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- ที่ปรึกษาผู้อำนวยการ ด้านศูนย์อุบัติเหตุ ศูนย์การแพทย์กาญจนาภิเษก คณะแพทยศาสตร์ศิริราชพยาบาล มหาวิทยาลัยมหิดล
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Geriatric; Trauma Assessment

Asst.Prof.Dr.Krongdai Unhasuta Ed.D
Post Doctoral in Trauma Research Fellowship

In 2030, all of the baby boomers will be 65 and older

↓

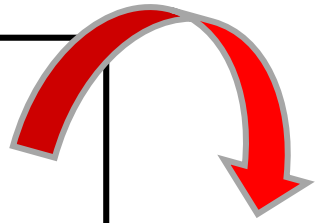
Traumatic injury in the geriatric ↑
higher mortality and morbidity

↓

Development of geriatric specific care and protocols

The most common cause of fatal & non-fatal injury; ≥ 65 years of age

- Falls (syncope)
- Motor vehicle crashes
- Neglect - Assaults



Geriatric guidelines

- Delirium
- Pain management
- Elder Abuse

25 YEARS
SOCIETY OF TRAUMA NURSES, THAILAND
1998

Evidence

Blunt trauma patient ≥65 years, mortality increase;
SBP drips below 110 mmHg,
Heart rates exceed 90 BPM

≤ 60 min

การเตรียมความพร้อม (Preparation)

การคัดแยกผู้บาดเจ็บ (Triage)

แรกรับผู้บาดเจ็บ (Approach to the injured patient)

การคาดการณ์ภาวะช็อกจากการบาดเจ็บ (Traumatic shock detection)

การประเมินเบื้องต้นและการช่วยชีวิต (Primary survey & resuscitation)

การเสริมการรักษาระยะการประเมินเบื้องต้น (Adjuncts and other considerations to primary survey)

การพิจารณาการส่งต่อผู้บาดเจ็บ (Consider of the need for patient transfer)

การประเมินระยะที่ 2 (Secondary survey)

การเสริมการรักษาในการประเมินระยะที่ 2 (Adjuncts to the secondary survey)

การเฝ้าระวังหลังการช่วยชีวิต และการประเมินซ้ำ (Continued post-resuscitation monitoring & re-evaluation)

การส่งต่อเพื่อการรักษา (Transfer to definite care)

ATCN, 2022

History

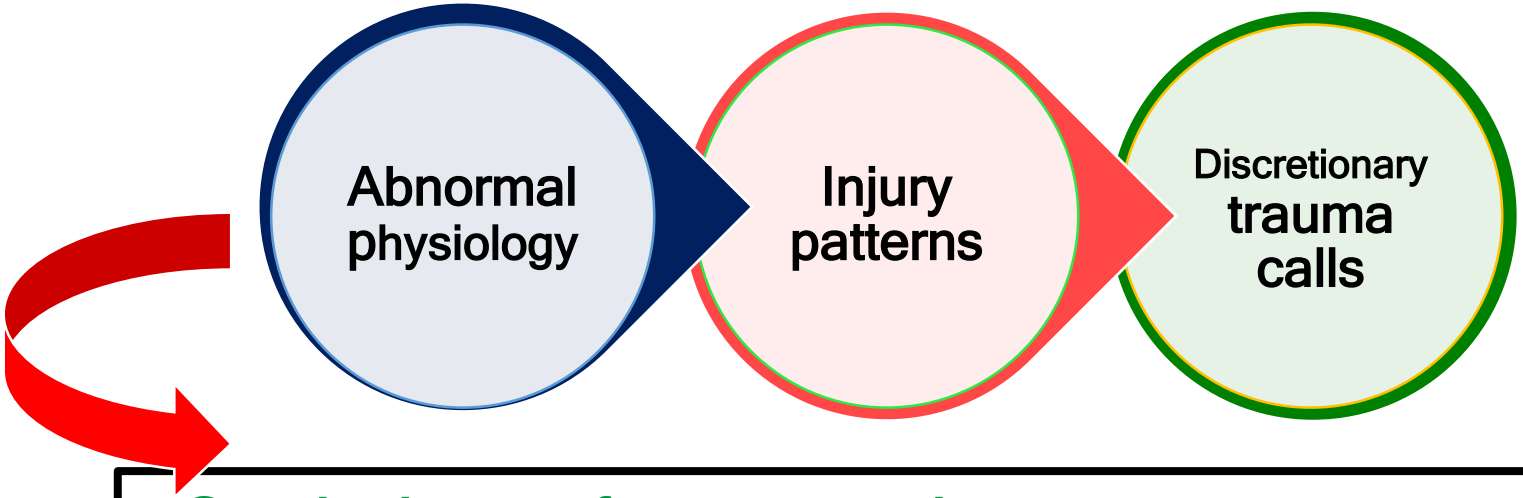
- What happened; before the trauma?
- What medications; the patient taking?
- What underlying illnesses; the patient have?
- What was the level of motor and cognitive function; prior the event?

“Alert Team” ➡ “Preparation”

- Age
- Gender
- Mechanism of injury
- Lowest BP
- Highest pulse
- Level of conscious
- Apparent injuries

- Trauma Alert
- Fast Track
- Prepare resuscitation area
- Prepare equipment
- Warm IV
- Resuscitation guideline

Trauma Activation



- Survival rate of trauma patients with TRISS> 0.75 (100%)
- Mortality rate of severe trauma patients with ISS 16-24 (< 5%)
- Mortality rate of higher very severe trauma patients with ISS > 24 (< 25%)

Geriatric Trauma Code Criteria

A - Intubated from scene
- Oral airway bleeding
- Inhalation injury
- Facial burn (3rd degree)

B - RR <8 or >15
- Respiratory arrest

C - HR <60 or >100
- SBP <110

D - GCS <9
- Open depress #skull

Anatomic
- Penetrating trauma to head, neck, torso, groin
- Complete amputation of major limb

Mechanism
- High risk MVC

Evaluation the geriatric trauma

Medical & Trauma patient !

- Past medical history
- Family members
- Medical records

Physical examination the geriatric trauma

Vital signs !

- Pain
- Anxiety
- Hypovolemia
- Medications

Prehospital management
Direct to trauma center

- Any patient ≥ 65 with SBP <110 mmHg
- ≥70 years of age
- GCS ≤14 with suspected of HI
- Injury sustained ≥2 body regions
- Fracture of >1 proximal long bone
- C1 or C2 cervical spine fractures

Primary survey; A & B

- Look for airway anomalies
  - Limited mouth-opening
  - Limited respiratory reserve

Management;

- Early administration of supplemental high flow oxygen
- Bag mask ventilation
- Laryngoscopy and intubation are more difficult

Pulmonary

Respiratory reserve ↓

Changes	Limited
- Capacity ↓ - Force expiratory volume ↓ - Smaller alveolar surface area - Chest wall compliance ↓	- the ability to adapt compensatory physiologic processes to hypoxia, hypercarbia and correct metabolic disturbances

- Respiratory failure
- Atelectasis

B; Chest wall trauma

Potential for respiratory problems;

- Cardiac monitor and pulse oximeter
- Using an end-tidal CO2 monitor
- Complaint mild shortness of breath

Evidence

A & B

According to **one** retrospective study of geriatric trauma patients, a respiratory rate below 10 breaths per minute is associated with a greater risk of death

Primary survey; C

- Baseline hypertension is common
- Represents relative hypotension
- Effect of medications

Management;

- V/S are very useful
- Repeat measurements frequently and readings interpreted

Cardiac

- Cardiac reserve ↓
- V/S may not reflect severity of injury

Changes	Limited
- Cardiac output ↓ - Sensitivity to catecholamines ↓	- Ability to contract - Responsive to neurohumoral effects - Response to compensate and maintain homeostasis; Polypharmacy

Occult shock

Occult shock

RASI > 1.3

$$\text{RASI} = \text{Shock Index} \times \frac{\text{RR}}{10}$$

(Respiratory Adjusted Shock Index)

Primary survey; C

Evidence

- one retrospective study; mortality increases when HR >90 beat BPM, SBP <110 mmHg
- Another study; tissue hypoperfusion despite "normal" blood pressures without isolated head injury

Primary survey; C

V/S; unreliable guide to hemodynamic status

→ signs of shock

→ hypoperfusion and early shock

- alterations in mental status
- mild tachypnea
- delayed capillary refill
- low urine output

C;
Using ultrasound

- useful for detecting significant hemoperitoneum in blunt trauma
- useful for detecting pneumothorax.
- useful for identifying such problems risk of cardiac dysfunction

Gastrointestinal

Potential for significant abdominal injury without peritoneal signs

Changes	Limited
Gastrointestinal; - Pain sensation ↓ - Laxity of abdominal wall musculature ↑	- Responsive to neurohumoral and endocrine stimuli ↓

C;
Aggressive resuscitation

- Assess the patient's response; BP, auscultate for lung crackles
- Strictly follow Standard ratios for transfusion of blood products
- Identified myocardial ischemia and pneumothorax.

C;
Hypoperfusion and shock tool

- Serial diagnostic testing;
  Blood lactate concentration

Renal

- Risk of traumatic injury ↑
- Susceptibility to fluid overload ↑
- Clearance of medication ↓

Changes	Limited
- Glomerular filtration rate ↓ - Renal mass ↓	- Clearance of solute and reabsorption of water - Renin-angiotensin-aldosterone system is downregulated - Less responsive to hypoxia - Less production of erythropoietin

- Disturbances in fluid and electrolyte homeostasis
- Osteomalacia and osteoporotic fractures

Hepatic

Clearance of curtained medication ↓

Chances	Limited
- Hepatic function ↓	- Parenchymal mass and blood flow - Ability to make proteins - Hepatic production of thrombopoietin

- Hypoalbuminemia
- Thrombocytopenia
- coagulopathy

Primary survey; D

- Difficult to assessment of neurologic function
- No neurologic deficits during the initial examination
- Comorbidities; dementia, reduced sensation

Close monitoring at the 1st hour;

- V/S, mental status, and reassessment of any areas of concern
- Focused reassessment every 5-15 minutes

Neurologic

- Susceptibility to injury from cerebral perfusion decrease ↑
- Risk of occult injury ↑

Chances	Limited
- Autoregulatory capability ↓ - Brain atrophy	- Neurohumoral responses - Sensation to nervous stimuli - Ability to auto-regulate blood flow - Co-morbidities

- Drowsiness, loss of energy, over sedation, loss of balance and memory
- Skin tears

Primary survey; E

- Assess for other injuries; bruising, lacerations, pressure ulcers
- Concern abuse/neglect as causes of injury
- Avoid hypothermia; keep warm
- Temperature; check a rectal

Musculoskeletal

Risk of fracture ↓

Chances	Limited
- Loss of muscle mass - Osteoporosis	- Thermoregulation - Demineralization processes - Bone density

- **Hypothermia**
- **Skin tears**

Immune

Risk of infection ↓

Chance	Limited
- Impaired immune response	- Generalized malnutrition with vitamin and mineral deficiencies

Secondary survey

- Head; intracranial injury
- Cervical spine injury
- Burns
- Clavicle and rib fractures
- Hip fracture
- Pelvic fracture

Head Injury

- GCS <9 have at least an 80% death or long-term care facility
- Early diagnosis and intervention is critical; reducing the associated with intracranial hemorrhage
- Rule for CT; >60 New Orleans Criteria, >65 NEXUS II, and the Canadian CT Head
- Risk of bleeding; taking warfarin ~10%

Cervical Spine Injury

- CT Head Rule; >60 New Orleans, >65 NEXUS II, and the Canadian
- Central cord syndrome; result of a hyperextension injury with long-standing cervical spondylosis,
  → motor impairment
  → bladder dysfunction
  → sensory loss below the level of injury

Chest Injury

- one rib fracture or multiple with ≥3 rib fractures; sign of respiratory difficulty → ICU admitted
- Blunt chest trauma; risk of complications
  - → Pneumonia
  - → Pulmonary contusion

Abdominal Injury

- Diminish pain sensation→ US
- Intra-abdominal injury → CT

Nephropathy
- Hypovolemia
- Chronic renal disease
- DM

Acute Kidney Injury

Musculoskeletal Injury

- Hip fractures → radiography, admission
- Pelvic fractures; Hemorrhage, hemodynamically unstable
  → angiography, CTa
- Extremity injuries → carefully evaluation

Secondary survey

- Pain management
- Diagnostic testing
- Imagine studies

Triage/Activation Criteria for Geriatrics;
STN Geriatric subcommittee

1. ≥60 y/o with polytrauma and/or significant mechanism-consider low level activation
2. Increased age ≥65 with pre-existing medical conditions and poor physiologic reserve consider low level activation
3. Anticoagulant use-consider low level activation
4. For any low level criteria, if patient is ≥65 elevate status to highest level activation
5. Use systolic blood pressure of <110 (rather than 90) for patients age ≥65 as criteria for highest level activation
6. Falls with evidence of TBI-consider activation
7. ≥65 with significant chest, abdomen, pelvic, extremity, or head trauma-consider low level activation

Geriatric Trauma Program Goals

1. 30 minutes from ED presentation to trauma service evaluation
2. 4 hours from ED presentation to inpatient room
3. 36 hours from ED presentation to OR
4. 5 days from ED to safe and appropriate discharge/ disposition

STN, retrieved Nov 2, 2022

Physical

- Mental status
- Vital signs
- Blood pressure and pulse
- Polypharmacy.
- Comorbid conditions
- Airway, Breathing, and Circulation,
- Complete head to toe physical examination

Early Management

- Maintain adequate oxygen delivery
- Packed RBC transfusion
- Base deficit & lactate levels
- Monitoring hemodynamic status
- Anticoagulation
- ICU Admission; polytrauma, chest wall injuries, abnormal V/S, occult hypoperfusion

Management

- Labs
- Central nervous system imaging
- Aggressive management; significant intracranial hemorrhage
- Coordinate timely consultation

Evaluation

- Complete assessment
- FRAIL scale
- Minute by Minute analysis

FRAIL scale

Where Fatigue, Resistance, Ambulation, Illnesses and Loss of weight make up the questions

A score of 0 is best and 5 is worst

0 = good health

1-2 = pre-frail

3-5 = frail

GTOS

The Geriatric Trauma Outcome

= (age) + (2.5 × ISS) + 22 (if packed RBC transfused within ≤24 hours of admission)

GERtality Score

Predict in-Hospital Mortality in Geriatric Trauma Patients

	Yes / No
> 80 Years	1 Point/ 0 Points
AIS ≥ 4	1 Point/ 0 Points
PRBC received prior admission to ward	1 Point/ 0 Points
ASA ≥ 3	1 Point/ 0 Points
GCS < 14	1 Point/ 0 Points

Maximum Score Value: 5 Points

ASA Class

- ASA Class 3 :

ผู้ป่วยที่มีโรคประจำตัวที่มีอาการรุนแรงมากขึ้น มีผลการใช้ชีวิตประจำวัน ได้แก่ ผู้ป่วยไตวายที่ต้องฟอกเลือด อ้วน BMI≥40 มีโรคประจำตัวที่ควบคุมอาการได้ไม่ดี ได้แก่ เบาหวาน ความดันโลหิตสูง และปอดอุดกั้นเรื้อรัง พิษสุราเรื้อรังร่วมกับมีตับอักเสบ ใช้สารเสพติด มีประวัติ angina pectoris มีเครื่องกระตุ้นหัวใจ Old age อายุ ≥ 85 ปี ทารกคลอดก่อนกำหนดอายุครรภ์ <60 สัปดาห์

American association of Anesthesiologist

ASA Class

- **ASA Class 4**

ผู้ป่วยที่มีโรคซึ่งรุนแรงมาก ต้องการการดูแลรักษาอย่างใกล้ชิด ได้แก่ ระบบหายใจล้มเหลวที่ต้องใช้ เครื่องช่วยหายใจ มี severe systemic disease ที่ทำให้ต้องจำกัด Activity และคุกคามชีวิตผู้ป่วยได้ ประวัติ unstable angina pectoris MI หรือ CVA ที่เกิดภายใน 3 เดือนก่อนผ่าตัด Severe Congestive Heart failure uncontrol DM หรือ Hypertension หรือ Epilepsy รวมทั้ง Thyroid

- **ASA Class 5**

ผู้ป่วย Coma หรือมีโอกาสเสียชีวิตภายใน 24 ชั่วโมงไม่ว่าจะได้เข้ารับการผ่าตัดหรือไม่ก็ตาม

- **ASA Class 6**

Case ผู้ป่วยที่แพทย์วินิจฉัยว่ามีภาวะสมองตายและลงความเห็นว่าเสียชีวิตแล้ว มาเข้ารับการผ่าตัด เพื่อบริจาคอวัยวะ

American association of Anesthesiologist

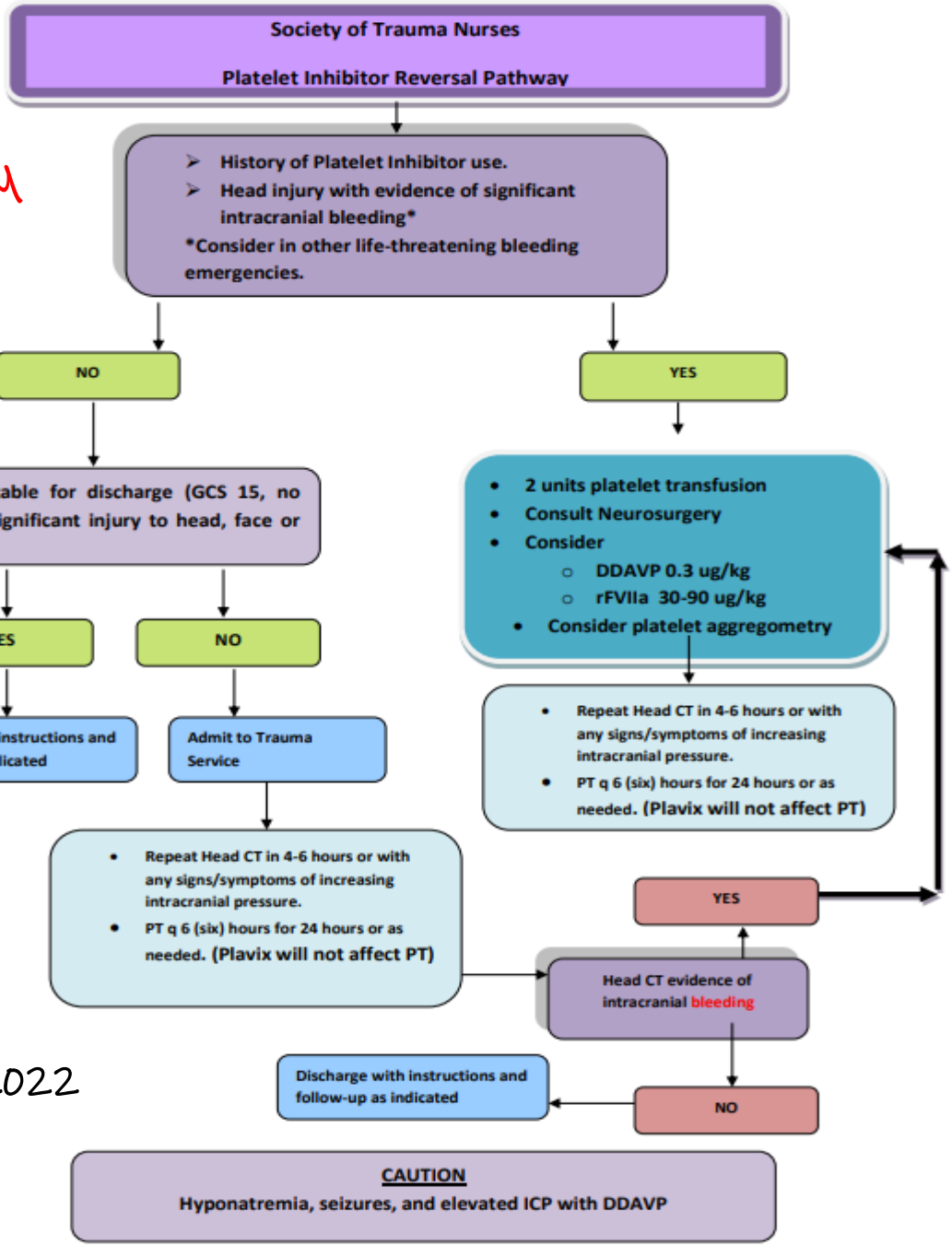
(qEMAT)

the quick elderly mortality after trauma on admission

(fEMAT)

the full elderly mortality after trauma which is done after radiologic evaluation

Platelet Inhibitor Reversal Pathway



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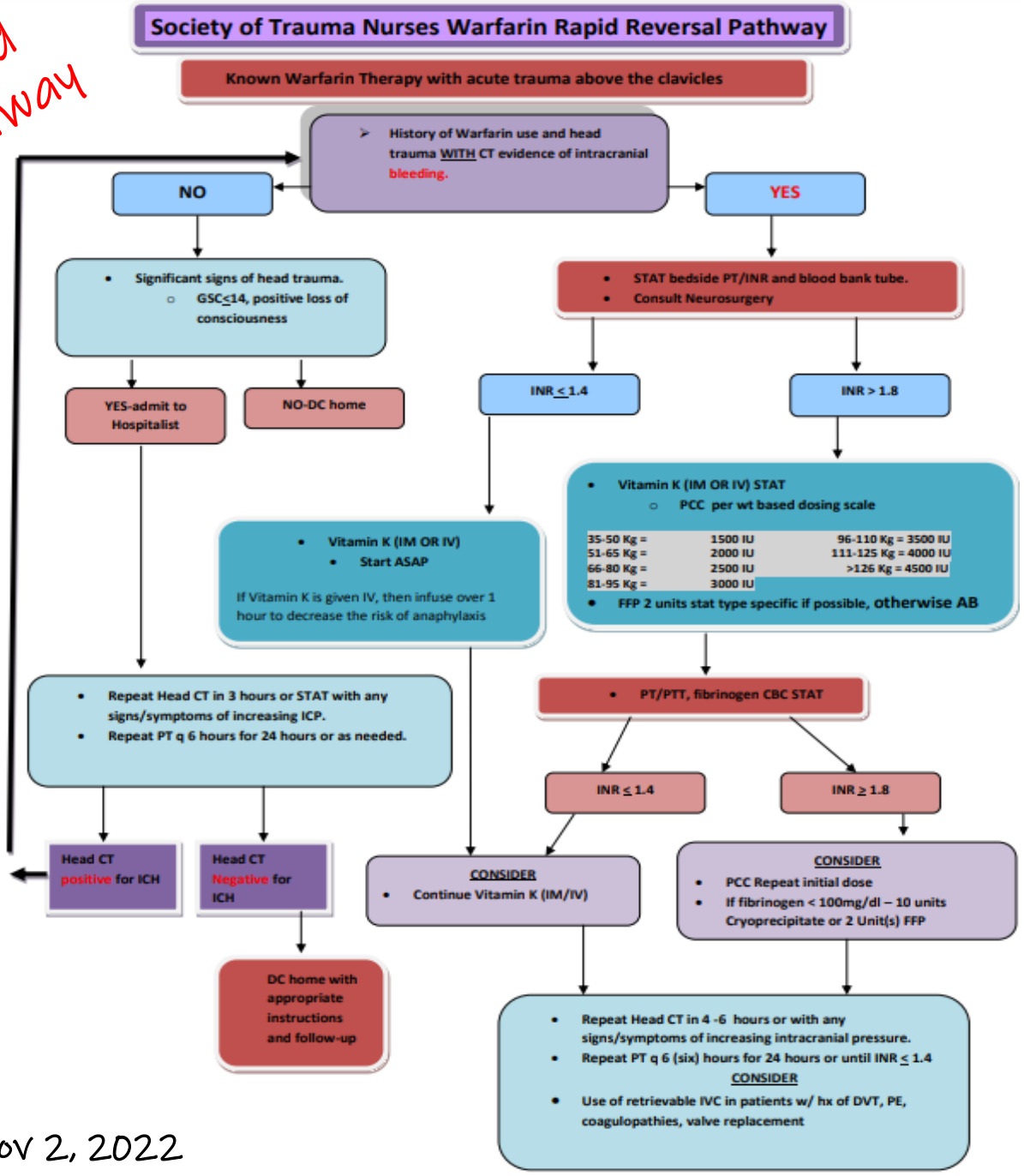
Warfarin Rapid Reversal Pathway



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Multidisciplinary Team

- Trauma Surgeon (lead)
- Geriatrics
- Cardiology / Orthopedics
- Internal Medicine Therapists
- Respiratory Therapist
- Case Coordinators
- Registered Nurses Advanced Practice Providers
- Nutritionists
- Speech Therapy
- Injury Prevention Coordinator
- Palliative Care
- Trauma Coordinators
- Neurosurgery
- Anesthesia
- Physical /Occupational
- Nurse Supervisor
- Emergency Services
- Pharmacy
- Social Workers
- Hospital administrators

Multidisciplinary Rounds

- Team Members could include: Trauma Surgeon
- Trauma Clinical Coordinator
- Registered Nurse
- Nurse Practitioner
- Nurse Manager
- Respiratory Therapist
- Occupational Therapist
- Physical Therapist
- Chaplin
- Social Workers

Discharge Planning

**Within 24 hours of admission,
all must have a pre-planned disposition,
agreed upon by the patient,
and/or family
and the admitting physician**

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