ORIGINAL ARTICLE

Compliance with Monitoring Standards for Anaesthesia in Malaysian Hospitals

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Summary

The Malaysian Society of Anaesthesiologists published a document entitled "Recommendations for Standards of Monitoring during Anaesthesia and Recovery" in 1993. This paper examines the results of two surveys, carried out in 1995 and 1996 respectively; to determine compliance with published Monitoring Standards in Malaysian public and private hospitals. In the private sector, compliance with the recommended standards during anaesthesia varied greatly. Of the 28 government hospitals surveyed in 1996, compliance with monitoring standards during anaesthesia was almost 100%. Standards in recovery areas were less than ideal. The majority of anaesthesiologists thought that the current recommended standards were adequate.

Key Words: Monitoring standards, Safety, Anaesthesia, Recovery

Introduction

The Harvard monitoring standards published in 1985 [1], was the beginning of a formalisation of minimal monitoring standards required for safety in anaesthesia. It has long been felt that the implementation of good monitoring for patients during anaesthesia and surgery leads to improved safety for patients. However, the main impetus for the development of published standards came from the litigation angle. In one instance, the effectiveness of published monitoring standards led to the reduction of medical malpractice insurance premiums for practising anaesthesiologists in the United States [2].

Following the publication of the "Harvard Standards", anaesthesiologists in several other countries published their own monitoring standards - including the Recommendations of the Association of Anaesthetists of Great Britain and Ireland (1988) [3], the policy document "Monitoring During Anaesthesia" by the Faculty of Anaesthetists, Royal Australasian College of Surgeons (1990)[4] and the Singapore Safety Guidelines in Anaesthesia (1990)[5].

In Malaysia, the need for minimal monitoring standards was also felt by the anaesthetic community, particularly due to the perception that there was a large variation in the standards of monitoring during anaesthesia and recovery in different hospitals in the country. In 1993, the Malaysian Society of Anaesthesiologists (MSA) published a document entitled "Recommendations for Standards of Monitoring during Anaesthesia and Recovery", stating the following : "As Malaysia progresses towards being a fully developed country, it is vital for medical practitioners to adopt high standards of practice, including those related to monitoring, to maintain optimal patient safety [6]."

The document was a *recommendation* by a professional body, formulated by consensus of Malaysian anaesthesiologists from the public, private and academic sectors. It was hoped that the recommendations would provide the impetus for anaesthesiologists and hospital administrators to critically examine the standards of monitoring in their practice and hospital, and to take measures to upgrade, if necessary, the level

of monitoring for patients during anaesthesia and recovery, leading ultimately to improved patient safety.

The objective of this paper is to examine the impact of the above document and the extent of compliance with the published standards among Malaysian anaesthesiologists* in public and private hospitals based on two surveys carried out in 1995 and 1996.

Materials and Methods

A survey was carried out among members of the Malaysian Society of Anaesthesiologists (MSA) who were specialist anaesthesiologists practising in Malaysia. 180 questionnaires were sent to individual anaesthesiologist in August 1995 and only 49 were returned, a response rate of 27.2%. Out of the 49 respondents, 31 were in private practice and 18 were government anaesthesiologists. Responses were all voluntary and anonymous.

In July 1996, the same questionnaire was sent to all government hospitals with at least one specialist anaesthesiologist. Altogether 28 hospitals were surveyed - 14 general hospitals, 12 district hospitals and 2 university hospitals - and all forms were finally returned. Due to the nature of the second survey, it was not possible to maintain anonymity here.

The questionnaire was in two parts : the first part included general information about the place of practice and the number of years experience as a specialist anaesthesiologist, prior knowledge of the existence of the document on monitoring standards and its implications on the anaesthesiologists' practice. The second part of the questionnaire was specific to the monitoring standards and had a section each on the following areas : the anaesthesiologist and anaesthetic assistant; the anaesthetic machine; patient monitoring under anaesthesia; recovery area; anaesthetics outside the operating theatre; and regional anaesthesia. The responses from the 31 private anaesthesiologists and those from 28 public hospital anaesthesiologists were analysed together.

Results

A. General Information

Among the private anaesthesiologists who responded to the survey, the majority had more than 10 years of experience and were working in private hospitals. More than half were from Selangor and Kuala Lumpur and this merely reflects the actual situation in Malaysia, where the majority of private hospitals are still centered in Kuala Lumpur and Selangor.

All government hospitals in Peninsula Malaysia, Sabah and Sarawak where there is an anaesthesiologist were included in the survery.

Table 1
Years of Experience as an Anaesthesiologist (Private Anaesthesiologists)

Years	Percentage
2 - 5	16%
6 - 10	13%
> 10	71%

Table II
Type of Private Practice

Type of Practice	Percentage
Hospital	81%
Freelance	16%
Small Medical Centres	3%

**Anaesthesiologist is defined as a registered medical practitioner who has received sufficient training in anaesthesiology and resuscitation [7].*

B. Knowledge about and usefulness of the Document

All except two private anaesthesiologists had heard of and obtained copies of the document "Recommendations for Standards of Monitoring during Anaesthesia and Recovery" prior to the survey. The source of information was mainly through the Malaysian Society of Anaesthesiologists, either at the launching of the document or via the society's newsletter. 62% private anaesthesiologists stated that they had found the document useful, mainly when it came to purchasing more monitors for patients. 52% of private anaesthesiologists said they were worried about the medicolegal implications of the document if they were unable to meet the standards required.

The situation for government and university-based anaesthesiologists was slightly different. Only 82% had heard of the document prior to the survey. This is probably because a number of the government district hospitals are staffed by foreign anaesthesiologists who are not members of the Malaysian Society of Anaesthesiologists. 68% of government anaesthesiologists stated that they found it useful, not only for the upgrading of monitoring and safety standards in their hospitals, but also for education of trainees, obtaining more staff and when expert opinions are sought. Only

Table III
The Anaesthesiologists and Assistants

Standard	Compliance (Government)	Compliance (Private)
Anaesthesiologist present all the time	86%	52%
Dedicated Assistant	97%	84%
Written Records of all Anaesthetics kept	93%	96%

Table IV
The Anaesthetic Machine

	Compliance (Government)	Compliance (Private)
Checked by Anaesthesiologist everyday	100%	74%
Regular maintenance service	100%	87%
Presence of ressure gauge	71%	55%
Disconnection alarm	75%	48%
Audible oxygen failure alarm	86%	100%
Anti-hypoxic device	86%	77%
Oxygen analyser	100%	42%

one-third was worried about medicolegal problems arising because of the document in question.

C. Compliance with the Recommended Standards

There is a significant number of anaesthesiologists in the private sector who run more than one operating theatre at a time. This was confirmed in a subsequent question, where anaesthesiologists were specifically asked if they ran more than one operating theatre using an assistant to monitor the other anaesthetised patient.

There was a very high compliance with safety standards with regards to the anaesthetic machine, both in the government hospitals and the private sector. However, two important safety features, the *anti-hypoxic device** and *oxygen analyser***, were absent in about 50% of machines used by private anaesthesiologists and 25% of government hospital machines. There was also no regular maintenance in more than half of the machines used in the private sector.

* *Anti-hypoxic device* : a device incorporated in the anaesthetic machine to prevent delivery if hypoxic mixture; minimum concentration of oxygen delivered is 25%.

** *Oxygen analyser* : a device which measures the oxygen concentration in a gas mixture continuously.

By 1996, all government hospitals were equipped with the 3 basic required monitors of pulse oximeters, continuous electrocardiography (ECG) and non-invasive blood pressure (NIBP) monitors. In 1995 there was still a small number (10%) of private anaesthesiologists who practised without the aid of a pulse oximeter, 25% and 13% respectively who did not have ECG and NIBP.

Capnography was available in 61% of government hospitals and only 30% of private practices.

Designated recovery areas were still absent in some government and private centres (7% and 13% respectively). Of those that had designated recovery areas, 82% of government hospitals and 93% of private practices had monitors in the recovery area. The majority of patients were reviewed by an anaesthesiologist before discharge from recovery room.

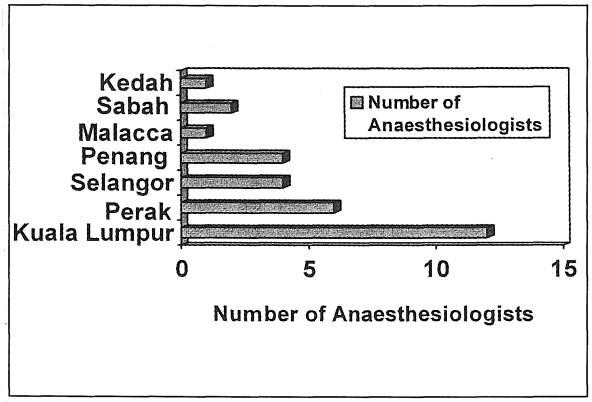

Fig 1: States where Private Anaesthesiologists Practised

Table V
Patient Monitoring under Anaesthesia

Monitors	Compliance (Government)	Compliance (Private)
Pulse oximeter	100%	90%
Electrocardiograph (ECG)	100%	75%
Non invasive blood pressure (NIBP)	100%	87%
Capnograph	61%	30%

Table VI
Recovery Areas

Standards	Compliance (Government)	Compliance (Private)
Designated recovery area	93%	87%
Minimum requirements		
– routine monitors e.g. ECG, SpO_2	82%	93%
– specialised equipment if necessary	61%	74%
– permanent and dedicated staff	61%	65%
Written protocol for transfer of care of patient	75%	48%
All patients reviewed by an anaesthesiologist before discharge from recovery area	93%	95%
Dedicated nursing staff for Recovery	61%	68%

Anaesthesia outside the Operating Theatre

Overall, 59% of anaesthesiologists, give anaesthetics outside the operating theatre environment. Places where anaesthesia is required include the Obstetric Suite (labour epidurals), the Radiology department (scans and angiograms mainly for children), Coronory Care Unit (cardioversion), Psychiatric ward (Electroconvulsive therapy), Accident and Emergency department and Endoscopy suite. In general, remote areas outside the operating theatres had a lower standard of monitoring, compared to the general operating theatres.

Regional Anaesthesia

Most patients (≈ 75%) receiving regional anaesthesia received the same standard of care with regards to observation by the anaesthesiologists and monitoring compared to patients undergoing general anaesthesia.

Discussion

There is a significant number of anaesthesiologists in the private sector who run more than one operating theatre simultaneously. The current recommendation in most National Standards[3,4,5,6] calls for a dedicated trained anaesthesiologist in each operating room. The situation was better in the government sector except for Sabah and Sarawak where a substantial number of anaesthetics were given by trained medical assistants under the supervision of specialists or anaesthetic medical officers.

As for the anaesthetic machine, the compliance among the private anaesthetists is less and this could imply that machines currently used in the private sector were of older design and not yet replaced. From 1992 onwards, there has been a continuous upgrading exercise involving replacement of old obsolete anaesthetic machine in government hospitals. The revised standards published by the MSA call for the inclusion of an anti-hypoxic device in all anaesthetic machines. All anaesthetic machines commissioned after the year 2001 will have a standard inbuilt anti-hypoxic device.

Although capnography is not a requirement in the minimal monitoring standards in Malaysia, it is a minimal requirement in all ventilated and intubated patients in several countries including Australia[8] and the

revised Malaysian standards[7] call for this to be included by the year 1998.

In addition to the above, other monitors were available to varying degrees (between 36% and 61%) in both government hospitals and private practices. These included precordial stethoscopes, invasive blood pressure monitors, temperature and nerve stimulators, all of which were optional monitoring aids for anaesthetised patients.

Designated recovery areas were still absent in some government and private centres. Of those that had recovery areas, only about 60% of both government hospitals and private practices had dedicated recovery nursing staff. Nursing staff shortage has sometimes contributed to lack of dedicated staff in recovery area. This practice should be seriously looked at, as the recovery room is an area where a high rate of critical incidents occur[9,11] and it has been shown that with highly trained dedicated recovery staff, the morbidity due to the recovery room incidents can be minimised.

In general, remote areas outside the operating theatres had a lower standard of monitoring, compared to the general operating theatres. In fact, it would be more logical to have a higher standard of monitoring and assistance in these areas which are not too familiar to the anaesthesiologists and therefore have a higher potential for the occurrence of critical incidents.

More than 75% of respondents from both surveys found that the standards in the document were reasonable and not too difficult to comply with. A minority of anaesthesiologists felt that there was a need to upgrade some of the monitoring standards as well as to come up with recommended standards in other areas related to the practice of anaesthesia.

Conclusion

The two surveys presented above show that many hospitals in Malaysia are complying with the Monitoring Standards for Anaesthesia and Recovery. This indicates that a consensus document like this can contribute positively towards the improvement of the standard of anaesthetic practice in Malaysia, particularly with regards to patient safety. However, it has to be emphasised again that no amount of advanced technology and equipment can replace a properly conducted anaesthetic by a well-trained and vigilant qualified anaesthesiologist.

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