Cervical Spine Clearance

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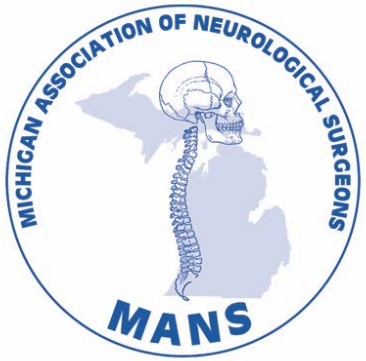
Cervical Spinal Cord Issues

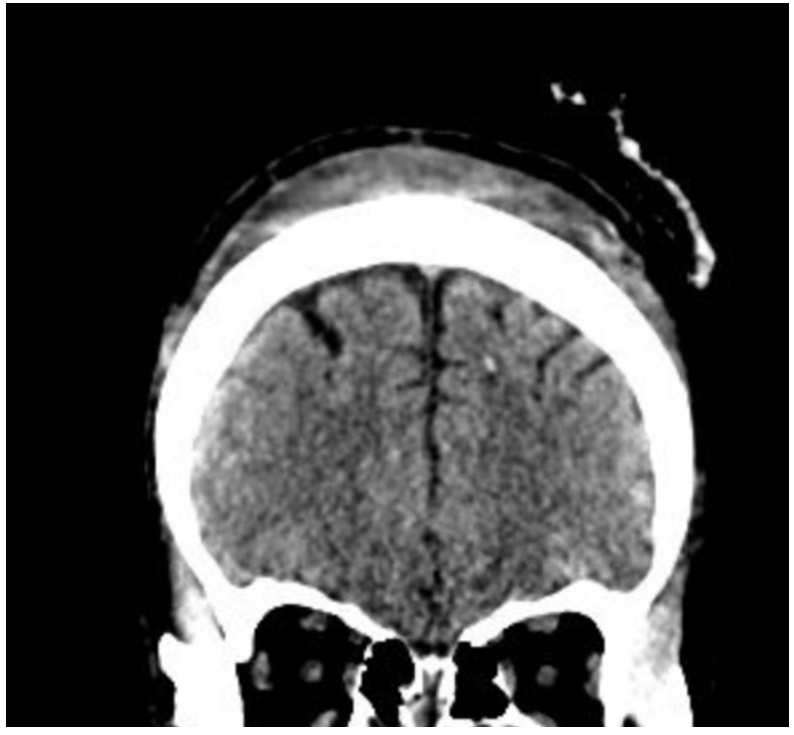
Joint Meeting of MANS and MTQIP

June 8, 2018



XX yom found of the expressway unconscious in the drivers seat with car impacted from top and ceiling collapsed into cabin. Intubated. Upon evaluation at first hospital was GCS13, transported to tertiary care for management

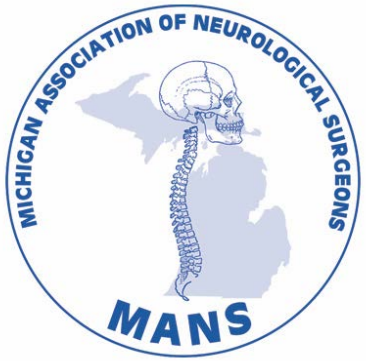
PE: PERRL, face symmetric MOTOR: Squeezes hands and wiggles toes bilaterally. Gives thumbs up in right hand and is more brisk in right upper as compared to left upper.



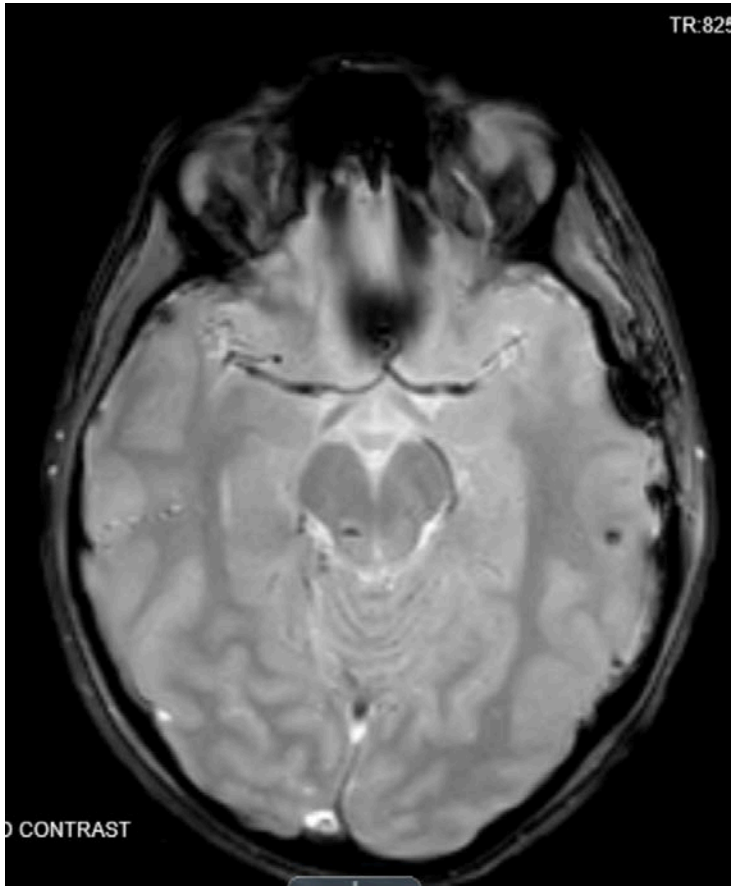
What Next Steps would you or your center
Wait until extubated?
Flex-Ex?
MRI?

XX yof MVA
Left chest tube placed in the field
Original GCS 7T
Mental Status: Does not open eyes to pain. Pupils are equal, round, and reactive to light. Localizes with the right upper extremity. No movement in the left upper extremity. Briskly withdraws bilateral lower extremities.
ICP monitor placed

What next step for C spine clearance would you or your center take?




H


TR:825
CONTRAST

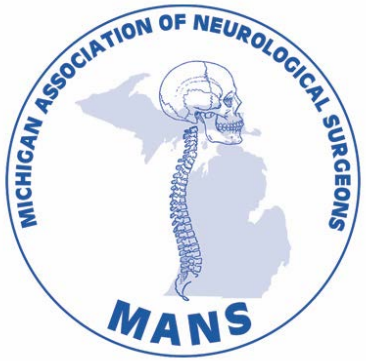
J Trauma Acute Care Surg. 2015 February ; 78(2): 430–441. doi:10.1097/TA.0000000000000503.

Cervical spine collar clearance in the obtunded adult blunt trauma patient: A systematic review and practice management guideline from the Eastern Association for the Surgery of Trauma

Mayur B. Patel, MD, MPH, **Stephen S. Humble**, **Daniel C. Cullinane, MD**, **Matthew A. Day, MD**, **Randeep S. Jawa, MD**, **Clinton J. Devin, MD**, **Margaret S. Delozier**, **Lou M. Smith, MD**, **Miya A. Smith**, **Jeannette M. Capella, MD, MEd**, **Andrea M. Long, MD**, **Joseph S. Cheng, MD, MS**, **Taylor C. Leath, BS, MPH**, **Yngve Falck-Ytter, MD**, **Elliott R. Haut, MD, PhD**, and **John J. Como, MD, MPH**

RECOMMENDATION

In obtunded adult blunt trauma patients, we conditionally recommend cervical collar removal after a negative high-quality C-spine CT scan result alone (Fig. 3). This conditional recommendation is based on very low-quality evidence but places a strong emphasis on the high negative predictive value of high-quality CT imaging in excluding the critically important unstable C-spine injury. Our recommendation is further supported by the high costs of MRI or other additional imaging. Adjunctive imaging after a high-quality CT scan increases the number of low-value diagnoses, places patients at risk for unnecessary treatment plans, puts patients with multiple injuries at risk by moving them out of the intensive care unit to the resource-limited MRI suite, and at best, results in the same clinical action of collar removal. However, the use of this approach may result in a nonzero rate of neurologic deterioration.



XX yof w/ h/o small intraventricular lesion fell down a set of stairs. In the field GCS 3.
Improved to following commands on initial eval. Zygomatic fracture, cribriform plate fracture, extremity abrasions
Intubated, She keeps her eyes closed, but awakens them to command. She nods appropriately to questioning.
Her pupils are equal, round, and reactive. Abrasion over her left eye with some periorbital ecchymosis.
Her face is symmetric at rest and with activation. No obvious CSF rhinorrhea. Full strength in her upper and lower extremities, both proximally and distally, No hyperreflexia or clonus in her upper or lower extremities. In a C-Collar

Next steps with multiple injuries?
Wait for extubation & clinical clearance?
MRI?
Flexion-extension?

Neurosurgery. 2013 Mar;72 Suppl 2:2-3. doi: 10.1227/NEU.0b013e3182772981.

The 2012 Guidelines for the Management of Acute Cervical Spine and Spinal Cord Injury.

Cozzens JW, Prall JA, Holly L.

RECOMMENDATIONS

Awake, Asymptomatic Patient

Level 1

- In the awake, asymptomatic patient who is without neck pain or tenderness, who has a normal neurological examination, is without an injury detracting from an accurate evaluation, and who is able to complete a functional range of motion examination; radiographic evaluation of the cervical spine is not recommended.
- Discontinuance of cervical immobilization for these patients is recommended without cervical spinal imaging.

Awake, Symptomatic Patient

Level I

- In the awake, symptomatic patient, high-quality computed tomography (CT) imaging of the cervical spine is recommended.
- If high-quality CT imaging is available, routine 3-view cervical spine radiographs are not recommended.
- If high-quality CT imaging is not available, a 3-view cervical spine series (anteroposterior, lateral, and odontoid views) is recommended. This should be supplemented with CT (when it becomes available) if necessary to further define areas that are suspicious or not well visualized on the plain cervical x-rays.

Level III

- In the awake patient with neck pain or tenderness and normal high-quality CT imaging or normal 3-view cervical spine series (with supplemental CT if indicated), the following recommendations should be considered:
  1. Continue cervical immobilization until asymptomatic,
  2. Discontinue cervical immobilization following normal and adequate dynamic flexion/extension radiographs,
  3. Discontinue cervical immobilization following a normal magnetic resonance imaging (MRI) obtained within 48 hours of injury (limited and conflicting Class II and Class III medical evidence), or,
  4. Discontinue cervical immobilization at the discretion of the treating physician.

Neurosurgery. 2013 Mar;72 Suppl 2:2-3. doi: 10.1227/NEU.0b013e3182772981.

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Obtunded or Unevaluable Patient

Level I

- In the obtunded or unevaluable patient, high-quality CT imaging is recommended as the initial imaging modality of choice. If CT imaging is available, routine 3-view cervical spine radiographs are not recommended.
- If high-quality CT imaging is not available, a 3-view cervical spine series (anteroposterior, lateral, and odontoid views) is recommended. This should be supplemented with CT (when it becomes available) if necessary to further define areas that are suspicious or not well visualized on the plain cervical x-rays.

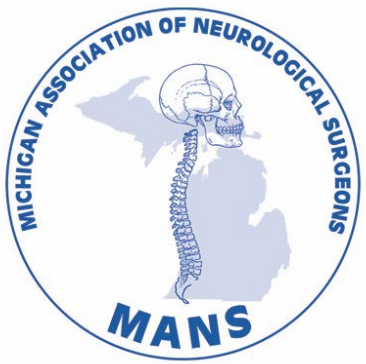
Level II

- In patients in whom there is a high clinical suspicion of injury yet have a normal high-quality CT imaging study, it is recommended that the decisions for further patient management involve physicians trained in the diagnosis and management of spinal injuries.

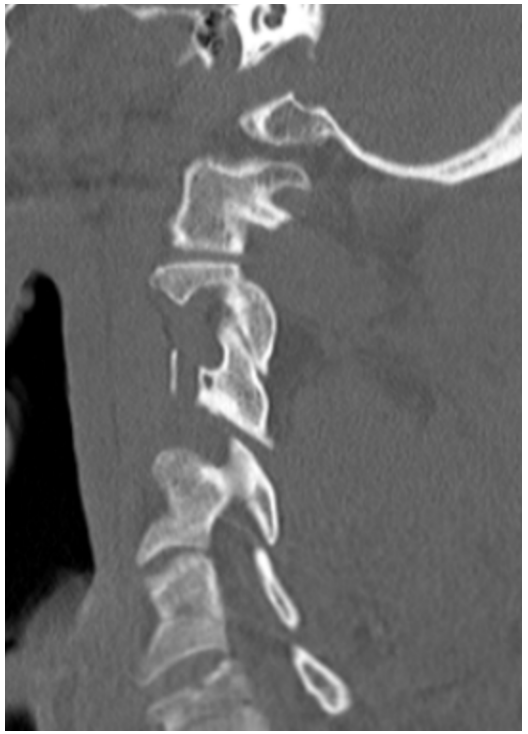
Level III

- In the obtunded or unevaluable patient with a normal high-quality CT or normal 3-view cervical spine series, the following recommendations should be considered:
  1. Continue cervical immobilization until asymptomatic,
  2. Discontinue cervical immobilization following a normal MRI study obtained within 48 hours of injury, (limited and conflicting Class II and Class III medical evidence), or,
  3. Discontinue cervical immobilization at the discretion of the treating physician.

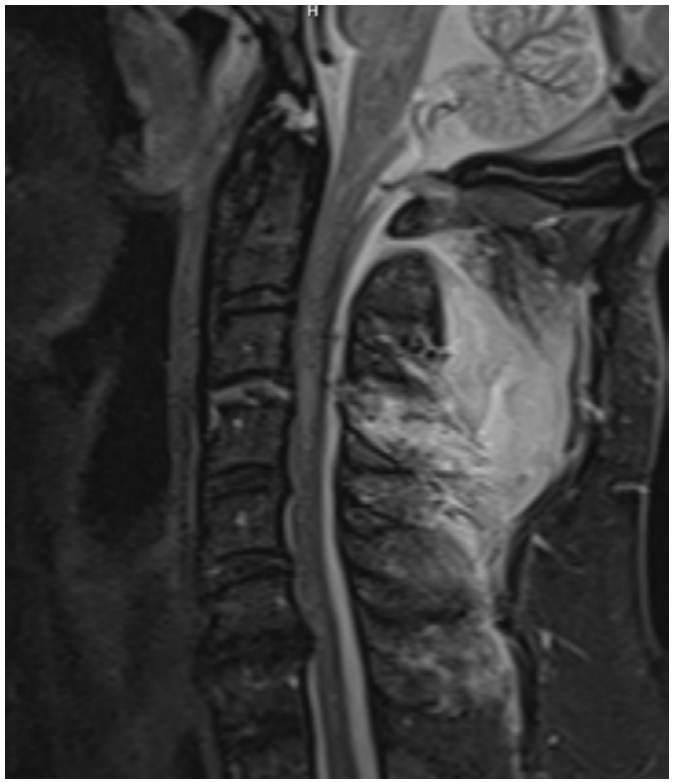
- In the obtunded or unevaluable patient with a normal high-quality CT, the routine use of dynamic imaging appears to be of marginal benefit and is not recommended.



XX yom s/p cardiac stenting 3 months prior
on ticagrelor (Brilinta) (elimination t1/2 7hrs, 9hrs active metabolite
syncope→ fall --> no volitional motion below deltoids, light touch discrimination >50%



When to operate?
ticagrelor (Brilinta) (elimination t1/2 7hrs, 9hrs for its active metabolite)



Cervical Spine Clearance Protocols in Level 1 Trauma Centers in the United States

SPINE Volume 39, Number 5, pp 356-361
2014

Alexander A. Theologis, MD, Robert Dionisio, BS, Robert Mackersie, MD, Robert Trigg McClellan, MD, and Murat Pekmezci, MD

- 191 Level I trauma centers, 166 responded, 57% had a protocol, 29% did not have a protocol

TABLE 4. Clearance Options in a Patient With Persistent Neck Pain and a Negative CT Scan

Method	No. of Institutions (%)
Flexion-extension	32 (30)
Not specified	19 (17)
MRI	15 (14)
Clinics	13 (12)
MRI/flex-ext	13 (12)
C-collar/MRI/flex-ext	8 (7)
Consult	3 (3)
Discontinue C-collar	4 (4)
C-collar/MRI	1 (1)
Total	108

TABLE 5. Methods to Clear the Cervical Spine in Patients who are Obtunded

Method	No. of Institutions (%)
MRI	33 (30)
Not specified	30 (28)
CT only	16 (15)
MRI/flex-ext	6 (5)
C-collar/CT only/MRI	6 (5)
CT only/MRI	4 (4)
C-collar	2 (2)
C-collar/MRI	2 (2)
Consult	2 (2)
CT only/MRI/flex-ext	2 (2)
Flex-ext	2 (2)
MRI (physician decision)	2 (2)
C-collar/MRI/flex-ext	1 (1)
Total	108

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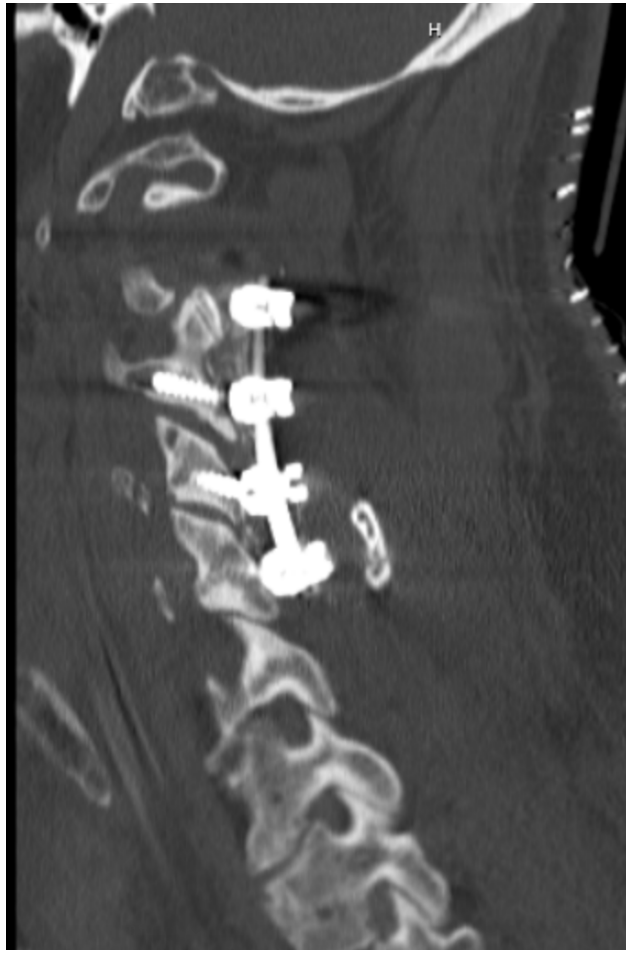
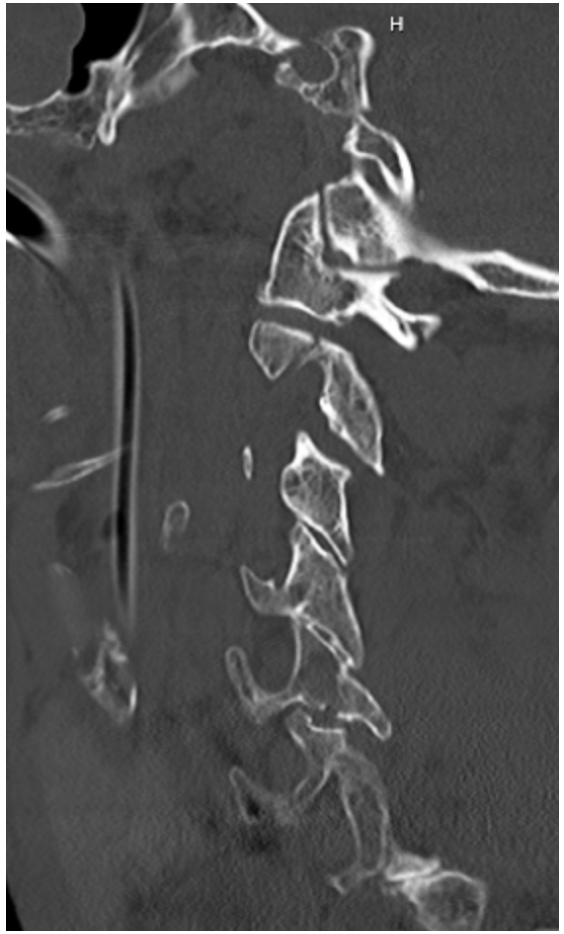
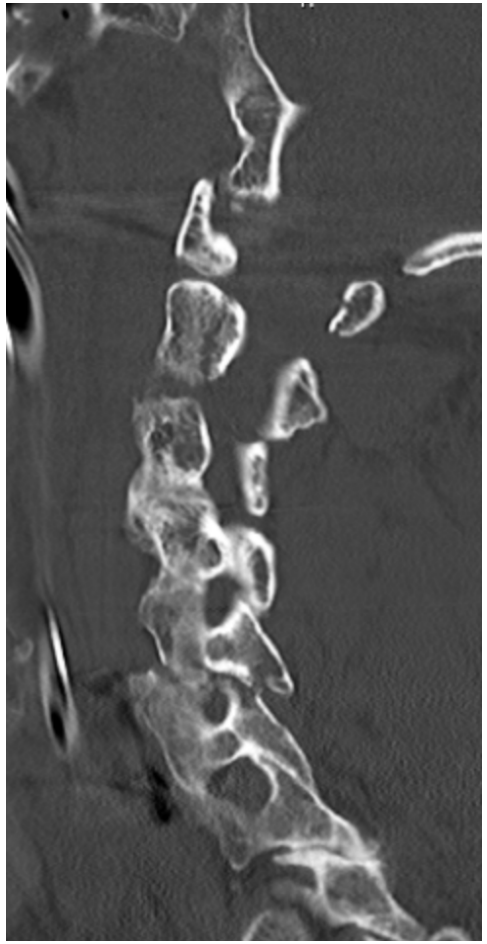
XX yom: Post-op



XX y.o. male with history significant for COPD, hypertension, PVOD s/p stenting and on Plavix who presents with Fall from roof. The patient fell off a roof, and has been unresponsive since that event. On EMS arrival he did have a GCS of 3. The patient's wife was concerned about possible period of cardiac arrest and provided CPR briefly. Attempted intubation in the field, unsuccessful. Brought to the emergency department with active bagging in place.





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Malpractice Premiums

176 working days per year.
General Surgery = $46,806 or $269 per diem
Neurosurgery = $72,538 or $412 per day

Malpractice Insurance Per FTE Neurosurgeon

Malpractice Insurance Costs (N=482)
Mean / Median = $48,887 / $36,977
% (25/75/90) = $22,011 / $57,731 / $$114,696

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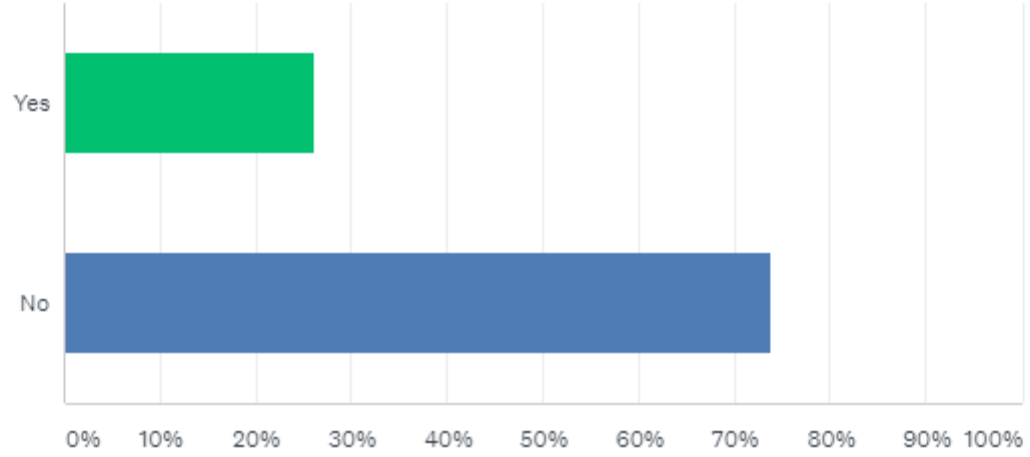
Question 16

If an intoxicated trauma patient has a negative c-spine CT scan are you comfortable clearing the cervical spine and removing the collar in the absence of a reliable physical exam?

Answered: 46 Skipped: 1

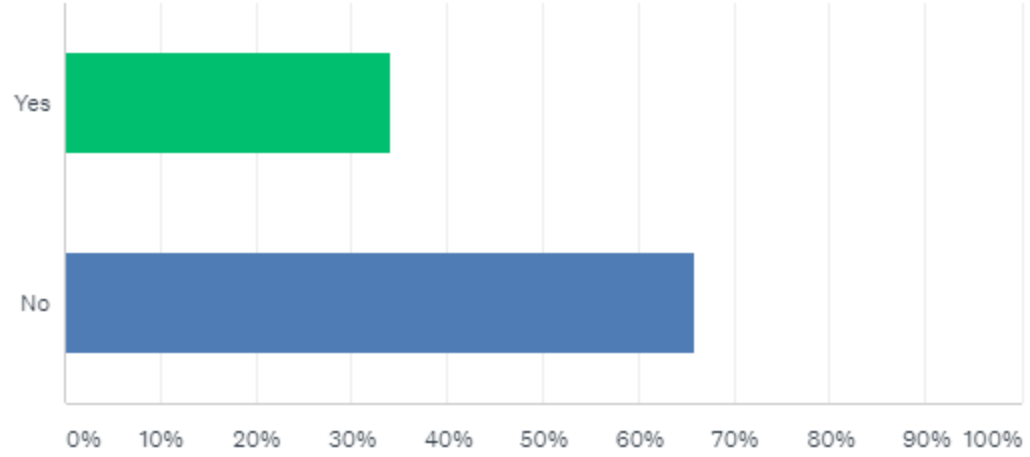


ANSWER CHOICES	RESPONSES	
Yes	26.09%	12
No	73.91%	34
TOTAL		46

Question 17

If an intubated trauma patient has a negative c-spine CT scan are you comfortable clearing the cervical spine and removing the collar in the absence of a reliable physical exam?

Answered: 44 Skipped: 3



ANSWER CHOICES	RESPONSES	
Yes	34.09%	15
No	65.91%	29
TOTAL		44

C-Spine Literature

- Negative Predictive Value
  - Probability that subjects with a **negative** screening test truly don't have the disease.
- Obtunded or Intubated, 99.7%
- Intoxicated, 99.2-100%

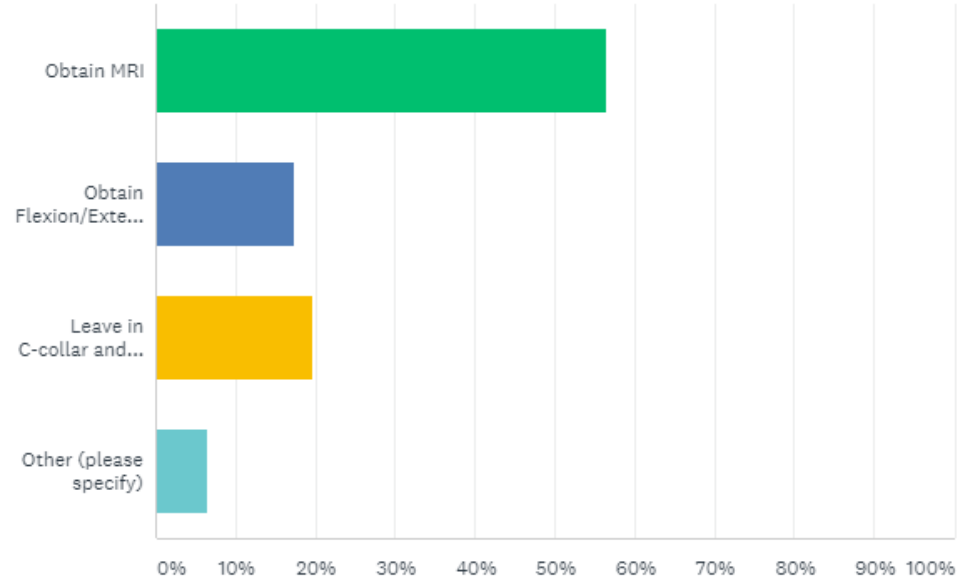
Serious conflict in practice

- Protocol for intubated patient considers MRI after negative CT Scan (Michigan)
- “EMS stopping using c-collars in field due to lack of supporting evidence and potential harm.” (Minnesota)

Question 18

How do you manage a patient with a negative c-spine CT scan that has pain on physical examination?

Answered: 46 Skipped: 1



ANSWER CHOICES		RESPONSES	
Obtain MRI		56.52%	26
Obtain Flexion/Extension views		17.39%	8
Leave in C-collar and reexamine in clinic in 2 weeks		19.57%	9
Other (please specify)	Responses	6.52%	3
TOTAL			46