

## TRAINING OF RESCUE SQUADS IN ENDOTRACHEAL INTUBATION

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The Heartmobile pilot program conducted by The Ohio State University, College of Medicine, Columbus, Ohio from April 30, 1969 to July 1, 1971 demonstrated the effectiveness of a program of efficient, on the spot treatment, along with rapid transportation of patients with myocardial infarct, multiple trauma, etc. This unit was staffed by a physician, generally an OSU Hospital resident, and Columbus City firemen. With the ending of this pilot program, the City of Columbus decided to continue this public service of such mobile units staffed by highly trained Columbus City firemen. These units are called Medic units in Columbus. Dr. Richard P. Lewis will discuss the overall program in his paper on "The Columbus Experience with Mobile Emergency Care," also published in these proceedings.

The Department of Anesthesiology at Ohio State University has been engaged in training Columbus and Ohio rescue squad men since the inception of the program in 1958. These men are extremely competent in bag and mask breathing. However, the Heartmobile demonstrated that in many instances a properly placed endotracheal tube early in resuscitation would have been life-saving. It was natural for our Department to further train these rescue squad men in endotracheal intubation.

In planning the endotracheal intubation training, it was decided that it was impossible to provide this training utilizing live patients undergoing anesthesia in the University Hospitals. The training policy adopted was as follows:

1. Training groups consist of 12-15 rescue squad men.
2. A staff member of the Department of Anesthesiology presents a lecture-demonstration using movies, slides, drawings, equipment and Laerdal Intubation manikins. This presentation takes 45-60 minutes.
3. The squad men practice intubation under the direction of the Anesthesiologist for 45-75 minutes. The manikins are available for further practice by the squad men after this.

The course has been successfully completed by 137 men (*Table 1*): Three have failed and two have dropped out; eighty-seven trainees are from Columbus and 50 from other areas in the state. There are at present four active trauma units in the City of Columbus and six

others in five surrounding communities that were trained in Columbus. Four other communities are starting units in the near future. Two other communities in Ohio have active trauma units who were not trained by us.

A retrospective study of the records of the completed Medic squad runs was made from the inception of the squads in July, 1971 to March 30, 1973 and also a study of the Heartmobile runs was made.

Table 2 shows that the percentage of intubation attempts compared to completed runs by the squad men (4.9%) is about the same as the percentage of attempts by the Heartmobile physicians (4.3%). In our squads, overutilization of endotracheal intubation has not been a problem.

The Columbus Medic squad men are as competent as physicians under similar circumstances in endotracheal intubation (*Table 3*). Many failures in both cases are due to large quantities of vomitus present in the mouth and difficulty in opening the mouth.

The squad men are not quite as successful in endotracheal intubation in children (*Table 4*), but for the minimal exposure to children they have, I believe these figures of 80% and 67% are acceptable. Laryngoscopy and pharyngeal suction of one 11-week-old child not included here provided successful resuscitation.

With the institution of three squads the number of unsuccessful intubations increased for seven months (*Figure 1*); however, in the last six months the squad men have been 95% effective, having only six unsuccessful intubations.

Experience gathered from the Heartmobile showed that the major reason for placing an endotracheal tube is to prevent the aspiration of stomach contents. Table 5 shows that the medic squads have one-sixth less vomiting in their patients than those of the Heartmobile. This bears out the clinical impression given me by our cardiac physicians. The decreased vomiting and aspiration, we feel, is due to earlier intubation because of shorter squad response time than the Heartmobile and to proficient squad men. This is a significant reason for having squad endotracheal intubations.

There have been no significant complications in this time period related to endotracheal intubation by either the squads or Heartmobile.

One of the benefits in training firemen is that they are very diligent and competent men in rescue work. Before they receive our advanced training they must be competent in fire rescue work. We believe that it is easier to train these men who have such expertise

to perform endotracheal intubation than it is to train and transport medical people to where people need intubation.

These men have placed endotracheal tubes in people from four months to 88 years of age. They have placed endotracheal tubes in people in bathtubs, in a physician's office and even in an electrocuted lineman while he was still on a ladder. I could not have placed the tube in that patient on the ladder because I would not have been near the top of that ladder. If we can't bring Mohammed to the mountain then let us take the mountain to Mohammed.

### In Summary

1. Endotracheal intubation is indicated in cardio-pulmonary resuscitation.
2. Endotracheal intubation is a mechanical task that can be mastered quite rapidly and efficiently by rescue squad men.
3. We have found this method of teaching endotracheal intubation utilizing manikins to be simple but effective while taking a minimum of time of both teacher and student.

TABLE 1

#### MEDIC SQUAD TRAINEES

142	Started Course
137	Completed Course
87	Columbus Fire Department
50	Other Fire Departments

TABLE 2

#### PERCENTAGE OF INTUBATION ATTEMPTS COMPARED TO COMPLETED RUNS

	SQUADS	HEARTMOBILE
Number Runs	5168	1028
Intubation Attempts	254 (4.9%)	44 (4.3%)

TABLE 5

#### VOMITING COMPLICATING INTUBATION AND RESUSCITATION

#### SQUADS HEARTMOBILE

INTUBATION ATTEMPTS	274	44
VOMITING	14 (5%)	13 (30%)

TABLE 3

#### PERCENTAGE OF SUCCESSFUL INTUBATIONS

	SQUADS	HEARTMOBILE
ATTEMPTED	274	44
SUCCESSFUL	241 (88%)	39 (88.6%)

TABLE 4

#### PEDIATRIC INTUBATIONS BY SQUAD

	1 YEAR	1-10 YEARS
ATTEMPTS	5	6
SUCCESSFUL	4 (80%)	4 (67%)

## ENDOTRACHEAL INTUBATIONS

- ATTEMPTED
- SUCCESSFUL
- UNSUCCESSFUL

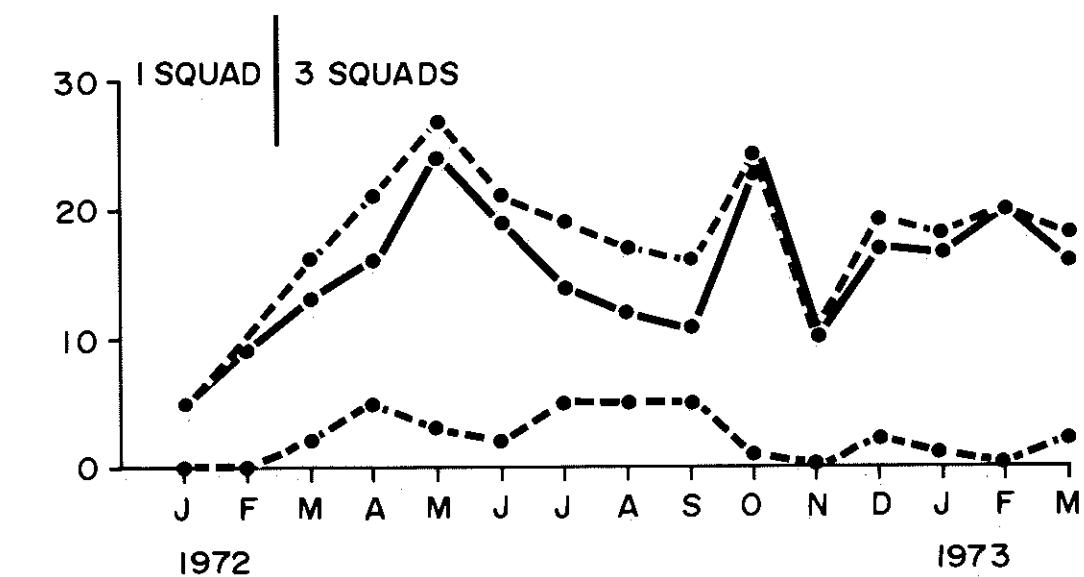


FIGURE 1—When three squads were instituted, unsuccessful intubations increased for seven months after which squad men achieved 95% effectiveness in the last six months with only six unsuccessful intubations.