Critical Care Air Transport Teams

Integrity - Service - Excellence

CCATT/TCCET

Critical Care Air Transport Teams
Tactical Critical Care Evacuation Teams

Lt Col Patricio G. Bruno, DO, FAAFP, FHM
CCATT Physician & Pararescue Flight Surgeon
920th Aeromedical Staging Squadron
Patrick AFB, Florida
Lt Col Patricio Bruno, DO

- New York, NY
- College: Queens College, CUNY
- Medical School: NYIT College of Osteopathic Medicine
- Osteopathic Internship: St. Clare’s Hospital
- Residency: Family Medicine, Beth Israel Medical Center
- Commissioned: 2002
- Deployments: OCONUS: Lakenheath, Ramstein, Moron
- Theatre: OIF: Balad, Iraq; OEF: Kandahar, Leatherneck, FSTs
- Command: Flight Commander, Flight Medicine, Chief of Aerospace Medicine
- Civilian: DME, Program Director, Regional Assistant Dean, Florida Region, LECOM
- Appointments: NATO CIOMR Delegate, HOA Delegate to AOA, former VP, COMS, Trustee, FOMA
## What is CCATT/TCCET

### Critical Care Air Transport Team (CCATT)
- **Team Members:**
  - Critical Care Physician
  - Critical Care Nurse
  - Respiratory Therapist
- Augment Aeromedical Evacuation
- Provide Critical Care ...in the Air

### Tactical Critical Care Evacuation Teams (TCCET)
- **Team Members:**
  - ER/Critical Care Physician
  - Certified Nurse Anesthetists
  - ER or Critical Care Nurse
- Journal of trauma published that 51.4% of battle injury deaths being survivable injuries.
- TCCET created to turn statistic around and provide aggressive damage control resuscitation at the point of injury – then transport
• Critical Care Air Transport Team (CCATT)
  • 3 person team
  • Ready to move when patient is validated needing critical care transport
    o Not subject to rules and regulations of line flyers
  • Co-located/strategically placed with AE in theater
  • Potential for augmentation with CCATT-E
    o Adds 2 personnel
1988 -- Birth of an idea

- Col PK Carlton, Med Center Commander, Scott AFB
  - Sends his ICU doctor (Maj Chris Farmer) to Wiesbaden, Germany
  - Maj Farmer travels via the AE system
- In-flight incident
  - Routine patient develops unexpected *status epilepticus*
  - AE crew not trained/equipped to address this challenge
- Back at the Med Center -- Col Carlton and Maj Farmer develop a plan for organic advanced medical capability in AES
  - Clinical skills
  - Specialized equipment
  - Aeromedical preparation
CCATT Pilot Program -- June 1994

- Teams set up at Wilford Hall and Keesler AFB
  - AETC provided team members
  - AFSOC provided equipment for the teams
  - 23rd AES (Pope AFB) provided guidance

- Operation UPHOLD DEMOCRACY
  - First CCATT deployment -- to Haiti
  - Concept gained in support
Formal CCATT Training

- Clinical proficiency a pre-requisite
  - Current privileged in specialty
  - Skills checklists
    - Readiness Skills Verification Program
    - Validation from Clinical Validation Committee

CCATT Basic
- 2 week training course at USAFSAM
- One time training

C-STARS Cincinnati
  Center for Sustainment of Trauma and Readiness Skills
  - 2 week training every 24 months (AEF cycle)
CCATT Initial Course Content

Doctrne
- CCATT & AE
- Concepts
- EMEDS
- AE Primer

Altitude Physiology
- Stresses of flight
- Chamber Rides

Clinical
- Patient flight physiology
- Acute respiratory failure
- Mechanical ventilation
- Hemodynamic monitoring
- Burn management
- Transport of medical & trauma patients
- Traumatic brain injury
CCATT Initial Course Content cont’d

Operational
- Allowance standards/CCAT Team bags
- Crew resource management
- Equipment approval
- Flight line safety
- Aircraft familiarization
- Oxygen therapy/systems
- Hands-on equipment training
- Litter loading & equipment configuration
- Infection control
- Mission management & documentation
- Field contingency exercises
C-STARS
Center for Sustainment of Trauma and Readiness Skills

- 2 Week course
- Each day different PowerPoint lectures
- Multiple SIM lab scenarios
- Clinical Rotations
- Flight on C-130 with patient scenarios
Formal TCCET Training

CCATT Basic
• 2 week training course at USAFSAM
• One time training

C-STARS Cincinnati
Center for Sustainment of Trauma and Readiness Skills
• 2 week training every 24 months (AEF cycle)

TCCET Cincinnati
• 1 week training course – one time course

JECC
• Teaches Helo Ops and Water survival – one time course

ATLS/TNCC/ATCN – maintain certification

ECAC (evasion conduct after capture)
• (Survive, Evade, Resistance, Escape training for medical) – one time course

Emergency War Surgery Course - one time course

CAST
• Combat Airman Skills Training – one time course
Casualties Who Die

- % DOW * decreased dramatically
- % KIA unchanged this century
- 1/3 survived at least 10 minutes
- OIF DOW rate are 98.5%

DOW (Died of Wounds) = Died After Reaching Care of Physician

Integrity - Service - Excellence
Battlefield Distribution of Wounds

Ref: Patel et al, J Trauma, Aug 2004, Vol 57, p201
Multi-purpose tool

“... since its inception CCATT has evolved into a multi-purpose tool that has been applied to a broad range of situations . . .”
Peacetime Healthcare

- Support for remote CONUS and near-offshore beneficiaries
- Support for patients needing highly specialized care
  - Organ transplant et al
- Training benefit
  - Keeps CCATTs flying between conflicts/deployments
- Potential financial benefit
  - Use fixed-cost personnel and flying training hours
Disaster Response

- Use retrograde airlift to decompress the most critical patient from the disaster area
  - Improve their standard of care
  - Preserve resources for those less critical
CCATT is a flexible tool that supports:

- Military operations
  - Full spectrum
- Peacetime healthcare
- Disaster response
  - International - Guam 747 crash, Ecuador pipeline . . .
  - Domestic - Hurricanes Lili, Katrina, Rita
- Special Missions
  - POTUS travel
  - NASA
- International Engagement
  - Training
  - Partnering for medical support
- Limited by . . . The imagination of the next generation!
Equipment Composition

**CCATT**
- 2 backpacks plus nine equipment, medication, and supply bags

**TCCET**
- Lighter and leaner
- 3 bags!

TOTAL WEIGHT: 750 lbs.
CCATT Allowance Standards

12 Bags

- Drug Main Supply Case
- Narcotics
- Respiratory Therapy Backpack
- Respiratory Support Bag
- Trauma Back Pack x 2
- Trauma Support Bag
- Gear bag x 3
- ZOLL Defibrillator
- SMEED Bag

1350 lbs +
PMI Allowance Standards

Zoll CCT Transport Monitor Defibrillator/Pacer
CCATT Allowance Standards

• DRUG MAIN SUPPLY CASE
• NARCOTICS CASE
CCATT Allowance Standards

- RESPIRATORY SUPPORT BAG
CCATT Allowance Standards

- GEAR BAG 1/2/3, PMI EQUIPMENT
CCATT Allowance Standards

- TRAUMA BACKPACK 1/2
CCATT Allowance Standards

- TRAUMA SUPPORT BAG
CCATT Allowance Standards

- DEFIBRILLATOR BAG
AE Allowance Standards
Typical Airframes

CCATT
- C-130s
- KC-135s
- C-17s

TCCET
- Rotary Wing Aircraft
- C-130s
- KC-135s
- C-17s
Airway
Exposure – Cover them

- Body bag
- Thermal space blanket inside body bag
- Head covering
Preparing for Transport

- Patient on Orange crush
- All lines and devices to the right side
- Tuck things in
- Paperwork and Xrays assembled
- Personnel effects
Preparing for Transport

- Nasogastric tube placed and secured
  - Prevent aspiration
- Suction one last time
  - NG and ET and mouth
- Chest tube
- Foley between legs
- Patient secured with litter straps
- Ear protection for you and patient
During Flight

- **Pulse**
  - **Tachycardia**
    - Hypovolemia – is B/P down? Increase fluids
    - Patient light? – increase sedation/analgesia
  - **Bradycardia**
    - Hypoxia- check saturation
    - Vagal- check for airway obstruction
    - Abdominal distension/vent NG
- **Blood Pressure**
  - May be tough to monitor
    - Arterial line- requires pressure bag
    - Non-invasive- may fail with high vibration
    - Oximeter- if it is reading with good waveform-perfusing
Ventilated Patient

CCATT
- Vented patients undergoing transport must have adequate pain medication and sedation
- Have plan if the ET tube comes out (e.g. bag with O2)
- Consider wiring ET tube to teeth in burns and cases where loss of airway will be life threatening
- If a paralyzed patient arrives with a severely fast heart rate - after considering possible low fluid volume consider poor sedation and pain control

TCCET
- Use any means necessary to secure an airway and provide ventilation
- Have plan if you can’t secure a definitive airway
- Consider wiring ET tube to teeth in burns and cases where loss of airway will be life threatening
Pneumothorax

• A tension pneumothorax can develop at any time
• If difficulty with ventilation remove the patient from the ventilator – bag and check the airway
• One cannot listen for breath sounds in a helicopter or plane
• Looking and feeling for tracheal deviation may point to the correct side of a pneumothorax
• The most expedient way to decompress a tension pneumo in an aircraft is bilateral needle decompression
CCATT

• Teams flexible / adaptable
  • Delivered high tech medicine in combat conditions
  • Adapted to fly on any A/C of opportunity
  • Flies on regulated missions

TCCET

• Proven to be light, lean and life-saving
• Flies on un-regulated missions
Amputee

CCATT
- When transporting amputee patients - plan for the worst case scenario
- Always have a tourniquet ready or loosely applied
- Bring blood products

TCCET
- Stop the bleeding immediately
- Apply tourniquet
- Bring blood products
Head-Injury Patient

CCATT
- HYPER & HYPO ventilation can be bad in a head injury
- The goal if for PCO2 (amount of carbon dioxide in the blood) to be 30-35 in brain injury unless otherwise noted by neurosurgeon
- Ventilators are more consistent than hand bagging during transport

TCCET
- Leave object in place and secure
- Establish a definitive airway
• Hypothermia kills
• A “hot pocket” with 2 wool blankets and a space blanket wrapped in an altered body bag will preserve body heat in most hypothermia risk situations
• Commercially available hypothermia prevention kits are an option
Lines and Catheters

**CCATT**

- Make sure all lines are secure and out of the way for transport
- Central lines and A-lines need to be sutured in place
- Be careful with ET tubes and chest tubes – most frequent lines pulled out with patient movement

**TCCET**

- Use interosseous access if IV line too difficult
- Bilateral needle decompression – don’t waste time on chest tube insertion
CCATT/TCCET Helpful Tips

- If chest tubes run out an endotracheal tube can be used as chest tube
- Canteens can be marked and used as urinal in a mass casualty situation
- Sterile gloves can be used as sterile light handle covers
- A sterile gown can be used as a sterile drape for minor procedures
- Use Excedrin with caffeine far enough ahead to avoid caffeine headaches
- Going days without showers – antifungal cream can be handy
In a pinch – IV tubing can be used to secure an ET or cricothyroidotomy tube

If you run out of lap pads anything sterile will work for packing – gowns, drapes, towels, gloves
Any Questions?

Integrity - Service - Excellence