



Critical Determination LEADS TO Critical Care

How Albuquerque Ambulance launched its first CCT team

It was quickly becoming a huge problem, both literally and figuratively. Outside the temperatures continued to drop as fast as the snow, but inside, the staff working in the intensive care unit at San Juan Regional in Farmington, NM, was beginning to feel the heat.

Earlier that day, a 38-year-old man came into the emergency room complaining of acute left-sided weakness. An MRI revealed a bulging cerebral aneurysm pressing on his brainstem. The patient had a history of both CVAs and seizures. Adding to the dilemma, the patient was dangerously hypertensive, requiring anti-hypertensives to keep his pressure in check.

The patient was scheduled to be evaluated for neurosurgery in Albuquerque, 200 miles away. But at 6'6" and weighing over 450lbs, simply transporting a critical patient was a logistical nightmare. The combination of weather and size of the patient eliminated both rotor wing and fixed wing as viable options.

The staff contacted Albuquerque Ambulance and had the agency dispatch its new ground critical care transport (CCT) Team to Farmington.

Once there, the team performed a detailed assessment of the patient and started him on Labetalol, an anti-hypertensive that no other ground ambulance service in the state is capable of initiating. The patient's pressure was maintained

under 100mmHg systolic throughout the nearly four-hour transport (poor weather and visibility adding an extra hour of transport time) and delivered safely to the University of New Mexico Neurology Unit.

"That's a perfect example of how effective this team can be and how I envisioned it being used," says AAS Critical Care Operations Supervisor and CCT founder Jeremy Coombs.

Coombs initially thought of putting together a critical care ground transport team after several instances in which he, or one of his peers, were requested to transport a patient with medications being administered that were currently out of the scope of practice for New Mexico paramedics.

CCT members William Rowland, Lonnelle Shields and Jeremy Coombs load a critically ill patient into the ambulance.



"Up until now we'd get called out to transport a critically ill patient with one, two or sometimes even three IV drips running that we wouldn't be able to transport," recalls Coombs. "The sending physician would have to make the decision to either discontinue the drip that was out of our scope or delay transporting the patient until the drip being administered was finished. I recognized that with the appropriate training and tools we could manage most of those patients and maintain their level of care."

Being available statewide to transport critically ill or injured patients places a tremendous amount of responsibility in the hands of the new CCT team. It meant training them to a higher level of

care, learning new tools and new procedures, and giving them the freedom to initiate and maintain a greater number of medications.

New Protocols

When Coombs pitched the idea of a critical care team to the senior leaders at AAS, they gave him the go ahead to begin researching the project. However before budgets, logistics or staffing could be studied, Coombs ran into an unexpected roadblock: there were no state protocols for ground transport critical care. In fact, there wasn't even a set definition of what critical care was.

"I quickly realized that we literally had to start from the ground up," says Coombs.

Coombs decided to tackle multiple obstacles simultaneously. He formed a task force consisting of Steven Weiss, MD, a University of New Mexico physician board-certified in both emergency medicine and internal medicine, who agreed to be the transport team's medical director, and AAS employees interested in creating a critical care program.

"That task force spent hours researching protocols, different equipment and crunching numbers," says Coombs. The group put together a business plan that looked at cost vs. benefits numbers, the specific types of new medical equipment and medications they would want to carry, and how the new critical care transport ambulances would be set up and staffed.

Still nothing had officially been presented to the state Medical Direction Committee (MDC), the board that approves or denies state EMS protocols. Coombs needed something concrete to show the MDC what his goals were and what exactly he wanted his team to be able to do.

Coombs contacted Ken Davis, an educator and managing partner of EMSRx, a critical care education and consulting business, based out of Dallas, TX, to provide a set of established CCT clinical practice guidelines (CPG) that could be used as a template to build their own CCT protocols.

"Those guidelines were already reviewed by multiple physicians," says Kurt Krumperman, AAS Executive Director, "so we had a solid starting point. We reviewed

each one in order to tailor it to fit what we wanted."

For example, certain skills, such as being able to place a chest tube, which were in the EMSRx protocols, were chosen not to be used by AAS.

Next Coombs and Weiss took the numerous guidelines and therapies outlined in each of them and submitted them to the various recognized leaders in each specialty of care for review at the physician level. Neuro guidelines were submitted to neurosurgeons, cardiac guidelines were submitted to cardiologists, etc.

"We wanted to make sure that what we felt was appropriate was also viewed as appropriate to the physicians in those areas, since they know best and they will be the recipients of our patients," says Coombs. "We also knew that it would strengthen our application to the state MDC if we had those physicians' input."

Once the various physicians reviewed and gave their opinions of the guidelines, they turned them back to Coombs and Weiss who then turned the guidelines over to the MDC members to review before the actual meeting where the decision to approve or deny the special skills application would be given.

Some of the special skills applied for with the MDC included the equipment and medications necessary to perform rapid sequence airway (RSA) procedures, invasive pressure monitoring, external fetal monitoring and intra-aortic balloon pump monitoring. In addition, they also requested the ability to carry 26 medications to their stocked formulary and multiple others to the list of drugs that they have the ability to monitor during transport. AAS pledged that the paramedics that would be involved with this team would be kept to a small number, no more than 20, trained to the critical care level established by UMBC, and would have ongoing CEs and training throughout the year.

In the end, AAS received unanimous approval for the special skills they applied for. Dr. Marc Munk, who was the acting state medical director at the time of AAS's application stated, "If anyone should be doing ground critical care in the state of New Mexico, then clearly it should be Albuquerque Ambulance."

Photos by Michael Barley

SKILLS APPROVED FOR CCT TEAM

Adult intraosseous access

Esophageal temperature monitoring

External fetal monitoring

Intra aortic balloon pump monitoring

Invasive pressure monitoring

King LT airway

RSI/RSA

Training

Albuquerque Ambulance has operated in New Mexico since 1972. It is a CAAS-accredited ambulance service employing the highest number of EMTs and paramedics in the state, and it's here that Coombs recruited the initial members of his team.

Potential team members needed to be in good standing with AAS, which meant no serious corrective action within the previous 12 months, and have a willingness to learn a tremendous amount of new protocols and procedures.

A pretest, using a mix of standard AAS paramedic protocol questions along with a few critical care questions, was used to determine who would be picked for the

new team. EMT team members did not have to take the pretest and were chosen on their experience, willingness to learn and the recommendations of those chosen to the team.

The new CCT team would consist of two critical care paramedics and one EMT, each working three 12-hour shifts one week and four 12-hour shifts the next. This, along with a small number of PRN and part time employees, would keep the size of the team to around 20 members.

In the end Coombs had 17 paramedics join the CCT team. Their range of experience spanned the gamut from close to 20 years to six months out of paramedic school. Three AAS supervisors were selected to the team, as well as one of the education coordinators.

Next Coombs had Ken Davis come out to Albuquerque to teach the team members the UMBC critical care class. Team members took the class on their own

time, scheduling it around their regular 9-1-1 schedule, resulting in a normally two-week class extending to a two-month class. The pace was relentless, members getting off their 10-, 12- or 13-hour shifts, getting home to study and a few hours sleep before heading back to AAS for eight hours of lecture and didactic training.

Team members were educated on the details of hemodynamics, fetal monitoring, rapid sequence airway procedures, Swan-Ganz catheters and intracranial pressure monitoring. They were expected to memorize over 20 new medications and become familiar with dozens of others they may be expected to transport. Many in the class felt the critical care paramedic course was more difficult and intense than their year-long paramedic course.

"It really shows the level of commitment and dedication these people have," says Coombs. "I knew this was going to be a small and tight-knit group, and this

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class bonded them in a way no other single experience could.”

Davis was a taskmaster on the details of the job. He insisted that paramedics learn not just the facts, but the reasoning behind every decision they were going to make. And then back that decision up with the hands-on ability to execute the procedure. When Davis educated the team on insertion of chest tubes, a skill not yet approved by the state of New Mexico, he detailed the why and when such a skill may be needed. He then asked a student if they thought they would be able to handle inserting a chest tube on a patient. When the student confidently answered yes, Davis provided a set of beef ribs for him to prove his worth. The student struggled, but was able, with some clear guidance from Davis, to successfully place the chest tube. Davis then had each member perform the task until they were confident they knew not just how to perform the skill, but why they would be expected to do it.

RSA medications were another large part of the class. AAS decided on a combination of Etomidate and Rocuronium for the initial RSA procedure, provided the patient didn’t show signs of asthma, hypotension or sepsis, in which case Ketamine replaced Etomidate. Post-airway management was a combination of Fentanyl and Versed or Ativan, with Phenylephrine available to be administered if the patient was hypotensive post fluid bolus.

However education wasn’t limited just to the medications that AAS was allowed to carry. Davis also went over the finite details of medications that the CCT team might come into contact with and would be expected to transport, including Propofol, Succinylcholine and other non-depolarizing medications.

After final testing all but one person, who incurred a personal emergency, passed the course.

CCT Responses

During their first week of activation, the CCT team received a call they both couldn’t wait for and were hoping never to take: a 60-year-old man, close to respiratory failure, 55 miles away.

Rotor wing, on another call.

“Is he intubated?” asked CCT

MEDICATIONS CARRIED

In addition to all meds carried by non-critical care ambulances, the CCT team has access to the following medications:

Ativan	Glucagon	Oxytocin	Promethazine	Vasopressin
Diltiazem	Hydrocortisone	Nicardipine	Rocuronium	Zyprexa
Dobutamine	Ipratropium	Nitroglycerin Drips	Solumedrol	
Enalapril	Keppra	Norepinephrine	Succinylcholine	
Esmolol	Ketamine	Phenylephrine	Terbutaline	
Etomidate	Labetalol	Procainamide	Thiamine	

paramedic Adam Kozacek. The facility answered that the patient wasn’t and they were waiting for the CCT team.

During the code 3 response out to the tiny hospital, Kozacek and his partner looked over their new protocols. They knew that the call could result in the need for them to use their RSA skills, and they wanted to be ready.

When they got there they found their patient near unresponsive being treated with a non-rebreather mask and albuterol treatments.

The patient was well known to the staff at the hospital, a chronic COPD patient who normally responds to albuterol treatments. Tonight however, they just could not get their patient’s O₂ sats up with oxygen and bronchodilators. On 15 lpm the patient’s sats were 84%.

Kozacek and his partner found the patient’s mentation too diminished for CPAP to be effective and supplemental oxygen was not effective. The patient’s lung sounds were near absent and his skin was beginning to show signs of peripheral mottling.

The two CCT paramedics came to the consensus that they were going to use their RSA skills to intubate the patient. Kozacek pulled out the endotracheal tube while his partner drew up the appropriate dosages of Etomidate and Rocuronium. Their EMT partner pulled out an LMA as a backup airway adjunct and acted as scribe. At 04:58 on November 28, the CCT team administered its first paralytic and performed the first successful RSA in the company’s 40-year history. The patient was placed on the team’s new LTV 1200 mechanical ventilator and his cardiac rhythm and CO₂ patterns were tracked by the team’s new Lifepack 15. For over an hour the patient remained sedated and ventilated by the CCT team until he was delivered to Presbyterian Hospital in down-

town Albuquerque.

Looking Ahead

Currently the team is based out of the newly constructed RUST Presbyterian Hospital in Rio Rancho, NM, a centrally located hospital just north of Albuquerque. It’s at RUST where the team interact with ER and ICU staff, and are expected to maintain a knowledge of which patients are in the ICU and potential critical patients in the ER, and also be available to assist AAS units bringing patients into the RUST ER.

The CCT team work 12-hour shifts designed to coincide with the hospital staff. The decision to have the team based out of the hospital makes them unique from their 9-1-1 counterparts who follow a system-status configuration keeping them mobile throughout the city. Coombs believes this decision is vital to the success of the team.

“It’s important to me that our team integrate with the hospital staff,” says Coombs. “I wanted our schedules to



The Albuquerque Ambulance CCT Team from left to right standing: Lonette Shields, EMT I, Noah Cooperstein, CCT-P, William Rowland, CCT-P, John Tatum, CCT-P, Jeremy Coombs, CCT-P, Contessa Chavez, EMT-I, Jonah Martinez, CCT-P, Scott Oglesbee, CCT-P, Nalani Feiselman, EMT-I; seated: Paul Serino, CCT-P, Dr. Stephen Weiss, Team Medical Director, Leslie Foust, CCT-P; not pictured: Adam Kozacek, CCT-P, Scott Brawley, CCT-P.

PROCESSES AND PROTOCOLS

Albuquerque Ambulance has reconfigured two of its ambulances to fit the CCT team's needs. The two ambulances, with a third designated as a potential back-up, carry the new Lifepak 15, fetal monitors, esophageal probes and two specially designed jump bags carrying the various medications and tools used exclusively by the critical care team. Medications and tools are inventoried by the team members every shift. Unlike the 9-1-1 crews who are restocked by a team of specialized stock room members, the CCT team is responsible for its own equipment..

Each day at the start of their shift, one CCT paramedic signs out two boxes of controlled substance medications. One box is the same as every 9-1-1 paramedic signs out and is used in the event that the CCT team is required to respond to a 9-1-1 call, as the broadened scope of protocols the CCT team works under is not yet approved for responding on a 9-1-1 call. That box contains 40mg of morphine and 200 mcg of fentanyl for pain control, along with 20mg of diazepam and 10mg of versed for seizures and convulsions. Next the CCT medic is handed a hard plastic gun case used as a secure controlled substance vault. This box contains: 50mg of morphine, 1250 mcg of fentanyl, 50mg of versed, 10mg of Ativan, 1000 mg of ketamine, 80 mg of Etomidate and 200mg of rocuronium. Given the great distances the team is required to travel and the types of patients and procedures they must potentially face, the team's protocols are extremely liberal in the amounts of starting and maintenance doses they can administer. For example: the pain management protocol used in the 9-1-1 system lists Fentanyl doses of 0.25-0.5mcg/kg up to a maximum dose of 1mcg/kg and requires an MCEP consult if the paramedic wishes to administer more. The CCT protocol for pain management lists a starting dose of 1-2mcg/kg with a max dose of fentanyl at 4mcg/kg. If the max dose is reached, the CCT medic then has the option to switch to morphine for continued analgesia without an MCEP consult.

However, with this tremendous amount of freedom comes a tremendous amount of scrutiny. Each and every one of the CCT charts generated is reviewed and QIed by at least three people. Charts are also reviewed by the entire team during a monthly meeting.

coordinate with the on-coming hospital staff so that the CCT team would know what patients are there, how they are progressing and what we can do to work towards their positive outcomes."

Coombs also believes that meshing his team with the hospital staff will build a desired sense of trust on both sides for this new and unique endeavour.

Future plans for the team include assisting with procedures and patient care in the ER and ICU and where the team will perform their 8 hours of OR time getting intubations in order to maintain RSI skills.

For more on Albuquerque Ambulance, visit <http://www.phs.org/PHS/programs/Ambulance/index.htm>. 

Paul Serino, AS, CCEMT-P, is a 10-year medic and a member of the Albuquerque Ambulance Critical Care Team. He has an associates degree in EMS from Eastern New Mexico University-Roswell and a bachelor's degree in journalism/communications from the University of New Mexico in Albuquerque.

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