Management of TBI in TCCC

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Mgt of TBI in TCCC

- The most important elements in the prehospital care of a casualty with TBI are to prevent secondary injury from hypotension or hypoxia
- These measures have been in the TCCC Guidelines since 2003
- The following slides review aspects of the TCCC Guidelines related to TBI.
- Proposed changes are noted by **red text.**
- **Note: References are not proposed as part of the change -included for info only.**

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Care Under Fire

7. Stop *life-threatening* external hemorrhage if tactically feasible:
   - Direct casualty to control hemorrhage by self-aid if able.
   - Use a CoTCCC-recommended tourniquet for hemorrhage that is anatomically amenable to tourniquet application.
   - Apply the tourniquet proximal to the bleeding site, over the uniform, tighten, and move the casualty to cover.

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Tactical Field Care

1. Casualties with an altered mental status should be disarmed immediately.

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Tactical Field Care

2. Airway Management

a. Unconscious casualty without airway obstruction:

- Chin lift or jaw thrust maneuver
- Nasopharyngeal airway
- Place casualty in the recovery position

b. Casualty with airway obstruction or impending airway obstruction:

- Chin lift or jaw thrust maneuver
- Nasopharyngeal airway
- Allow casualty to assume any position that best protects the airway, to include sitting up.
- Place unconscious casualty in the recovery position.
- If previous measures unsuccessful:
    - Surgical cricothyroidotomy (with lidocaine if conscious)

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Tactical Field Care

3. Breathing

a. In a casualty with progressive respiratory distress and known or suspected torso trauma, consider a tension pneumothorax and decompress the chest on the side of the injury with a 14-gauge, 3.25 inch needle/catheter unit inserted in the second intercostal space at the midclavicular line. Ensure that the needle entry into the chest is not medial to the nipple line and is not directed towards the heart.

b. All open and/or sucking chest wounds should be treated by immediately applying an occlusive material to cover the defect and securing it in place. Monitor the casualty for the potential development of a subsequent tension pneumothorax.

c. Casualties with moderate/severe TBI should be given supplemental oxygen when available to maintain an oxygen saturation > 90%.

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Tactical Field Care

- Section 4 – Bleeding
- Section 6 – TXA
- Section 7 - Fluid Resuscitation
  - For TBI casualties: more aggressive fluid resuscitation strategy - give Hextend as needed to maintain a palpable radial pulse.
- Section 8 - Hypothermia Prevention

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Tactical Field Care

10. Monitoring

Pulse oximetry should be available as an adjunct to clinical monitoring. **All individuals with moderate/severe TBI should be monitored with pulse oximetry. (*BTF 2007*)** Readings may be misleading in the settings of shock or marked hypothermia.

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Tactical Field Care

13. Provide analgesia as necessary.

a. Able to fight:

These medications should be carried by the combatant and self-administered as soon as possible after the wound is sustained.

- Mobic, 15 mg PO once a day
- Tylenol, 650-mg bilayer caplet, 2 PO every 8 hours

b. Unable to fight:

Note: Have naloxone readily available whenever administering opiates.

- Does not otherwise require IV/IO access
    - Oral transmucosal fentanyl citrate (OTFC), 800 ug transbuccally
        - Recommend taping lozenge-on-a-stick to casualty's finger as an added safety measure
        - Reassess in 15 minutes
        - Add second lozenge, in other cheek, as necessary to control severe pain.
        - Monitor for respiratory depression.

Mgt of TBI in TCCC
Tactical Field Care

13. Provide analgesia as necessary (cont)

- IV or IO access obtained:
  - Morphine sulfate, 5 mg IV/IO
    - Reassess in 10 minutes.
    - Repeat dose every 10 minutes as necessary to control severe pain.
    - Monitor for respiratory depression
- Promethazine, 25 mg IV/IM/IO every 6 hours as needed for nausea or for synergistic analgesic effect

Note: Narcotic analgesia should be avoided in casualties with respiratory distress, decreased oxygen saturation, shock, or decreased level of consciousness.

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Tactical Evacuation Care

2. Breathing

c. Most combat casualties do not require supplemental oxygen, but administration of oxygen may be of benefit for the following types of casualties:

- Low oxygen saturation by pulse oximetry
- Injuries associated with impaired oxygenation
- Unconscious casualty
- Casualty with TBI (maintain oxygen saturation > 90%)
- Casualty in shock
- Casualty at altitude

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Tactical Evacuation Care

- Section 3 – Bleeding
- Section 5 - TXA

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New #6. Traumatic Brain Injury

a. Casualties with moderate/severe TBI should be monitored for:

1. decreases in level of consciousness

2. pupillary dilation

3. SBP should be > 90 mmHg

4. O2 sat > 90

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New #6. Traumatic Brain Injury (cont)

a. Casualties with moderate/severe TBI should be monitored for:

5. Hypothermia

6. PCO2 (If capnography is available, maintain between 35-40 mmHg) (*Blackbourne 2008, Cochrane Review 2009, BTF 2007, Ling 2010*)

7. Penetrating head trauma (if present, administer antibiotics) *(JTS CPG, Ling 2010)*

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Tactical Evacuation Care

New #6. Traumatic Brain Injury (cont)

b. Unilateral pupillary dilation accompanied by a decreased level of consciousness may signify impending cerebral herniation; if these signs occur, take the following actions to decrease intracranial pressure:

1) Administer 250 cc of 3 or 5% hypertonic saline bolus. (*BTF 2007, Dubose 2010, Rockswald 2009, BTF 2007, Ling 2010, Torre-Healy 2011, Strandvik 2009, CPG 2010, Meyer 2010, Timmons 2010, Rickard 2010*)

Mgt of TBI in TCCC
Tactical Evacuation Care

New #6. Traumatic Brain Injury (cont)

2) Elevate the casualty's head 30 degrees. (*CPG 2010, Meyer 2010, Feldman 1992, Fessler 1993*)

3) Hyperventilate the casualty.

a) Respiratory rate 20 *(BTF 2007)*

b) Capnography should be used to maintain the end-tidal CO2 between 30-35. (*BTF 2007*)

c) The highest oxygen concentration (FIO2) possible should be used for hyperventilation. (Tolias 2004, Tolias 2009)

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New #6. Traumatic Brain Injury (cont)

*** Notes:**

- **Do not hyperventilate unless signs of impending herniation are present.**
- **Casualties may be hyperventilated with oxygen using the bag-valve-mask technique.**

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10. Monitoring

Institute pulse oximetry and other electronic monitoring of vital signs, if indicated. **All individuals with moderate/severe TBI should be monitored with pulse oximetry. (*BTF 2007*)**

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Mgt of TBI in TCCC
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Additional Recommendation:

DoD should make research regarding prehospital management of moderate/severe TBI a priority.

Questions?

11th MEU in the Arabian Sea