

# ENA Topic Brief

## Key Information

The detection of strangulation and its effects on a patient can be challenging for emergency nurses despite their level of skills and expertise.<sup>1,2</sup>

Strangulation can occur with very little pressure to the neck, therefore physical signs and symptoms are not always obvious and can easily be missed by healthcare providers.<sup>1</sup>

The incidence of strangulation, in particular, hangings, has increased in the United States and worldwide.<sup>3</sup>

The primary mechanisms of strangulation are hanging, ligature strangulation, and manual strangulation.<sup>5</sup>

Near-hangings and accidental hangings are rare but do occur in both children and adults.<sup>8</sup>

Statistics related to the choking game may be inaccurate since many deaths from self-asphyxia are classified as suicide and not accidental death.<sup>14</sup>

Autoerotic asphyxia resulting in death can often be mistaken for homicide or suicide.<sup>19</sup>

Non-fatal strangulation inflicted by an intimate partner is recognized as a predictive risk factor for subsequent severe violence.<sup>24,40</sup>

## An Overview of Strangulation Injuries and Nursing Implications

### Purpose

The detection of strangulation and its effects on a patient can be challenging for emergency nurses despite their level of skills and expertise.<sup>1,2</sup> Strangulation can occur with very little pressure to the neck, therefore physical signs and symptoms are not always obvious and can easily be missed by healthcare providers.<sup>1</sup> The patient may not report that strangulation occurred for various reasons, making evaluation of these patients more difficult. Having an index of suspicion for strangulation during the assessment may help detect these injuries when they are insidious.<sup>1</sup> The incidence of strangulation, particularly hangings, has increased in the United States and worldwide.<sup>3</sup> While the emergency nurse is prepared to manage airway obstructions and hypoxia, he or she may have limited understanding of the complexities surrounding strangulation, including assessment, signs and symptoms, nursing implications, and other challenges such as those associated with intimate partner violence (IPV), risky personal behaviors, forensic evidence collection, and suicide. The emergency nurse who knows the mechanisms of strangulation injuries and the associated social factors, is well-positioned to quickly identify risks that may not be immediately evident.<sup>4</sup>

The purpose of this topic brief is to provide the emergency nurse with an overview of strangulation injuries and clinically relevant information to enhance assessment, treatment, and support of a patient who has been strangled. Physiologic factors, risky behaviors associated with strangulation, strangulation as a component of IPV, and nursing implications are reviewed.

### Overview

Strangulation is defined as an external pressure applied to the neck that compresses the blood vessels and potentially the airway.<sup>1,5</sup> A pressure of only 11 pounds per square inch (PSI) applied for 10 seconds to both carotid arteries can cause unconsciousness; permanent brain damage can result if pressure is

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sustained for two minutes<sup>6</sup>, and brain death can occur if pressure is sustained for three to five minutes.<sup>1</sup> Suffocation, choking, and strangulation can all lead to a lack of oxygen to the body (asphyxia), but each is different (see Definitions).

The primary mechanisms of strangulation are hanging, ligature strangulation, and manual strangulation.<sup>5</sup> Hangings are one of the most commonly used methods of suicide<sup>3,5,7</sup> and may occur both intentionally and unintentionally. Intentional strangulation includes deliberate assaults or homicidal acts, IPV, and suicide. Near-hangings and accidental hangings are rare but do occur in both children and adults.<sup>8,9</sup> Ligature strangulation involves the use of objects such as a cord, belt, bed sheet, shoelace, rope, or wire to compress the neck. Ligature strangulation is most often seen in homicides but can also be observed in suicidal acts as well as accidental self-strangulation. Manual strangulation is the most common form of strangulation and occurs when an individual's hands or objects are used to compress the victim's neck<sup>1</sup> and is often seen in IPV.

All these strangulation mechanisms can result in oxygen deprivation and obstruct blood supply to the brain.<sup>5</sup> The anatomical structures of the neck, which include the larynx, trachea, arterial blood vessels, and cervical veins, ensure transport of respiratory gases and blood.<sup>10</sup> Compression of the cervical soft tissues can occlude the blood vessels. Applying pressure to either side of the neck, occluding carotid and vertebral arteries, can stop the flow of blood to the brain.<sup>4</sup> It is likely that arterial obstruction, venous obstruction, and autonomic nervous system reflexes all play a role in the rapid loss of consciousness with strangulation.<sup>11</sup>

Ventilation may be disrupted if direct pressure is applied to the airway, reducing the width and making the exchange of air more difficult. Direct pressure on the airway can cause loss of consciousness within seconds; if total occlusion continues, irreversible damage with potentially fatal outcomes can occur within three to five minutes due to a lack of oxygen.<sup>4,5</sup> The force of the pressure can displace the cervical soft tissue, resulting in the root of the tongue being pressed against the palate and posterior wall of the pharynx, occluding the upper respiratory tract.<sup>5</sup> The compression of the tissues is poorly tolerated and compensated by the body, leading to vascular congestion in the head followed by cyanosis, soft tissue swelling, and petechial hemorrhages.<sup>4,5,7,12,13,14</sup> Petechiae are classic symptoms of venous congestion and are typically seen in the conjunctiva of the eyes, the face, soft palate, oral mucosa, on the scalp, and the skin behind the ears. Additional findings include fracture and dislocation of the cervical vertebrae, more often found in hangings,<sup>15</sup> stretching of the carotid sinus, resulting in cardiac arrest,<sup>4,8,16,17</sup> ligature marks or bruising and scratches on the neck,<sup>4,7,8,12,14,18,19,20</sup> and fecal and urinary incontinence as well as body fluids from nose, mouth, or genitals.<sup>1,4,5,13,19</sup> Other findings have shown cricoid fractures, laryngeal or thyroid cartilage damage, and hemorrhage.<sup>3,4,7,14</sup>

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## *Short and Long-Term Health Sequelae of Strangulation*

Strangulation can be lethal, but those who survive a strangulation attempt suffer from short and long-term consequences. Patients who have a low Glasgow coma scale (GCS) score and require mechanical ventilation following a near-hanging or strangulation are at risk of developing acute respiratory distress syndrome (ARDS).<sup>21</sup> Also, patients will have a high mortality rate, especially if they arrive to the ED pulseless and have abnormal neurological radiology exams.<sup>21</sup> Another potential short-term sequela is the development of thyroid storm.<sup>22</sup> Researchers conducted a post-mortem analysis that revealed microscopic changes in the thyroid glands of patients who had sustained traumatic injuries to the neck.<sup>22</sup>

Moreover, damage to the carotid arteries can lead to dissection or cerebral infarction.<sup>1</sup> Other potential consequences include both long- and short-term memory loss, unresolved neck and throat injuries with voice changes, and swelling up to 24–48 hours post-injury, which can lead to airway compromise.<sup>23,24</sup> Long term sequelae can include higher incidence of depression and anxiety, post-traumatic stress disorder, low self-esteem, suicidal ideation, and overall lower health status.<sup>25</sup> Delayed morbidity and mortality, even days later,<sup>6</sup> has been reported in strangulations as a result of vascular and respiratory complications.<sup>26</sup> Some suggest that after the initial examination and resuscitation, the diagnostic value of computed tomography (CT) and color Doppler of both the head and neck be strongly considered in every case of neck trauma.<sup>26</sup> If the Doppler reveals intimal injury, further investigation is suggested, such as angiography and immediate surgery even in the absence of neurological deficit. According to the Training Institute on Strangulation Prevention resource, *Recommendations for the Medical/Radiographic Evaluation of Acute Adult, Non-Fatal Strangulation*, the gold standard for evaluation of vessels and bony structures is a CT angiography of the carotid and vertebral arteries.<sup>27</sup>

## *The Choking Game*

Unintentional or accidental strangulation is rare but does occur, and is of particular concern in the pediatric population.<sup>8,28</sup> Older children and adolescents are not immune to strangulation injuries. Particularly in the adolescent population, unintentional trauma related to high risk behaviors is a public health concern.<sup>29</sup> One of these high risk behaviors related to strangulation is the Choking Game, which involves strangulating or applying pressure to the neck, either by oneself or by another person, to restrict oxygen to the brain, with the purpose of inducing a euphoric feeling just before loss of consciousness occurs.<sup>14,30,31</sup> This high-risk behavior can cause asphyxia and is not sexual in nature, although some argue that it is an early manifestation of autoerotic asphyxiation.<sup>14,32</sup> Both males and females play this potentially fatal game, with males about twice as likely to participate.<sup>14</sup> The average age of those who engage in this game is 13.3 years, and it is more common in rural than urban areas.<sup>14,33</sup> Some research has found that adolescents who engage in the Choking Game are usually athletic, like being extreme, and believe it is a safe game because drugs or alcohol are not involved.<sup>14,34</sup> Even though this game has existed for many years, few parents, teachers, or healthcare providers have actually heard

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about it, and there is a general lack of knowledge about this high risk behavior.<sup>14</sup> Signs of participation in asphyxial games include headaches, seizures, unexplained bruising around the neck, petechial hemorrhages in the conjunctivae and face, disorientation after being alone, acute vision loss, behavioral changes, wear marks on furniture, and head or musculoskeletal trauma related to falls.<sup>14</sup> Educating parents, caregivers, and healthcare professionals in how to identify at-risk children and adolescents, as well as potential risks and hazards in the home, can help raise awareness and potentially save lives.

## *Sexual Asphyxia*

Sexual asphyxiation, classified as one of the paraphilias,<sup>13</sup> is the purposeful induction of hypoxia to cause heightened sexual arousal.<sup>19</sup> As with the Choking Game, the decreased availability of oxygen leads to lightheadedness or a euphoric sensation, but in this case it is used to enhance the experience of an orgasm.<sup>19</sup> Sexual asphyxia can be practiced alone as an autoerotic activity or as a consensual sadomasochistic act between two or more people.<sup>19</sup> In the United States, the annual autoerotic death rate has been estimated between two and four cases per million, mostly males between 15 and 25 years.<sup>13</sup> The several characteristics that distinguish an intentional strangulation from an autoerotic death can be seen by first responders or immediately when the victim arrives at the ED. The signs of an autoerotic death include:<sup>19</sup>

- Evidence of solo sexual activity
- Discovery of the body in a private or secure location
- History of previous similar activity
- No obvious suicidal intent
- Unusual props—ligatures, clothing, pornography—or failure of a device or setup integral to the activity that caused death

In many situations, family members or friends who discover the victim may take steps to conceal the nature of the fatal circumstance through embarrassment and concern for the deceased's reputation.<sup>19</sup> In some settings or circumstances, it may be the responsibility of the emergency nurse to collect, preserve, and transfer any potential forensic evidence and appropriately document relevant information.<sup>35</sup>

## *Strangulation and Intimate Partner Violence*

Intimate partner violence is any physical, sexual, or psychological harm caused by a current or former partner or spouse<sup>36</sup> and is a worldwide problem affecting all demographic groups.<sup>37</sup> The prevalence of non-fatal strangulation by an intimate partner in the U.S. and Europe is estimated to range from 3.0% to 9.7%, with estimates as high as 27% and 68% for women with a history of IPV.<sup>24</sup> In IPV, strangulation is used as a tool for power and control. In most cases, those who strangle are not intending to kill their partners, but rather use strangulation to demonstrate their control of their victims, causing them to live in constant fear.<sup>38</sup> Victims of IPV,

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particularly those who have experienced non-fatal strangulation, will often not readily disclose medical information and may have to be repeatedly asked about the presence of violence in their lives before acknowledging their problems or seeking assistance.<sup>39</sup>

Non-fatal strangulation inflicted by an intimate partner is recognized as the most predictive factor for subsequent severe violence and is associated with a 7.5-fold increased risk of homicide.<sup>24,38</sup> Nearly half of all victims of intimate partner homicide have had prior experience of at least one episode of strangulation<sup>23,40</sup> and victims of one episode of intimate partner strangulation are eight times more likely to become a homicide victim of that partner.<sup>24,40</sup> Since victims of IPV rarely volunteer that they have been strangled<sup>40,41</sup> and may often present with little or no obvious clinical signs of strangulation or other physical abuse,<sup>1,24</sup> the American Medical Association, the American College of Obstetrics and Gynecology, the American Nurses Association, the Joint Commission, and the Institute of Medicine have all recommended routine screening for IPV.<sup>37</sup> Routine screening can also be conducted during any health visit including to primary providers and for obstetrical or gynecological exams.

A sore throat is the most common complaint from strangulation, reported at 60–70%, and voice changes are reported at 50%.<sup>42,43</sup> Common physical injuries from IPV include lacerations, contusions, multiple physical symptoms, and chronic pain.<sup>37</sup> Additional health consequences include difficulty swallowing, stridor, gastrointestinal disorders, chronic diseases, sexually transmitted diseases, alcohol and substance abuse, changes in vision, memory disturbances, depression, posttraumatic stress disorder, difficulty sleeping, headaches, seizures, pregnancy, and suicide.<sup>4,7,12,15,17,28,37,39,43,44</sup> It is important to note that the absence of external neck injuries does not always exclude strangulation.<sup>24,45</sup> External injuries are often entirely absent even in cases of homicidal assault.<sup>6</sup>

## *Nursing Implications*

EDs are often the primary access point for care for many victims of non-fatal strangulation, and the triage process may be the first opportunity to begin screening and assessment. One of the most important steps to accurately obtain information is to interview the patient alone. This task may include carefully and discretely separating the victim from a spouse, partner, family member, or child.<sup>37</sup> Receiving a detailed handoff report from emergency medical services (EMS) can also provide additional information especially if the patient is reluctant to disclose an accurate history of events. In some circumstances it may be required to ask specific questions like, “Has a partner or someone else tried to hurt you by putting their hands around your throat and squeezing it or by putting a piece of clothing or object around your throat and pulling it tightly?” When asking questions during triage or the nursing assessment, phrasing, semantics, and documentation are very important. Clarify and document what the patient says by using direct quotations especially when describing the events of the injury.

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Terms such as “laceration” and “tear” may have different meanings but can be used interchangeably.<sup>37,46</sup> It is also very important for ED nurses to be aware of “red flag” patient statements that suggest strangulation. It is advisable to ask open-ended questions and listen carefully to patient statements that may suggest strangulation, such as: “I couldn’t breathe,” “I lost control of my bowels,” “I passed out,” “Everything was fuzzy,” “I was dizzy,” and “I had a head rush.” “Everything was black and white.” “I lost control of my bladder.”<sup>47</sup> As mentioned previously, patients often have varying definitions of “strangulation” and “choking”,<sup>41</sup> therefore, obtaining a thorough history and conducting a full assessment as well as ensuring accurate and complete documentation are essential steps in the forensic evidence collection process.

A forensic nurse examiner (FNE) with specialized training in medical forensic examinations and legal testimony would be the most appropriate person to care for a patient with suspected strangulation.<sup>48</sup> Sexual Assault Nurse Examiners (SANEs) are also trained in the assessment and care of these patients.<sup>48</sup> Unfortunately, not all EDs have the advantage of a regularly staffed SANE or FNE. However, by being familiar with IPV screening, medical forensic evaluations, accurate documentation, and the health consequences associated with strangulation injuries, emergency nurses can be well prepared to care for these patients.

Victims of non-fatal strangulation require immediate medical attention, but their safety must also be assured and their psychosocial needs met, including emotional support, crisis intervention, risk-assessment, safety planning, and follow-up care.<sup>49</sup> Ultimately, it is the patient’s decision whether or not to remain in their current situation and to initiate filing charges. Each state has its own laws regarding mandated reporting and it is essential for emergency nurses to be familiar with their state’s laws. As with any health risk, patients need to be fully informed when making their decisions,<sup>37</sup> and it is a priority of the emergency nurse to provide appropriate health information and resources so that the patient can make a well-informed decision. Some states do not require mandatory reporting of IPV, however, healthcare providers are obligated to provide patients with referrals to IPV services. It is important for the ED nurse to encourage the patient to work with the IPV advocates to develop a safety plan, especially in the case of a strangulation assault.

Documentation is a vital component when caring for a victim of strangulation. Good documentation assists in the coordination of care with other providers or referrals and can legally protect healthcare providers by demonstrating that the patient’s needs were addressed and appropriate resources and services provided.<sup>37</sup> Accurate documentation including photo documentation can also assist prosecutors in convicting the perpetrators.<sup>37</sup>

Patients who have suffered asphyxia, hanging, or strangulation should have a thorough physical and psychological assessment.<sup>50</sup> This includes continual evaluation of the head and neck in a 360 degree fashion, throat, and mouth, and pain level.<sup>4</sup> Documentation is essential to provide a clear history of the events, signs and

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symptoms, and diagnostic results including measurements of the neck circumference to follow the course of any edema.<sup>1</sup> Some recommend patients be admitted for observation for at least 12–24 hours<sup>49</sup> and to consider the administration of steroids in addition to further evaluations of any underlying pathology.<sup>4</sup> In instances of pregnancy, further consultation and fetal monitoring may be indicated. Critical indicators that may necessitate further imaging and/or admission include a history of loss of consciousness, facial and/or conjunctival petechiae, neck soft tissue injury, incontinence (urinary or fecal), intoxication, and the potential for poor home observation.<sup>49</sup> In addition, care may require a consult with an otolaryngologist for a laryngoscopy and to a computerized tomography (CT) scan for assessment of any hypopharyngeal fractures.<sup>51</sup> Pressure inflicted on the carotid sinus, sympathetic ganglion, or carotid body has the potential to induce bradycardia and cardiac arrest; continuous cardiac monitoring is therefore recommended.<sup>8</sup> Appropriate nursing interventions may help to prevent further complications.

## *Conclusion*

Patients who have experienced strangulation are at risk for a variety of immediate and delayed sequelae and may suffer severe emotional consequences. Victims of IPV are also at risk of future homicide by their partners.<sup>24,40</sup> The emergency nurse should be aware of age-specific, high-risk behaviors of those presenting to the ED with non-fatal strangulation injuries. Sensitive and timely assessment that includes multidisciplinary diagnostic investigations can improve immediate and long-term health outcomes. One of the most important facts, emphasized throughout this document, is that the lack of visible evidence does not rule out strangulation or the presence of a potentially life-threatening condition.<sup>1,51</sup> Emergency nurses have significant opportunities to assist victims of strangulation and their families by providing education on the serious and potentially fatal nature of this violent act.

Caring for the trauma patient that has experienced strangulation can be a difficult but manageable task for the emergency nurse. The initial patient contact is a vital opportunity for the nurse to establish a trusting relationship and to begin the forensic evidence collection process. Obtaining an accurate history of events, evaluating the potential health risks, having an index of suspicion, and understanding the needs of the patient are the first steps in identifying and caring for these patients. Integrating a multidisciplinary team approach helps create a supportive environment, and offering safety, crisis intervention, and resources can help the patient make informed decisions. Conducting routine screening, recognizing the signs and symptoms of strangulation, understanding the cultural context or social factors surrounding the event, and serving as an advocate for the patient are all components of an informed approach to caring for those that have suffered this type of trauma.



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## *Tools and Resources*

[Games Adolescents Shouldn't Play \(GASP\)](#)

[International Association of Forensic Nurses](#)

[John Hopkins School of Nursing: Danger Assessment Tool](#)

[National Coalition against Domestic Violence \(NCADV\)](#)

[National Domestic Violence Hotline](#)

[National Health Resource Center on Domestic Violence](#)

[National Institute of Justice: The Neurobiology of Sexual Assault](#)

[Nursing Network on Violence Against Women International \(NNVAWI\)](#)

[Training Institute on Strangulation Prevention](#)

[Training Institute on Strangulation Prevention: Recommendations for the Medical/Radiographic Evaluation of Acute Adult, Non-Fatal Strangulation](#)



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## Definitions of Terms

**Asphyxia:** Deprivation of oxygen resulting in unconsciousness or death.

**Autoerotic asphyxiation:** Accidental death or near-death occurring during solitary sexual activity in which an apparatus, material, or substance is used to induce hypoxia to enhance sexual stimulation.<sup>13</sup>

**Choking:** Obstruction of the airways internally, such as with an object or food.<sup>1</sup> The term choking is often used by patients to describe their experience of a nonfatal strangulation. For example, “They had their hands around my neck and I was being choked,” when in fact the patient is actually describing being manually strangled. Healthcare providers can use the word “strangulation” when documenting the mechanism of external compression of the neck, or document “choking” in quotations when reporting what is said by a victim or witness.<sup>2</sup>

**Choking game:** Intentionally restricting oxygen to the brain with the goal of inducing temporary euphoria and near-unconsciousness.

**Consensual sexual asphyxia:** Allowing another individual to intentionally restrict oxygen to the brain for the purpose of sexual arousal.

**Intimate partner violence:** The purposeful use of threatened or actual physical force against another person that results in or has a high likelihood of resulting in injury, death, psychological harm, or deprivation.<sup>52</sup> The four main components of intimate partner violence are physical violence, sexual violence, stalking, and psychological aggression.<sup>52</sup>

**Hanging:** Suspending the body in the air using something placed around the neck with the aim of causing death by asphyxiation.

**Ligature strangulation:** A cord-like object used to apply pressure to the neck.<sup>49</sup>

**Manual strangulation:** A form of strangulation accomplished with a choke hold using one or both hands, or another body part.<sup>49</sup>

**Near-hanging:** Suspending the body in the air using something placed around the neck but without causing death by asphyxiation.

**Non-fatal strangulation:** Excessive compression or constriction of a part of the throat that causes a suspension of breathing, of the passage of contents, or of the circulation, but does not result in death.

**Sexual asphyxia:** A form of asphyxia that is intentionally induced by oneself or by another (consensual) to achieve euphoria during a sexual act.<sup>13</sup>

**Strangulation:** Death from excessive compression or constriction of a part of the throat that causes a suspension of breathing, of the passage of contents, or of the circulation.



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