“Oh, They’re Fine” Strangulation in Domestic Violence and Sexual Assault Cases

Ellen Kennedy, BSN, RN, SANE-A
Jessica Hobbs, DO, FACEP

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What you'll learn today

- Define strangulation and the sub-categories of the act
- List signs and symptoms of strangulation, both short-term and long-term
- Describe treatment and care options for victims of strangulation


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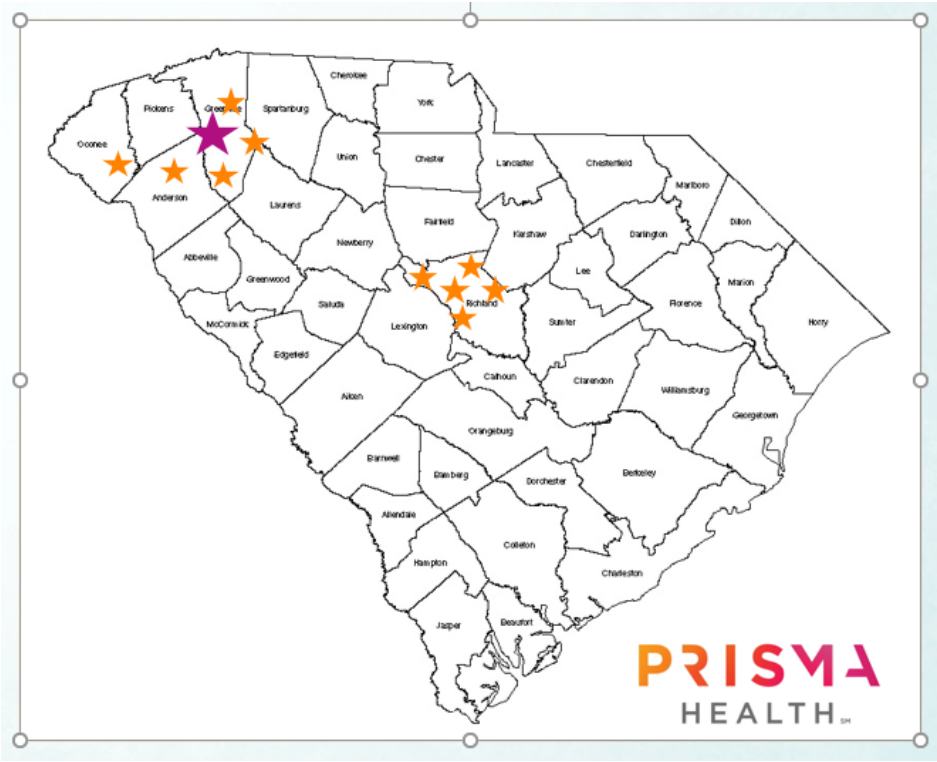
Prisma Health Upstate

- Level 1 Adult/Trauma Center—Greenville Memorial
  - 110,000 visits per year
  - 32,000 peds
- 4 Counties: Rural, Urban, City
- 6 Emergency Departments
- Academic Center of Excellence
- Level 1 Adult Trauma Center
- Level 2 Pediatric Trauma Center

Our SANE Program

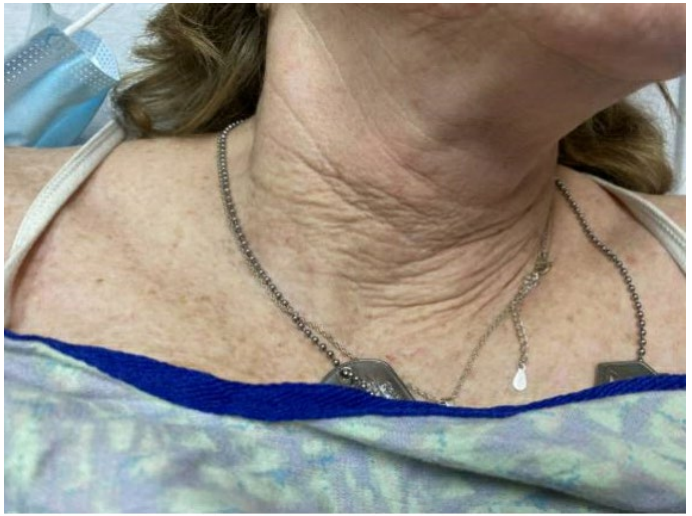


Our SANE Program

- 24/7 Coverage, 365 days per year
- Travels to location where patient presents
- Perform over 200 SANE kits per year
- Consults for ED and Inpatient Care
- Program created 2018
- 20 SANE RNs serving in secondary role
- Recipient of over $1 Million Grant Funding

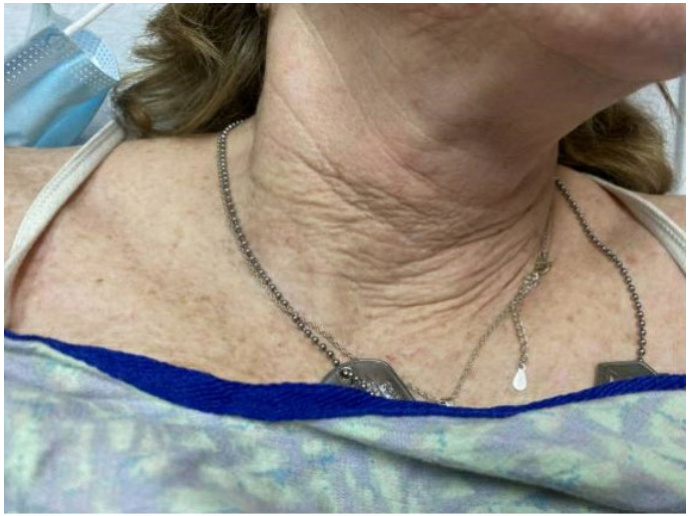
It’s 2AM in the ED and…

- Patient well known to the department with history of drug and alcohol use disorder presents with AMS
- VSS
- States that her boyfriend assaulted her after an altercation over finances
- States that he attempted to strangle her, and kicked and punched her multiple times in the face



It’s 2AM in the ED and…

- What is your plan of care for this patient?
- What types of injuries should you consider?
- How do you document these findings?
- What type of testing should you order?
- How can you be sure this patient has a safe plan for discharge?

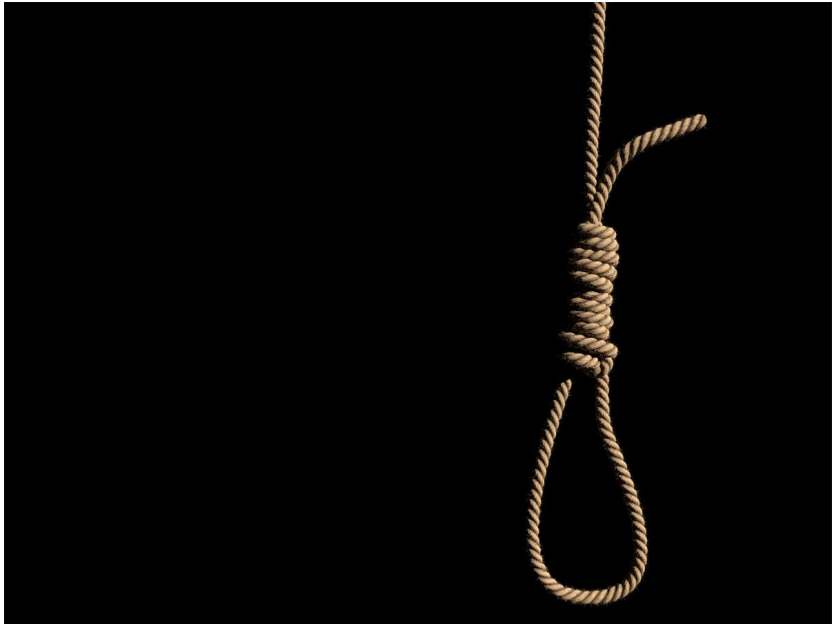


What we do (and don’t) know about strangulation

- Strangulation vs Choking
- One of most commonly over-looked and under-treated presentations in Emergency Departments
- Time periods mentioned today are average-factors such as ETOH/drug use, physiology variances, comorbidities, can and will impact times

What we do (and don’t) know about strangulation

- Manual strangulation
- Ligature strangulation
- Vascular restraint
- Hanging



Breaking it down

Second 0: Pressure applied/vasculature occluded

Seconds 5-10: Person becomes unconscious

Seconds 11-17: Anoxic seizure

At 15 seconds: Loss of bladder control

At 30 seconds: Loss of bowel control

1 minute: Death

Pounds of pressure

- 6 PSI to pull handgun trigger
- 20 PSI to open can of Coke
- 80-100 PSI in adult male handshake

- Jugular veins can be occluded with 4.4 PSI
- Carotid arteries with 11 PSI
- Trachea with 34 PSI

I know it when I see it

- DV patients present to ER 7x before disclosure
- Typically abused in less “obvious” manifestations
- Strangulation **is** escalation of DV
- Only 3% of strangulation victims present to the ED for strangulation-specific medical care
- Only HALF of victims have visible injuries
  - Of these, only 15% could be photographed

I know it when I see it

- Any history of strangulation places patient at higher risk for more serious violence by hands of their intimate partner
- One in four women experience IPV in their lifetime
  - Of those, up to 68% will experience near-fatal strangulation
- One of the most lethal forms of domestic violence

Signs and Symptoms of Strangulation

Head & Scalp: Petechiae*, Bald Spots from Hair Pulling, Bump from Blunt Force Trauma or Falling, Concussion, Skull Fracture

Face: Petechiae*, Slightly Red/Florid, Scratch Marks, Facial Drooping, Swelling

Eyes & Eyelids: Petechiae* on Eyeball/Eyelids, Bloodshot Eyes, Vision Changes, Droopy Eyelid

Neck: ness, rks, Bruise(s) e by Thumbs or Fingers, Abrasion(s), Fingernail Impressions, Swelling, Ligature Marks, Neck Pain

Breathing Changes: Difficulty Breathing, Inability to Breathe, Hyperventilation

Voice & Throat Changes: Raspy/ Hoarse Voice, Coughing, Inability to Speak, Loss of Voice, Trouble/ Painful Swallowing, Nausea Drooling, Sore Thro Throat, High

Ears: Ringing Sound, Petechiae* on Earlobe, Bruising Behind the Ear, Bleeding from the Ear

Nose: Bloody, Broken, Petechiae*

Mouth: Bruising, Swollen Tongue/Lips, Cuts/ Abrasions, Petechiae*

Fingertips: Faint Circular/ Oval Bruises

*Petechiae - Red Spots

Signs of strangulation are not always visible

In the ED

- Pain out of proportion
- Vision changes
- Ringing in ears
- Swollen tongue
- Cuts in mouth
- Swelling of neck
- Difficulty swallowing
- Trouble breathing
- Voice or throat changes
- Neurologic changes due to deoxygenation
- Psychiatric complaints

Current practices don’t make perfect

- Mechanism
  - 1 hand vs two vs something else?
  - In front of patient or from behind?
- Timeline
  - Last thing pt remembers vs first
  - Clock/cellphone nearby? Window?
  - How many times did this occur during assault?

Current practices don’t make perfect

- Did pt lose consciousness?
  - Incontinence?
  - “Greying out” vs complete loss of memory
- Voice quality
  - Hoarse, difficult to talk?
  - May present to ER alone – encourage friend/family opinion on voice alone or have patient record themselves

Current practices don’t make perfect

- Was pt lifted off your feet or knocked over?
- Did abuser say anything during strangulation?
- Has this happened before?

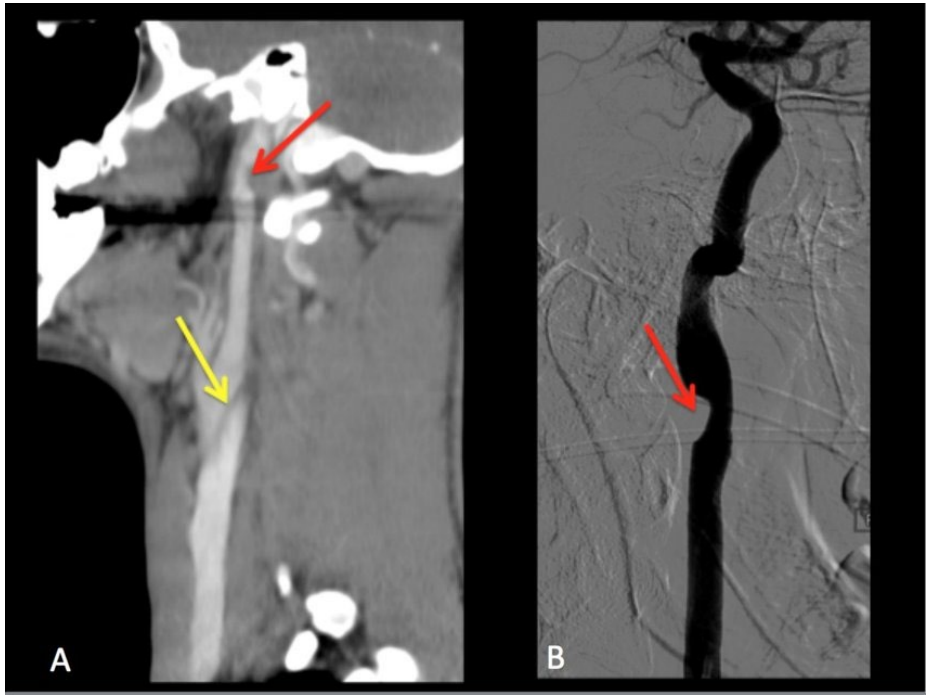
The complications you don’t want to miss

- Weeks to years? later
  - Carotid artery dissection
  - Pneumonia
  - ARDS
  - Embolization
  - Psychiatric
  - Spinal cord injury
  - Thyroid storm

- *Carotid artery dissections are the number one cause of stroke in people under the age of 45*

What do I order?

- Treat the whole patient
- Have a high level of suspicion
- Have a low threshold to order CTA



History of and/or physical exam with ANY of the following:

- **LOC** (anoxic brain injury)
- **Visual changes**: “spots”, “flashing light”, “tunnel vision”
- **Facial intraoral or conjunctival petechial hemorrhage**
- **Ligature mark or contusions** on neck
- **Soft tissue neck injury/swelling of the neck**
- **Incontinence** (bladder and/or bowel from anoxic injury)
- **Neurological signs or symptoms** (i.e. LOC, seizures, mental status changes, amnesia, visual changes, cortical blindness, movement disorder, stroke-like symtoms.)
- **Dysphonia/Aphonia** (hematoma, laryngeal fracture, soft tissue swelling)
- **Dyspnea** (soft tissue swelling, hematoma, phrenic nerve injury)
- **Subcutaneous emphysema** (tracheal/ laryngeal rupture)

Recommendations: MEDICAL/RADIOGRAPHIC EVALUATION OF ACUTE ADOLESCENT/ ADULT, NON-FATAL STRANGULATION

TRAINING INSTITUTE on STRANGULATION PREVENTION

Prepared by Dr. Bill Smock, Police Surgeon, Louisville Metro Police Department and Sally Sturgeon, DNP, SANE-A
with the support of the Medical Advisory Committee for the Training Institute on Strangulation Prevention

GOALS:
1. Evaluate carotid and vertebral arteries for injuries
2. Evaluate bony/cartilaginous and soft tissue neck structures
3. Evaluate brain for anoxic injury

Strangulation patient presents to the Emergency Department

History of and/or physical exam with ANY of the following:

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History of and/or physical exam with:

- **No LOC** (anoxic brain injury)
- **No visual changes**: “spots”, “flashing light”, “tunnel vision”
- **No petechial hemorrhage**
- **No soft tissue trauma to the neck**
- **No dyspnea, dysphonia or odynophagia**
- **No neurological signs or symptoms** (i.e. LOC, seizures, mental status changes, amnesia, visual changes, cortical blindness, movement disorder, stroke-like symtoms)
- And **reliable home monitoring**

Discharge home with detailed instructions to return to ED if: neurological signs/ symptoms, dyspnea, dysphonia or odynophagia develops or worsens

Radiographic Study Required to R/O Life-Threatening Injuries*

- **CT Angio of carotid/vertebral arteries** (gold standard for evaluation of vessels and bony/cartilaginous structures, less sensitive for soft tissue trauma)
- **CT neck with contrast** (less sensitive than CT Angio for vessels, good for bony/cartilaginous structures)
- **MRA of neck** (less sensitive than CT Angio for vessels, best for soft tissue trauma)
- **MRI of neck** (less sensitive than CT Angio for vessels and bony/cartilaginous structures, best study for soft tissue trauma)
- **MRI/MRA of brain** (most sensitive for anoxic brain injury, stroke symptoms and intercerebral petechial hemorrhage)

(-) Continued ED/Hospital Observation (based on severity of symptoms and reliable home monitoring)

(+)
- Consult Neurology Neurosurgery/ Trauma Surgery for admission
- Consider ENT consult for laryngeal trauma with dysphonia,

*References on page 2

Version 1.3, 2/16
WSS

Denver screening criteria for blunt cerebrovascular injury

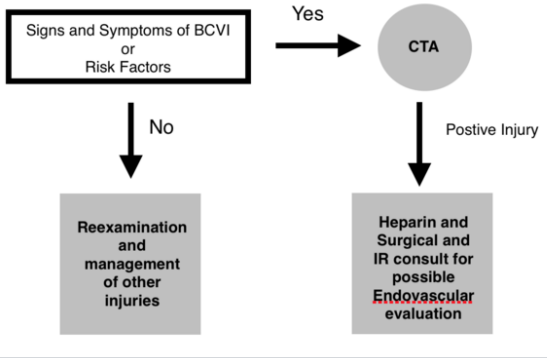
The Denver Screening Criteria are divided into risk factors and signs and symptoms

Signs and Symptoms

- Arterial hemorrhage
- Cervical bruit
- Expanding neck hematoma
- Focal neurologic deficit
- Neuro exam inconsistent with head CT
- Stroke on head CT

Risk Factors

- Midface Fractures (Le Fort II or III)
- Basilar Skull Fracture with carotid canal involvement
- Diffuse axonal injury with GCS<6
- Cervical spine fracture
- Hanging with anoxic brain injury
- Seat belt abrasion or other soft tissue injury of the anterior neck resulting in significant swelling or altered mental status
  - Isolated seatbelt sign without other neurologic symptoms has not been identified as a risk factor[5][6][7]



Algorithm for evaluation of BCVI with high risk criteria based on Memphis and Denver Screening Criteria

Why is discharge planning so important?

- Long term sequela
- Social needs
- Aftercare
- Social workers and community partners are vital
- PLAN for safety, even if patient plans to return to abuser

This patient will probably be back again

Resources

- Kevin J. Knoop, Lawrence B. Stack, Alan B. Storrow, R. Jason Thurman; The Atlas of Emergency Medicine, 5e, 19-05 Strangulation Injuries
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- Esther K Choo, MD, MPH, Debra Houry, MD, MPH. Managing Intimate Partner Violence in the Emergency Department. Annals of Emergency Medicine, *65*(4), 447–451.e1.
- Family Justice Center (2018). Strangulation Training Institute. “Resource Center” strangulationtraininginsitute.com
- Dunn RJ, Sukhija K, Lopez RA. Strangulation Injuries. 2021 Oct 1. StatPearls Publishing; 2022 Jan–. PMID: 29083611.
- Abigail T. Harning, EMT-P, M.Ed. Initial Findings in Strangulation Injury Aren’t Indicative of Outcome. Journal of Emergency Medical Services, 15 December 2015.

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