



Eastern Association for the Surgery of Trauma
Advancing Science, Fostering Relationships, and Building Careers

Advanced Practitioners in Trauma Workshop

Addressing Professional and Clinical Development When Caring for the Acutely Injured Patient

**January 17, 2019
JW Marriott Austin
Austin, Texas**

CME and CNE Credit for this workshop is being provided by the Society of Trauma Nurses. To claim credit for this workshop go to <http://www.traumanurses.org/east-cne-evaluation-forms>. **Visit the STN Booth in the EAST Exhibit Hall for additional details, or contact Brian Doty, STN Meetings and Education Director, at 859-977-7446 or bdoty@traumanurses.org for more information.**

Workshop Directors: A. Britton Christmas, MD, Jasmine Garces-King, DNP, RN, CCRN, TCRN, ACNP-BC, & Jonathan Messing, MSN, ACNP-BC

Faculty: A. Britton Christmas, MD, Jasmine Garces-King, DNP, ACNP-BC, Jonathan Krotz, FNP-BC, Drew Maurano, PA-C, Jonathan Messing, MSN, ACNP-BC, Christina Prather, MD, Joan Pirrung, MSN, APRN, ACNS-BC, & Jonathan Van Horn, PA-C

Schedule:

1:30 pm – 2:30 pm	Pharmacology of Falls – ABCs You Cannot Afford to Miss – Christina Prather, MD
2:30 pm – 3:30 pm	Penetrating Trauma: Kinetics & Management – A. Britton Christmas, MD
3:30 pm – 3:45 pm	Break
3:45 pm – 4:45 pm	Mass Casualty Events & the Advanced Practitioner – Drew Maurano, PA-C
4:45 pm – 5:30 pm	Lessons Learned Panel <ul style="list-style-type: none">• Jasmine Garces-King, DNP, RN, CCRN, TCRN, ACNP-BC• Jonathan Krotz, FNP-BC• Joan Pirrung, MSN, APRN, ACNS-BC• Jonathan Van Horn, PA-C
5:30 pm – 5:45 pm	Summary and Closing Remarks – Jonathan Messing, MSN, ACNP-BC

Pharmacology of Falls: ABCDs of Fall Management Your Patients Can't Afford For You To Miss

Christina Prather, MD
Assistant Professor, Geriatric and Palliative Medicine
The George Washington University
EAST 2019

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Everything you wanted to know
about fall management and
prevention... in 55 min or less!

And I promise to talk about medications but take home point: less is always more

2

Roadmap for Today's Talk

- Introducing CPR: A streamlined approach to falls management
- ABCDs of falls in older adults
- Caring for the patient with falls
 - Without an injury
 - With an injury
- Application and Cases
- Tough Topics

3

How do you approach management of an older adult (any patient?) who has a fall?

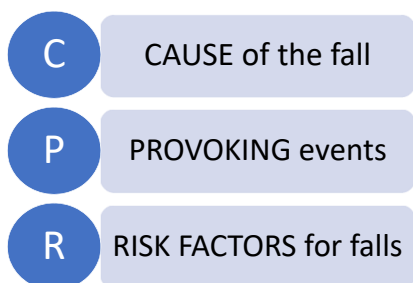
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Comprehensive Management of Falls

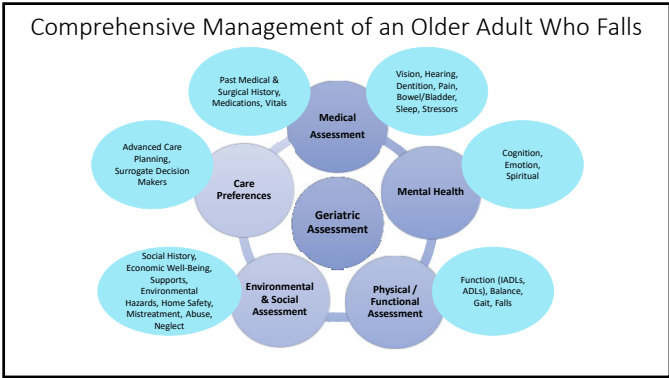
1. Identify Injuries Initiate Treatment
2. ABCDs and CPR

5

Comprehensive Management of Falls



6



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AAFP Recommendations for a Multifactorial Risk Assessment for Older Adults who Fall

(This represents the first of several pages)

Multifactorial risk assessment		Management	
History	Physical examination and laboratory evaluation	Intervention	Evidence for intervention in these clinical settings
Was there an injury? What are the patient's risk factors and chronic medical conditions that may predispose to falls or injury (e.g., musculoskeletal or neurologic problems)? (Q)	Evaluate injury Consider complete blood count and chemistry panel, especially if presenting with an acute fall	Treatment of acute underlying condition or chronic musculoskeletal or neurologic disease	Multifactorial intervention in community, hospital, or nursing home
Does the patient have osteoporosis?	Consider dual energy x-ray absorptiometry	Treatment of osteoporosis	Decreased hip fractures in single interventions
What were the circumstances of the fall? (Q) Were there any environmental hazards that may have precipitated it?	Evaluate the environment in the home (Q) or in the hospital or nursing home (at the time of the fall, if possible) Home safety intervention in high-risk persons (previous fall or at least one risk factor) Home safety intervention in persons with severe visual impairment	Environmental hazard modification (Q) Home safety intervention in high-risk persons (previous fall or at least one risk factor) Home safety intervention in persons with severe visual impairment	AGS/RC guidelines in community or nursing home; multifactorial intervention in community, hospital, or nursing home ↓ rate & risk in single intervention in community ↓ rate & risk in single intervention in community
Have any medications been recently started or increased, including over-the-counter or herbal medications? (Q) in hospital and community	Check for toxicity of medications, such as digoxin or anticonvulsants; check 25-hydroxyvitamin D level if low	Medication reduction, especially psychotropic medications (Q*) Prescribing modification program for primary care physicians ¹	AGS/RC guidelines in community or nursing home; multifactorial intervention in community, hospital, or nursing home ↓ rate & risk in single intervention in community

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AAFP Recommendations for a Multifactorial Risk Assessment for Older Adults who Fall

(This represents some of another page...)

Multifactorial risk assessment		Management	
History	Physical examination and laboratory evaluation	Intervention	Evidence for intervention in these clinical settings
Is there any foot pain? What footwear was worn at the time of the fall?	Examine feet and footwear	Advice about appropriate footwear (those with low heel height and high surface contact area) Management of foot problems/ referral to podiatrist when necessary Antislip shoe device used in icy conditions ¹	AGS/RC guidelines in community; multifactorial intervention in community or hospital ↓ rate in single intervention in community
Was there any acute or subacute change in mental status that preceded the fall?	Check neurologic examination and cognitive status (Q) with tool such as Mini-Mental State Examination; complete blood count, chemistry panel, urinalysis, chest radiography if signs and symptoms of acute illness are present	Treat underlying precipitants of delirium, such as infection Nonpharmacologic management of confusion by nursing staff	Multifactorial intervention in hospital Multifactorial intervention in hospital
Is an assistive device being used, or is there impairment in activities of daily living (e.g., transferring, walking, toileting, bathing, grooming, dressing, and eating)? (Q) Is there fear related to falling?	Examine muscle strength and gait and balance with the Get Up and Go test, Timed Get Up and Go test, Berg Balance Scale, or Performance-Oriented Mobility Assessment (Q)	If balance or gait is impaired: Physical therapy for gait and balance retraining/gait device recommendations (Q) Multiple component group exercise targeting at least two of the following: strength, balance, flexibility, endurance Teach group exercise (strength and balance)	AGS/RC guidelines in community or nursing home; multifactorial intervention in community, hospital, or nursing home AGS/RC guidelines in community; multifactorial intervention in community, hospital, or nursing home AGS/RC guidelines in community; multifactorial intervention in community, hospital, or nursing home ↓ rate & risk in single intervention in community

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Support for
Comprehensive
Care:

You be the judge

JAMA | Original Investigation

Comparisons of Interventions for Preventing Falls in Older Adults

A Systematic Review and Meta-analysis

Andrea C. Tricco, PhD; Sonia M. Thomas, MSc; Aneti Angeliki Veroniki, PhD; Jemila S. Hamid, PhD; Elise Cogo, MD; Lisa Striffler, MSc; Paul A. Khan, PhD; Reed Robson, MSc; Kathryn M. Siskey, PhD; Heather MacDonald, MSc; John J. Shea, DC; Anthony Thawani, PhD; Charlotte Wilkes, MSc; Jynia Holmgren-Lester, MD; Gillian D. Kerr, MD; Fabio Feldman, PhD; Samir R. Majumdar, MD; Susan B. Jaglal, PhD; Wing-Hui MSc; Sharon E. Straus, MD, MSc

IMPORTANCE Falls result in substantial burden for patients and health care systems, and given the aging of the population worldwide, the incidence of falls continues to rise.

OBJECTIVE To assess the potential effectiveness of interventions for preventing falls.

DATA SOURCES MEDLINE, Embase, Cochrane Central Register of Controlled Trials, and Ageline databases from inception until April 2017. Reference lists of included studies were scanned.

STUDY SELECTION Randomized clinical trials (RCTs) of fall-prevention interventions for participants aged 65 years and older.

DATA EXTRACTION AND SYNTHESIS Pairs of reviewers independently screened the studies, abstracted data, and appraised risk of bias. Pairwise meta-analysis and network meta-analysis were conducted.

MAIN OUTCOMES AND MEASURES Injurious falls and fall-related hospitalizations.

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Comprehensive Management of Falls

C

CAUSE of the fall

P

PROVOKING events

R

RISK FACTORS for falls

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ABCD's of Falls in Older Adults

The "bread and butter" causes and risk factors for falls

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"ABCDs" of FALLS IN OLDER ADULTS

A	Ambulation
B	Bowel & Bladder
C	Cognition
D	Drugs & More Drugs

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Comprehensive Management of Falls

1. Identify Injuries Initiate Treatment
2. CPR (Cause / Provocation / Risks) and ABCDs (Ambulation, Bowel / Bladder, Cognition, Drugs)
3. Identify & Manage Injury Risks

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Injury Management in the Older Adult

If they are NOT INJURED....

What might "WE" do to make them worse off?
aka: What do you wish was different? What are your horror stories?

What can we do to make them better off in the future?
aka: What are the things that take time we don't do or struggle to do?

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Injury Management in the Older Adult

Can you answer the following questions for each injury pattern?

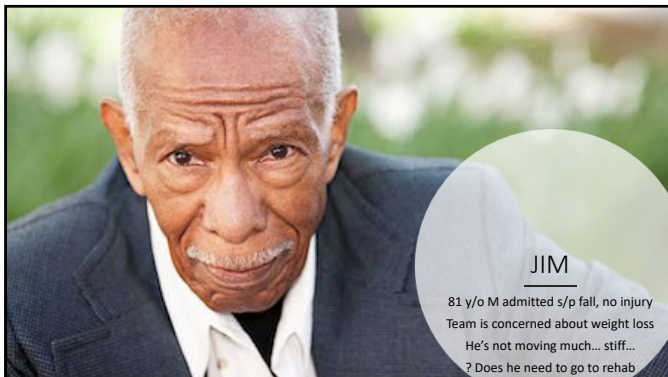
1. How is the person's function impacted by this injury or its management?
What are the implications of this?
2. What do we worry will happen to a patient with each of these injuries?
3. What can we do to minimize the risks we know are present (#2)?

1. Right sided rib fractures, ribs 3-9 (to plate or not to plate?)
2. Intertrochanteric hip fracture (OR < 2 midnights)
3. B/L LC1 hip fracture (non op mgmt, WBAT)
4. Right humerus fracture (non op mgmt)

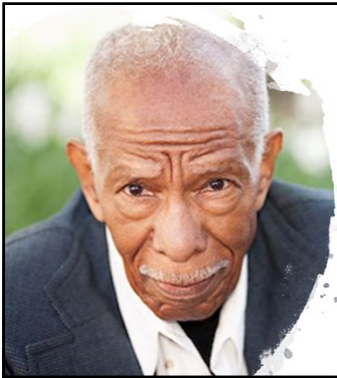
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Gather Round... It's Story Time

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C (Cause)

Death of partner
Depression, Weight Loss, Atrophy,
Weakness

P (Provoking Event)

Icey day, going out for carry out

R (Risk Factors)

Parkinson's Disease
Single male, Isolated elder
IADL support needs
Diabetes, Hypertension
Gait abnormality
Vitamin D & Other insufficiency

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MARLENE

98 y/o F admitted s/p fall getting
up to toilet overnight, no injury
Team is concerned about
hypertension
Starts amlodipine 5mg
Discharge home, hospitals are bad

20



C (Cause)

Nocturia with urgency
Sarcopenia, Frailty,
Weakness
Gait abnormality

P (Provoking Event)

Bowel and Bladder

R (Risk Factors)

Single female, Isolated elder
Hypertension
Gait abnormality
Vitamin D & Other
insufficiency
Age (> 80 yo)
Urinary Incontinence

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MARLENE #2

98 y/o F readmitted 3 days s/p d/c
with fall getting up from the toilet
overnight, now unable to stand up

- hip films neg
- Blood pressure is beautiful
(120/80) on amlodipine 5mg

22



C (Cause)

Orthostasis with standing
Vasovagal syncope

Nocturia with urgency
Sarcopenia, Frailty,
Weakness
Gait abnormality

P (Provoking Event)

Encounter with health care
Delayed onset medication
effect (amlodipine)

Bowel and Bladder

R (Risk Factors)

Single female, Isolated elder
Hypertension
Gait abnormality
Vitamin D & Other
insufficiency
Age (> 80 yo)
Urinary Incontinence

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MARLENE #3

99 y/o F readmitted 1 day s/p d/c
Still unable to stand up, surprise
MRI shows full thickness hamstring
tear

Marlene died under my care 1 year
later...

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Joan

84 y/o F admitted with a right radial fracture, casted, sent home

Readmitted 1 week later (new hospital) with R humerus fx, R rib fractures 3-8

She is a dancer, with heart failure, and no vitamin F (or D)

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C (Cause)
(injury 1: "my relax pill")
Balance/gait instability
Lack of use of DME
MCI, Urinary frequency

P (Provoking Event)
"Furniture Walking"
Recent fall,
hospitalization, injury of dominant arm, lack of support

R (Risk Factors)
Age (> 80), MCI
Caucasian, Female
Osteoporosis
Heart Failure (diuretic)
Urinary frequency / meds
Home environment

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MARGIE

85 y/o female admitted after a fall walking to the bathroom on her birthday


b/l posterior rib fractures, 6-12 (HOW?)

right intertrochanteric hip fracture

Left pubic ramus fracture

Something else in the right arm....

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C (Cause)
Gait instability, neuropathy, footwear
bunions / foot deformity

P (Provoking Event)
Birthday party (wine!)
+ diuretic, + urinary frequency, + donepezil...
Do you want ACh or not?
Do you want her to pee or do you not?

R (Risk Factors)
Caucasian, Female, > 80 yo
Gait imbalance
Low BMI
Footwear (low heel!)
Urinary urgency and frequency (Ditropan)
MCI (?donepezil)
Heart failure (diuretic use)
History of hip fracture
osteoporosis

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Hospital Course

"I just don't feel good"

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Pharm: antidepressants

Antidepressants, alone or in combination Amitriptyline Amoxapine Clomipramine Desipramine Doxepin >6 mg/d Imipramine Nortriptyline Paroxetine Protriptyline	Highly anticholinergic, sedating, and cause orthostatic hypotension; safety profile of low-dose doxepin (<6 mg/d) comparable with that of placebo	Avoid	High	Strong	Coupland 2011 Nelson 2011 Schart 2008
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Pharm: Z-type sedative hypnotics and benzos

Benzodiazepines <i>Short- and intermediate- acting:</i> Alprazolam Estazolam Lorazepam Oxazepam Temazepam Triazolam	Older adults have increased sensitivity to benzodiazepines and decreased metabolism of long-acting agents; in general, all benzodiazepines increase risk of cognitive impairment, delirium, falls, fractures, and motor vehicle crashes in older adults May be appropriate for seizure	Avoid	Moderate	Strong	2015 Criteria: Breitbur 1996 de Gage 2012 de Vries 2013 Gallacher 2012 Tannenbaum 2012 From previous criteria: Allain 2005
Nonbenzodiazepine, benzodiazepine receptor agonist hypnotics Eszopiclone Zolpidem Zaleplon	Benzodiazepine-receptor agonists have adverse events similar to those of benzodiazepines in older adults (e.g., delirium, falls, fractures); increased emergency room visits/hospitalizations; motor vehicle crashes; minimal improvement in sleep latency and duration	Avoid	Moderate	Strong	2015 Criteria: Berry 2013 Hampton 2014 From previous criteria: Allain 2005 Cotroneo 2007 Finkle 2011 McCue 2007 Orsels 2011 Rhalim 2009 Wang 2011b Yang 2011

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Pharm: blood pressure management and falls

- Beware of...
 - Nodal blockade (BB & CCB)
 - Changes in peripheral vascular resistance (ACEi)
 - Delayed onset of action (amlodipine)
- Sprint trial may have shown that primary outcomes were improved in the 80+ population... but tighter control had more falls...
 - Patient-driven decision making is essential

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Comprehensive Management of Falls

1. Identify Injuries Initiate Treatment
2. CPR (Cause / Provocation / Risks) and ABCDs (Ambulation, Bowel / Bladder, Cognition, Drugs)
3. Identify & Manage Injury Risks
4. Prevention, Prognosis, Preparation

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Prevention, Prognosis, Preparation

- Prevention: Everything we've been talking about to reduce future injury as well as morbidity and mortality from the current injury
- Prognosis: Be real.
 - "Unfortunately we know that when someone has a fall, they are likely to fall again"
 - "I really hope your mom does recover and is able to come home, but I think your family should anticipate that she will need more help and might not bounce back to quite where she was before"
- Preparation: Advance Care Planning or Identify a Surrogate (minimum!)
 - Identify HCPOA and POA, DOCUMENT DOCUMENT DOCUMENT!
 - Bare: "In the event you had another injury, we need to know who to call. Name & #."
 - Best: "What are the things in life that bring you joy and make life worth living?"

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Challenging Topics

What are the day to day struggles you have with decision making around pharmacologic management of older adults?

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Challenging Topics

- Whether to anticoagulate
- Recurrent hypoglycemia in a patient on insulin with CKD
- Blood pressure management
- Alcohol use and hospital withdraw
- Z-type sedative hypnotics and other sleep aid use
- Managing delirium
- Using *any of the drugs on the [BEERS LIST](#)*

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Quick Summary of CPR

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C: Identify the CAUSE of the fall

Consider

- Medications
- Footwear
- Ambulatory status
- Cognition
- Availability of assistance
- Willingness or ability to utilize assistance / devices

Table 3. Medications Associated with Falls

Anticonvulsants*	Digoxin
Antidepressants (tricyclic antidepressants and selective serotonin reuptake inhibitors)*	Diuretics
Antihypertensives	Laxatives
Antiparkinsonian drugs	Opioids*
Antipsychotics (typical and atypical)*	Nonbenzodiazepine, benzodiazepine receptor agonist hypnotics*
Benzodiazepines (short- and long-acting)*	Nonsteroidal anti-inflammatory drugs
	Sedatives and hypnotics*

*—These medications are on the 2015 Beers Criteria list for potentially inappropriate medication use in older adults who have a history of falls or fractures.¹⁸
Information from references 11 and 31.

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Medication Pearls

- What was recently started? Why?
- What was recently stopped? Why?
- What was recently changed? Why?
- Are all the medications necessary?
- Vitamin D 1000IU daily. Moving Target...

Table 3. Medications Associated with Falls and Fractures

Medication	Falls	Fracture	Hip fracture
Antidepressants (tricyclic antidepressants and selective serotonin reuptake inhibitors)	✓	✓	✓
Antihypertensives	✓		
Antipsychotics (typical and atypical)	✓	✓	✓
Benzodiazepines (short- and long-acting)	✓	✓	
Cholinesterase inhibitors			✓
Diuretics	✓		
Nonsteroidal anti-inflammatory drugs	✓		
Sedatives and hypnotics	✓	✓	

Information from references 11 through 15.

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P: Identify PROVOKING factors for the fall

Remember when you rotated through the ER and asked: "What brought you to here, TODAY?"

What made the patient fall, TODAY?

Consider:

Weather (I'm serious)
Pets (I'm serious)
Sensation of postural dizziness or hypotension
Medication review
Cognitive screen
Feet and footwear
Use (or lack of) assistance or assistive devices
Visual acuity
Recent change in gait, strength, mobility

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R: Identify RISK FACTORS for falls

Table 2. Risk Factors for Falls in Older Persons

Potentially modifiable	Potentially modifiable (continued)	Nonmodifiable
<ul style="list-style-type: none"> Cardiac: <ul style="list-style-type: none"> Cardiac arrhythmias Congestive heart failure Hypertension Environmental hazards: <ul style="list-style-type: none"> Medication use (see Table 1; risk is higher when four or more medications are used simultaneously) Metabolic: <ul style="list-style-type: none"> Diabetes mellitus Low body mass index Vitamin D deficiency Malnutrition Balance impairment Foot problems Gait impairment Impaired activities of daily living Limited activity Lower extremity muscle weakness Musculoskeletal pain Use of an assistive device 	<ul style="list-style-type: none"> Neurologic: <ul style="list-style-type: none"> Dizziness Disorders or vertigo Parkinson disease and other movement disorders Regional neuropathy Psychological: <ul style="list-style-type: none"> Depression Fear of falling Sensory impairment: <ul style="list-style-type: none"> Hearing impairment Multiocular lens Visual impairment Other: <ul style="list-style-type: none"> Acute illness Anemia Cancer Impaired footwear Medication Obstructive sleep apnea Postural hypotension Urinary incontinence 	<ul style="list-style-type: none"> Age older than 80 years Female Cognitive impairment/dementia Recent stroke History of cardiovascular accident/fracture Ischemic attack History of falling History of fractures Recently discharged from the hospital (within one month) White race

Adapted with permission from Moricelli CJ. Management of falls in older persons: a prescription for prevention. Ann Fam Physician. 2015;92(11):1267-1268, with additional information from references 6, and 11 through 15.

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A Prescription for Prevention

1. Identify the risk and provoking factors for the fall
2. Make changes!
3. Remember the bones
4. Exercise/Movement are key
5. Know. Every. Medication. And. Why.
6. Be honest about risk / prognosis
7. Anticipate. Plan.

Fall Prevention Prescription

Patient name _____
 Date of birth _____
 Address _____
 Phone number _____
 Date _____
 Diagnosis (ICD-10 code for abnormality of gait) _____
☐ Physical therapy: to evaluate and treat abnormal gait/stride and provide balance, gait, and strength training _____
☐ Exercise _____
 For city group member _____
☐ Home safety evaluation and modification _____
☐ Footwear with low heels and high surface contact area _____
☐ Referral to podiatrist, PT _____
☐ Referral to ophthalmologist or optometrist, DR _____
☐ Bone density scan (last energy x-ray abnormality) _____
☐ Blood work: (25 hydroxyvitamin D level) _____
 Diagnosis _____
☐ Treatment with osteoporosis medication _____
 Drug name # _____ bottle _____
☐ Calcium 1,200 mg per day from diet, please read patient education materials _____
☐ Vitamin with vitamin D _____
☐ Referral to _____
☐ Referral to low blood pressure treatment _____
☐ Stop these medications to reduce fall risk _____
☐ Medical emergency response system _____
☐ Please read patient education materials or go to the American Geriatrics Society website: <http://www.healthaging.org/patienteducation> (page 16, last paragraph)

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Thank you for your engagement, openness, and most importantly, your comprehensive and thoughtful care of older adults.

Questions?
Comments?
Feedback?

cprather@mfa.gwu.edu



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References

- [Management of falls in older persons: a prescription for prevention](#) Moncada, L. Management of falls in older persons: a prescription for prevention. American Family Physician. 2011; 84(11):1267-1276.
- [Preventing Falls in Older Persons](#) Moncada, L. and Mire, L. Preventing Falls in Older Persons. American Family Physician. 2017; 96(4):240-247.
- [Comparisons of Interventions for Preventing Falls in Older Adults: A Systematic Review and Meta-analysis](#) Tricco AC, et al. Comparisons of Interventions for Preventing Falls in Older Adults: A Systematic Review and Meta-analysis. JAMA. 2017; 318(17):1687-1699.

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Peaked your interest? Awesome! 😊

On Falls

- [CDC Steadi Program](#)

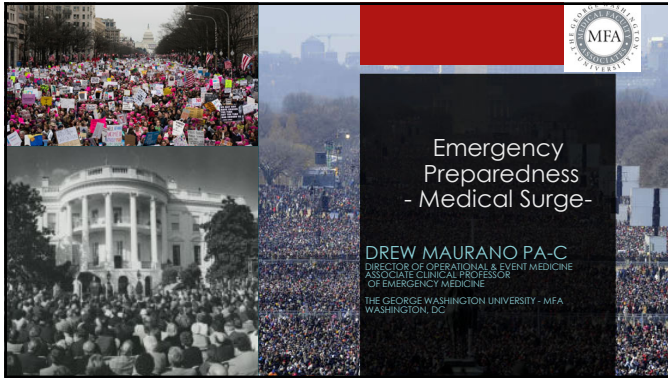
On Geriatric Knowledge & Skills

- [www.geriatriccareonline.org](#)
- [American Geriatric Society Virtual Patient Cases for Subspecialists](#)

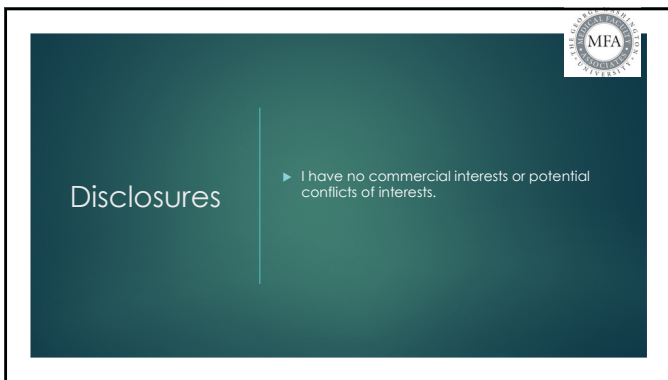
On Prescribing & Deprescribing

- [ARMOR: A Tool to Evaluate Polypharmacy in The Elderly](#)
- [START \(screening tool to alert doctors to the right treatment\)—an evidence-based screening tool to detect prescribing omissions in elderly patients](#)
- [STOPP \(Screening Tool of Older Persons' potentially inappropriate Prescriptions\): application to acutely ill elderly patients and comparison with Beers' criteria](#)

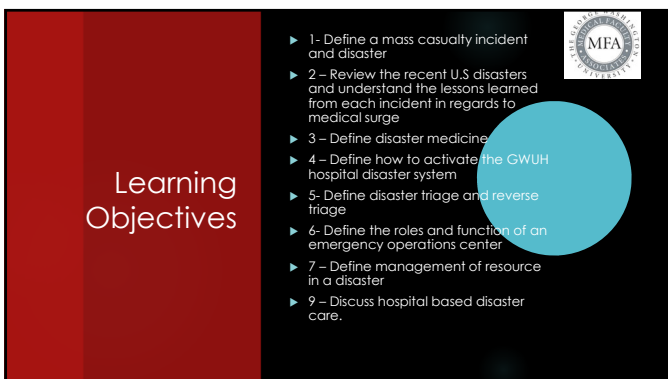
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1



2



3

District of Columbia Profile

- 692,228 Residents
- 1.5 M Daytime Population
- 19 M visitors annually
- 64 square miles
- 42% land federally owned
- Very diverse communities
- 8 Hospitals
 - 3 Level 1 Trauma Centers
 - 1 Pediatric Hospital
- >500 EMS calls daily
- High Threat Level
 - Seat of the Federal Government
 - Symbolic Targets
 - Many high profile special events

4

Multiple vs. Mass Casualty

Multiple Casualty

Patients are successfully managed by mobilizing additional resources

Mass Casualty

Number of patients exceeds available medical resources

Controlled / Routine

Disaster

5




9/11


- Sept 11, 2001 – 9:37am
- Flight 77 crashes into the Pentagon
- GW ER Notified shortly after "Prepare for Mass Casualty Event"
- All patients discharged or move up to the floors
- All staff and medical students active
- All ER rooms were converted into Trauma Bays
- ER / Trauma teams
- Total 32 patients, 0 surgeries

6

2001 Anthrax Attacks on The US Capitol

- ▶ Sept 18, 2001
- ▶ 5 Dead, 17 Infected
- ▶ Over 500 patients at GWU Hospital
- ▶ Decontaminated on scene
- ▶ Formed evaluation teams
- ▶ Mass evaluations of patients in the hospital auditorium and conference room




7



April 15, 2013

27,000 runners, 500,000 spectators
200 medical professionals with staged ambulances
2:49pm – 2 bombs detonated 12 sec apart
3:04pm – 1st patient arrived at Mass General. – Cars, Police Van, Ambulance
6 went straight to the OR – 1 Misidentified
3 killed, 264 treated at 27 local hospitals, 6 Trauma Centers
14 people required amputations





8


Pulse Nightclub Shooting


JUNE 12, 2016 - 2am

- ▶ 320 people in a Nightclub
- ▶ 49 people dead, 68 Injured

Orlando Regional Medical Center

- ▶ 2:14am – 1st victim – Pickup truck
 - 36 GSW victims in 36 mins
 - 32 Staff on Duty
 - ▶ Reduced Nursing as a result of pressure bags and ventilators
- ▶ Total of 44 victims
 - ▶ 28 surgeries in first 24hrs, 17,000 surgical supplies used
 - ▶ 550 Units of blood in 86 days


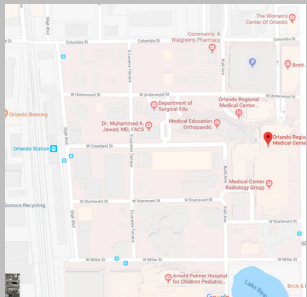




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Pulse Nightclub

- ▶ Staffing
 - ▶ 2am
 - ▶ Road Blocks – Delayed Staff
 - ▶ Other Hospitals Staff
- ▶ Security Threat
 - ▶ Active Shooter Code Called
- ▶ Identification of Victims
- ▶ Updating over 250 visitors, media and VIPs
- ▶ Debrief



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Las Vegas Shooting

- ▶ 58 Killed, 546 injured
- ▶ 147 ambulance runs
- ▶ 17 Hospitals
- ▶ 3 Trauma Centers
 - ▶ UMC Level 1, Level 2 Peds
 - ▶ Sunrise Hospital Level 2
 - ▶ St. Rose Dominican Hospital Level 3
- ▶ UMC
 - ▶ Triage in the parking lot
 - ▶ >12 trauma surgeons (2 hours)
 - ▶ >70 medical residents and fellows
 - ▶ 8 operating rooms running
 - ▶ 104 patients

Source: Emergency Physician Monthly


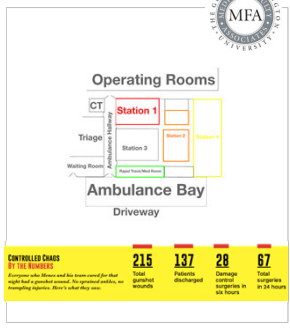


11

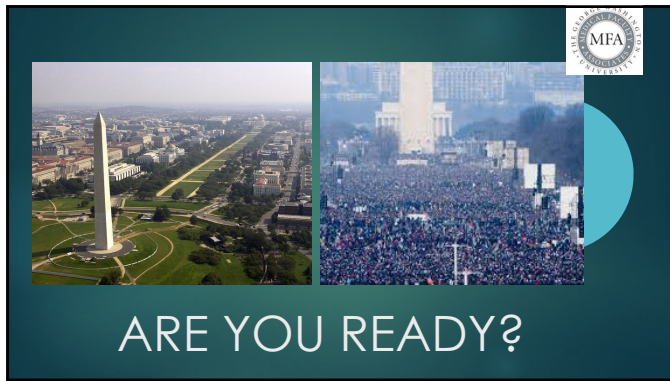
Las Vegas Shooting

Sunrise Hospital

- ▶ First 24 hours - 212 patients, 67 surgeries. (83 surgeries in total)
 - ▶ 8 GSWs to the chest
 - ▶ 10 GSW to the Head
 - ▶ 13 GSWs to the abdomen
 - ▶ 17 Ortho GSWs
 - ▶ 33 GSW to the neck or major extremities
- ▶ Triage from the Trauma Bay
- ▶ Patient Flow – CT Conga Line, Rad Live Read
- ▶ No CT or Fast Exams for Red Tags
- ▶ Orange Tag
- ▶ Use of Y tubing in ventilation of patients of similar size
- ▶ ET tubes and Suture Kits for chest tubes



12



13

 Slide 14 has a dark teal background. The title 'Disaster Medical Considerations' is at the top left in white. Below it, the text 'Proximity to "Impact Zone" – Will affect the severity of injuries.' is followed by '3 Stages of Victims (all overlapping)'. The stages are listed as:

- 1) In the First Hour
 - Life-Threatening & Large number of walking wounded
 - Triage is Key in this Group**
 - Arrive by alternative method
 - Need to prepare for the next wave while providing care
 - Large need of OR teams, blood, ICU services, lab studies and staffing
- 2) Hours 1-6
 - Large volume of critical patients
 - Demand on materials, pharmacy and staffing resources
 - Community Interaction
- 3) 24 Hours
 - Supplies, staffing, OR Time

 A large light blue circle is positioned to the right of the text. The MERT logo is in the top right corner.

14



15

Activation of Emergency Operations Plan – Partial or Complete

Reliable Information Gathering

Potential Threats - Still an "Active" or "Perceived" Threat

CBRNE – Need to Decon?

Number of Potential Patient

Type of Incident – Blunt vs Penetrating, fluid, isolated, prolonged

Begin Assigning Roles:

Lead Physician – Oversees Flow of Care

Lead Trauma Surgeon – Directs Trauma

Lead Anesthesiologist – OR Manager


Charge Nurse – ER Manager

Triage Officer

Care Sections - Lead Providers

Logistics ?

Security Manager ?



16

MCI Disaster Steps

Activate
Emergency
Operation
Plan

TRIAGE /
REVERSE-
TRIAGE
Up or Out

Emergency
Operations
Center

Resource
Assessment/
Activation


Disaster
Care




17

Triage

- ▶ Registration
- ▶ Triage Identification – ESI vs Start vs ?
- ▶ EMR
- ▶ Reverse Triage





18

THE GEORGE WASHINGTON
UNIVERSITY
MEDICAL FACULTY
ASSOCIATES
MFA

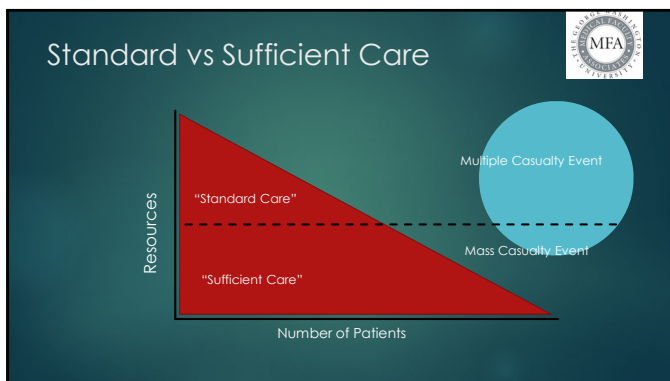
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Resources		
Staff	Space	Supplies
Activation? Road Closures prior to the event Surgical Pool Medical - Nursing Pool ***Everyone Shouldn't Report to the ER*** Accountability Project needs – Night Shift	Triage Area(s) RED/Critical – ER, PACU, OR, ICU Yellow – ER, PACU, ICU, WARDS Greens – Waiting Room, Fast Track, Conference Space Staff Pools – ? Visitors – Cafeteria, Kept Out? Media – ? Beds vs Chairs	Airway Supplies – ET tubes, Vents Meds – Pyxis Control, code meds Blood Fluids Critical Supplies – Chest Tubes, Rapid Transfuser OR Supplies Labs, Radiology, RT,

22



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Citations



- All information was obtained by personal interviews and a review of national lesson learned documents.



25

Questions



Drew Maurano PA-C

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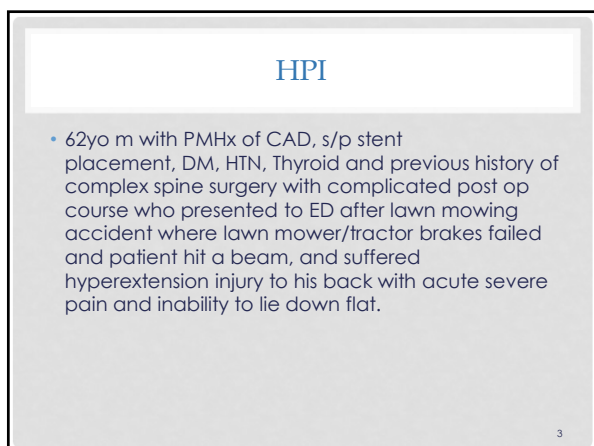
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ED TIMELINE

- **1740** Pt arrived to ED placed in Pod 3
- **1741** c/o back pain
- **1755** Triage
- **1804** Medication Given HYDROMorphone (DILAUDID) injection 1 mg - Dose: 1 mg ; Route: IV Push
- **1810** Chief complaint: + back injury
- **Triage notes:** Pt BIB EMS for eval of lower back injury. Pt states that he was driving his lawn tractor when his brakes gave out and he drove under a back hoe. Pt HAS ABRASIONS TO his left chest. C/o lower back pain. States , " I was bent over backwards." Pt changed to gown and placed on cardiac monitor.

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ED TIMELINE

- **1811** VS: BP: 189/83 Resp: 27 Heart Rate: 82 SpO2: 98 % Pain Reassess: Yes
- **1813** Patient acuity 2
- **18:23** Orders Placed CT C Spine Wo Contrast ; **CT T Spine Wo Contrast ; CT L Spine Wo Contrast** (not completed in ED)
- **18:26** Orders Discontinued CT Abdomen Pelvis With Contrast ; CT Abdomen Pelvis With Contrast
- **18:26** Orders Placed CT Chest Abdomen Pelvis With Contrast
- **18:31** **Trauma Start** Tx to trauma bay

Patient was initially seen by ED APP but once severity of injury was identified, trauma alert was called and trauma service assumed care of pt.

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IMAGING: CT CSPINE

1910start/ 1936 completed/2035 results

- Impression: The study is extremely limited, the entire cervical spine is not included. There is no gross evidence of a compression fracture on the sagittal and coronal reformatted views. However if there is truly clinical concern for a fracture, a repeat study is recommended.

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IMAGING: CT CHEST/ABD/PELVIS

1910 Start/2016 Results

- **IMPRESSION:** There is straightening of the lumbar spine with posterior stabilization rods from S1-L2 with posterior laminectomy.
- There is suspicion for chronic bony destruction of L1 with soft tissue replacement of the vertebral body and paraspinal soft tissue mass, resulting in mass effect and severe narrowing of the central canal and neural foramina best visualized on sagittal image 98 coronal image 82 and axial image 155
- In addition there is thickening of the right and to lesser extent left diaphragmatic crura (axial image 142) extending along the paravertebral bodies and along the ilium psoas muscles which may represent postoperative scarring; the possibility of retroperitoneal hemorrhage is not completely excluded There is a right gluteus maximus lipoma axial image 245, likely benign
- There is an anterior abdominal wall hernia containing fat axial image 196 and bilateral inguinal hernias containing fat axial image 250
- There are bilateral subcentimeter in size renal cysts, with probable vascular calcification in the right inferior renal pole coronal image 57

7

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EP NOTES

- **6:26 PM** Trauma alert called
- **1831 ED MD note:** Patient unable to lay flat on his back secondary to pain.
 - Musculoskeletal: Positive for back pain.
 - Back: Patient brought in on backboard, which is removed after examination. No midline bony tenderness, deformities, or step-offs of the thoracic spine. Tenderness of lumbar spine with palpable mass on left lateral aspect of lumbar spine, most likely surgical hardware from previous surgeries
- **6:32 PM** PA-C (Trauma) and TS at bedside performing trauma assessment.
- **6:45 PM** Patient unable to lie flat for CT secondary to severe back pain. Discussed with trauma team who agrees with need for sedation. Verbal consent received from patient and patient's wife. Also discussed with patient the benefits and risks of needing an intubation if needed. Patient and wife in agreement with plan of care
- **8:22 PM** Patient is awake and alert, but continues to have pain. Trauma team involved in care and ordering medications for the patient at this time. Please refer to their documentation for more information.

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8

TRAUMA H&P

- **MECHANISM:** blunt chest trauma, lumbar hyperextension injury
- Patient is a 42 y.o. male who presents to the ED via EMS where he presented S/P lumbar hyperextension injury and blunt chest trauma. Per spouse and son, pt was riding a tractor and crashed into the arm of a backhoe causing him to fall backwards onto the ground. He was initially evaluated by EP and upgraded to a trauma alert.
- Spouse reports that he had surgery at a local tertiary center about 5 years ago where 2 rods and pins were placed in lower back. He developed an abscess post-operatively and had a long hospital course. She reports being told that he has spinal instability above hardware but doctors did not believe he would survive another surgery so it was deferred. He normally walks with a kyphotic antalgic gait. Son states that he bends over more than 45 degrees at baseline.
- **SPINE/BACK:** lower thoracic and lumbar midline tenderness w/o significant deformity, atraumatic, no step-offs
- **CT C-spine 9/16/2017:** no evidence of acute bony injury or acute disruption of spinal alignment
- **CT Chest, abdomen, pelvis 9/16/2017:** no evidence of acute visceral injury; presence of hardware L2 through L5 with absent L1 vert body and malalignment above fixating hardware

9

9

TRAUMA H&P

- CONSULTANTS: neurosurgery in am (neuro sx consult entered 9/25 by medicine)

EMERGENCY ROOM COURSE/PLAN:

- The patient was observed in the emergency room for several hours. He remained hemodynamically and neurologically stable.
- While this patient has remained hemodynamically stable, he requires high dose pain medications that place this patient at high risk for acute clinical deterioration. He requires critical care monitoring.

PLAN:

Admit to SICU

- Neuro: pain control with Dilaudid PCA, Perc for breakthrough, Flexeril standing
- Sedation: none
- Cardiovascular: Htn: obtain doses of home meds; give IV Lopressor for now
- Maintain MAP >65 Cardiac monitoring
- Respiratory: Continuous pulse oximetry Pulmonary toileting incentive spirometry maintain O2 sat >92%

- 9/16 2028 Neurovascular checks Q2h ordered

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HD 1-2

9/17

- Trauma progress note: This patient is post-injury day 1 following a lumbar hyperextension injury/blunt chest wall trauma where he sustained injuries

RN notes: 0700 -1032PM multiple reports of pain

9/18

- 0102am -1009PM RN notes: multiple reports of uncontrolled pain

Trauma Progress note: The patient reports pain has been persistent. He has been using PCA which has had minimal help. Patient localizes pain to his lumbar spine. Denies any numbness or tingling and denies any radicular symptoms. Pain is not adequately controlled; this patient was hemodynamically stable and afebrile overnight.

Neuro: Alert and oriented x 3, moves all extremities, grossly intact

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HD 3

9/19

- 0230am-0431 AM Pt continues to scream and writhe in pain. PA made aware. New orders rec'd
- Pt continues to c/o pain to lower back. PT refuses PT.
- Surgical consult note: This patient is post-injury day 3 following a fall from tractor with blunt chest trauma where he sustained injuries Blunt chest trauma Lumbar spine strain Intractable low back pain.
- Overnight, patient with elevated HR 110-130s in A&B with hypertension. Patient's oral hypertensives were held as he was orthostatic yesterday AM, placed back on IVF with improvement.
- This AM, HR 100-115, BP remains elevated. The patient reports pain has been persistent, patient with chronic back at home and actively sees pain management doctor. He has been seen by pain management currently on long acting and short acting narcotics. Denies any numbness or tingling and denies any radicular symptoms. Pain is not adequately controlled; this patient was hemodynamically stable and afebrile overnight.
- Neuro: Alert and oriented x 3, moves all extremities, grossly intact
- 5:58 PM RN notes: Patient's wife expressing concern that patient is not "doing well" and "is not ready for discharge". Requesting to speak with the patient advocate. Wife updated on patient's progress this afternoon with physical therapy. This RN explained to patient's wife that patient will not be discharged unless he is medically stable. Explained that there are no discharge orders in for tonight and that he will be monitored closely throughout the night. Explained that discharge orders will not be placed until patient is evaluated by trauma team in the morning. Emotional support provided. Wife amenable to plan of care at this time.
- 1115PM RN Note: Pt given percocet at 2213. Now complaining of continuous pain 10/10 to anterior and posterior RLQ. States that the percocet gave no relief.

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HD 4-5

09/20

- **0341 AM RN Note:** Pt continues to cry and moan all night due to pain, pointing to RLQ/groin area asking "Can't someone come look at it again, it hurts so much." Unable to successfully control patient's pain with alternative measures. PA aware. Orders for dilaudid 1mg rec'd

- **Trauma Neuro:** Alert and oriented x 3, moves all extremities, grossly intact Musculoskeletal: extremities normal, atraumatic, no cyanosis or edema

9/21

- **9/21 Trauma Neuro:** Alert but not oriented. Motor in all four extremities is grossly intact. Decrease sensation to lower extremities which is base line. Musculoskeletal: Marked peripheral vascular disease noted in bilateral lower extremities. decrease sensation. dorsalis pedal pulses 2+.

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HD 6

9/22

- **IP CONSULT TO INTERVENTIONAL RADIOLOGY** acute on chronic severe back pain; possibility for Selective nerve root block Assessment/Recommendations: Based on the trauma surgery assessment, patient is unlikely to benefit from selective nerve root block

- **INTERNAL MEDICINE INITIAL CONSULT**

- **Trauma Neuro exam:** Alert but not oriented. Motor in all four extremities is grossly intact. Decrease sensation to lower extremities which is base line. Musculoskeletal: Marked peripheral vascular disease noted in bilateral lower extremities. decrease sensation. dorsalis pedal pulses 2+.

14

14

HD 7-9

9/23

- **Trauma Note:** Discussed with hospitalist, will transfer to medical service at this time for management of on going cardiac/medical comorbidities. Cardiology on case as well. No acute trauma injuries. Trauma will sign off

9/24

- **RN notes :** Pain, confusion, increased confusion, pulled out ivs. Haldol given, family worried about pt returning for CT due to resp distress.

9/25

- **RN Note:** Wife left the bedside and the patient is confused and he states that he "can't move his legs or feel his legs at all." Palpable pulse to RLE and doppler pulse to LLE. Used sharp object and no sensation to LLE. This RN called wife and attempted to reduce anxiety. MD paged, en route to bedside to assess.

- **Transferred to tertiary center**

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10/20 TRAUMA NOTE ADDENDUM

Made aware of patient's recent hospital course. The purpose of this note is to addend original H&P to improve documentation regarding this patient's admission.

- Pt presented to the ED on 9/16/17 as a trauma activation after fall from a tractor. Wife and son were at bedside. They reported that he had 'back surgery' at tertiary center 5 years prior to admission. He had a complicated operative course (wife states that he 'almost died' twice on the table and 'bled out').
- Post-operatively he remained in a 'coma' for about 2 weeks and developed a spinal infection. He eventually was able to be discharged to rehab. He continued to have pain and could not stand up straight. Because they felt that the neurosurgeon at tertiary center 'messed up the surgery', they did not return to see this neurosurgeon.
- Instead they went for another opinion at specialized surgical hospital where they were told that his back wasn't stable just about the hardware and that the surgeon should have 'started the hardware higher'. The surgeon at that hospital stated the pt needed surgery but he didn't think he would survive another surgery. The patient and family elected to continue therapy at home. Pt saw pain mgmt physician locally and continued to walk with torso at 45 degrees. He was never able to straighten his back without experiencing excruciating pain.

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10/20 TRAUMA NOTE ADDENDUM

- In the ED, he required conscious sedation with ketamine and propofol to tolerate lying flat. He demonstrated very little respiratory reserve and needed bag ventilation several times during the 3-4 minute study. He also barely fit into the scanner. We needed to tape down one of his extremities in order for him to fit through the scanner.
- CT scans were reviewed with radiologist and the TS spoke with her via phone. The radiologist was made aware of the patient's clinical history and she reported that the abnormal findings were chronic in nature. Recon images were not thought to be necessary.
- On HD1, patient was found to be neurologically intact and reported improved pain control. He was able to confirm the history as reported to us by his wife and son. Neurosurgery consult was not pursued given improvement in pain control, neurological stability, and lack of acute injury found on CT.

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17

REVIEW

- 62yo m with PMHx of CAD, s/p stent placement, DM, HTN, Thyroid and previous history of complex spine surgery with complicated post op course who presented to ER after lawn mowing accident where lawn mower/tractor brakes failed and patient hit a beam, and suffered hyperextension injury to his back with acute severe pain and inability to lie down flat. Patient was initially seen by ER midlevel but once severity of injury was identified, trauma alert was called and trauma service assumed care of pt. Since patient could not lie flat, a conscious sedation was instituted in order to obtain CT scan of chest abdomen and pelvis. Subsequently, patient was admitted to trauma service.
- Because of the complexity of previous spine surgery and extensive hardware, radiological interpretation of the scans was deferred to the radiologist report, who suggested that findings were of a chronic injuries. No new injury was identified. From then onward, unfortunately, everybody on the trauma service and then other specialties involved subsequently in the care of this patient continued to assume acute exacerbation of chronically injured lower back and treated as such. Patient continued to suffer from uncontrollable and required intensive pain management initially by trauma service and then by palliative/pain service. Clinical exam was always limited due to patient reluctance to move around though his overall mobility continued to deteriorate. Because of high doses of narcotics, patient becoming more and more confused and delirious, which made neurological exam of the lower extremities further unreliable.

18

18

REVIEW

- Patient also developed arrhythmias and respiratory issues after three or four days on trauma service, which led the patient transferred to medical service with pulmonary/critical care service actively involved in managing his medical condition.
- Later on, one day patient was found unable to move both lower extremities. At this point alarm went off and emergency CT scan was obtained that showed unstable partially disrupted previous spine stabilization surgery. Comparison with earlier scan done on admission revealed that instability of spine with acute injury was present even at that time as well and was wrongly interpreted as chronic injury.
- Stat neurosurgical consultation was obtained and per neurosurgeon's recommendation, patient was emergently transferred to a tertiary care level I trauma center for possibly an urgent spine cord decompression.
- Till the time of transfer, patient was hemodynamically very stable with no imminent threat to his life.

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ISSUES IDENTIFIED

- **Undertriage:**
 - Initial triage should have been trauma alert
- **Radiologic misread:**
 - scans read as chronic when in fact were acute
- **Failure of escalation of chain of command**
- **Failure to adhere to consultation guidelines policy**
- **Non-surgical admissions not being audited through trauma program**
- **PIPS process for radiologic misreads, errors, addendums, etc not in place**

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ACTIONS TAKEN

- DI/Trauma PIPS integration
- Audit of NSA rates
- Audit of Trauma team response times
- Re-Education for all nursing staff on escalation/chain of command
- Re-education for all trauma/ED providers re: need to communicate change in pt status so imaging gets expedited for reading
- Re-education of consultation guidelines policy
- Re-education of trauma activation criteria for ED providers

21

21

LESSONS LEARNED

- Don't be distracted by pre-existing history
- Important to always keep the pt and family involved in the care plan—they know the patient best!
- Disproportionate pain has to make the light bulb go off
- Re-assessment and review of current state are key
- Bring in your experts, don't be too proud or hesitant to ask for another opinion; there is strength in numbers!
- Communication can not be undervalued

22

VITAL SIGNS OR METABOLIC INDICATORS

WHEN VITAL SIGNS MISLEAD

Jonathan Kneez NP
University of Rochester Medical Center
Department of Trauma and Acute Care Surgery

1

SPLEEN INJURY CASE STUDY

- 27 year old male admitted for splenic injury following MVC
- Found to have multiple rib fractures, pulmonary contusions, and splenic injury
- The patient was intubated for hypoxia and placed on Propofol and Fentanyl for management of his pulmonary contusions
- Overnight the patient was hemodynamically stable except for one brief episode of hypotension that was attributed to his sedation
- In the morning the patient remained hemodynamically appropriate and his HCT was essentially unchanged overnight

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07/04 07:00 - 07:05 0550						24 Hz	3 Hz	4 Hz	1 Hz	15 Min
1116	1293	1312	1356	1830	1922	0019	0021			
7.30	7.23			7.24	7.27	pH				
35	43			47	49	pO ₂				
229	103			227	169	pCO ₂ A				
18	18			21	23	CO ₂ A				
17	16			20	22	HCO ₃				
-9	-9			-7	-5	Base...				
95	96			98	98	PO ₂ H...				
0.6	0.3			0.4	0.2	Methe...				
0.75	0.35			0.55	0.35	CO				
111						Chlori...				
137	135				139	NA, WB				
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	4.6				3.7	Lactat...				



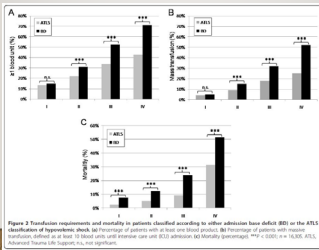
COMPARISON OF BASE DEFICIT TO ATLS SHOCK CLASSIFICATION

- Patients were stratified into categories of shock based on their base deficit (BD)
 - Class I / No shock: BD not more than 2
 - Class II / Mild shock: BD 2.0-6.0
 - Class III / Moderate shock: BD 6.0-10
 - Class IV / Severe shock: BD > 10
- Patient were likewise classified into ATLS shock categories which are dependent upon HR, BP, and GCS.

Muticlier, et al. Renaissance of base deficit for the initial assessment of trauma patients: a base deficit based classification for hypovolemic shock developed on data from 16,305 patients from the TraumaRegister DGU. Critical Care 2013; 17:R42

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BASE DEFICIT VS. ATLS CLASSIFICATION



8

BASE DEFICIT VS. ATLS CLASSIFICATION

Table 1 Patients classified by base deficit (classes I to IV); demographics, injury mechanism, severity of injury, and outcome

	Class I BD ≤ 2.0 (no shock)	Class II BD > 2.0 to 6.0 (mild)	Class III BD > 6.0 to 10.0 (moderate)	Class IV BD > 10.0 (severe)
Demographics				
Total number (percentage)	7,931 (48.5)	5,831 (35.0)	1,999 (12.3)	892 (5.5)
Male number (percentage)	5,927 (74.7)	4,158 (71.3)	1,782 (89.1)	667 (74.8)
Mean age (SD), years	46 (20.5)	45.8 (19.5)	44.4 (19.5)	45.8 (19.7)
Blunt trauma, number (percentage)	7,389 (93.2)	5,430 (93.1)	1,889 (94.4)	816 (91.5)
Injury severity				
Mean ISS (SD), points	19.1 (11.9)	24.9 (13.8)	29.8 (16)	35.7 (17.6)
Mean RISC (SD), points	24.2 (19)	29.9 (18.1)	35.1 (17.1)	42.9 (18.5)
Mean RISC score (SD), points	30.1 (18.1)	34.4 (22.4)	39.4 (26.6)	51.3 (25.5)
ATLS head ≥ 3 points, number (percentage)	3,865 (48.6)	2,711 (46.5)	1,039 (52)	526 (59)
ATLS thorax ≥ 3 points, number (percentage)	2,825 (35.7)	2,811 (48.2)	1,131 (56.6)	577 (64.7)
ATLS abdomen ≥ 3 points, number (percentage)	819 (10.3)	939 (16.1)	1,201 (60.3)	296 (33.2)
ATLS extremities ≥ 3 points, number (percentage)	1,066 (13.4)	1,071 (18.5)	661 (33.1)	419 (47.1)
Outcome				
Mortality, number (percentage)	364 (4.6)	721 (12.4)	475 (23.8)	459 (51.5)
Mean hospital LOS (SD), days	15.1 (15.2)	24.6 (24.2)	34.7 (27)	50.1 (31.2)
Mean ICU LOS (SD), days	7.8 (10.7)	11.3 (13.3)	13.1 (15.3)	12.8 (18.8)
Mean ventilator days (SD)	4.8 (8.8)	7.7 (11.8)	10.1 (12.8)	10.1 (15.2)
Multiple organ failure, number (percentage)	807 (12.2)	1,064 (18.2)	1,116 (56.4)	294 (33.2)
Severe, number (percentage)	400 (5.0)	566 (9.7)	105 (5.3)	126 (14.1)

Values represent all 16,305 patients. P < 0.001 for all parameters. ATLS, Abbreviated Injury Scale; ISS, Injury Severity Score; RISC, Revised Injury Severity Classification; SD, standard deviation.

9

DIFFERENTIATING INJURIES

- 1435 patients were enrolled, 242 (17%) had major injuries. Abnormal VS alone had a sensitivity of 40.9% (95% CI, 34.7-47.1%) for identifying major injury patients. When abnormal metabolic parameters were added, major injury detection increased significantly to a sensitivity of 76.4% (95% CI, 71.1-81.8%).

Paladino, et al. The utility of base deficit and arterial lactate in differentiating major from minor injury in trauma patients with normal vital signs. *Resuscitation*, 2008 Jun;77(3):363-8

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LESSONS

- Vital signs and HCT will often fail to represent the current state of bleeding
- When trauma patients become hypotensive with the administration of sedation there should be consideration that they are sensitive due to their injuries / blood loss
- Metabolic markers of ongoing bleeding should be followed closely to evaluate for occult bleeding
- The grade of the injury should not cloud your view of the available data

11



Lessons Learned: Importance of Trends

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Director of Clinical Operations, Trauma

1


Disclosure

- I have no conflict of interest relative to this educational activity.

2

Case Review

- 34 year old unhelmeted male involved in a MCC
- Found 20 feet in front of the impact with a SUV
- Diagnoses:
 - SDH
 - Right fail chest
 - BL PTX/HTX
 - L open femur fracture



3

Case Review

- Arrived in trauma bay combative, hypotensive & actively bleeding from the open femur
- Arriving SaO₂: 88% with a declining mental status
- Patient immediately intubated and receives BL chest tube
- Class I to the OR for evacuation of a large SDH, femur washout and application of an external fixator



4

Case Review

- ICU course is uncomplicated:
 - Eventually returns to the OR for an ORIF of the femur
 - Extubated within a week
 - GCS 14-15
 - Chest tubes to UWS
 - Foley catheter removed
 - OOB with nursing and PT at the bedside
 - Once urinating without difficulty transferred to the trauma floor 10 days after the traumatic event



5

Case Review

- 2 days after transfer to the floor:
 - Increase in confusion; resisting OOB attempts
 - Stat CT: no new bleeds
 - CXR: resolving PTXs
 - Femur staples intact; site without swelling or redness
 - Labs and blood cultures: WNL
- 4 days after transfer to the floor:
 - Agitation continues
 - Urinary output decreased; noted patient requiring straight-catheterization more frequently
 - Abdomen distended and no BM for the last 6 days
 - Flat-plate shows stool throughout



6

Case Review

- Review of chart:
 - Mobility: Lacking since transferred out of the ICU
 - 1-2 days after transfer from ICU patient had difficulty using the urinal while in bed
 - Straight-cath protocol enacted
 - Documentation of urinary output implies voiding on own
 - Cocktail of medications for agitation
 - Flomax eventually started on day 3 as patient had a new history of enlarged prostate a few weeks prior trauma



7

Case Review

- Day 14 post-trauma
 - Urine sample sent: + for UTI
 - Flomax discontinued
 - OOB to chair for all meals and urinating
 - OOB to bedside commode for BMs
- Day 16 post-trauma
 - GCS 15
 - Urinating on own
 - Regular BMs
 - Cooperating with PT and using walker for ambulation



8

Lessons Learned

- Review the records more thoroughly
- Be cautious in providing phone orders
- Question the use of all requested medications
- Ensure all appropriate labs are sent
- Review the trends:
 - What changed between the ICU and floor?
 - Frequency of mobility
 - Route of urination
- Don't under-estimate the power of mobility!



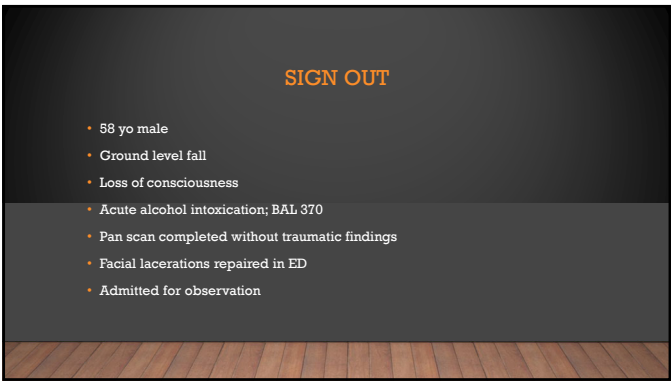
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IMAGING REVIEW

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SIGN OUT CONTINUED

- He has a over 75 pack year smoking history
- States that he has been "hoarse" since his "Bronchitis" a year ago
- Denies swallowing difficulties, or SOB

5



6

REVIEW IMAGING AGAIN

7

CT NECK SOFT TISSUE

8

IMMEDIATE ACTION

- OMFS consulted
- Attending OMFS surgeon at bedside
- Patient goes into laryngospasm and loses airway
- Taken emergently to OR where anesthesia is unable to intubate, and abuts the ET tube against the mass while emergent trach performed

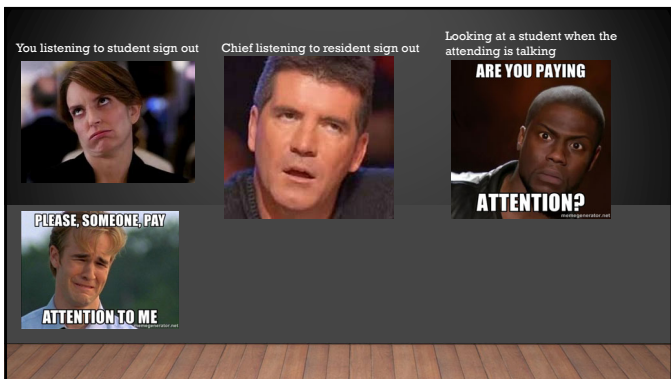
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11




12

COMMUNICATION

- Potential catastrophic missed diagnosis if key phrase or information missed
- Should be done in a low distraction area, phones down
- Team hand-off
- "Following implementation of the I-PASS Handoff Bundle across 10,740 patient admissions, we found that medical errors decreased by 23% (24.5 vs 18.8 per 100 admissions, $p<0.001$) and preventable adverse events—medical errors resulting in harm to patients—decreased by 30% (4.7 vs 3.3 per 100 admissions, $p<0.001$)."
- <https://ipassinstitute.com/> (Sectish et al. Pediatrics 2011).



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I Illness Severity	<ul style="list-style-type: none"> • Stable, "watcher," unstable
P Patient Summary	<ul style="list-style-type: none"> • Summary statement • Events leading up to admission • Hospital course • Ongoing assessment • Plan
A Action List	<ul style="list-style-type: none"> • To do list • Time line and ownership
S Situation Awareness and Contingency Planning	<ul style="list-style-type: none"> • Know what's going on • Plan for what might happen
S Synopsis by Receiver	<ul style="list-style-type: none"> • Receiver summarizes what was heard • Asks questions • Restates key action/to do items

Nonverbal Communication Tools Hospital	
S	<p>Stable _____</p> <p>Unstable _____</p> <p>Watcher _____</p> <p>Summary _____</p> <p>Events _____</p> <p>Hospital course _____</p> <p>Ongoing assessment _____</p> <p>Plan _____</p>
A	<p>To do list _____</p> <p>Time line and ownership _____</p> <p>Know what's going on _____</p> <p>Plan for what might happen _____</p>
S	<p>Receiver summarizes what was heard _____</p> <p>Asks questions _____</p> <p>Restates key action/to do items _____</p>

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QUESTIONS



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