

USE of the MELKER KIT for EMERGENCY CRICOTHYROTOMY
in RIVERSIDE COUNTY

Results of the 24-month Trial Study Period
March 1, 2003 – February 28, 2005



submitted by the

Riverside County Emergency Medical Services Agency

to the
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INTRODUCTION

In February 2003, the State EMS Authority (EMSA) approved the Riverside County EMS Agency to initiate an 18-month trial study utilizing the Melker Emergency Cricothyrotomy Catheter Kit (Melker) to perform needle cricothyrotomy in the field. Because of the multiple steps required to place an airway when using a Melker kit, EMSA requested that skills retention be monitored. Skills checks every six (6) months were agreed upon and implemented as part of the study. Of the 12 ALS providers in the county, 11 were included in the study, as the 12th, an air provider, used their registered nursing personnel for this procedure. Based on the size and demographics of Riverside County, we anticipated 3 – 4 incidents per year where a needle cricothyrotomy would be necessary. After 18 months, there had been only one attempted needle cricothyrotomy. This prompted an extension of the study by EMSA for another six months.

TRAINING

Paramedic personnel had previously (June/July 2002) completed a 4 - 6 hour training session on airway management, including use of the Melker kit. Therefore, prior to the inception of the study, providers were required to hold a simple skills review for their personnel. Skills reviews were to occur, with all ALS providers having the procedure reviewed and available by May 1, 2003. Eight of our eleven providers met this deadline; three completed training in May.

Both the baseline skills review and the every-six-months skills reviews were done using the skills check list from the initial training. It was explained to providers that these skills checks were not punitive and could be used as a skills review, but that their primary purpose was to determine skills retention, so review should come after an initial skills check. During the initial 18 months, reminder notices were sent out 2 -3 months in advance of the review due date to allow providers ample time to schedule their personnel. A follow-up phone call was placed the month of review, and again 1-month post review date if no data had been received. During the six-month extension, repetitive notices /reminders to the providers to complete their skills review was not done; they were left on their own to schedule appropriately.

RESULTS

Implementation of Needle Cricothyrotomy

In the 24 months of the study, the needle cricothyrotomy procedure was used twice.

Incident #1

Needle cricothyrotomy with the Melker kit was instituted on a cardiac patient in full arrest after multiple attempts with other airways were unsuccessful due to airway edema. Paramedics placed the airway but had difficulty advancing it, so did not utilize it for ventilations. However, the receiving physician confirmed correct placement upon patient arrival in the ED.

Incident #2

The second use involved an elderly patient whom paramedics were dispatched to as a “choking”. The patient was in full arrest when BLS personnel arrived, and BVM ventilation was difficult due to resistance. ALS personnel could visualize the vocal cords but could not pass the ET tube more than a fraction beyond them. Because of a large mass directly over the anterior trachea, paramedics were unable to establish appropriate landmarks for a needle cricothyrotomy. Upon consultation, the Base Hospital gave the order, with the knowledge of poor landmark identification. Needle insertion was difficult and ventilation through the needle catheter itself was unsuccessful. Upon arrival at the receiving center, the patient was orally intubated, but never regained a rhythm and was eventually pronounced. It was later identified that the patient suffered from severe esophageal strictures and goiter.

Skills Review and Retention

During the first 18 months of the study, several providers had difficulty meeting the every-6-months aspect of skills review. Citing a plethora of other training (mandated and voluntary) that needed to be accomplished, the 6-month format proved burdensome and was difficult to maintain for most providers. In fact, only two providers were able to successfully meet each deadline, though most came within a month of the 6-month time frame. Skills checks ranged from 5 to 10 months, with the mean being 6.85 months and the median 6.5 months. Overall, 80% of personnel passed on the first attempt, and 99.6% after two attempts. Passing rates for individual providers ranged from 21% - 100% on first attempts, and 72% - 100% on second attempts.

With the six-month extension, all eleven providers were due or past due for skills review. However, left on their own to schedule appropriately, only one provider completed it.

DISCUSSION

Use of Needle Cricothyrotomy

At the onset of this study we anticipated 3 – 4 uses of the needle cricothyrotomy procedure per year, giving us a total of 6 - 8 procedures in a 24-month period. Our incidence fell well below that, at two. It is difficult to glean any information from two procedures, except to say that needle cricothyrotomy is seldom used.

Skill Retention and Review

For a complex, multi-step procedure, the initial pass rate of 80% was remarkably high. We suspect that this high percentage may be due, in part, to self review prior to the skills checks. While the providers themselves did not perform a skills review prior to the skills check, there was no way to monitor individuals doing self-study after being informed that a skills check was upcoming. However, after one short skills review, skill performance rose by one-quarter to a 99+% pass rate. We believe this to be a more telling figure in that it demonstrates that seldom used skills benefit from periodic review.

What became apparent during the first 18 months of the study and obvious during the last 6 months, was that there was great difficulty and concern on the part of many providers to schedule time for skills review, as well as the cost in training and overtime hours to hold review sessions. Therefore, the time frame of “q.6mo” for formal skills review seems impractical.

CONCLUSIONS

Use of Needle Cricothyrotomy

With only two uses, there were too few cases to make any determinations. Long-term investigational study is needed to determine the efficacy of this procedure.

Skill Retention and Review

While periodic skills review increases the pass rate of persons on this particular skill, semi-annual skills reviews appear impractical and unpopular to implement.

Based on this study, we will be discontinuing needle cricothyrotomy using the Melker kit effective 1 April 2005, replacing it with the more traditional pre-packaged catheter over needle kits (ex. Rusch). Since use of these types of kits is part of the basic scope of practice for paramedics, skills checks/maintenance will be completed per each provider's CQI plan.