



Welcome to the second edition of the *North Memorial Trauma Update*. This peer reviewed educational newsletter, written by the trauma surgeons at North Memorial, arrives on a quarterly basis. One of the goals of a Level I Trauma Center is to provide quality trauma education to providers caring for injured patients. Volume 1 covered initial resuscitation of the trauma patient. Subsequent editions discuss the secondary and tertiary survey, role of radiographs and laboratory studies, and mechanism of injury.

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Secondary and Tertiary Survey

OBJECTIVES:

1. To describe the secondary survey of injured patients
2. To evaluate common pitfalls in the secondary survey
3. To describe the importance of the tertiary survey

The previous edition of *Trauma Update* reviewed the primary survey. In brief, the primary survey consists of evaluating and treating the most life threatening injuries to a trauma patient. This consists of stabilizing the airway, ensuring adequate ventilation, and maintaining sufficient perfusion.

Once these objectives have been accomplished, the secondary survey begins:

- In the secondary survey, a head to toe physical exam is conducted and the pertinent components of the history are obtained. Additional radiographic studies are obtained as indicated.
- This history may come from secondary sources, as severely injured patients are often unable to communicate.
- The mantra of the secondary survey is “a finger and tube in every orifice.” The finger should precede the tube, however, as there are contraindications to intubating certain orifices. For instance, severe facial fractures are a contraindication to placement of a nasogastric tube and severe pelvic fractures contraindicate placement of a foley catheter until the urethra has been evaluated.

CASE STUDY:

A 49 year old man was injured in a motor vehicle collision. By report, he has a deformed extremity and has complained of significant pain. He arrived at the Emergency Department relatively stable. The primary survey was conducted, which was stable outside of mild tachycardia (HR=120). This was treated with intravenous fluids. The following questions pertain to the secondary survey.

QUESTION #1:

What components of the history are obtained during the secondary survey?

- | | |
|----------------|-----------------------------|
| A. Allergies | D. Events leading to injury |
| B. Medications | E. All of the above |
| C. Last meal | |

continued on page 2

The secondary survey contains important historical data. The mnemonic used in Advanced Trauma Life Support (ATLS) is to take an AMPLE history. This refers to allergies, medications, past medical history, last meal, and events surrounding the injury. These last two points are particularly relevant to trauma patients. The mechanisms of injury, such as specific height of a fall or duration of unconsciousness, are associated with specific injury patterns.

QUESTION #2:

The patient wishes to have the c-collar removed. You note paresthesias of his arms bilaterally. At what point during the secondary survey can the C-spine be safely cleared?

- A. Lack of tenderness to palpation and range of motion
- B. Negative lateral C-spine films
- C. Negative CT scan of the C-spine
- D. None of the above

This patient has a significant distracting injury. As a result, the physical examination is unreliable in assessing for the presence of a c-spine injury. Although lateral c-spine films have historically been obtained, their utility in clearing a c-spine is minimal at best. CT scans have emerged as the primary modality to image the cervical spine. CT scans provide axial images as well as coronal and sagittal images. These images are highly sensitive for detecting bony fractures, but they can miss ligamentous injuries. Accordingly, the safest course of action in this patient is to maintain c-spine precautions and proceed with MRI evaluation of the cervical spine and/or neurosurgical consultation.

QUESTION #3:

You get additional history that the patient was exposed to smoke while trapped in his vehicle. Which of the following is the most concerning finding on secondary survey?

- A. Hoarseness
- B. Singed nasal hairs
- C. 5 percent second degree burn to the leg
- D. Deformed extremity

Airway injuries are life threatening and are not always readily apparent on primary survey. A patient with an inhalation injury may have unlabored respirations and SpO₂ of 100 percent; however, the presence of hoarseness during the secondary survey is very concerning for an inhalation injury. Hoarseness, carbonaceous sputum, and evolving tachypnea should heighten your suspicion of an airway injury. Although singed nasal hairs are a notable finding, they are not as concerning as hoarseness. These



findings should prompt consideration of early intubation prior to complete airway loss. If the airway completely obstructs prior to intubation, emergency airway placement can be very difficult. Accordingly, these patients may suffer anoxic complications. Any deterioration during the secondary survey should lead the physician to immediately return to the primary survey and re-evaluate the airway, breathing and circulation.

QUESTION #4:

The patient complains of severe leg pain. He has a splint in place but the leg has not yet been examined by anyone at your hospital. Which of the following describes the appropriate approach to the physical exam?

- A. As long as plain films show adequate alignment of the fracture, there is no need to physically look at the leg, as it will only cause discomfort.
- B. The leg must be examined to evaluate for a compartment syndrome.
- C. As long as there are pulses present, the exam can be deferred.
- D. The leg must be examined to evaluate for an open fracture.
- E. More than one of the above

Fractures result in severe leg pain. When a splint has already been placed, it is tempting to omit examination of extremity. The pitfall associated with this approach is missing a compartment syndrome or missing an open fracture. If there is a laceration overlying a fracture, the patient needs immediate antibiotics and subsequent irrigation and debridement.

QUESTION #5:
Intravenous narcotics are contraindicated in trauma patients secondary to concerns of hemodynamic disturbance.

- A. True
- B. False

Narcotics are a mainstay of pain management among trauma patients. Patients should be rapidly stabilized in the primary survey such that they may receive analgesia in the secondary survey. Narcotics can be safely given to appropriately resuscitated patients. They should be delivered by the intravenous route, as intestinal absorption is slow and unreliable after injury.

Answers: 1-E; 2-D, 3-A; 4-E; 5-B; 6-B

QUESTION #6:
When should the tertiary survey be performed?

- A. Immediately after the primary survey
- B. The following morning
- C. When radiology is available
- D. Right before discharge from the hospital

The concept of the tertiary survey was developed to minimize missed injuries. Injured patients may have life threatening injuries that require immediate attention. Accordingly, it is easy to miss a hand fracture in a patient with a splenic laceration. The tertiary survey consists of repeating the secondary survey and evaluating the radiologic images in a delayed fashion. This is generally completed the following morning.

References:

American College of Surgeons Committee on Trauma, "Initial Assessment and Management," in *ATLS: Student Course Manual, 7th edition, ACLS; (Chicago); 2004.*

Parks, SN, "Initial Assessment in Trauma 5th Ed; Moore, EE, Feliciano, DV, Mattox, KL, editors; McGraw-Hill (New York), 2004.

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Advanced Trauma Life Support (ATLS)

Oct. 22-23, Dec. 4-5, 2008

Feb. 26-27, June 11-12, Oct. 22-23, Dec. 3-4, 2009

This program was developed by the *American College of Surgeons Committee on Trauma* and is designed to assist physicians in providing the first hour of emergency care to trauma patients. Training combines didactic lectures and practical skills stations, allowing time to perfect skills in the initial assessment; and management and stabilization phases of trauma patients.

For more information and to register online for classes, please go to cmetracker.net/NM/catalog.

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2008 Trauma Nursing Conference

Beyond The Secondary Survey

Critical Care Trauma Course

Oct. 20 & 21, 2008; May 4-5, 2009

This course is directed to critical care nurses that provide care to trauma patients after the initial resuscitation period. It will include lecture and discussion on pathophysiologic responses to injury, management of the critically injured patient and the components of an organized trauma system.

For registration and/or questions, please call (763) 520-5940 or email, ce@northmemorial.com

Trauma 101

Oct. 26, 2009

This course is designed for nurses who work in the non-critical hospital setting. Focus will be on neurological, orthopedic, chest, abdominal and plastic surgery trauma.

