DISSEMINATION OF FIBREOPTIC AIRWAY ENDOSCOPY SKILLS BY MEANS OF A WORKSHOP UTILIZING MODELS

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Fibreoptic airway endoscopy is a new psychomotor skill. Vaughan has recently stated: "it is of paramount importance that anaesthetists learn to use a fibreoptic bronchoscope competently" [1]. As there is substantial evidence supporting the value of learning that results from practising on models or simulators [2], a practical workshop using models, and based on sound educational principles, may provide a partial solution to this challenge. The object of this study was to assess the effectiveness of such a workshop.

METHODS AND RESULTS

The training staff consisted of academic and resident anaesthetists who had been trained in fibreoptic airway endoscopy. The number of instructors varied with the number of attendees; there was a minimum ratio of one instructor to five learners, in addition to the Course Director. The programme consisted of 2 h of lectures followed by 4 h of practical workshops conducted in two classrooms. Attendees were allocated to two groups. After 2 h in one classroom, students changed classroom for a second 2-h period. The programme concluded with a 30-min panel discussion of questions raised by attendees.

Four different models were available: (1) The Zavala Bronchoscopic Lung Model (Medi-Tech Inc., 150 Coolidge Avenue, Watertown, Ma. 02172); (2) A latex tracheobronchial model (Richard Wolf Medical Instruments Corp., 7046 Lyndon Avenue, Rosemont, Il. 60018); (3) The Laerdal Adult Intubation Model and (4) The Laerdal Infant Intubation Model (both: Armstrong Industries Inc., 3660 Commercial Avenue, P.O. Box 7, Northbrook, Il. 60062). One classroom had five stations using model 1, and two stations using model 2. The second classroom had five stations using model 3, and two stations using model 4.

Each attendee worked on the four models for a total of 60 min, with the complete attention of a faculty member. Twenty-two minutes were spent learning to manipulate a fibrescope to visualize the segmental bronchi of the Bronchoscopic Lung Model, and 22 min were devoted to learning orotracheal and nasotracheal intubation and to change a tracheal tube in the Adult Intubation Model. Eight minutes were spent learning orotracheal intubation in the Infant Intubation Model using the technique of Stiles [3], and 8 min learning to place left and right double-lumen endobronchial tubes in the latex tracheobronchial model.

A questionnaire, mailed twice, contained four questions which could be used to assess if the attendees had been successful in being able to introduce fibreoptic intubation into individual clinical practice or improve their success rate. A
code known only to the secretary was used to ensure anonymity. The questions elicited the number of fibreoptic intubations performed before and after the workshop (five-point scale: 0, 1–5, 6–10, 11–25, > 25) and the success rate before and after the workshop (four-point scale: 25 %, 50 %, 75 %, 100 %). Two criteria were used to minimize any bias resulting from the presumed high motivation of the attendees. Those who had not performed fibreoptic intubation before the workshop were successful if, after the workshop, they had performed one to five or more intubations with at least a 50 % success rate, or if they commented that they had used the fibrescope successfully. Those who had performed fibreoptic intubation before the workshop were successful if, after the workshop, they had performed at least six to 10 intubations, and their success rate had improved by 50 percentage points or more—that is from 25 % to 75 % or 100 %, or from 50 % to 100 %.

A total of 150 questionnaires were returned by the 182 attendees (58 %), all of whom were physicians, with the exception of six nurse anaesthetists. Twenty-three (21 physicians) of the 40 attendees who had never previously performed fibreoptic intubation successfully performed such intubations after the workshop, and 23 (all physicians) of the 65 attendees who had performed fibreoptic intubation improved their success rate by 50 percentage points or more (table I). A random sample of 32 % of the non-respondents (25 of 77) was selected by use of a random numbers table. The secretary was able to contact 10 (all physicians) of these and asked them to complete the questionnaire over the telephone. Five of them who had never performed fibreoptic intubation successfully performed such intubations after the workshop, and one who had performed fibreoptic intubation improved his success rate by 50 percentage points or more. Transposing these figures to the whole group of 77 non-respondents (6/25 x 77 = 18) indicates that 18 of them should have been in the successful group. Adding this to the results for the respondents indicates that 64 (35 %) of the 182 attendees surveyed may be classified as having been able to introduce fibreoptic intubation, or increase their success rate with it, in their clinical practices, after attending the workshop (table I).

**COMMENT**

The only previous study of the effectiveness of continuing medical education (CME) in anaesthesia did not assess psychomotor skills [4]. The present study is the first to suggest strongly that a practical workshop using models was effective in encouraging clinicians to adopt a new psychomotor skill in the critical area of airway management.

It is also one of few CME programmes in any specialty to rely entirely on inanimate models. These models avoid the problems involved in the use of biological materials, live animals, volunteer patients and anaesthetized patients.

Stein found that three techniques were suitable for assessing the acquisition of new psychomotor skills through CME: surveys, audits of hospital records, and changes in patterns of referral [5]. More importantly, Curry and Purkis concluded that self-reports of changes in behaviour appeared to be a valid method of evaluating CME courses [6]. In the context of CME, therefore, there is often no alternative to relying on self reporting by physicians for evaluating their own clinical performance when they resume clinical practice.

This study strongly suggests that a new psychomotor skill may be acquired by clinicians via a practical workshop. Further studies are

| Table I: Number of attendees who successfully introduced fibreoptic intubation or improved their success rate with it after the workshop |
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| Successfully introduced fibreoptic intubation | Random sample of non-respondents transposed to whole group |
| Successfully introduced fibreoptic intubation | 23/40 (58 %) | 18/77 (23 %) |
| Improved success rate | 23/65 (35 %) |
| Total successful | 46/105 (44 %) |
| Total attendees | 64/182 (35 %) |
required to determine how the success rate may be improved. It is important to determine if the availability of these models in all hospitals, accompanied by written instructions or even a video-tape for self study, would be as successful as attendance at a practical workshop such as that described here.

REFERENCES


