cells in the islets of Langerhans of the pancreas. It can inhibit secretion of both glucagon and insulin. Somatostatin is also secreted by the hypothalamus into the portal-hypophyseal circulation and inhibits the secretion of growth hormone.

This is the first report describing the anesthetic management of a patient presented for somatostatinoma resection at the ampulla of Vater. The management of this patient was complicated by her co-existing hyperthyroidism and neurofibromatosis.

Case History

A 36 years old female patient was presented with obstructive jaundice in July 2003. She was underweight, weighing only 33 kg with a height of 154 cm. Body mass index (BMI) calculated was 13.9. She was known to have

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neurofibromatosis. Ultrasound scan and computerized tomography (CAT scan) of her abdomen showed a soft tissue mass in the distal common bile duct. Endoscopic retrograde cholangiopancreatography (ERCP) for a stent insertion was unsuccessful. Subsequently external biliary drains were inserted under radiological guidance to relieve the obstruction.

In November 2003, the patient had a laparotomy. An excisional biopsy of the tumor at the ampulla of Vater was taken. A choledochoduodenostomy with anastomosis was also performed to relieve the biliary obstruction. The histopathology of the biopsy showed that the tumor was composed of islets with positive staining for somatostatin. Endocrinologist opinion was sought and subsequent screening tests discovered the patient was hyperthyroid. The patient's plasma was positive for anti-thyroid antibodies. Anti-thyroid treatment with carbimazole was commenced.

A decision was made to completely excise the tumor as somatostatinoma frequently behaves in a malignant fashion with metastatic potential. A Whipple's procedure (pancreatico-duodenoectomy) to remove the tumor was scheduled.

Thyroid function tests performed before the procedure showed the patient had been rendered euthyroid. Biochemical and hematological profiles were also in the normal range.

Operation was scheduled to commence in the morning. Three large bore cannulae were inserted in anticipation of possible massive blood loss. A thoracic epidural was inserted. Initial bolus doses of 2.5 and 7.5 ml of 0.75% ropivacaine was given followed by an infusion with the same local anesthetic at 5 ml/hr. The block was established from T_4 to T_{10}. Full monitoring was applied including an arterial line, a central venous line and bispectral index (BIS) monitoring.

Anesthesia was induced with midazolam 3 mg, remifentanil infusion of 0.1 μg/kg/min, propofol 130 mg and rocuronium 30 mg. The trachea was intubated and the lungs were ventilated. Intraoperatively the surgeon encountered difficulties as her extensive neurofibromatosis obscured the usual tissue planes and resulted in massive blood loss. The patient was transfused with eight units of packed cells, four units of fresh frozen plasma, ten litres of crystalloid solution and 3,500 ml of haemaccels. There were periods of hypotension. Active resuscitation restored her haemodynamic parameters. Urine output was maintained between 55 to 160 ml/h.

In addition, blood sugar level was regularly measured due to her somatostatinoma. Arterial glucose concentrations at 1, 2, 4 hour after start of surgery were 5.3, 6.9, 8.3, mmol/L, respectively.

The operation concluded after 6.5 hours. The patient was sedated and transferred to the Intensive Care Unit. She was stable overnight and the trachea was extubated the next day. The epidural was accidentally dislodged and pain relief was continued with patient controlled analgesia (PCA). The patient was transferred to general ward after three days and was eventually discharged home twenty days after the operation.

Discussion

Somatostatin

Somatostatin is a hormone secreted by the D cells in the islets of Langerhans of the pancreas. It was first isolated by Brazeau in 1973.[1] The action of somatostatin can be thought of a hormone that inhibits the secretion of other hormones in the gastrointestinal tract, including glucagon and insulin. Somatostatin is also secreted by the hypothalamus into the portal-hypophyseal circulation where it inhibits the secretion of growth hormone in the anterior pituitary gland (adenohypophyses). It is also secreted by other tissues in the gastrointestinal tract and other parts of the central nervous system.

Structure and Synthesis

Somatostatin exists in two forms, referred to as SS-14 and SS-28, indicating the length of their amino acid chains. The hormone was first produced as a pro-hormone preprosomatostatin, which was cleaved to form prosomatostatin, and subsequently to form either SS-28 or SS-14.[2] Different tissues vary in the relative amounts of SS-14 and SS-28 secreted. The pancreas secretes exclusively SS-14 which is also the major form secreted by the central nervous system. In contrast, the intestine secretes mostly SS-28.[2] SS-14 and SS-28 also differs in their relative potencies in their target tissue. SS-28 is ten times more potent to inhibit growth hormone secretion, but less potent than SS-14 to inhibit glucagon release.[2]

Somatostatin Receptors

Somatostatin acts through specific receptors of which five have been identified. All of them are G protein-coupled receptors that signal to inhibit adenyl cyclase.[1]

Physiologic Effects

Somatostatin exerts its physiological effects in both endocrine and paracrine fashions to its target cells. The physiological effect of somatostatin can be summarizd as '*a hormone which inhibit the secretions of many other hormones*'.

Effects on the Pancreas

There are at least four different cell types present in the pancreatic islets of Langerhans. A cells secrete glucagon, B cells secrete insulin, D cells secrete somatostatin and F cells secrete pancreatic polypeptide. These cells are arranged in a particular manner within the islets: the B cells are located in the centre of the islets surrounded by A, D and F cells in the periphery. Somatostatin is thought to act in a paracrine manner to inhibit the secretion of both insulin and glucagon: the hormone is released into the extracellular fluids and diffuse to other islet cells and inhibit their secretory functions.[2] It also suppresses pancreatic exocrine secretions and bicarbonate secretion by inhibiting the secretion of cholecystokinin and secretin respectively.[1]

Effects on the Gastrointestinal Tract

Somatostatin is also secreted by other epithelial cells scattered in the gastrointestinal tracts. It is secreted by nerve cells in the enteric nervous system. The secretion of other hormones that are inhibited by somatostatin includes cholecystokinin, gastrin, secretin, and vasoactive intestinal pepide.[1,2] Somatostatin decreases gastric acid and pepsin secretion, decreases gastric emptying, decreases smooth muscle contraction and blood flow in the gut with an overall effect of decreasing the rate of nutrient absorption.[1, 4]

Effects on the Pituitary Gland

Somatostatin was named after its effect of inhibiting the secretion of growth hormone in the anterior pituitary gland (adenohypophyses). It is also known as growth hormone-inhibiting hormone (GIH). Growth hormone secretion is controlled by the inter-play of growth hormone releasing hormone (GRH) and GIH. Both hormones are secreted by the hypothalamus and transported to the anterior pituitary via the portal-hypophyseal circulation.

Somatostatinoma

'Islet cell tumors' are uncommon endocrine tumors of the pancreas. Among the islet cell tumors, insulinomas are more common whereas somatostatinomas are the rarest.

Somatostatinoma was first reported by Ganda et al in 1977.[5] The classical symptoms of secretory somatostatinoma syndrome are diabetes, diarrhea, steatorrhoea, cholelithiasis, hypochlorhydria and weight loss.[5-7] They can arise from the pancreas, intestine and extra-pancreatic tissues.

Somatostatinoma occurs most commonly in middle ages patients. They are twice more frequent in the female than in male patients. Other islet cell tumours have equal sex distribution.[6,7]

Symptoms of Somatostatinoma:

Diabetes Mellitis

75% of patients with pancreatic somatostatinoma and 11% of patients with intestinal Somatostatinoma have diabetes

respectively.[8] The diabetes is mild and ketoacidosis rarely occurs. It can usually be controlled by diet or oral hypoglycaemic agents. Proposed mechanisms of diabetes include differential inhibition of insulin and glucagon, and destruction of other functioning cells in the islets.[8] Somatostatinomas are usually large and can destroy a substantial portion of the pancreas. In contrast, insulinomas are usually small. Our patient did not have diabetes, and her blood sugar levels monitored intraoperatively were also fairly stable. This might be related to that her tumor was non-secreting.

Cholilithiasis

Cholilithiasis is common in patients with somatostatinoma, (75% in pancreatic somatostatinoma and 27% in intestinal somatostatinoma).[8] In contrast, cholilithiasis is not associated with other islet cell tumors. Somatostatin is known to inhibit motility of the gallbladder.[9] This inhibition of gall bladder emptying may be the cause of frequent cholilithiasis in patients with somatostatinoma.

Intestinal symptoms

Diarrhoea and steatorrhoea are common symptoms for patients with somatostatinoma. It may be related to the effects of somatostatinoma in inhibiting the exocrine secretions of the pancreas causing decrease in proteolytic enzymes secretion. This is aggravated by the decrease of gall bladder motility causing decrease in bile secretion. Mass effect of the tumor can also cause obstruction of the secretory ducts, and may even cause obstructive jaundice.[10-11] Our patient presented with obstructed jaundice from the mass effect of the tumor, however she had minimal if any of diarrhoea or steatorrhoea prior to presentation. Again, it may be related that her tumor was non-secretory and her pancreatic exocrine function was not much affected.

Hypochlorhydria

Hypochlorhydria (poor stomach output of hydrochloric acid) is associated with somatostatinoma. Somatostatin inhibits gastric acid secretion.[10] The symptoms of hypochlorhydria are non-specific and include stomach bloating, burping, dyspepsia, flatulence, diarrhea. Our patient did not report such symptoms specifically, however such symptoms are very non-specific and could have been overlooked or because our patient had an non-secreting somatostatinoma.

Weight loss

Weight loss between 9 to 21 kg had been reported.[8] Our patient weighed only 33 kg at the time of presentation. She claimed she had always been underweight. In fact, she mentioned she had put on 5-7 kg in the interim period of approximately 9 months from the time of first presentation to when the Whipple's procedure was performed. This could have been related to better nutrition from the release of bile obstruction and control of her hyperthyroidism.

Associated Endocrinopathies

Somatostatinoma is also associated with Multiple Endocrine Neoplasia Syndrome Type I (MEN I)[11] and neurofibromatosis. Neurofibromatosis type I (von Recklinghausen's disease) refers to peripheral neurofibromatosis which is manifested as multiple skin neurofibromas and multiple *café-au-lait* spots. Skin neurofibromas are subcutaneous, soft, sometimes pedunculated, tumors. They increase in numbers throughout life.[15] In fact, neurofibromas also occur in tissues inside the body as in this patient. Our patient was known to have neurofibromatosis type I. She has multiple skin tags and multiple *café-au-lait* spots causing significant cosmetic disability. She was also discovered to have hyperthyroidism.

Tumor characteristics

Vinik and Harris analyzed the location of smatostatinomas.[12,13] Majority (60%) were found in the pancreas and 40% were found in the duodenum or jejunum. Of the pancreatic tumors, half were found in the head, a quarter in the tail and the rest were found in the body or infiltrated the whole pancreas. Of those found in the gut, the most common site was in the duodenum, which accounted for about half of the cases, followed by the ampulla of Vater.

Somatostatin containing or secreting tumors have also been reported to occur in medullary carcinoma of the thyroid, oat cell carcinoma of the lung and phaeochromocytomas.[11] More than one hormone can also be secreted by an endocrine tumor.[13]

Diagnosis

This disease is difficult to diagnose, both from its rarity and from the non-specific symptoms it causes. The tumors were often found accidentally in laparotomy, in the upper gastrointestinal tract imaging studies or endoscopies for investigation of non-specific symptoms such as dyspepsia, gastro-intestinal tract hemorrhages and bowel habit changes. Because of their large size and solitary, somatostatinomas usually are well localized radiographically before surgical exploration.[6-12] Our patient presented with obstructive jaundice which illustrated its often delay in diagnosis. Such presentation was reported previously.[13] The tumor is confirmed by immunohistological staining with and without elevated level of plasma somatostatin, indicating whether it is a secreting or non-secreting tumor.

Anaesthetic Management

Patients with somatostatinoma are often associated with other endocrine disorders such as those in MEN I, and neurofibromatosis. Resection of this tumor may be met with surgical difficulties from the numerous co-existing neurofibromas in tissue planes resulting in massive blood loss requiring massive blood transfusion. Stabilization of co-existing endocrine disorders such as hyperthyroidism pre-operatively and anticipation of massive blood loss and provision for massive blood transfusions should be prepared for intra-operatively.

REFERENCES

1. Brazeau P, Vale W, Burgus R, *et al*. Hypothalamic polypeptide that inhibits the secretion of immunoreactive pituitary growth hormone. Science 1973; 179:77-9.
2. Larsson LI, Hirsch MA, Holst JJ, *et al*. Pancreatic somatostatinoma. Clinical features and physiological implications. Lancet 1977; 1:666-8.
3. Vale W, Rivier C, Brown M. Regulatory peptides of the hypothalamus. Annu Rev Physiol 1977; 39:473-527.
4. Creutzfeldt W, Arnold R. Somatostatin and the stomach: exocrine and endocrine aspects. Metabolism 1978; 27(Suppl 1):1309-15.
5. Ganda OP, Weir GC, Soeldner JS, *et al*. "Somatostatinoma": a somatostatin-containing tumor of the endocrine pancreas. N Engl J Med 1977; 296:963-7.
6. Tan CC, Hall RI, Semeraro D, Irons RP, Freeman JG. Ampullary somatostatinoma associated with von Recklinghausen's neurofibromatosis presenting as obstructive jaundice Eur J Surg Oncol 1996; 22:298-301.
7. Kainuma O, Ito Y, Taniguchi T, *et al*. Ampullary somatostatinoma in a patient with von Recklinghausen's disease. J Gastroenterol 1996;31:460-4.
8. Krejs GJ, Orci L, Conlon JM, *et al*. Somatostatinoma syndrome. Biochemical, morphologic and clinical features. N Engl J Med 1979; 301:285-92.
9. Fisher RS, Rock E, Levin G, Malmud L. Effects of somatostatin on gall bladder emptying. Gastroenterology 1983; 92:885.
10. Bloom SR, Mortimer CH, Thorner MO, *et al*. Inhibition of gastrin and gastric-acid secretion by growth-hormone release-inhibiting hormone. Lancet 1974; 2:1106-9.
11. Griffiths DF, Williams GT, Williams ED. Duodenal carcinoid tumors, phaeochromocytoma and neurofibromatosis: islet cell tumour, phaeochromocytoma and the von Hippel-Lindau complex: two distinctive neuroendocrine syndromes. Q J Med 1987; 64:769-82.
12. Vinik A, Delbridge L, Moattari R, Cho K, Thompson N. Transhepatic portal vein cathereterization for localization of insulin-omas: a ten-year experience. Surgery 1991; 109:1-11.
13. Harris GJ, Tio F, Cruz AB Jr. Somatostatinoma: a case report and review of the literature. J Surg Oncol 1987; 36:8-16.

Abstracts presented at the Combined Scientific Meeting 2005

East meets West in Pain Medicine

An official satellite meeting of the 11th World Congress on Pain

New Horizons in Anaesthesia

Hong Kong Convention and Exhibition Centre, 27-28 August, 2005

F-005

A Retrospective Cohort Study Investigating the Incidence of Hypotension and Vasopressor Administration in Twin and Singleton Pregnancies Undergoing Spinal Anesthesia for Caesarean Delivery

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Objective: The use of spinal anesthesia in twin caesarean delivery is controversial. We conducted this study to compare the incidence of clinically relevant hypotension after spinal anesthesia in twin and singleton caesarean deliveries. The primary outcome measurement was the incidence of clinically relevant hypotension, defined as the point a vasopressor was used before delivery of the neonate.

Methodology: In this retrospective, cohort study, 103 hospital records of twin caesarean deliveries and 330 singleton caesarean deliveries under spinal anesthesia between 1996 to 2004 were reviewed. If the time of vasopressor administration occurred before the delivery of the neonate, the patient was considered as having a clinically relevant episode of hypotension. Baseline characteristics were compared using unpaired t-test, Mann-Whitney U test, and chi-squared test. Odds ratios for vasopressor administration and possible predictor variables were calculated using logistic regression.

Results: Baseline demographic differences were observed in age, weight, height, gestational age, parity, bupivacaine dose, and intravenous fluid volume between the twin and singleton groups. There was a lower incidence of vasopressor administration (hypotension) prior to delivery of the neonate in the twin as compared with the singleton group (34 *vs* 47%). The odds ratio (or) for vasopressor administration was 0.508 for twin pregnancy after adjustment (95% confidence interval (CI) 0.311 to 0.829). Logistic regression analysis showed that ward systolic blood pressure and number of fetus were the predictor variables associated with vasopressor administration before delivery (OR 0.947, 95% CI 0.930 to 0.964; OR 0.508, 95% CI 0.311 to 0.829).

Conclusion: Twin pregnancy is associated with a lower incidence of vasopressor administration before delivery as compared with singleton pregnancy in spinal anesthesia for caesarean section. The assumption that twin pregnancy patients are more likely to experience hypotension with spinal anesthesia is not supported.

F-006

Performance Of BIS® XP During Simulated High Frequency Electrocautery Interference

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Background: Electroencephalogram (EEG) is vulnerable to contamination from high frequency noises during electrocautery. The A-2000 System XP monitor is designed to eliminate artifacts and thus allowing BIS monitoring during electrocautery. We evaluated the accuracy of BIS during electrocautery interference.

Methods: Forty-five patients were induced and maintained with target controlled infusions of propofol and remifentanil aiming at an effect site concentrations of 3μg/ml and 4ng/ml, respectively. Bispectral index (BIS, version 4.0) was

measured using a Quatro sensor and an XP monitor. After baseline recordings (T1), "simulated" electrocautery interference was induced continuously for 15 min. At 5 min after the start of electrocautery (T2), propofol infusion was increased to achieve an effect site concentration of 6 μg/ml. At T3, electrocautery was stopped and T4 was 5 minutes afterwards. We recorded BIS values and signal quality index (SQI) at 4 points.

Results: During electrocautery, mean (±SD) SQI decreased significantly from 97±3.5 in baseline (T1) to 81±6.7 (T2), paired *t* test; *P*<0.001. However, there was no significant change in BIS value (T1 vs T2; *P*=0.99), even after a step increase in propofol infusion (T2 vs T3; *P*=0.14). In 39% of the patients there was a paradoxical increase in BIS values after doubling of propofol concentration. Following cessation of electrocautery, there was however a significant decrease in BIS (T3 vs T4; *P*<0.001).

Conclusions: Calculation of BIS requires a wealth of raw EEG signals. Rejecting artifacts from electrocautery interference using the hardware and software designs reduce the ability for BIS to respond to changes in anesthetic depth.

F-007

Perioperative Complications in Patients Taking Traditional Chinese Medicines Before Major Surgery

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Objectives of the study: to determine the incidence of traditional Chinese medicines (TCM) use within 2 weeks of surgery and assess its impact on perioperative care.

Methods: 601 patients undergoing major elective surgery were asked about their western medicine and tcm use in the 2 weeks before surgery. Data on abnormal preoperative laboratory results, intraoperative and postoperative hemodynamic instability, excessive blood loss during surgery and delayed emergence were collected. Causal assessments between TCM and perioperative complications were assessed independently by 2 anaesthesiologists.

Results: 530 patients (88%) took TCM in the form of herbal "cooling" teas 草本涼茶(33%), herbal soups 草本湯 (69%), over the counter pre-packed preparations 不用處方的即食/預制草本(29%) and TCM prescription 中藥處方(8%). We identified 33 (5.5%, 95%CI: 3.9% to 7.6%) TCM related perioperative complications: 12 impaired haemostasis (2 required re-operations to control bleeding), 15 haemodynamic instability, 2 preoperative hypokalaemia and 4 excessive sedation. These complications were "possibly" (n=30) or "probably" (n=3) caused by TCM. The severity of complications were mild (n=13), moderate (n=16) and severe (n=4). Common TCM related to perioperative complications included Huang qi 黃耆, Dangshen 黨參, Bai zhu 白朮, Di huang 地黃, Asian/American Ginseng 人 參/西洋參 and San qi 三 七.

Conclusion: approximately 1 in 20 patients had TCM-related perioperative complications. During the preoperative evaluation, anesthesiologists should document a history of recent TCM use and consider modify perioperative care accordingly.

F-008

Determination of an Optimal Dose of Fentanyl for Use with Propofol when Inserting the Laryngeal Mask Airway

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Objective and methods: We conducted a prospective, double blinded, and randomized controlled study to determine the most appropriate dose of the short acting opioid fentanyl co-administered with a standard dose of propofol (2.5 mg/kg) for facilitating the insertion of a laryngeal mask airway (LMA) in patients requiring general anesthesia for minor surgeries. Five doses of fentanyl (placebo, 0.5, 1.0, 1.5 and 2.0 μg/kg) were studied in 75 ASA I to II patients, age 18-63 years. The responses to LMA insertion were assessed using a six category (mouth opening, ease of insertion, swallowing, gagging/coughing, head/limb movement, laryngospasm), three point score (full/partial/nil; easy/difficult/impossible; nil/slight/gross; or nil/partial/total).

Results: There was no significant difference in the frequency of incorrect position of lma among different fentanyl dose groups (χ^2_4 = 2.54, p=0.64). There was no significant difference in the proportion of patients requiring more than one attempt to secure lma among different groups (χ^2_4 = 4.10, p=0.39).

After LMA insertion, the mean arterial pressure (map) in the control group increased. This was in contrast to other fentanyl groups where the map continued to decrease. Similarly, after lma insertion, the heart rate in the placebo group increased, whilst in the other fentanyl groups it decreased.

No dose response relationship could be shown for fentanyl in the respect to degree of mouth opening, difficulty of LMA insertion, gagging or coughing, laryngospasm and time of apnoea after induction. There were dose response relationships for fentanyl in respect to preventing swallowing, head or limb movements, optimal LMA insertion condition but the ED90 and ED_{95} were not very reliable because of the enormous upper ranges of 95% confidence interval.

Conclusion: we conclude that the optimal dosage of fentanyl which totally abolishes patient's response (ED_{95}) for the facilitation of LMA insertion could not be determined. At best we could predict an ED_{50} for fentanyl 0.5 μg/kg.

F-009

Does Hyperventilation Improve Neurosurgical Operating Conditions During Supratentorial Craniotomy?

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Objective: In a randomized study, we evaluated the effects of moderate hyperventilation on the surgical operating conditions and intracranial pressure (ICP) in patients undergoing craniotomy for excision of supratentorial brain tumors during isoflurane or propofol anesthesia.

Methods: 101 patients were randomized to receive either propofol or isoflurane anesthesia. Following induction of anesthesia, patients were randomly allocated into two groups, so that ventilation was adjusted to achieve an arterial carbon dioxide tension ($PaCO_2$) between 25-27 mmHg (hyperventilation) or 35-39 mmHg (normoventilation). After 15 minutes of equilibration, we measured the ICP subdurally and recorded the operating condition of the brain by the neurosurgeon using a four point scale (1=excellent, 2=acceptable, 3=swollen, 4=swollen needing treatment). Ventilation was then readjusted, so that hyperventilation was induced in patients who had been receiving normoventilation and vice versa. Measurements were repeated at the end of equilibration period. Therefore, each patient was assessed at two $PaCO_2$ ranges.

Results: Hyperventilation reduced ICP effectively. However there is no change in the assessment of brain condition when patients received hyperventilation from normoventilation or vice versa.

Conclusion: This study demonstrated no statistically significant benefit to hyperventilation either in terms of surgeon assessment of the operating conditions in patients undergoing supratentorial tumor excisions during propofol or isoflurane anesthesia.

F012

Hemodynamic Monitoring During Elective Caesarean Section: The Good, The Bad Aand The Ugly.

Shara WY Lee, Kim S Khaw, Warwick D Ngan Kee, Bryan Ng, Floria Ng, Lester AH Critchley.

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Objective of the study: To evaluate three monitors capable of detecting real-time haemodynamic changes in parturients receiving spinal anaesthesia (SA) for elective Caesarean section (CS).

Methodology: With Ethics Committee approval and informed consent, 10 ASA I-II parturients were monitored. In addition to standard monitoring including NIBP, ECG and SpO_2, patients were monitored with the Finometer®, which measures beat-to-beat blood pressure by finger plethysmography and cardiac output (CO) by the Modelflow method. CO was also measured using continuous wave Doppler ultrasound, USCOM®, and impedance cardiography RheoCardioMonitor® (RCM). Data were collected for 20-minutes before induction of SA, and intra-operatively, for 10-minutes after delivery of the baby. We compared the measurements taken from these devices and evaluated the capability to monitor haemodynamic changes before and during hypotension. Data were analysed using ANOVA for repeated measures, correlation coefficient and Bland-Altman analysis.

Results: Spinal anaesthesia results in a compensatory increase in CO, prior to decompensation and hypotension which were detected by all three devices. Effect of vasopressor treatments given for hypotension was also detected. Interference of RCM signal was a problem when surgical diathermy was used. The USCOM was highly operator-dependent making it difficult to apply in operating theatre environment. Beat-to-beat BP measurements using the Finometer showed good agreement with the standard NIBP, and detected hypotension earlier.

Conclusion: All three monitors detected CO changes before BP changes occurred, and the Finometer also detected hypotension earlier than standard NIBP. They have potential use for hemodynamic monitoring during regional anaesthesia.

F-014

Anesthesia Does Not Increase Rate of Perforation During Colonoscopy (Retrospective Study)

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Objective: Bowel perforation during colonoscopy was estimated around 0.01 to 0.3 percent. Controversial in using analgesics and sedatives during colonoscopy has been under much debate. Our aim was to compare retrospectively the rate of bowel perforation during colonoscopy with or without anesthesia.

Methodology: There were total 19,649 colonoscopies performed in our hospital between 2000~2004. Group A, 10,148 cases were diagnostic/therapeutic colonoscopy without anesthesia, while 9,501 cases were performed for group B (Health Check Service, with or without anesthesia). Bowel perforation rate was compared between these two groups and among patients (group B) receiving or not receiving anesthesia. Fisher's exact test was used for significance checking.

Results: The mean age for group A was 55.46 (SD= 16.33) and 51.19 for group B (SD=12.05) ($p<0.001$). In group A, only

one patient (0.0099%) suffered from perforation while three perforated cases (one male and two females) (0.032%) were found in group B (p=0.359). In group B, one out of 2460 patients not receiving anesthesia suffered from perforation while the rest of the group (7041 patients) received anesthesia with only two patients suffered from perforation of colon. (p=1.000).

Conclusion: There was no significant difference in the perforation rates for colonoscopy between group A and B. Present abdominal illness did not increase perforation risk as reviewed from our study. No significant difference in perforation rate was found between patients who received colonoscopy with or without anesthesia. Anesthetic drugs (propofol, midazolam and alfantanil) did not increase the risk of colon perforation during colonoscopy.

F-016

A Survey of Attitude of Hong Kong Chinese Patients Towards Day-Case Surgery

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Objective: This study evaluated Chinese patients' attitude towards day case surgery at a public hospital in Hong Kong.

Methodology: We conducted a survey on patients scheduled for elective surgery who attended the preanaesthetic assessment clinic. Following informed consent, all respondents completed a standardised questionnaire. Demographic data, information on home situation, their understanding and preference for day-case surgery, and past experience were collected. They were instructed to rate statements explaining the reasons for their preference with a score from 1 to 5 (most important). Postoperative, they were reviewed by telephone for postoperative adverse effects, overall satisfaction and again their preference for day-case. Assuming a score of 3 being neutral, statistical analysis was performed to determine the trend of their responses to the statements using the sign test. Univariate and logistic regression analyses were performed to examine factors that may influence the patients' preference and satisfaction. P-value of <0.05 was considered significant.

Results: Two hundred respondents were surveyed. The mean age was 28.1±18.5 years. One hundred eighty respondents preferred day-case surgery. Important reasons were shorter duration of hospitalisation, dislike hospital environment, belief that hospital is highly infectious, having to look after family, return to work early and doctor's advice. Small home environment and the belief that day surgery is unsafe were not important. Respondents who did not prefer day-case surgery stressed the importance of better care in hospital, concerned with surgical complications, nausea and vomiting, and doctors' advice. Demographic characteristics did not affect patients' preference for day-case surgery.

122 patients actually underwent day-case surgery, while 48 were in-patients. Only 10.5% respondents complained of postoperative adverse effects. The actual conduct of the procedure and presence of postoperative adverse effect affected respondents' preference after the surgical experience. The latter also affected respondents' satisfaction.

Conclusion: Day-case surgery is preferred by most local patients. Postoperative adverse effects may influence the respondents' satisfaction and preference after their surgical experience.

F-018

Long Term Outcome of Acute Respiratory Distress Syndrome (ARDS) Caused by Severe Acute Respiratory Syndrome (SARS)

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Objective: To examine long term outcome of pulmonary function, exercise capacity and health-related quality of life (HRQoL) in patients with ARDS caused by SARS.

Methods: Fifty nine patients with ARDS caused by SARS were evaluated in ICU and after discharge up to 1 year. They underwent pulmonary function testing, six-minute walk test and HRQoL evaluation by SF-36 questionnaire at 3, 6, and 12 months after illness onset.

Results: Mean cohort age was 47(SD15.7) years, median APACHE II score 10 with 47% requiring invasive mechanical ventilation (IMV). The median stay in ICU and hospital were 9 and 31 days respectively. Mortality was 24% at hospital discharge and at 1 year. Survivors were significantly younger with a lower APACHE II score, shorter ICU stay, lower peak INR, lower average fluid balance, less nosocomial infection, lower maximum multi-organ dysfunction (MOD) score and required less IMV. The mean lung volumes and spirometric measurements were normal by 6 months, but diffusion capacity at 12 months was significantly lower among survivors who had IMV. The 6-minute-walk-distances (6MWD) improved from 400(SD90) m to 461(SD140) m and 475(SD94) m to 523(SD95) m from 3 to 12 months in those with and without prior IMV respectively. The 6MWD was significantly higher at 3 months in patients with no prior IMV (p=0.043). Patients with younger age had remarkable recovery of HRQoL by 6 months. They also had lower MOD score, shorter ICU and hospital stay. Those aged >40 years had no clear trend of recovery with impaired health status in multiple domains.

Conclusions: Older subjects > 40 years with ARDS due to SARS still had impaired health status at 1 year despite relatively normal pulmonary function.

Council Highlights

Review of Congregation

The Council has reviewed the procedures of the annual College Congregation and has resolved to maintain the current support for new fellows. Graduating fellows who present themselves to the Congregation, are entitled to the following benefits:

(1) Free registration for the associated Annual Scientific Meeting.
(2) Complimentary dinner tickets will be provided to the graduating fellows and two other accompanying persons. Additional ticket (the fourth ticket) will be charged at 50% of the cost.

Visiting Clinical Scholarship

Early in the year, the Council has resolved to establish one visiting clinical scholarship per year. There has been no application so far. The Council would like to re-advertise for the award.

The scholarship will allow a visiting scholar from any anesthetic department in the Mainland to visit Hong Kong for a period of no more than twelve months. The College will assist the visiting scholar with the application for temporary medical registration (with the Hong Kong Medical Council), so that the (s)he is allowed to gain clinical experiences in any hospital run by the Hospital Authority. The hosting department/hospital should apply to the Hospital Authority for appropriate clinical appointment and medical indemnity insurance. The visiting scholar will not occupy the usual training position as stipulated by the Board of Accreditation.

Support for the visiting scholar will usually include:

(1) a reasonable amount of cash for living allowance (to be provided by the College), and
(2) accommodation on hospital quarters / campus (to be provided by the hosting department / hospital).

Eligibility/Application

Individual department intending to bring in visiting clinical scholars should apply to the College (office@hkca.edu.hk). A proposal should include the nature of work during the period and a copy of the curriculum vitae of the visiting scholar. An ad hoc committee will consider the application on a case-to-case basis.

Expert witness

The College would like to establish a list of fellows who may wish to serve as expert witnesses for medico-legal cases related to anesthesia, intensive care and pain medicine. Fellows with more than five years experience are eligible for this program. Further information and application form can be obtained from the College office. The closing date of application is 30th November, 2005. Late application will not be considered.

Thank you, Chandra!

Professor Chandra Rodrigo has recently retired from the University of Hong Kong and is now staying in Sri Lanka. Chandra has been serving the College in various Boards and Committees, including the Assistant Secretary, Editor of the College Newsletter, Formal Project Officer and Examiner in the Final Fellowship Examination. Of note, the Mace of the College was made in Sri Lanka on a design forwarded by Chandra. The HKCA is the first College in Hong Kong to possess a mace.

The Council would like thank Chandra for all his contributions to the anesthetic community. Fellows who wish to get in touch with Chandra, should contact the College office for details.

Board of Education

Vocational Training

The New Vocational Training Guide (VTG) in anesthesia has been updated and has taken effect on 1st January 2005. Trainees joining the anesthesia training program of the Hong Kong College of Anaesthesiologists on or after 1st January 2005 must follow the new VTG.

For those trainees who join the vocational training before 1st January 2005, they can opt for joining the new vocational training program or remain in the 'old' vocational training program. However, all trainees attending the Exit Assessment on or after 1st January 2008 will be assessed based on the new VTG. It is advisable for those who join the training program on or after 1st January 2002 to changeover to the new VTG, as the likelihood for them completing all the fellowship requirements before 1st January 2008 is very remote.

All trainees who commence training before 1st January 2002 need to indicate whether they wish to join the new VTG. This decision has to be made one year before the expected date of completion of the vocational training and this decision is irrevocable.

The "Transition Arrangements for change of Vocational Training Guide" has been published in HKCA Newsletter 2004;13(2):21-2, and can be found at the College website (www.hkca.edu.hk/transitanaes.pdf).

eLog Book

In response to the comments from the questionnaire survey and the SOT meeting during the CSM 2005, the following changes have been implemented in the eLogBook.

(1) Enter approximate duration of the operation instead of the exact start and end time.
(2) Simplify the data entry of the acute pain management cases.

CH Koo,
Training Officer

Peter Kam's Courses ….

REVISION TUTORIAL COURSE IN ANAESTHESIOLOGY 2005

This year Professor Peter Kam will again be running two REVISION TUTORIAL COURSES:

	Basic science in Anesthesiology	***Clinical Anaesthesiology***
Time	14 - 25 November, 2005	26 November – noon, 3 December 2005 (including the Sunday on 27 Nov., 2005!)
Contents	2 weeks "fulltime" course containing lectures, tutorials and mock viva	7½ -day course with interactive lectures, tutorials and mock viva sessions
Target audience	Trainees preparing for the Intermediate Fellowship Examination	Trainees preparing for the Final Fellowship Examination
Venue	Queen Elizabeth Hospital	
Maximum number	30	30
Fee	HK$ 2,000 Registered HKCA trainee HK$ 4,000 for non-HKCA member	HK$ 1,500 Registered HKCA trainee HK$ 3,000 for non-HKCA member
Deadline for application	1st November, 2005	11th November 2005

If you have any queries concerning the course, please contact Mr. Daniel Tso, Administrative Executive at 2871 8833. Further information can also be obtained at the College website www.hkca.edu.hk.

Drs CH KOO and Douglas FOK,
Course Coordinators, Department of Anaesthesia, Queen Elizabeth Hospital

Board of Examination

We started our Fellowship examinations 12 years ago. Both HKAM and our own College Administrative Instruction on Examinations require only one external examiner in each examination. Nevertheless, in each examination, we have invited two external examiners, one each from RCA and ANZCA. The external examiners ensure the standards in our exam are comparable to RCA and ANZCA. The exchange and dialogue with the external examiners have kept local examiners updated on development in professional matters including training and examination. They also help in fostering links between our College and sister Colleges. The external examiners from RCA and ANZCA have helped us in establishing a reliable and credible examination system.

The College examinations are now more established. From 2006, we plan to have one external examiner, alternating between RCA and ANZCA in each examination. We will invite two external examinations when the need arises. This arrangement will give us greater flexibility in controlling the examination expenses. Both air travel and hotel expenses are escalating in Hong Kong. It is, however, necessary that we try to control the examination expenditure. Trainees are earning less because of pay cut. The number of trainees is likely to decrease because of reduced intake in medical schools. The savings from the examination expenditure will also allow us to develop other areas of our examination system, such as running examiners workshop with invited tutor from overseas, and developing new examination materials such as MCQs.

In the autumn examinations this year, we saw an outstanding passing rate in the Intermediate examination. Examiners were all very pleased with the high standards of our junior trainees. We all hope this trend will continue. The passing rate in the Final Fellowship examination was however, disappointing. I like to take this opportunity to emphasize that we do not have a quota system in our examinations. We do not set passing or failure rates. Candidates achieving the set standards will pass the examinations.

We are aware that Departments, SOTs, fellows and senior trainees put in enormous efforts in helping trainees preparation for the examinations. We like to take this opportunity to ask fellows and trainees to write to us if they have any feedbacks and comments relating to College examinations.

Dr PT Chui
on behalf of Board of Examinations

Intermediate Fellowship Examination June / August 2005

CHAN Kai Man	FU Yim Ting
CHEUNG Chuen Ho	KAM Hau Tsz
CHU Chung Yin	KHU Kin Fai
CHU Ka Lai	KOO Emily Gar Yee
CHUNG Yu Fai	LAM Chi Shan

Fourteen out of 17 candidates passed this examination.
The Prize of the Intermediate Fellowship Examination was awarded to Dr KHU Kin Fai. The College is grateful to Drs Janis Shaw of RCA, and Peter Roessler of ANZCA for their assistance as External Examiners during the examination.

Fellowship Examinations 2006

Intermediate Fellowship Examinations
Examination Fee: $ 6,000

Feb / March	**Date**
Written	10 February 2006 (Fri)
Oral	31 March/1 April 2006 (Fri/Sat)
Closing Date	10 Jan 2006 (Tue)

July / August	**Date**
Written	7 July 2006 (Fri)
Oral	25/26 Aug 2006 (Fri/Sat)
Closing Date	7 June 2006 (Wed)

Final Fellowship Examination in Anaesthesiology
Examination Fee: $ 9,500

March / May	**Date**
Written	17 March 2006 (Fri)
Oral/OSCE	19-21 May 2006 (Fri-Sun)
Closing Date	17 February 2006 (Fri)

July / September	**Date**
Written	21 July 2006 (Fri)
Oral/OSCE	1-3 Sept 2006 (Fri-Sun)
Closing Date	21 June 2006 (Wed)

Application forms are available from Supervisors of Training and HKCA Office.

Board of Censor

Admission to Fellowship by Examination, FHKCA

Cheng, Yat-hung
Cheung, Ning Michelle
Chu, Suk Yi Annie
Ho, Yau Leung
Ho, Sin Shing
Hui, Kit Man Grace
Kwan, Wai Man Gladys
Lam, Cheung Kwan Brian
Lau, Angela Shuk Hang
Lee, Yeuk-ying Samantha
Lee, Yuk Ming Sunny
Low, Kai Ngai Kevin Yves
So, Chi Long
So, Ching Yee
Tong, Gerald Sze-Ho
Tsang, Ho Sze Kristie
Cheng, Tsang Dawn
Wong, Chak Man
Wong, Kan-nam

Admission to the Diploma of Pain Management (HKCA) by Examination, Dip Pain Mgt (HKCA)

Kong, Suet-Kei
Kwok, Fung Kwai

Admission to Fellowship *ad eundem*, FHKCA(IC)

Gomersall, Charles David
Chan, Kin Wai
So, Hui Kei Dominic

New Members

Au, Siu Wah Sylvia
Chau, Wai Suen Madeleine
Cheung, Suk Kwan
Chiu, Ching Pik Cindy
Lai, Ka Wang Alan
Lai, Kwong Lun
Lai, Man Ling
Lau, Wai Ling
Leung, Rebecca Wai Chee
Man, Hiu Kwan Jannifer
Pong, Man Kei Anita
Yip, Vivian Wai Man
Sham, Penelope Pui Yee

Michael Irwin
Censor-in-Chief

Approved Formal Projects

TONG, Gerald Sze Ho	Early Predictors for Prolonged Mechanical Ventilation
LAU, Angela Shuk Hang	A Retrospective Cohort study Investigating the Incidence of Hypotension and Vasopressor Administration in Twin and Singleton Pregnancies undergoing Spinal Anaesthesia for Caesarean Delivery

The ***Formal Project Prize*** was established by the College Council. This Prize is awarded to the best paper presented at the Formal Project Prize Session, usually held as part of the College Annual Scientific Meeting (ASM) or any other meeting approved by the Council. Registered Trainees in Anesthesia, Intensive Care or Pain Medicine and Fellows within one year of award of the corresponding Diploma of Fellowship are invited to submit the abstract of their formal projects to the organizing committee of the ASM for consideration of the award. Projects that have previously been published as a full manuscript or have been presented in another local or overseas meeting will also be considered. However, projects that have previously entered in another Formal Project Prize competition will be excluded.

The Chairman of the Board of Education will appoint at least two judges to select a number of projects for presentation during the "Formal Project Prize Session" at the ASM. The criteria for selection will be based on the scientific content of the submitted abstracts. The final assessment for the award will also include the quality of performance during the presentation and discussion afterwards.

The College reserves the right not to award the Prize if none of the project achieves a sufficiently high standard.

CSM 2005

On 27th and 28th August, we were delighted to see 360 registrants, including 54 overseas delegates turning up for the various workshops, refresher course and symposiums at the combined scientific meeting in Anaesthesiology 2005 at the Hong Kong Convention and Exhibition Center. The two lunch symposiums attracted some 180 audience each day. The meeting ended in the most soothing manner with the wine-tasting. Heartfelt thanks must go to all the speakers, chairpersons, all the 17 sponsors and last but not the least the organizing committee. Comment and feedback collected will be valuables for organizing the future meeting and is much appreciated. I sincerely hope that you did enjoy the meeting thoroughly and is looking forward to your participation in the future.

Timmy Yuen, Chairman, CSM 2005

Future Meetings: Anesthesia, Intensive Care & Pain Medicine

Local meetings 2005

5 November, 2005	**PAIN PATIENT EVALUATION WORKSHOP** Venue: Institute of Clinical Simulation, 3/F North District Hospital Contact: Emily Wong Phone: (852) 2683 8095 Email: wongwme@ha.org.hk
4 December, 2005	**PAIN SEMINAR: THE ESSENTIALS OF CHRONIC PAIN MANAGEMENT** Venue: Miramar Hotel, TST Contact: HKCA, Room 807, Hong Kong Academy of Medicine Building, 99 Wong Chuk Hang Road, Aberdeen, Hong Kong Phone: (852) 2871 8833. Fax: (852) 2814 1029, Email: office@hkca.edu.hk, website: www.hkca.edu.hk
10 December, 2005	**SYMPOSIUM ON ULTRASOUND GUIDED REGIONAL ANAESTHESIA** Venue: Prince of Wales Hospital Contact: Ms Connie Pang; Phone: (852) 2632 2735 Fax: (852) 2637 2422 E-mail: ansoffice@cuhk.edu.hk
14-15 January, 2006	**2ND ASIA PACIFIC NATA SYMPOSIUM ON TRANSFUSION MEDICINE AND ALTERNATIVES** Venue: Lecture Theatre, M/F, Hospital Authority Building, 147B Argyle Street, Kowloon, Hong Kong Contact: NATA Secretariat c/o LMS Group, 75, rue Guy Môquet 92240 Malakoff – France, Phone: +33 1 42 53 03 03 - Fax: +33 1 42 53 03 02 E-mail: nata.secretary@lms-group.com
26 February, 2006	**HKAM's THIRD INTER-COLLEGIATE SCIENTIFIC MEETING** Theme: Disaster Management Venue: Hong Kong Convention and Exhibition Center Contact: HKAM Conference Department, Hong Kong Academy of Medicine Building, 99 Wong Chuk Hang Road, Aberdeen, Hong Kong; Phone +(852) 2871 8787; Email: lenora@hkam.org.hk

Overseas Meetings 2005-2006

Haroi, VIETNAM 23-25 November, 2005	**14TH ASEAM CONGRESS OF ANAESTHESIOLOGISTS** Contact: Professor Nguyen Thu or Dr Cong Quyet Thang. Anesthesiology Department, Viet Duc Hospital, 40 Trang Thi Street, Hanoi, Vietnam. Tel: +84 4 9286149 Fax: +84 4 8248308 Email: nguyen_thugmhs@hmu.edu.jn or cqthang@fpt.vn
New York, USA 9-13 December, 2005	**NEW YORK STATE SOCIETY OF ANESTHESIOLOGISTS 59TH POSTGRADUATE ASSEMBLY IN ANESTHESIOLOGY** Venue: New York Hilton Hotel, New York. Contact: NYSSA, Kurt G. Becker, 85 Fifth Avenue, 8th Floor, New York, NY 10003. Phone: 1 212 867 7140 Fax: 1 212 867 7153 Email: kurt@nyssa-pga.org Website: www.nyssa-pga.org
San Diego, USA 14-18 January, 2006	**6TH ANNUAL INTERNATIONAL MEETING ON MEDICAL SIMULATION** Venue: San Diego Sheraton. Contact: Society for Medical Simulation, PMB 300 223 N. Guadalupe, Santa Fe, NM 8750 USA. Tel: 1 505 983 492 Fax: 1 505 983 5109 Email: info@SocMedSim.org Website: www.socmedsim.org

San Francisco, USA 24-28 March, 2006	**INTERNATIONAL ANESTHESIA RESEARCH SOCIETY 80TH CLINICAL AND SCIENTIFIC CONGRESS** Venue: Hyatt Regency San Francisco Embarcadero Center. Contact: International Anesthesia Research Society, 2 Summit Park Drive #140, Cleveland, OH 44131 , USA. Phone: 1 216642 1124 Fax: 1 216 642 1127 Email: iarshq@iars.org Website: www.iars.org
Madrid, SPAIN 3-6 June, 2006	**EUROANAESTHESIA 2006** Contact: Phone: +44 (0) 870 0132930 Fax: +44 (0) 870 0132940 Email: info@optionsglobal.com Website: www.optionsglobal.com
Toronto **Canada** 16 - 20 June	**CANADIAN ANAESTHESIOLOGISTS' SOCIETY ANNUAL MEETING.** Venue: Toronto. Contact: 1 Eglinton Avenue East, Suite 208, Toronto,Ontario Canada M4P 3A1. Tel: 416 480 0602 Fax: 416 480 0320 Email: meetings@cas.ca Website: www.cas.ca
Queensland **AUSTRALIA** 20-24 October, 2006	**65TH NATIONAL SCIENTIFIC CONGRESS OF THE AUSTRALIAN SOCIETY OF ANAESTHETISTS** Contact: Organisers Australia. PO Box 1237, Milton, Qld 4064. Tel: +61 (0)7 3371 0333 Fax: +61 (0)7 3371 0555
Adelaide, SA **AUSTRALIA** 13-17 May, 2006	**2006 ANZCA ASM** Theme: All in a Day's Work? Venue: Adelaide Convention Centre. Contact: Mr Christopher Boundy, South Australian Postgraduate Medical Education Association Inc (SAPMEA) Tel: 08 8274 6060 Fax: 08 8274 6000 Email: admin@sapmea.asn.au Website: www.sapmea.asn.au/conventions/anzca/index.html

WORKSHOPS ORGANISED BY THE INSTITUTE OF CLINICAL SIMULATION

A Collaboration between the Hong Kong College of Anaesthesiologists and the North District Hospital

(Application form can be downloaded from the College website: *www.hkca.edu.hk*)

Anaesthetic Crisis Resource Management (ACRM)

Date:	5 November and 3 December, 2005
Time:	08:00 – 18:00
Venue:	The Institute of Clinical Simulation
CME points:	HKCA 10 points
Max participants:	4
Fee:	HK$2000 per head
Format:	Each registrant will participate in (1) An introduction on the METI Simulator, the anesthetic machine for use in the workshop and the theories of crisis management (2) Allocated time for hands-on crisis scenario management on the METI Simulator, rotating through different roles and handling different scenarios (3) A group debriefing session at completion of each scenario

"Group" registration welcome if you can find your own partners to form a group of four. Mutually agreed dates may be arranged. Sessions will be videotaped. All participants in the workshop will be required to sign a confidentiality statement.

Honorary Fellowship, HKCA

Professor Teik Ewe Oh, MB BS, MD, FRCP, FRCPE, FRACP, FRCA, FANZCA, Hon FCA RCSI, FJFICM, FHKAM

The Honorary fellowship is the highest honor of the College. The fellowship is conferred at the discretion of the Council in recognition to individual's contributions to the status of anesthesia, intensive care and pain medicine in Hong Kong.

Mr President, It is a great honor to present Professor Teik Oh for the Fellowship of the Hong Kong College of Anaesthesiologists.

Professor Oh is currently Professor of Anesthesia at the University of Western Australia, in Perth. The Hong Kong College of Anaesthesiologists wishes to honor him for his substantial contributions in the fields of anesthesiology and intensive care. During his ten year tenure as Professor and Chair of the Department of Anaesthesia and Intensive Care at the Chinese University of Hong Kong, Professor Oh proved not only to be a great innovator and leader, but also an outstanding teacher and friend to many Hong Kong anesthesiologists and intensivists.

Professor Oh was educated in Australia at Brisbane Boys College, and after matriculation in 1963, he began his medical studies at King's College of the University of Queensland in Australia. He graduated *MB BS* in December 1969. He then began his clinical apprenticeship in Australia, moving to London to broaden his horizons, before returning to Perth in Western Australia to complete his training as an anesthetist. Teik's real interest lay elsewhere, however, in the still rapidly developing specialty of intensive care. His intentions to be a part of the development of intensive care were soon made clear when he took up successive Foundation Directorships of intensive care units in Canberra and Perth and contributed to the rapid development of intensive care organization that was being pioneered in Australasia at the time. During this formative period he still found the time to edit the widely used and highly successful "Intensive Care Manual". Teik Oh's Manual, as it is now known, is in its 5th edition.

Professor Oh's reputation was growing and in 1988 he was invited to become Professor and Chairman of the Department of Anaesthesia and Intensive Care at The Chinese University of Hong Kong. He was Dean of the Faculty of Medicine of The Chinese University of Hong Kong from 1989-1992. During his tenure in Hong Kong, Professor Oh's contribution to the University, Department, and to both anesthesiology and intensive Care in Hong Kong was considerable. As an example, Professor Oh, virtually single-handed, not only introduced the concept of independent intensive care practice to Hong Kong, but had the strength of personality to implement its practice in the face of not inconsiderable opposition. He was also instrumental in laying down the administrative foundations of the Hong Kong College of Anaesthesiologists. These and several other innovations in the organization, administration and practice of both anesthesiology and intensive care survive today as monuments to his positive influence.

Professor Oh's international prominence in the field of anesthesiology and intensive care is a result of decades of sustained contributions to administration, teaching and research. His personal academic publications number in the hundreds and he has been awarded several Fellowships. These include the Fellowship of the Royal Australasian College of Physicians, Fellowship of the Royal College of Physicians of London and Edinburgh, Fellowship of the Hong Kong College of Physicians, Fellowship of the Australian and New Zealand College of Anaesthetists, Honorary Fellowship of the College of Anaesthetists of the Royal College of Surgeons Ireland, and Honorary Fellowship of the College of Anaesthetists of South Africa. His personal areas of research include investigations in pharmacology, physiology, quality control

and organizational aspects of critical care medicine. The subject of his own doctorate was 'Important factors in weaning critically ill patients from mechanical ventilation'.

Professor Oh is a past President of the Hong Kong College of Anaesthesiologists, the Hong Kong Society of Critical Care Medicine, the Australian and New Zealand Intensive Care Society and of the Australian and New Zealand College of Anaesthetists, and has held several other important professional offices.

Throughout his career, Teik has been tirelessly supported by his wife Lala. They have had the satisfaction of parenting two children, one now a lawyer and one a university student. Teik is not only a successful doctor, professional and family man. He represented Kings College in rugby, hockey and athletics, being awarded half-blues in rugby and hockey. His current hobby and sporting passion is sailing.

I trust that by now a clear image of Teik's achievements is beginning to emerge, and so, Mr President, it remains only my great personal pleasure to present Professor Teik Oh for the Fellowship of the Hong Kong College of Anaesthesiologists.

Gavin Joynt

The President of HKCA (middle): Professor Tony Gin (2003-)
Past presidents (from left): Professor Teik Oh (1991-1993); Drs Ronald Lo (1993-1995), TW Lee (1999-2003); CT Hung (1995- 1999)

Golden Jubilee Banquet of the Society of Anaesthetists of Hong Kong

The Society of Anaesthetists of Hong Kong celebrated her 50th anniversary on 28 August 2005 in the presence of one of her cofounder, at the age of 88, Dr Zoltan Lett. The Golden Jubilee Banquet held at the Hong Kong Convention and Exhibition Centre overlooking the Hong Kong harbor was a great success and a truly memorable evening.

The Society was founded in 1954. Dr KC Yeo, the Director of Medical and Health Services of the Hong Kong Government at the time, had the foresight to appoint a specialist anesthetist in Hong Kong. Dr Lett was recruited from the United Kingdom to take up this monumental task. The year 1954 witnessed the founding of the Society (by Dr Lett and the late Dr Ozorio), which was to become the first specialist medical society to be registered legally in Hong Kong. Since then, the Society has been dedicated to the development of expertise in anesthesia, improving the conditions for training and continuing medical education, upholding the standard and care, and promoting the image of the specialty locally and internationally as well as education of the public. Furthermore, the Society initiated the founding of the Hong Kong College of Anaesthesiologists in 1989, which subsequently took over the academic capacities and development of postgraduate training program locally. It is envisaged that the Society and the College will continue their joint effort in propagating anesthetic history in Hong Kong.

The dinner party evening saw an attendance of over 100 invited guests and members. Amongst these were:

The Secretary for Health, Welfare and Food Bureau, Dr York Chow;
The Cofounder of the Society Dr Lett and his wife Hilde;
Chairman, executive committee, World Federation of Societies of Anaesthesiologists: Dr. Florian Neuvo;
The current President of the Society Dr Yu-fat Chow;
President of the Hong Kong College of Anaesthesiologists Prof Tony Gin;
President of the Federation of Medical Societies of Hong Kong: Dr Dawson Fong;
Former presidents/Chairmen of the Society;
Current & past Office bearers and Council members of the Society;
Members retired from clinical practice and from overseas;
Representatives from Sister Societies and Colleges;
Representatives from the Mainland: Academic Secretary of the Chinese Society of Anaesthesiology: Prof Zhang Hong; Former president of the Chinese Society of Anaesthesiology: Dr Luo Ailun;
Representatives from anesthetic counterparts from other regions: Macau, Taiwan, Philippines;
Speakers of the Combined Scientific Meeting 2005 which preceded the banquet locally and from overseas (including China, Canada, America and Australia)

The program began with a cocktail reception, photographing session followed by the welcome reception by the current President of the Society Dr. Yu-fat Chow, etc. The changes encountered in the history of the Society were highlighted and Dr. Chow stressed that the focus of serving target remains, as always, the same; in collaboration with the College, the Society will continuously strive to serve their members, fellows, the specialty, the profession of medicine and the public.

Dr York Chow, himself a former orthopedic surgeon of high repute, the Secretary for Health, Welfare and Food Bureau delivered his congratulatory address and best wishes to the continual growth and achievement of the Society locally and internationally.

The Banquet reached its climax when Dr Lett, the cofounder of the Society presented his Golden Jubilee speech, aided by a slide presentation: an entertaining graphic depiction of the history of anesthesia in Hong Kong. The guests were led through a journey in time and were all very impressed by the vivid demonstration, illustrating just how far the Society has progressed in the past decades.

For commemoration of the anniversary, a special publication "Golden Jubilee Commemorative Monograph" was published and distributed to all the guests.

After exchanging souvenirs between various distinguished parties, the master of ceremonies. Drs Douglas Fok and Libby Li who had been in "masterly form" throughout the evening, brought the splendid gathering to a close, promising another equally memorable event in a decade: the 60th birthday of the Society in 2014.

More photos are available at www.hkca.edu.hk/csm2005.htm

Combined Scientific Meeting in Anaesthesiology 2005

CSM2005

27-28 August 2005


香港麻醉科醫學院
The Hong Kong College of Anaesthesiologists


The Society of


The Society of Anaesthetists of Hong Kong
Golden Jubilee Dinner


The Society of Anaesthetists of Hong Kong

Formal Project Prize 2005

The 2005 Formal Project Prize was awarded to Dr Sandy LI. The title of her presentation was "A survey of attitude of Hong Kong Chinese patients towards day-case surgery".

Intermediate Fellowship Examination June / August 2005

Panel of examiners and successful candidates

HKCA Council 2005-2007

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  - o Double Burst Stimulation

Reference:
1. Wierda et al., Br J Anaesth 1990;64:521-3.
2. Chetty M et al., Anaesth Intens care 1996;24:37-41.
3. J. C. De mey et al., Eur J Anaesthesiol 1994;37-40.
4. Schramm et al., Br J Anaesth 1996;77:607-11.
5. Naguib et al., Br J Anaesth 1995;75:588-92.
6. Scott et al., Anaesthesia 1998;53:867-71.
7. Schramm et al., Acta Anaesthesiol Scand 1998;42(Suppl 112):233-5.
8. Calon B et al., Data on file.
9. Prielipp RC et al., Anesth Analg 1995;81:3-12.
10. Strange C et al., Am J Respir Crit Care Med 1997;156:1556-61.
11. Khuenl-Brady et al., Eur J Anaesthesiol 1995;12(Suppl 11):79-80.
12. Approved Product information

HK.05.ESM.01

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For further information, please contact:
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Tel: 2833 6380 Fax: 2574 9151

The Hong Kong College of Anaesthesiologists

Pain Seminar -

The Essentials of Chronic Pain Management

December 4 , Sunday, 2005
0900-1600 h
Ballroom, Penthouse, Miramar Hotel, TST

Target Audience - Doctors, nurses, physiotherapists, occupational therapists, clinical psychologists, health administrators.....

Objectives - Participants will learn about epidemiology, the concepts of pain, the principles of chronic pain management, and about clinical management of chronic pain conditions including chronic headache and migraine, neuropathic pain, low back pain ,etc. presented as series of lectures and clinical case panel discussion.

Faculty

Professor Michael Nicholas	Clinical Psychologist, University of Sydney, Australia
Dr Roger Goucke	Pain Specialist, Sir Charles Gairdner Hospital, Perth, Australia
Dr Jacobus KF Ng	Anaesthesiologist, Queen Mary Hospital, University of Hong Kong, HKSAR
Dr TH Tsoi	Neurologist, Pamela Youde Nethersole Eastern Hospital, HKSAR
Dr Anne Kwan	Anaesthesiologist, United Christian Hospital, HKSAR
Dr Theresa Li	Anaesthesiologist, Queen Elizabeth Hospital, HKSAR
Dr Joseph Lam	Neurosurgeon, Prince of Wales Hospital, HKSAR
Dr Kenneth MC Cheung	Orthopaedic Surgeon, Queen Mary Hospital, University of Hong Kong, HKSAR
Ms Polly Lau	Physiotherapist, Queen Elizabeth Hospital, HKSAR
Dr PP Chen	Anaesthesiologist, New Territories East Cluster Hosptials, HKSAR

Academic Accreditations

College of Anaesthesiologists	6 CME	College of Nursing	6 CNE
College of Family Physicians	5 CME	HKMA CME	5 CME
College of Orthopaedic Surgeons	3 CME	Hong Kong Doctor Union	5 CME
College of Physicians	2 CME	Occuption Therapists	6 CPD
College of Psychiatrists	6 CME	Physiotherapists	5 CPD
College of Surgeons	6 CME	Clinical Psychologists	6 CE
MCHK CME	5 CME		

Secretariat

The Hong Kong College of Anaesthesiologists, Rm 807, Hong Kong Academy Jockey Club Bldg., 99 Wong Chuk Hang Road, Aberdeen. Tel : 2871-8833, Website : www.hkca.edu.hk
Registration fee- $300 (non-refundable, tea and lunch included).
Cheque should be made payable to "Hong Kong College of Anaesthesiologists" and send to Secretariat. Registration form and programme details can be downloaded from HKCA College website.

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Registration Deadline- October 31, 2005

The Hong Kong College of Anaesthesiologists

Room 807, Hong Kong Academy of Medicine Building, 99 Wong Chuk Hang Road, Aberdeen, Hong Kong
Phone: (852) 2871 8833. Fax: (852) 2814 1029, Email: office@hkca.edu.hk, website: www.hkca.edu.hk

Office Bearers and Council (2005-2007)

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	Theresa HUI
Honorary Secretary	Simon CHAN
Honorary Treasurer	Anne KWAN
Assistant Secretary	Matthew CHAN
Assistant Treasurer	Edward HO
Council Members	Phoon Ping CHEN
	Po Wah CHEUNG
	Yu Fat CHOW
	Gavin JOYNT
	Chi Hung KOO
	Tsun Woon LEE
	John LIU

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Administrative Executive	Daniel TSO
Assistant	Cherry WONG

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YF Chow *(Deputy Censor-in-Chief)*

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PT Chui	CT Hung
Gavin Joynt	Lilian Lau
TW Lee	KC Li
John Liu	DA Sudhaman

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PT Chui	CT Hung
Mike Irwin	Gavin Joynt
Anne Kwan	CK Koo
TW Lee	Joseph Lui
Andrea O'Regan	

Formal Project Officer: KF Ng
Matthew Chan *(Deputy officer)*

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Simon Chan *(Ex-officio)*	Peggy Tan *(representing BoICM)*
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CT Hung	Mike Irwin
SK Ng	Andrea O'Regan
Steven Wong	

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TS Sze	

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MC Chu *(Training Officer)*	
Tony Gin *(Ex-offico)*	Simon Chan *(Ex-offico)*
YF Chow	CT Hung
SL Tsui	TS Sze

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PW Cheung	Edward Ho
Anne Leung	Karl Young

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John Low *(Chairman)*	CT Hung

Resuscitation Committee

HY So *(Chairman)*	KM Ho
TY Chan	

Guidelines Committee

Anne Kwan *(Chair)*	PP Chen
Joseph Lui	Theresa Hui
Agnes Cheng	

Organizer, Basic Science Course: CH Koo, Aaron Lai
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