Case 3- Time Line and Case Review

Event Identification: The Trauma Program Manager (TPM) at a Level III center is conducting the weekly review of trauma cases. During the chart reviews the following case was pulled for further PIPS activity as it triggered the audit filter trauma transfer. The following timeline was created for the primary review.

Primary Review by TPM:

History – On 4/25/17, EMS responded to an ATV crash approximately 20 minutes away from the trauma center. A 21 year old female was thrown a considerable distance and experienced an initial loss of consciousness. Vital signs on scene were as follows: BP 88/60 P 122 R 24 GCS 14 (minus 1 for verbal). Medics note deformity of both upper thighs and apply bilateral traction splints. One large bore IV initiated with crystalloid at a rapid rate. EMS called this report and recommended activation of the trauma team. Total time on scene 25 minutes.

ED Timeline:

1230 – Based on EMS report patient is made a highest level alert. The patient arrives in the ED awake and alert complaining of bilateral leg pain. Airway is patent. Oxygen is being delivered via non-rebreather mask. One large bore IV is infusing crystalloid at a rapid rate in the right AC (750ml infused). All members of the trauma team arrive within twenty minutes of patient arrival except the surgeon. Vital signs as follows: BP 100/66 P 112 R 22 GCS 15. The ED physician states the surgeon is not needed as he can handle it, and calls the surgeon off. The plan will be to eventually transfer the patient after evaluation. Second IV ordered and capped.

1255 – Patient to CT for head, neck, chest, abdomen, and pelvis tests. Plain films of both legs also obtained while in radiology.

1345 – Grade IV splenic laceration with active bleeding found on CT. Bilateral mid-shaft femur fractures are noted on plain films. Head and c-spine films negative. C-collar removed based on negative CT c-spine.

1400 – Call initiated to tertiary trauma facility for transfer. Request is made for transfer via ground inter-facility critical care team due to weather. Vital signs BP 96/70, HR 108, RR 18 with second liter of crystalloid infusing.

1415- EMS called to transport patient

1500 – EMS is present and loading patient. ED dwell time is noted to be at 3 hours. The second IV is utilized for transport and IV fluids of crystalloid are infusing at a rapid rate.

Follow up from Tertiary Care Facility: The referring facility is able to view the documentation at the tertiary care facility. They note the following:

1545 – Patient arrives at the Level I/II center**.** Report includes vital signs as follows: BP 88/64 (lowest systolic BP 82) P 126 (highest reported HR 134) R 22 GCS 14. Total IV fluid infused 3.5 L crystalloid. Summary of injuries given. (Same as what was reported to team prior to patient arrival.) The team replaces the c-collar following their Trauma Practice Guideline. Films from referring facility reviewed. The patient received one

unit of packed red cells and was taken to Interventional Radiology (IR) for embolization of the splenic injury that was actively bleeding. The patient is taken to ICU from IR, where he remains in stable condition.

1800 – Repeat CT of spine taken so reformatting can be completed. New films reveal C5 and C6 spinous fractures. Total spine precautions initiated.

PIPS process timeline:

Primary review completed by the TPM and the case sent on to the TMD for secondary review. The results of that review recommended having the case go to Trauma PIPS Committee (Tertiary review).

Critical opportunities for improvement identified through the PIPS process included but are not limited to:

- Surgeon Response (activated and then called off)
- ED Length of Stay (could this patient have been transported quicker)
- Fluid Resuscitation – (patient left with soft pressures and active bleeding, no blood products and capping of second IV)
- Practice Guideline Variation (Cervical Spine Clearance)
- Missed Injury: C5-C6 Spinous Process Fracture

Actions discussed in tertiary review:

- Address human factor (ED physician ordering team not to call the surgeon)
    - Peer review committee endorsement of following Level III requirements for 30-minute surgeon response for patients meeting highest level trauma activation/alert
    - 1:1 counseling of physician involved
    - Set the expectation with the ED physicians and surgeons that there won't be a "call off" of surgeon for patients meeting the highest-level activation. Include this in the Trauma Activation Guideline.
- Fluid Resuscitation:
    - Review ATLS principles with hypotension with known active bleeding and need for blood products vs fluid
- Trauma Practice Guideline variation – spine clearance
    - Review of current Practice Guideline – does it address this situation?
    - New literature search needed?
    - Education on cervical spine clearance
- Missed Injury: C5-C6 Spinous Process Fracture
    - Are 3D reconstruct/reformatting routinely completed for spinal CT?
- ED Dwell Time:
    - Was there an opportunity to transfer the patient quicker?

Describe evidence of event resolution (aka "loop closure"):

- After completion of all action plans the following events will be considered closed when:
    - Highest Level Activation surgeon response is monitored for six months demonstrating compliance of 80% with zero (0) cancellations/call offs by ED Physicians

- For a period of six-month's fluid resuscitation is reviewed in all patients with BP less than 90 & known sources of bleeding along with monitoring total amount of crystalloid and blood product administration.
- Chart review of four months of cases demonstrates compliance with c-spine clearance policy 95% of the time without missed injury
- Patients arriving with signs of shock were transferred out within 75 minutes 90% of the time over a nine-month period

Michigan Statewide Trauma System
Site Review Report

Case Summaries

Category: Transfer
(Please format case summary as follows):

Date of Service: 04/25/17 **Admission Service (if applicable): Transfer**
Level of Activation: I **Injury Severity Score (if available): 29**
ICU Patient: Yes **No**

Case Summary:

Initial VS: **BP:** 88/60 **P:** 122 **RR:** 24 **T:** 36.7 **Pulse Ox:** 96%-Non-Rebreather **Initial GCS:** 14 (minus 1 for verbal)

A young female driving an ATV was involved in a crash and thrown a distance. She was hypotensive and tachycardic on scene with obvious bilateral lower extremity fractures. She arrived at the level III center as a highest trauma activation. The team was present within 20 minutes except for the surgeon, who was called off by the ED physician. The patient was taken to the CT scanner within an hour of arrival, where a grade IV splenic laceration was found with active bleeding. Vital signs remained soft with crystalloid resuscitation. The patient was transported to a higher level of care after a great than two-hour ED dwell time.

PI Findings (clinical, system or process):

- Case underwent primary review by the TPM, secondary by the TMD and tertiary review in Trauma PIPS.
- The PI meeting minutes document a discussion on calling off the surgeon, crystalloid fluid resuscitation with need for blood products, spinal clearance, missed injury and ED dwell time.
- Action plan included monitoring of key issues noted in PI review was developed.

Reviewer Comments:

- The hospital's PI process accurately identified the issues in the case.
- There was good documentation of the TMD discussion with the ED physician involved with the case on the above issues.
- The center placed monitoring parameters in place and reported those back to the peer review committee. The trauma system committee may have benefitted by these audit filters being presented there as well.
- Some general education could be utilized on ATLS principles of resuscitation, and incorporation of NEXUS spine immobilization guidelines.
- Additional work related to spinal image reconstruct/reformatting might reduce risk of missed injuries.
- Additional follow up from tertiary facility might be useful for team.