RECOMMENDATIONS for the MEDICAL/RADIOGRAPHIC EVALUATION of ACUTE ADULT, NON-FATAL STRANGULATION

Prepared by **Bill Smock, MD** and **Sally Sturgeon, DNP, SANE-A**
Office of the Police Surgeon, Louisville Metro Police Department
Endorsed by the **National Medical Advisory Committee**: Bill Smock, MD, Chair; Cathy Baldwin, MD; William Green, MD; Dean Hawley, MD; Ralph Riviello, MD; Heather Rozzi, MD; Steve Stapczynski, MD; Ellen Tailiaferro, MD; Michael Weaver, MD

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:

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

Recommended Radiographic Studies to Rule Out Life-Threatening Injuries*
(including delayed presentations of up to 6 months)

- **CT Angio of carotid/vertebral arteries** (***GOLD STANDARD*** for evaluation of vessels and bony/cartilaginous structures, less sensitive for soft tissue trauma) ***or***
- **CT neck with contrast** (less sensitive than CT Angio for vessels, good for bony/cartilaginous structures) ***or***
- **MRA of neck** (less sensitive than CT Angio for vessels, best for soft tissue trauma) ***or***
- **MRI of neck** (less sensitive than CT Angio for vessels and bony/cartilaginous structures, best study for soft tissue trauma) ***or***
- **MRI/MRA of brain** (most sensitive for anoxic brain injury, stroke symptoms and intercerebral petechial hemorrhage)
- **Carotid Doppler Ultrasound** (***NOT RECOMMENDED:*** least sensitive study, unable to adequately evaluate vertebral arteries or proximal internal carotid)

*References on page 2

(-)

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

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

(+)

- Consult NeurologyNeurosurgery/Trauma Surgery for admission
- Consider ENT consult for laryngeal trauma with dysphonia

Brochure Design by Yesenia Aceves

StrangulationTrainingInstitute.com

Version 17.9 9/16 WSS

RECOMMENDATIONS for the MEDICAL/RADIOGRAPHIC EVALUATION of ACUTE ADULT, NON-FATAL STRANGULATION

REFERENCES

(Recommendations based upon case reports, case studies, and cited medical literature)

1. Christe A, Thoeny H, Ross S, et al. Life-threatening versus non-life-threatening manual strangulation: are there appropriate criteria for MR imaging of the neck?. Eur Radiol 2009;19: 1882-1889
2. Christe A, Oesterhelweg L, Ross S, et al. Can MRI of the Neck Compete with Clinical Findings in Assessing Danger to Life for Survivors of Manual Strangulation? A Statistical Analysis, Legal Med 2010;12:228-232
3. Yen K, Thali MJ, Aghayev E, et al. Strangulation Signs: Initial Correlation of MRI, MSCT, and Forensic Neck Findings, J Magn Reson Imaging 2005;22:501-510
4. Stapczynski JS, Strangulation Injuries, Emergency Medicine Reports 2010;31(17):193-203
5. Yen K, Vock P, Christe A, et al. Clinical Forensic Radiology in Strangulation Victims: Forensic expertise based on magnetic resonance imaging (MRI) findings, Int J Legal Med 2007;121:115-123
6. Malek AM, Higashida RT, Halback VV, et al. Patient Presentation Angiographic Features and Treatment of Strangulation-Induced Bilateral Dissection of the Cervical Carotid Artery: Report of three cases, J Neurosurg 2000;92(3):481-487
7. Di Paolo M, Guidi B, Bruschini L, et al. Unexpected delayed death after manual strangulation: need for care examination in the emergency room, Monaldi Arch Chest Dis 2009;Sep;71(3):132-4
8. Dayapala A, Samarasekera A and Jayasena A, An Uncommon Delayed Sequela After Pressure on the Neck: An autopsy case report, Am J Forensic Med Pathol 2012;33:80-82
9. Hori A, Hirose G, Kataoka, et al. Delayed Postanoxic Encephalopathy After Strangulation, Arch Neurol 1991;48:871-874
10. Iacovou E, Nayar M, Fleming J, Lew-Gor S, A pain in the neck: a rare case of isolated hyoid bone trauma, JSCR 2011;7(3)
11. Oh JH, Min HS, Park TU, Sang JL, Kim SE, Isolated Cricoid Fracture Associated with Blunt Neck Trauma; Emerg Med J 2007;24:505-506
12. Gill JR, Cavalli DP, Ely SF, Stahl-Herz J, Homicidal Neck Compression of Females: Autopsy and Sexual Assault Findings, Acad Forensic Path 2013;3(4):454-457
13. Sethi PK, Sethi NK, Torgovnick J, Arsura E, Delayed Left Anterior and Middle Cerebral Artery Hemorrhagic Infarctions After Attempted Strangulation, A case report; Am J Forensic Med Pathol 2012;33:105-106
14. Clarot F, Vaz E, Papin F, Proust B, Fatal and Non-fatal Bilateral Delayed Carotid Artery Dissection after Manual Strangulation, Forensic Sci Int 2005;149:143-150
15. Molack J, Baxa J, Ferda J, Treska V, Bilateral Post-Traumatic Carotid Dissection as a Result of a Strangulation Injury, Ann Vasc Surg 2010;24:1133e9-1133e11
16. Plattner T, Bollinger S, Zollinger U, Forensic Assessment of Survived Strangulation, Forensic Sci Int 2005;153:202-207
17. Miao J, Su C, Wang W, et al. Delayed Parkinsonism with Selective Symmetric Basal Ganglia Lesion after Manual Strangulation, J Clin Neurosci 2009;16:573-575
18. Purvin V, Unilateral Headache and Ptosis in a 30-Year-Old Woman, Surv Ophthalmol 1997;42(2):163-168
19. Nazzal M, Herial NA, MacNealy MW: Diagnostic Imaging in Carotid Artery Dissection: A case report and review of current modalities; Ann Vasc Surg 2014;28;739.e5-739.e9
20. Chokyu TT, Miyamoto T, Yamaga H, Terada T, Itakura T: Traumatic Bilateral Common Carotid Artery Dissection Due to Strangulation: A case report; Interventional Neuroradiology;12:149-154, 2006