Beyond the Basics: Critical Thinking in EMS

with NIK
This is an Obvious Skill Needed in EMS, So....?

- This term we are losing 14+ months of call experience for our New(er) members

- EMT class teaches you ~10% of what you actually need in the field, all the rest is learning how to combine and organize the knowledge on the fly

- This will not replace the experience you will have on calls but it can get your brain rolling in the right direction
Critical thinking a new approach to patient care

David L Sullivan, Christopher Chumbley
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Abstract

As EMS responders, we're challenged with complex patient care situations, and we often make decisions using past experiences, protocols and medical consultation to guide us through treatment "mazes." Using our natural problem-solving process, we tend to see a problem and think about similar past experiences, which we believe will help us implement a workable solution to the problem. (1,2,3) As we strive toward patient care excellence, however, we need to also look for the best solution for our patient care needs. Research continues to reveal that EMS responders may benefit from increasing their practice of critical thinking, problem-solving and decision-making in initial and continuing education. (4-13) Studies are finding that increased practice and exposure to triage, airway management and medication administration decision-making will allow us to achieve an increased quality of patient care. (7,14-22) Research has also found many reasons for patient care deficiencies, but a common theme is that EMS students and providers may not be getting enough practice or exposure to thinking "outside of the box" in difficult, critical-thinking scenarios. (12,14,18,20,21,23-25) This lack of exposure is why EMS educators should continue to challenge students with skills practice and competency assessments. Even with minimal time and practice in the classroom and clinical settings, EMS educators and instructors should infuse the curriculum with complex scenarios and problems to stimulate students' critical thinking and problem-solving skills.
“Cook Book Mentality”
What does Cook Book Mentality look like?

<table>
<thead>
<tr>
<th>Takes or verbalizes appropriate PPE precautions</th>
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<tbody>
<tr>
<td>SCENE SIZE-UP</td>
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<tr>
<td>Determines the scene/situation is safe</td>
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<tr>
<td>Determines the mechanism of injury/nature of illness</td>
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<tr>
<td>Determines the number of patients</td>
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<tr>
<td>Requests additional EMS assistance if necessary</td>
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<td>Considers stabilization of the spine</td>
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| PRIMARY SURVEY/RESCUSCITATION                |
| Verbalizes general impression of the patient |
| Determines responsiveness/level of consciousness |
| Determines chief complaint/apparent life-threats |
| Airway                                        |
| -Opens and assesses airway (1 point)         |
| -Inserts adjunct as indicated (1 point)      |
| Breathing                                     |
| -Assess breathing (1 point)                  |
| -Initiates appropriate oxygen therapy (1 point) |
| -Assures adequate ventilation (1 point)      |
| -Manages any injury which may compromise breathing/ventilation (1 point) |
| Circulation                                   |
| -Checks pulse (1 point)                      |
| -Assess skin [either skin color, temperature or condition] (1 point) |
| -Assesses for and controls major bleeding if present (1 point) |
| -Initiates shock management [positions patient properly, conserves body heat] (1 point) |

<table>
<thead>
<tr>
<th>Identifies patient priority and makes treatment/transport decision (based upon calculated GCS)</th>
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<tbody>
<tr>
<td>HISTORY TAKING</td>
</tr>
<tr>
<td>Obtains baseline vital signs [must include BP, P and R] (1 point)</td>
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<tr>
<td>Attempts to obtain SAMPLE history</td>
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<tr>
<td>SECONDARY ASSESSMENT</td>
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Steps to Critical Thinking in EMS

1) **Knowledge**
   - Identification and recall

2) **Comprehension**
   - Ability to interpret and paraphrase

3) **Application**
   - Use all knowledge, information, and experience to determine additional information, solve any problems and explain actions

4) **Analysis**
   - Prioritize and initiate appropriate treatment
Knowledge

-Having the baseline knowledge of an EMT
-Stopping here will result in Cook book mentality.
Let’s Review Some Basics

**COPD (Chronic Obstructive Pulmonary Disease)**
- Tightness in the chest
- Constant fatigue
- Barrel chest
- Exhale through pursed lips
- Abnormal breath sounds
- Digital clubbing

**Hypertension**
- Sudden severe headache
- Strong bounding pulse
- Ringing in the ears
- Nausea and vomiting
- Dizziness
- Warm skin (dry or moist)
- Nosebleed
- Altered mental status
- Sudden development of pulmonary edema

**Hyperglycemia**
- Kussmaul respirations
- Dehydration
- Sweet or fruity odor on breath
- Rapid, thready pulse
- Normal or slightly lower blood pressure
- Varying degrees of unresponsiveness
- Weakness
- Nausea
- Vomiting
<table>
<thead>
<tr>
<th>And a few more...</th>
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</thead>
<tbody>
<tr>
<td><strong>Tension Pneumothorax</strong></td>
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<tr>
<td>Progressive shortness of breath</td>
</tr>
<tr>
<td>Increasing altered LOC</td>
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<tr>
<td>Neck vein distention</td>
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<tr>
<td>Tracheal deviation</td>
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<tr>
<td><strong>Congestive Heart Failure (CHF)</strong></td>
</tr>
<tr>
<td>Dependent edema</td>
</tr>
<tr>
<td>Rales</td>
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<tr>
<td>Paroxysmal nocturnal dyspnea</td>
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<tr>
<td><strong>Anaphylaxis</strong></td>
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<tr>
<td>Flushed skin or hives</td>
</tr>
<tr>
<td>Generalized edema</td>
</tr>
<tr>
<td>Decreased blood pressure</td>
</tr>
<tr>
<td>Laryngeal edema with dyspnea</td>
</tr>
</tbody>
</table>
Comprehension

- Understanding the WHY and HOW

- Understanding why symptoms arise will make you a SIGNIFICANTLY better provider
WHY?

COPD (Chronic Obstructive Pulmonary Disease)

- Tightness in the chest → Difficult to expand lungs due to alveolar obstruction
- Constant fatigue → Extra energy being used to breathe/not enough oxygen to support activity
- Barrel chest → Constant over-inflation of lungs
- Exhale through pursed lips → Creates the same effect as CPAP, uses air to keep airways open to prevent collapse
- Abnormal breath sounds
- Digital clubbing → Edema building up in extremities causes deformity in finger tips
Barrel chest

Digital Clubbing
Hypertension

- Sudden severe headache
  - Pressure in the blood vessels of the brain causes pain

- Strong bounding pulse
  - More pressure, More displacement of artery

- Ringing in the ears
  - Tinnitus caused by turbulent blood flow, more noticeable

- Nausea and vomiting
  - Body is trying to displace pressure/irritant (albeit an ineffective response)

- Dizziness
  - Increased ICP causes the vestibular system in the brain to malfunction

- Warm skin (dry or moist)
  - More pressure, larger vessels, more heat given off

- Nosebleed
  - Nasal capillaries are very delicate and easily rupture with pressure

- Altered mental status
  - Increased ICP causes AMS

- Sudden development of pulmonary edema
  - Alveolar capillaries similar to nasal, easily permeable
Hyperglycemia

Kussmaul respirations → Body is trying to blow off CO2
Dehydration → Takes water to break down sugars
Sweet or fruity odor on breath → Ketones being developed to break down fat as fuel
Rapid, thready pulse → Dehydration and increased cardiac stress
Normal or slightly lower blood pressure
Varying degrees of unresponsiveness → Electrolyte imbalance, dehydration, ketones, low BP...a Myriad of causes
Weakness → Can’t convert energy so… no energy
Nausea/Vomiting → DKA develops, Body wants to flush ketones via vomiting
Tension Pneumothorax

Progressive shortness of breath  →  Pressure builds over time causing increased dyspnea with each breath

Increasing altered LOC  →  Less O2 taken in with each breath

Neck vein distention  →  Pressure increased in chest caused blood to back up into the jugular veins

Tracheal deviation  →  Affected lung will deviate trachea in opposite direction because of pressure and displacement
Congestive Heart Failure (CHF)

Dependent edemas → Heart cannot remove edema in certain areas (lower body usually) because of reduced cardiac ability

Raless → Fluid building up in lungs because of pulmonary backup causing alveolar sacks to fill

Paroxysmal nocturnal dyspnea → Lying flat causes fluid buildup in the back of the lungs, causing dyspnea
Anaphylaxis

Flushed skin or hives
Generalized edemas
Decreased blood pressures
Laryngeal edema with dyspnea

Histamines cause plasma to leak out of the blood vessels causing flushing, hives, and angioedema
Histamines cause opening of vessels and plasma leakage (mostly near mucous membranes)
Vessels open to flush allergen
Capillaries are very permeable, plasma leaks into alveolar sacs and larynx swells from angioedema.
Application

- How we apply deep understanding to patient care
- Most useful in Diagnosis stage
- Not every patient (rarely any TBH) presents textbook so how to you figure out what's wrong
What Does Application Look like in the field?

- Seeing each patient as an individual
- Recognizing trends in your patients
- Understanding your patients symptoms in context of their “normal”
Example:

You have a 22 year old female patient who is hyperventilating and extremely nervous. Your patient has a history of Asthma and Anxiety.

Expected Symptoms for Anxiety?
- Rapid pulse
- Tachypnea
- Uneasiness
- High blood pressure
- Chest pain/pressure
- Nausea

Expected Symptoms for Asthma?
- Rapid pulse
- Shortness of breath
- Uneasiness
- Low blood pressure
- Chest pain/pressure
- Nausea
Example:

You have a 19 year old patient who has been drinking moderately all night and it found only responsive to touch on the second floor of his fraternity.

His brothers say that he has to “watch his sugar”

Assessment reveals:

BP: 90/64  Alcohol smell on breath  What’s the thing to check in this patient?
P: 70      weak pulse
R: 26      Moist pale skin
Analysis

- Prioritize based off critical thinking
- Balance two different tracks of thinking at once:
  - What issue can I help the most right now/make the largest impact on?
  - What things do I need to set in motion now that will be time dependent

Plan B
All in All

Understanding why things happen and how symptoms are connected to underlying causes will allow you to actually treat your patient effectively.