Introduction

In Malaysia, cardiac surgery began in the 1970s at the University of Malaya's medical center. Paramedics available for the perfusion services then were medical laboratory technologists who had taken a course in "Surgical Laboratory Technology" as part of the established medical laboratory technology course. When the national health service (NHS) began its open-heart program a few years later, the training for the NHS perfusionists took on a similar form except that trainees were sent to established cardiac centers abroad (Australia). Nevertheless, both forms of training were "on the job." Today, the training methods in Malaysia remain quite the same and perfusionists have no structured avenues to advance in their basic skills and knowledge. It has become apparent that in several other countries in the ASEAN/Asian region too, perfusionists lack formal structured education and are trained "on the job."

In contrast, in advanced countries such as the US, rigorous formal education and certification programs as well as continuing education opportunities ensure high standards of practice. The disparity in standards of practice between the advanced and the developing countries will continue to widen if no attempt is made to create opportunities for educational advancement for perfusionists in developing countries. Given the fact that cardiopulmonary perfusion is not a straightforward and predictable procedure, the lack of formal education programs for perfusionists not only limits their contribution towards the success of open heart surgery but also poses a potential risk to the patient. We hypothesize that formal structured perfusion education for perfusionists in developing countries will profoundly improve perfusion practice in those countries by precipitating well-informed and precise maneuvers during cardiopulmonary bypass. The proposals described in this paper largely characterize current initiatives by a Malaysian cardiopulmonary perfusion team in thrusting into the forefront of a University's curriculum, a discipline in cardiopulmonary perfusion.

Objectives

This presentation is intended to:

*Emphasize the immense need to establish minimum standards of perfusion practice in developing countries,
*Propose mechanisms for establishing formalized education in developing countries where formal education is lacking, and
*Re-awaken the interest in establishing the International Council of Perfusion Societies (ICPS), the success of which would be beneficial to perfusion practice in both developing and advanced countries.

Methods

The mechanism to establish a structured perfusion education can be expressed in the following diagram:

```
        "High Standard of Perfusion Practice"
         
         4
         -Formal Courses & Registration established

        3
        -Drafts presented to University & NHS (endorsed by relevant medical profession

        2
        -Draft proposals for:
          1) Formal course
          2) Registration bill
          -Involve relevant medical professions

        1
        National Perfusion Society (Core of Experts)
        -appraises standard of practice
        -formulates strategies to overcome deficiencies
```

Aim of National Perfusion Society

Once established, the national perfusion society would engage in activities that support the central objective of pursuing a high
standard of training and competence in perfusion practice.

The primary task would be that of establishing a formal course to train perfusionists. Preferably, this should be initiated in a university with an on-going cardiothoracic program. The national society would draft the proposals for the establishment of the perfusion course. It is not within the scope of this paper to outline the curriculum of the perfusion courses but we suggest that they cover sufficient detail (but not be limited to) anatomy, physiology and pharmacology.

Final acceptance of the proposals by government or its agencies would depend very much on how readily the proposals are supported by the medical profession. Thus, it is essential that collaboration is sought from the relevant medical profession such as from the Society of Anesthesiologists or from the Society of Cardiothoracic Surgeons or jointly from both societies at this stage. This would make easier acceptance of the proposals by the medical profession and later on by the government or its designated agencies.

We propose that there be two stages of formal education for perfusionists:

1. A formal certificate course specially designed to provide paramedics currently in practice, with basic theoretical knowledge and

2. An advanced course in the form of a major discipline within a Bachelor's degree.

The course content at degree level would comprise deeper concentration and further development of the student's previous knowledge and experience.

Aims of the Perfusion Course

The aims of both these courses would be to enable the perfusionist to:

1. Make intelligent observations of the patient's condition before bypass; observe, analyze and describe conditions, reactions and changes within the patient and to suggest and carry out all the necessary measures to preserve the patient's overall condition within safe physiological and biochemical limits during bypass.

2. Inform, teach and supervise junior perfusionists and to carry out research.

International Council of Perfusionist Societies (ICPS)

An international body of perfusion knowledge such as the once-existent ICPS is necessary if the goals of expansion and improvement of perfusion training programs and the narrowing of differences in practice throughout the world is to be actively pursued. Endowed with the qualities of leadership, will AmSect consider the prospects of reorganizing the ICPS?

Discussion

Enhanced knowledge of one's job should provide enhanced performance in the clinical setting (1). The knowledge and skills of perfusionists graduating from a formal structured course will be superior to that of a paramedic trained while employed.

Cardiopulmonary bypass is undertaken based on an implied contract between patient and establishment promising the delivery of the highest possible standards of care. If the tool to establish standards in perfusion care is a formal structured education, is there a breach wherever the latter is non-existent?

References