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Title : FIBEROPTIC NASOTRACHEAL INTUBATION: A TRAINING PROGRAM

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Fiberoptic intubation is the latest addition to techniques for tracheal intubation in difficult conditions,<sup>1</sup> but it has not enjoyed the popularity it deserves. Because this may be due to insufficient teaching of it in academic departments, we have developed a stepwise training program with graduated learning objectives, using model and live patient simulators.

#### Training Program:

1. Demonstration of the fiberoptic, in order that trainees may become familiar with physical structure, characteristics, and care of the instrument.
2. Practice on tracheobronchial model in order that trainees may learn to manipulate the fiberoptic, and become familiar with the characteristic of its visual field.
3. Exposure of epiglottis and vocal cords in order that trainees may become familiar with live, moving laryngeal structures, and be able to identify and correct problems created by secretions. The trainees insert a nasopharyngeal airway into a nostril of a consenting patient (approved by Human Subjects Committee) at the end of general anesthesia, and attempts to locate the epiglottis and vocal cords with the fiberoptic in the recovery room.
4. Supervised fiberoptic nasotracheal intubations performed by trainees in order that they may gain confidence, and be able to perform intubations without help. The trainees are provided with a written step-by-step description of the procedure. The first intubation is performed with some assistance and demonstration by the instructor; all subsequent intubations are done by trainees with progressively less help unless difficulty is encountered.

#### Evaluation of Trainee and Program:

Trainee Part I: Oral questions are asked about important features, characteristics of the instrument.

Trainee Part II: Trainee is asked to demonstrate a predetermined sequence of different sections of bronchial tree.

Trainee Part III: The trainee is evaluated on his sixth exposure of the larynx by being asked to demonstrate the epiglottis and larynx.

Trainee Part IV: The trainee is evaluated on the fifth or sixth intubation attempt. If trainee can not expose the larynx and physical assistance is given by instructor, that intubation is considered "failed". Six criteria are used to evaluate the quality of the intubation: degree of sedation; adequacy of topical anesthesia; intubation time; number of intubation attempts; demonstration of epiglottis and vocal cords; and recognition of problems such as excessive secretions.

Program: Comments received from trainees are added to our objective and subjective evaluations of their performance, and to the comments made by the patients postoperatively.

Results: Eight trainees have completed this course and performed satisfactorily on all parts of the program. The Results of the evaluation of Part IV

fiberoptic nasotracheal intubation are summarized in the table. On postoperative visit on 48 of our 50 patients, all were satisfied; 25 indicated no recall and 23 some degree of recall. Three recalled the procedure as unpleasant because of pain on intubation. Interview with trainees resulted in numerous comments about strengths of the program, e.g. "well structured and well organized program", and "all stages serve specific purpose and were useful". Comments about weaknesses of the program were mainly about obtaining patients' consent for exposure of larynx in the recovery room.

Discussion: We present this pilot study to describe our initial experiences with a graduated training program. We have demonstrated that trainees are able to achieve the learning objectives in a reasonable period of time, and in a manner that is acceptable to them, to their teacher and to their patients. We believe that this graduated program fulfills the conditions required for learning a skill.<sup>2</sup> All trainees agree that going through the graduated phases of training, both on the model and by exposure of the larynx in patients recovering from anesthesia, gave them the opportunity to learn how to use the instrument, and the confidence to attempt intubation in subsequent patients. On the basis of the apparent success of this pilot study we are now conducting a randomized controlled study to compare the results of our training program, with those of a series of anesthesiologists trained in the traditional manner on patients in the operating room.

#### References

1. Murphy P: A fiberoptic endoscope used for nasal intubation. *Anaesthesia* 22:489-491, 1967
2. Menges RJ: Intended learning outcome, learner and teacher characteristics, and the selection of instructional methods. *The Future American College*. Edited by A W Chickering, San Francisco, Jossey-Bass, 1980. In press

Fiberoptic Nasotracheal Intubation in Evaluation Case

| Trainee   | Intubations Performed before eval. case | Attempts at Intubation in eval. case | Intubation Accomplished | Dexterity * | ** Intubation Time(min) | *** Total Time(min) |
|-----------|---|--------------------------------------|-------------------------|-------------|-------------------------|---------------------|
| 1         | 4                                       | 1                                    | yes                     | 4           | 1.75                    | 15                  |
| 2         | 6                                       | 1                                    | yes                     | 3           | 5.00                    | 25                  |
| 3         | 4                                       | 1                                    | yes                     | 4           | 8.00                    | 23                  |
| 4         | 4                                       | 1                                    | yes                     | 4           | 2.50                    | 17                  |
| 5         | 5                                       | 1                                    | yes                     | 4           | 1.00                    | 15                  |
| 6         | 5                                       | 1                                    | yes                     | 3           | 1.00                    | 20                  |
| 7         | 5                                       | 1                                    | yes                     | 3           | 1.25                    | 20                  |
| 8         | 5                                       | 1                                    | yes                     | 3           | 7.25                    | 19                  |
| mean time |   |                                      |                         |             | 3.50                    | 19.25               |

Times rounded to the nearest quarter minute.

\* Dexterity: 0=poor, 4=very good

\*\* From insertion of fiberoptic into endotracheal tube to completion of intubation

\*\*\* From beginning of sedation to completion of intubation