



# **Combitube Study 1995-1999 Final Report**

**January, 1999**

Gail F. Cooper, Administrator  
Community Health Programs

Mel A. Ochs, M.D.  
Medical Director

County of San Diego  
Health and Human Services Agency  
Division of Emergency Medical Services

## CONTENTS

I.	Background	1
II.	Description of Study	1
III.	Evaluation of Effectiveness	2
IV.	Progress Report	2
	A. Outcome of Combitube Insertions	2
	1. Unsuccessful Combitube Insertions	3
	2. Successful Combitube Insertions	3
	3. Chief Compliant	3
	4. Participating Agencies	3
V.	Comparison	3
VI.	Conclusion	4
	EMT-D/C Agencies Participating in Combitube Study	5
	Graphs	6

**San Diego County-Combitube Study Final Report  
December 1998**

---

**I. BACKGROUND**

The success of cardiopulmonary resuscitation (CPR) depends on the ability to effectively provide chest compressions, the initiation of defibrillation and the maintenance of an adequate airway. With development of the esophageal tracheal combitube (ETC), a secure airway can be accomplished without visualization of the vocal cords as required in endotracheal intubation. The ETC provides an airway regardless of whether the tube is blindly placed in the esophagus or the trachea.

The County of San Diego, Health and Human Service Agency, Division of Emergency Medical Services (EMS) embarked on a study which would determine the feasibility of using the ETC as an airway management tool for Emergency Medical Technician-Is (EMT-Is) who were also accredited to operate a semi-automatic defibrillator in the prehospital setting (EMT-Ds). The purpose of this study was to determine if the ETC could be successfully placed by EMT-D's, and to validate previous findings that the ETC could provide a sufficient airway.

In January 1995 a task force was assembled and established: a) ETC protocols which were integrated with existing defibrillation policies, b) training curriculum for ETC, and c) the data set used in collection of information to evaluate the effectiveness of ETC study.

**II. DESCRIPTION OF STUDY**

EMT-Ds, employed by agencies in San Diego County which voluntarily participated in this study, were trained and successfully completed a course of instruction on Combitube insertion and management. Each agency identified at least one training officer (TO) who was either BLS (EMT-D) or ALS (EMT-P or RN) certified/licensed. These individuals attended an 8 hour "Train the Trainer" course which was offered through a local Community College.

The ETC course for the field providers included a total of five hours of training. Two hours of instruction contained didactic material, two hours involved the demonstration and return demonstration of the ETC, and one hour was devoted to the demonstration and return demonstration of the ETC portion of the existing defibrillation protocol. Competency-based written and skills examinations, approved by the County of San Diego EMS Medical Director, were administered by the TO's and all participants were acquired to successfully pass in order to continue in the study.

## **San Diego County-Combitube Study Final Report December 1998**

---

Agencies submitted written requests to the EMS Medical Director for participation in the study. There were 22 agencies that participated during the first 18 months of the study. Since that time, 5 additional agencies have come on-line, and 1 agency dropped out, bringing the total of participating agencies to 26. Each agency had an identified geographic area of service, a Base Hospital which agreed to provide medical control for the ETC trained personnel and to collect the necessary data, and a signed agreement with the County to be an approved ETC provider. (Attachment: List of agencies, geographical service area)

As part of this study, the following hypotheses were made:

- 1. Properly trained EMT-Ds will successfully place ETC's and will be able to retain that skill and knowledge in order to manage ETC's.*
- 2. When inserted and managed successfully, an ETC will provide a sufficient airway.*
- 3. No difference will be found between the retention of knowledge and skills of personnel trained by either BLS trained personnel or ALS trained personnel.*

The results of the first 18-months of the study provided the necessary information to recommend to the EMS Authority to add ETC to the optional scope of practice for EMT-Is in the State of California.

### **III. EVALUATION OF EFFECTIVENESS**

The ability of EMT-Ds to perform the skill of ETC insertion and monitoring was evaluated by documenting the success rates during the trial study period. To identify any difference in EMT-D skill level based on training from BLS versus ALS training officers ETC success rates were compared between ALS trained and BLS trained EMT-D personnel, controlling for patient condition and environmental influences. As identified in the initial report, there was no identified difference between the success rate of those trained by ALS personnel versus BLS personnel. During the second portion of the study this area was not followed for comparison.

### **IV. PROGRESS REPORT**

#### **A. Outcome of Combitube Insertions**

During the second 18-month study 170 patients had EMT-D combitube insertions attempted. There were 135 successful insertions and 33 unsuccessful attempts for a success rate of 79%. There were 2 cases which had an unknown attempt outcome based on record review. These cases were excluded from the success rate calculation.

## **San Diego County-Combitube Study Final Report December 1998**

---

Of the 170 patients, 72 were pronounced on scene, 53 expired in the Emergency Department (ED), and 20 were admitted to the hospital. In 25 cases (14.7%), patient records did not list patient outcome. Of these 25, 5 indicated the patient was transported to the hospital.

- 1. Unsuccessful Combitube Insertions** – Of the 33 unsuccessful insertions by EMT-Ds there were 10 cases of documented resistance, 4 of deformity and 19 with other or unknown complications listed. This field includes patient physical anatomy (i.e. short neck), copious amounts of emesis present, and other complications. Of the 33 unsuccessful insertions 16 were pronounced on scene, 8 expired in the ED, 1 was admitted, and 4 were transported with non reported outcomes. Of the 16 patients pronounced on scene, 3 were trauma patients and 13 were medical.
- 2. Successful Combitube Insertions**- Of the 135 successful insertions by EMT- Ds 56 were pronounced on scene, 45 expired in the ED, 19 were admitted to the hospital. There were 15 records which did not indicate a patient outcome. Of the 15 records, 1 record did indicate the patient was transported.
- 3. Chief Compliant** – There were 152 cases presenting a chief complaint that was medical in nature. There were 16 cases that were presented as trauma patients. Two cases did not report a chief complaint.
- 4. Participating Agencies** – Currently 26 agencies are participating in the study. The City of San Diego was removed from the study due to the implementation of their ALS First Responder Program.

## **V. COMPARISION**

Over the first 18-month study period there was a 79% success rate for ETC insertions. Much of the data collect for the second half of the study follows the same trends of the first 18 months. There were more omissions of information on the early portion of the second half of the study. This was due to confusion regarding the status of the study. Agencies were educated in this area once the data collection issues were identified. The documentation did improve significantly over the last 10 months of the study.

During the first half of the study there were 195 cases with 155 successful. The second half of the study had 170 cases with 135 successful. Both halves of the study recorded the 79% success rate. The first half had 40 unsuccessful attempts and the second had 33.

**San Diego County-Combitube Study Final Report  
December 1998**

---

The outcomes recorded for the first 18 months were 67 pronounced on scene, 84 expired in the ED, 37 admitted and 7 unknown. The second 18 months recorded 72 pronounced on scene, 53 expired in the ED, 20 admitted, and 25 unknown. There were more cases during the second half of the study that were pronounced on scene. In contrast there were more patients the first half of the study who expired in the ED. There were also a greater number of patients admitted to the hospital during the first 18 months. The agencies added to the study in the second half were mainly in the outlying rural areas, further away from hospitals than traditional urban EMT-Ds. This would account for the increase in patients pronounced on scene and decrease in hospital admittance.

There were 40 unsuccessful attempts during the first 18 months and 33 during the second. There was an increase in deformity-related issues and a decrease of resistance issues over the second 18 months. The chief complaint ratio for medical versus trauma stayed consistent over the 36-months of the study.

**VI. CONCLUSION**

There were many consistencies over the entire 36-month study. The second 18-months mirrored the first 18 months' results in various areas reported. These areas include the ratio of medical versus trauma patients. The most consistent finding was the maintenance of the 79% success rate. The study has enabled the EMT D to establish an adequate airway and properly maintain it.

**San Diego County-Combitube Study Final Report  
December 1998**

---

**EMT-D AGENCIES PARTICIPATING IN COMBITUBE STUDY**

<b>Agency</b>	<b>Date Participating</b>	<b>Population Served</b>
Alpine Fire Department	12/18/95	< 1.0%
American Medical Response*	11/1/96	< 1.0%
Barona Fire Department	5/1/97	< 1.0%
Bonita-Sunnyside Fire Department	12/12/95	3.9%
Borrego Springs Fire Department	2/26/96	< 1.0%
Care Medical Services	7/1/97	Countywide
Chula Vista Fire Department	7/1/97	3.8%
Coronado Fire Department	11/1/97	1.1%
Deer Springs Fire Department	6/1/98	< 1.0%
Del Mar Fire Department	12/12/95	3.9%
East County Fire Protection District	12/12/95	2.4%
Encinitas Fire Department	1/11/96	< 1.0%
Imperial Beach Fire Department	7/1/97	1.04%
Julian-Cuyamaca Fire District	7/1/96	< 1.0%
La Mesa Fire Department	12/1/95	2.3%
Lemon Grove Fire Department	12/18/95	1.1%
National Steel and Shipbuilding C0. (NASSCO)	10/1/96	< 1.0%
North County Fire Protection District	1/1/96	< 1.0%
Poway Fire Department	2/1/96	2.6%
Rancho Santa Fe Fire Protection District	12/1/95	< 1.0%
San Diego Rural Fire Protection District	12/18/95	< 1.0%
San Miguel Consolidated Fire Protection District	12/1/95	1.0%
Solana Beach Fire Department	10/1/96	1.4%
Sycuan Fire Department	12/12/95	1.4%
Valley Center Fire Department	6/1/98	< 1.0%
Warner Springs	6/1/98	< 1.0%

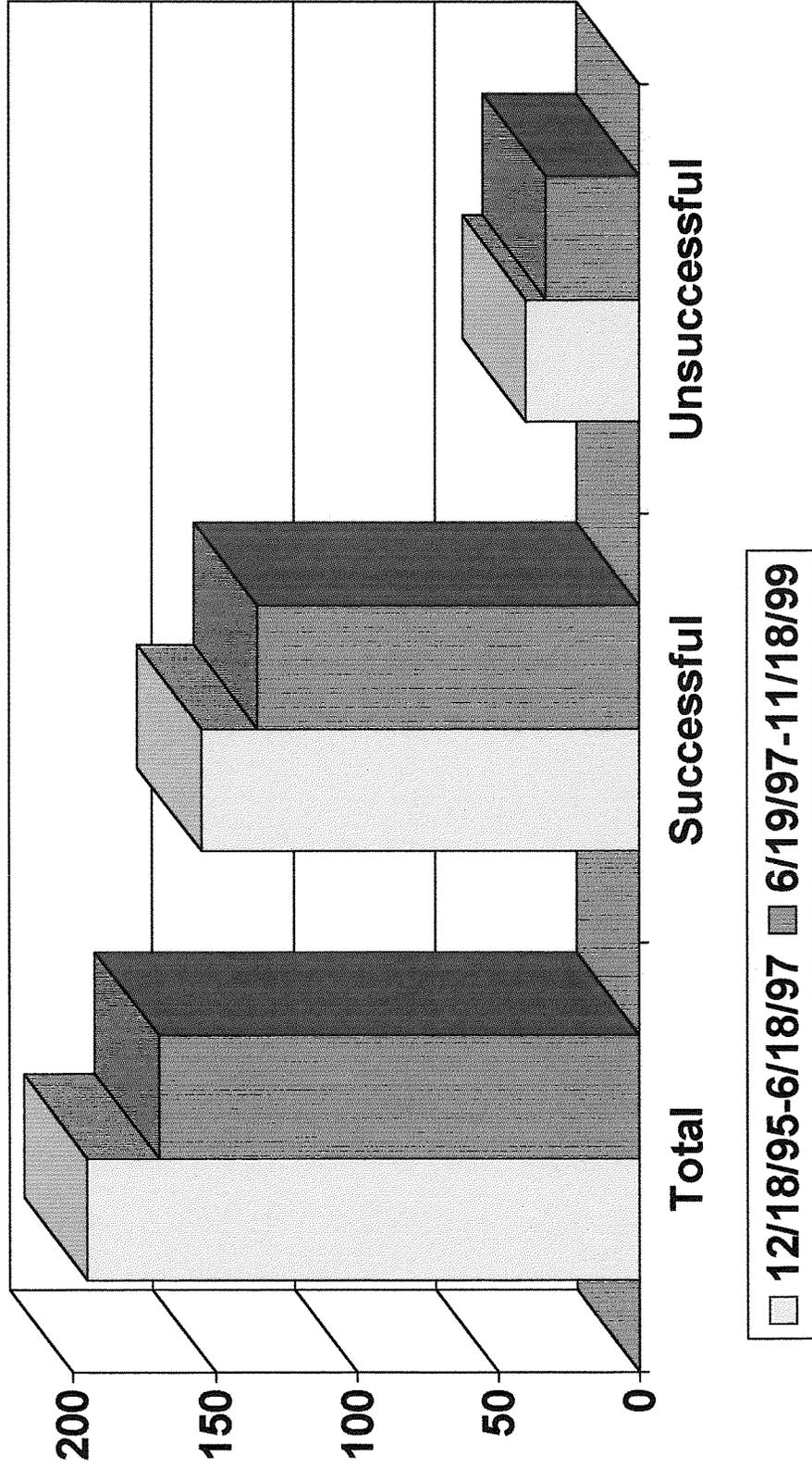
The City of San Diego Fire Department removed themselves from the study December 18, 1997. This action was taken in conjunction with the implamation of the ALS First Responder Program that placed ALS personnel on every fire engine.

\* This agency is implemented in one rural community not a countywide provider.

**EMT D/C  
Combitube Study  
12/18/95-11/18/98  
Trial Study Results**

**County of San Diego  
Division of Emergency Medical Services**

# Combitube Insertions



# Combitube Outcome

