

Strangulation Injuries

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ABSTRACT

Strangulation accounts for 10% of all violent deaths in the United States. Many people who are strangled survive. These survivors may have minimal visible external findings. Because of the slowly compressive nature of the forces involved in strangulation, clinicians should be aware of the potential for significant complications including laryngeal fractures, upper airway edema, and vocal cord immobility. Survivors are most often assaulted during an incident of intimate partner violence or sexual assault, and need to be specifically asked if they were strangled. Many survivors of strangulation will not volunteer this information. Accurate documentation in the medical chart is essential to substantiate a survivor's account of the incident. Medical providers are a significant community resource with the responsibility to provide expert information to patients and other systems working with survivors of strangulation. This case study reviews a strangulation victim who exhibited some classic findings.

STRANGULATION CASE PRESENTATION

A 24-year-old woman presented to the emergency department after being physically assaulted by her intimate partner 1 hour prior to arrival. The patient was 7 months pregnant. He grabbed her and threw her to the ground. She reported being strangled, with both hands around her neck. Her face was buried/smothered into the carpet. He also gouged her eyes with his fingers. She started screaming, and he put his hands over her mouth and strangled her again. The patient lost consciousness. He stated, "Don't think I won't kill you." He also punched her in the head with his fists. He bit her right ear, and stated "I won't let go." He then strangled the patient for a third time and stated, "You're lucky I don't kill you, you'll never see your

daughter again." She started crying, and he stopped strangling her. He left the house. She then started walking towards the local women's shelter. She encountered a police officer on patrol, and she reported the incident. She was brought immediately to the emergency department (ED). On assessment in the ED, she had numerous abrasions and contusions to her extremities and face. She had a 3 cm laceration/human bite wound to the posterior area of her right ear. When asked what she thought would happen when she was being strangled, the patient stated, "I thought I would die."

On initial physical exam, her vital signs were BP 141/54, pulse – 110, respirations – 22, pulse oximetry – 99% on room air, fetal heart tones – 147. Tetanus status was up to date.

Injuries that may have been strangulation related included right eye reddened, eyelid drooping with subconjunctival hemorrhage, petechiae right frontal region, 2 cm abrasion to right posterior neck region, ecchymosis to left clavicle region, 5 cm abrasion to left lateral neck region. Her voice was slightly raspy.

Her subjective symptoms pertaining to strangulation included pain in the posterior neck region, complaints of swelling in throat region, difficulty breathing and swallowing, feeling lightheaded, loss of consciousness, sore throat, and headache.

In the ED, x-rays were taken of her facial bones and left knee, which were negative for fracture. Her right ear was irrigated and sutured. She was placed on augmentin prophylactically for her human bite wound. All injuries were documented on the "Physical Trauma Body Map." The Strangulation Check List (Figure 1) was completed. Photographs were taken of all injuries, including hand placement of perpetrator during strangulation. The ED social worker provided emotional support for the patient and did safety assessment. The patient was reassessed and observed for further complications from the strangulation attempts. She was discharged after a 2.5-hour emergency department stay. An ophthalmology appointment was arranged. A refer-

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ral to the hospital-based domestic abuse/sexual assault program was also made and follow-up was provided. She was taken to the Labor and Delivery department for fetal monitoring and was discharged after a 4-hour stay.

INTRODUCTION

Services for patients experiencing domestic violence or sexual assault have expanded dramatically in the hospital setting. Medical providers have learned to routinely screen, document and refer patients who experience intimate partner violence. Many communities in Wisconsin now offer collection of forensic evidence by Sexual Assault Nurse Examiners. This increase in care and knowledge about the needs of patients presenting with these issues also increases the medical system's responsibility in collaborating with other agencies.

Strangulation is an injury experienced in sexual assault and intimate partner violence. It is imperative that patients who experience this type of violence access medical care as soon as possible. It is important for all service providers in a community to be trained about the potential injuries and risks associated with strangulation. Often victims do not present to an emergency department identifying that they have been strangled in an assault. They may present to various community resources with a variety of physical complaints, none of which may appear to be serious. Advocates, local women's shelter staff, law enforcement, district attorneys, EMS personnel, human services, and particularly ED and urgent care staff should be educated about strangulation.

Service providers must ask a victim if they have been strangled during the assault. When patients present to an ED or urgent care with injuries from intimate partner violence or a sexual assault, they must be screened for strangulation. Many patients do not remember being strangled, or will not offer that information, unless they are specifically asked. If law enforcement or an advocate is the first community provider contacted by the victim, they also need to screen for strangulation. If victims identify that they have been strangled, they should be instructed to seek medical attention in the ED as soon as possible.

BACKGROUND

Patients that seek medical care after a strangulation episode are often not thoroughly evaluated. This may occur if the victim is intoxicated or hysterical. Their description of the strangulation attempt is often viewed as an exaggerated claim and not addressed with a clinically

appropriate workup, unless there are visible injuries to the neck.¹

"Strangle" means to obstruct seriously or fatally the normal breathing of a person. "Choke" means having the trachea blocked entirely or partly by some foreign object like food.² When assessing a patient who may have been strangled, it is acceptable to ask whether they were strangled or choked. When documenting, always use the term "strangled."

There are 4 types of strangulation:

- Hanging
- Manual (also called throttling)—The use of bare hands
- Chokehold (also called sleeper hold)—Elbow bend compression
- Ligature (also known as garroting)—Use of a cord-like object, clothing, rope, or belt

When being strangled, the victim will first experience severe pain, followed by loss of consciousness, then brain death. The victim will lose consciousness by any one or all of the following: pressure obstruction of the carotid arteries preventing blood flow to the brain, pressure on the jugular veins preventing venous blood return from the brain, or pressure obstruction of the larynx, which cuts off air flow to the lungs, producing asphyxia.^{2,3} Only 11 pounds of pressure placed on both carotid arteries for 10 seconds is necessary to cause loss of consciousness. However, if pressure is released immediately, consciousness will be regained within 10 seconds. To completely close off the trachea, 33 pounds of pressure is required. If strangulation persists, brain death will occur in 4 to 5 minutes.²

CLINICAL PRESENTATION

Because of the slowly compressive nature of the forces involved in strangulation, victims may present with deceptively harmless signs and symptoms. There may be no or minimal external symptoms of soft tissue injury. The upper airway also may appear normal beneath intact mucosa, despite hyoid bone or laryngeal fractures. Up to 36 hours after the strangulation attempt, the patient can develop edema of the supraglottic and oropharyngeal soft tissue, leading to airway obstruction.

Delayed edema, hematoma, vocal cord immobility, and displaced laryngeal fractures all may contribute to an unstable airway following strangulation.⁴ If the victim survives the initial assault and the injuries go unrecognized and untreated, delayed life-threatening airway obstruction or long term vocal dysfunction may result.⁵

Signs and Symptoms

The specific injury will depend on the method of strangulation, the force and duration of the strangulation episode.

- **Voice Changes**—May occur in up to 50% of victims, may be as minimal as simple hoarseness (dysphonia) or as severe as complete loss of voice (aphonia).
- **Swallowing Changes**—Due to injury of the larynx and/or hyoid bone. Swallowing may be difficult but not painful (dysphagia) or painful (odynophagia).
- **Breathing Changes**—May be due to hyperventilation or may be secondary to underlying neck and airway injury. The victim may complain of dyspnea. Breathing changes may initially appear mild, but underlying injuries may kill the victim up to 36 hours later.
- **Mental Status Changes**—Early symptoms may include restlessness and combativeness due to temporary brain anoxia and/or severe stress reaction. Changes can also be long-term, resulting in amnesia and psychosis.
- **Involuntary Urination and Defecation**
- **Miscarriage**
- **Swelling of the Neck**—Edema may be caused by any of the following: internal hemorrhage, injury of any of the underlying neck structures, or fracture of the larynx causing subcutaneous emphysema.
- **Lung Injury**—Aspiration pneumonitis may develop due to the vomit that the patient inhaled during strangulation. Milder cases of pneumonia may also occur hours or days later. Pulmonary edema symptoms may also develop.
- **Visible Injuries to the Neck**—These may include scratches, abrasions, and scrapes. These may be from the victim's own fingernails as a defensive maneuver but commonly are a combination of lesions caused by both the victim and the assailant's fingernails. Erythema on the neck may be fleeting, but may demonstrate a detectable pattern. Ecchymoses may not appear for hours or even days. Fingertip bruises are circular and oval, and often faint. A single bruise on the victim's neck is most frequently caused by the assailant's thumb.
- **Chin abrasions**—May occur as the victim brings their chin down to their chest, to protect the neck.
- **Ligature Marks**—May be very subtle, resembling

the natural folds of the neck. They may also be more apparent, reflecting the type of ligature used. Ligature marks are a clue that the hyoid bone may be fractured.

- **Petechiae**—May be found under the eyelids, periorbital region, face, scalp, and on the neck. Petechiae may occur at and above the area of constriction.
- **Subconjunctival Hemorrhage**—This may occur when there is a particularly vigorous struggle between the victim and assailant.²
- **Neurological Findings**—These may include ptosis, facial droop, unilateral weakness, paralysis or loss of sensation.
- **Psychiatric Symptoms**—including memory problems, depression, suicidal ideation, insomnia, nightmares, and anxiety.
- **Other Symptoms**—Dizziness, tinnitus, and acid reflux.

A study conducted by the San Diego City Attorney's Office of 300 domestic violence cases involving strangulation revealed that 50% of the victims had no visible injuries and 35% of the victims had injuries too minor to photograph.⁶

MEDICAL EVALUATION AND DOCUMENTATION

The treatment and evaluation of strangulation is dependent on the signs and symptoms. Detailed studies and invasive procedures should be employed as indicated for patients with more significant findings, such as dyspnea, behavioral or neurological changes, and visible neck lesions.¹ These procedures include

- **Pulse Oximetry**: This is the first step in evaluating a patient with mental status changes that may be secondary to hypoxemia. It is also indicated if the patient has any respiratory symptoms.
- **Chest X-Ray**: Diagnosis of pulmonary edema, pneumonia, or aspiration.
- **Soft Tissue Neck X-Ray**: For evaluation of subcutaneous emphysema, secondary to a fractured larynx. It may also demonstrate tracheal deviation because of edema or hematoma, and may identify a fractured hyoid bone.
- **CT Scan and/or MRI of Neck Structures**
- **Carotid Doppler Ultrasound**: May be indicated for patients with neurological lateralizing signs.

- **Laryngoscopy:** For evaluation of vocal cords and trachea. May be helpful for patients with hoarseness, dyspnea, and odynophagia

Patients who have been strangled may need to be admitted, if clinically indicated. This allows for continuous monitoring of their vital signs, respiratory function and neurological status. If any progressive worsening of symptoms occurs, this may warrant admission and subspecialty consults. Special care and observation is indicated for the strangulation patient who is under the influence of drugs or alcohol.¹

The documentation of a strangulation incident is crucial for both medical and legal intervention. Aside from documenting the signs and symptoms, it is also helpful to document the method and manner of strangulation. This can be accomplished by using a strangulation documentation tool. See Figure 1.

PHOTOGRAPHY

It is very important to photograph any injuries or findings that may have occurred as the result of strangulation. The following photographs should be taken:²

Distance Photo—One full body photograph of the victim will help identify the victim and the location of the injury.

Close-up photos—Take close-up photographs of the injuries from different angles to maximize visibility. Take each photo both with and without a ruler placed on the same plane as the injury. The ruler will help document the size of the injury.

Follow-up photos—Taking follow-up photographs of the injury at different time intervals will document the injuries as they evolve over time and maximize your documentation. Ask the victim to describe and demonstrate how she was strangled, i.e. with one or two hands, forearm, object?

Photograph the victim demonstrating the strangulation attempt.

SUMMARY

Collaboration with numerous community systems is essential when addressing strangulation in intimate partner violence and sexual assault. It is critical for providers who work with these survivors to have a thorough knowledge and understanding of strangulation. Intimate partner violence and sexual assault are crimes that usually have no witnesses. Medical evaluation and documentation (including photographs) are

Figure 1.

Date: _____
Pt. Name: _____
Clinic #: _____

STRANGULATION CHECK LIST

Neck Pain
 Neck Swelling
 Difficulty Breathing
 Difficulty Swallowing
 Pain with swallowing
 Nausea and Vomiting
 Lightheaded
 Loss of memory
 Loss of control of urine
 Loss of control of bowels
 Fainting or loss of consciousness
 Voice Changes (raspy, hoarse, unable to speak)
 Red Eyes, ___Right ___Left
 Sore throat
 Headache
 Coughing
 Red spots/petechia
 Miscarriage

Document all injuries on body maps

Description of Injuries _____

Photographs taken ___Yes ___No By Whom _____
Photographs to be taken to show suspect's method of strangulation
Photography Consent signed ___Yes ___No

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Date: _____
Pt. Name: _____
Clinic #: _____

STRANGULATION CHECK LIST

METHOD AND/OR MANNER OF STRANGULATION:
How was victim strangled?

One hand - ___Right Hand ___Left Hand ___Two Hands ___Knee ___Foot
 ___Right Forearm ___Left Forearm ___Uncertain
 Ligature (Describe) _____

Length of time of strangulation _____

Was the victim also smothered ___Yes ___No

From 1 to 10, how hard was the suspect's grip? (Low) 1, 2, 3, 4, 5, 6, 7, 8, 9, 10

Multiple attempts ___Yes ___No Multiple methods ___Yes ___No

Was victim shaken during strangulation ___Yes ___No

Was victim's head pounded against wall, floor or ground ___Yes ___No

Describe _____

What did suspect say to victim during strangulation? _____

What did victim think was going to happen? _____

How or why did the suspect stop strangling the victim? _____

_____, RN/MD Signature

powerful ways to substantiate the survivor's account of the incident.

If a patient identifies intimate partner violence or sexual assault, it is important to further screen for strangulation.⁷ In our experience, this information is not freely offered by a patient, but instead, health care providers and law enforcement officials need to specifically ask about strangulation. It is important to identify non-lethal strangulation, especially in intimate partner violence. These individuals are at higher risk for continuing severe abusive events.⁷ It is also vital to provide follow-up services through hospital-based programs or community service providers.

As a community of systems that provide services to individuals experiencing intimate partner violence and sexual assault, our goals are the same. We aspire to make survivors safer, and to make the perpetrator accountable. This can be accomplished with community education on strangulation, and collaboration with all community systems working with this potentially lethal form of physical violence.

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Appendix

Hospital based domestic abuse/sexual assault programs are part of a growing trend of health systems responding to patients who experience abuse in their lives. A high-quality program has some or all of the following:

- Written policy and procedure concerning the assessment and treatment of victims of domestic violence and sexual assault
- Mandated ongoing training on domestic violence and sexual assault for staff which addresses screening, documentation, referral of patients and cultural competency
- A hospital-based interdisciplinary task force which meets monthly and includes physicians and administration, especially when developing a program
- Monetary support for a program provided by hospital
- Posters and brochures associated with domestic violence and sexual assault should be publicly displayed throughout the hospital
- State wide referral information should be available and easily accessible to staff
- Provides follow-up contact and direct services for patients after domestic violence or sexual assault is identified
- Provides an identified coordinator of a program who collaborates with community domestic violence and sexual assault programs
- Victim advocacy services provided on-site
- Provides coordination with behavioral health and chemical dependency services within the hospital
- Provides Sexual Assault Nurse Examiners for forensic evidence collection

It is important for local hospitals to have an ongoing collaboration with local domestic abuse and sexual assault programs and be involved in a coordinated community response to domestic violence and sexual assault services. For more information contact the Wisconsin Domestic Violence Training Project at 608.262.3635. This project offers an updated packet titled Many Models (In Wisconsin) of Health Systems Responding To Domestic Violence.



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