

## Main Article

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# Otolaryngology contribution to the care of patients following non-fatal strangulation in the settings of alleged sexual assault

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## Abstract

**Background.** Non-fatal strangulation as a consequence of a sexual assault attack or domestic violence represents serious bodily harm. Otolaryngologists have an important role in documenting physical findings and managing airway symptoms. This study aimed to describe our otolaryngology department's experience managing patients referred from the sexual assault referral centre who suffered non-fatal strangulation.

**Method.** A retrospective analysis of patients suffering non-fatal strangulation referred to the Manchester University Hospitals NHS Foundation Trust Otolaryngology Department from Saint Mary's Sexual Assault Referral Centre in Manchester between 1 January 2017 and 31 December 2019 was carried out.

**Results.** A total of 86 patients were referred from Saint Mary's Sexual Assault Referral Centre. Of these patients, 56 were given telephone advice and the remaining 30 were seen by the on-call otolaryngology team. In addition, 20 out of 30 (66.6 per cent) patients underwent fibre-optic nasal endoscopy. Common presenting symptoms were neck pain (81.4 per cent), dyspnoea (80.2 per cent) and dizziness (72.1 per cent). Five patients had identifiable laryngeal injury on endoscopy.

**Conclusion.** Meticulous documentation is recommended when managing patients who suffer non-fatal strangulation because medical records may be used as evidence in criminal investigations.

## Introduction

Sexual assault is the intentional physical, psychological and/or emotional violation of one person by another through performing a sexual act without consent.<sup>1</sup> The Crime Survey for England and Wales estimated that in the year ending in March 2020, 773 000 people between the ages of 16 and 74 years stated that they had experienced a sexual assault.<sup>2</sup> Sexual assault can be accompanied by a range of other assaults and injuries, including strangulation.

Strangulation is the act of applying external pressure to the neck, which may cause compression of the jugular veins, carotid arteries and airway. As greater levels of force are applied, cessation of venous return may cause petechial haemorrhage. Arterial occlusion, with or without airway obstruction, can cause brain hypoxia with neurological symptoms such as blurred vision, loss of consciousness, loss of continence, brain injury and, eventually, death. Strangulation can also cause direct trauma to the skin and subcutaneous tissues, and injuries to the pharynx, larynx, oesophagus and cervical spine.<sup>3</sup>

The most common mechanism of non-fatal strangulation in domestic violence is manual strangulation, that is, the application of compressive force to the victim's neck by the assailant's hands. Postural, ligature and hanging strangulation attempts are less common in this situation.<sup>4,5</sup>

Historically, the otolaryngologist's focus in assessing non-fatal strangulation has been to evaluate and manage life-threatening or evolving airway obstruction, as well as voice and swallowing conditions. While there has always been an understanding that information gathered as part of the clinical examination may come to be used as evidence in a court, the introduction of non-fatal strangulation as a chargeable offence in the new Domestic Abuse Act 2021<sup>6</sup> highlights the importance of the ENT examination in assisting courts to deliver justice. The otolaryngologist must therefore also ensure they document all aspects of the examination in a clear and comprehensive manner, because findings may be used as evidence in the court of law. This study describes an otolaryngology experience of managing non-fatal strangulation in the setting of sexual assault.

## Methods

We performed a retrospective audit of all patients over the age of 18 years who were referred to the otolaryngology department at Manchester Royal Infirmary, UK, with a history of non-fatal strangulation between January 2017 and December 2019. All patients were referred from Saint Mary's Sexual Assault Referral Centre, Manchester, and had a forensic medical examination between 1 January 2017 and 31 December 2019.

Information about age, sex, method of strangulation, timing of presentation, and the presenting symptoms and signs was recorded. Data are presented using descriptive statistics. The Health Research Authority tool was used to determine the need for ethical approval. The study was classed as a service evaluation audit by our local audit department (reference number: SE-075). Formal ethical approval via a research ethics committee was not necessary.

## Results

Between January 2017 and December 2019, a total of 2206 adult ( $\geq 18$  years old) sexual assault patients attended Saint Mary's Sexual Assault Referral Centre for an acute forensic medical examination. Overall, 2002 cases (91 per cent) did not report strangulation, while 204 cases (9 per cent) suffered non-fatal strangulation. All patients underwent a forensic medical examination at the centre. Eighty-six (42 per cent) of the 204 non-fatal strangulation patients were referred to the otolaryngology team. The remaining 118 non-fatal strangulation patients were not referred to otolaryngology by the centre as their presenting symptoms did not warrant specialist input. There were 82 females and 4 males. Mean age at forensic assessment was 29.8 years. Most patients were of White ethnicity (74.4 per cent), and the most common alleged assailants were partners or former partners (46.5 per cent).

Over a third of patients referred to ENT reported having experienced at least one previous strangulation attempt at the hands of the same alleged assailant. Most patients presented within 24 hours of the alleged assault, but a significant minority (17.4 per cent) presented more than 48 hours later. All alleged strangulations were done by hand and most of them were one-handed. Tables 1 and 2 provide information about patient demographics and details of the alleged assaults.

The most common presenting symptoms were neck pain (81.4 per cent), dyspnoea (80.2 per cent) and dizziness (72.1 per cent). Bruising and abrasions were present in 39.5 and 19.8 per cent of the patients, respectively. The presenting symptoms and signs associated with non-fatal strangulation are shown in Table 3. Of the 86 patients referred to the otolaryngology team, 56 were managed by telephone advice. The remaining patients were seen by the on-call otolaryngology team because of the severity of their symptoms. Of those patients who had face-to-face reviews, 21 were offered flexible laryngoscopy and 20 agreed to undergo it. Given the equipment available to the acute service at the time, all examinations were performed by fibre-optic endoscopes without image or video documentation.

Flexible laryngoscopy identified three patients with laryngeal erythema and two patients with laryngeal bruising. The remaining patients were deemed, within the significant quality constraints of fibre-optic laryngoscopy, to have had normal examination findings. None of the patients required hospital admission. One patient was discharged with oral steroids, and the remaining patients were discharged home with advice. There were no re-admissions within the series.

**Table 1.** Demographics of non-fatal strangulation patients referred to ENT\*

Variable	Value
Year ( $n = 86$ (%))	
– 2017	46 (53.5)
– 2018	15 (17.4)
– 2019	25 (29.1)
Gender ( $n = 86$ (%))	
– Male	4 (4.7)
– Female	82 (95.3)
Mean age at assessment (years)	29.8
Ethnicity ( $n = 86$ (%))	
– White British	64 (74.4)
– Asian	5 (5.8)
– Unknown or mixed	5 (5.8)
– European	4 (4.7)
– White other	3 (3.5)
– Black African	3 (3.5)
– Black Caribbean	2 (2.3)

\*Total  $n = 86$

## Discussion

### Study background

The prevalence of non-fatal strangulation as part of a sexual assault case is difficult to quantify and is most likely under-reported. However, non-fatal strangulation occurrences during domestic violence cases have been well documented. In a large systematic review of published studies between 1960 and 2014 investigating the occurrence of non-fatal strangulation in domestic violence, Sorenson *et al.*<sup>7</sup> revealed that between 3 and 9.7 per cent of women reported a non-fatal strangulation event by an intimate partner. Their systematic review covered nine countries, with regions representing Europe, the

**Table 2.** Details of alleged assailant and strangulation method\*

Parameter	Cases ( $n = 86$ (%))
Alleged assailant	
– Partner or ex-partner	40 (46.5)
– Stranger	14 (16.3)
– Acquaintance >24 hours	11 (12.8)
– Acquaintance <24 hours	10 (11.6)
– Friend	9 (10.5)
– Husband	1 (1.2)
– Family member	1 (1.2)
Strangulation method	
– Manual, 1-handed	40 (46.5)
– Manual, 2-handed	28 (32.6)
– Unsure of method	11 (12.8)
– Headlock	5 (5.8)
– Ligature	1 (1.2)
– Against object	1 (1.2)

\*In those patients referred by Saint Mary's Sexual Assault Referral Centre to ENT (total  $n = 86$ )

**Table 3.** Timing of presentation after strangulation, and presenting signs and symptoms

Parameter	Cases (n = 86 (%))*
Timing of sexual assault referral centre presentation post strangulation event	
– <24 hours	49 (57)
– 24–48 hours	22 (25.6)
– >48 hours	15 (17.4)
Neurological symptoms	
– Visual complaints	44/86 (51.2)
– Tinnitus	24/86 (27.9)
– Loss of consciousness	17/86 (19.8)
– Dizziness	62/86 (72.1)
– Bowel or urinary incontinence	9/86 (10.5)
Pharyngeal or oesophageal symptoms	
– Dysphagia	19/86 (22.1)
– Odynophagia	41/86 (47.7)
Laryngeal symptoms	
– Dyspnoea	69/86 (80.2)
– Dysphonia	44/86 (51.2)
External symptoms	
– Neck pain	70/86 (81.4)
– Neck swelling	16/86 (18.6)
Neck signs	
– Tenderness	45/86 (52.3)
– Bruising	34/86 (39.5)
– Abrasions	17/86 (19.8)
– Swelling	7/86 (8.1)
– Erythema	6/86 (7.0)
Facial signs	
– Bruising	24/86 (27.9)
– Tenderness	18/86 (20.9)
– Abrasions	7/86 (8.1)
– Swelling	7/86 (8.1)
– Erythema	4/86 (4.7)
– Laceration	3/86 (3.5)
Ophthalmic signs	
– Bruising	4/86 (4.7)
– Swelling	2/86 (2.3)
– Petechial haemorrhage	1/86 (1.2)

\*Total n = 86

Americas and the East Mediterranean, and over 70 000 participants responding to 11 surveys. In a more recent study, Zilkens *et al.*<sup>8</sup> reported that 7 per cent of 1064 sexual assault victims attending an Australian sexual assault referral centre between 2009 and 2015 suffered non-fatal strangulation. In another study, McQuown *et al.*<sup>9</sup> reported that non-fatal strangulation occurred in 38 per cent of domestic violence incidents and in 12 per cent of sexual assaults.

Non-fatal strangulation is a strong predictor of death through domestic violence. In a retrospective case-control

study investigating the risk for attempted or completed homicide in patients suffering non-fatal strangulation as part of domestic abuse, Glass *et al.*<sup>10</sup> revealed an over seven-fold risk of victims going on to suffer a completed homicide if non-fatal strangulation had occurred in prior abuse. With such high stakes, it is very important that clinicians document their physician examination findings judiciously when seeing these patients.

The latter consideration is especially important given that a new offence of non-fatal strangulation has been introduced as part of the Domestic Abuse Act 2021.<sup>11</sup> The clinical presentations of non-fatal strangulation, which may be subtle clinically, can play a crucial role in obtaining justice for the victim. Otolaryngologists have a key and expanding role in this process.

### Synopsis of key findings

Otolaryngology manifestations occurred in 86 out of 204 people, with 30 out of the 86 patients (35 per cent) needing an otolaryngology evaluation. Furthermore, 20 out of 30 patients (66.6 per cent) seen underwent fibre-optic laryngoscopy (Table 4). Positive laryngeal findings were identified in 5 out of 20 patients (25 per cent).

The majority of patients had other significant head and neck findings, including tenderness and bruising, which were identified in 45 out of 86 patients (52.3 per cent) and 34 out of 86 patients (39.5 per cent), respectively. The incidence of serious neurological findings i.e. loss of consciousness and bowel/urinary incontinence, which denotes a more significant and sustained assault, occurred in 26 out of 86 patients (30 per cent).

Patients with laryngeal findings were often unable to recall the duration of strangulation, which may suggest a more sustained assault with amnesia compared with patients who recalled an event lasting longer than a minute. This could suggest that the occurrence of positive laryngeal signs is associated with more severe and sustained injury, and this may in turn provide evidence that could help identify those patients at greater risk of future homicidal strangulation. However, overall, patients were not very confident at estimating the duration of strangulation. In addition, it is possible that patients who presented within 24 hours of a non-fatal strangulation event with symptoms of upper aerodigestive tract injury (e.g. dyspnoea and dysphagia or odynophagia) also experienced a more violent strangulation attempt and may be at a higher risk of future homicidal strangulation.

It is surprising that only a minority of the patients who underwent endoscopy had actual laryngeal findings given the number of reported symptoms. We speculate that this discrepancy is due to the quality of equipment being used at the time of examination as well as the clinical experience of the physician performing the endoscopy. For instance, a junior ENT clinical fellow performing the endoscopy may miss subtle laryngeal findings that a senior ENT fellow would not. Given that the flexible scopes used during this study period were not high-resolution cameras and could neither take nor store images, the laryngeal findings documented were based solely on the clinician's subjective findings at the time of examination.

None of the patients in our series had progressive airway obstruction. Stanley and Hanson,<sup>12</sup> in their case series on the same subject, documented three patients presenting with acute airway compromise more than 24 hours after their

**Table 4.** Timing of presentation after strangulation, and presenting signs and symptoms in patients that underwent fibre-optic flexible nasal endoscopy\*

Parameter	Cases (n = 20 (%))
Timing of sexual assault referral centre presentation post strangulation event	
– <24 hours	12/20 (60)
– 24–48 hours	5/20 (25)
– >48 hours	3/20 (15)
Neurological symptoms	
– Visual complaints	12/20 (60)
– Tinnitus	9/20 (45)
– Loss of consciousness	4/20 (20)
– Dizziness	16/20 (80)
– Bowel or urinary incontinence	0
Pharyngeal or oesophageal symptoms	
– Dysphagia	6/20 (30)
– Odynophagia	12/20 (60)
Laryngeal symptoms	
– Dyspnoea	17/20 (80.2)
– Dysphonia	12/20 (51.2)
External symptoms	
– Neck pain	17/20 (85)
– Neck swelling	4/20 (20)
Neck signs	
– Tenderness	13/20 (65)
– Bruising	11/20 (55)
– Abrasions	3/20 (15)
– Swelling	1/20 (5)
– Erythema	0
Laryngeal signs	
– Erythema	3/20 (15)
– Bruising	2/20 (10)
– Oedema	0
– Bleeding	0

\*Total n = 20

strangulation event. All three patients required an emergency tracheostomy to secure their airway. It is crucial, therefore, as with all cases of blunt laryngeal trauma, to be vigilant to the presence of airway symptoms, especially within the first 48 hours of injury.<sup>13</sup>

From a legal perspective, the presence of laryngeal signs after non-fatal strangulation equates to grievous bodily harm to an individual. The ability to document and visually demonstrate injuries can prove highly valuable in a court of law, and all efforts must be made to acquire high-quality digital images of the acute injury (both positive and negative findings). This was not possible at the time of this audit and we now aim to use disposable digital laryngoscopes to allow for photographic and video documentation of findings, for both medical and legal purposes.

In the USA, the Training Institute on Strangulation Prevention has created a management protocol for strangulation patients.<sup>14</sup> It aims to assess patients for serious

complications from strangulation by radiological evaluation. If patients have symptoms in keeping with serious injury, imaging in the form of computed tomography or magnetic resonance imaging is recommended, and referral to the relevant surgical specialty should be made.

In order to assist our local sexual assault referral centre doctors in making appropriate referrals to the on-call ENT team, the ENT referral guideline for non-fatal strangulation patients (Figure 1) was created with the assistance of the Saint Mary's Sexual Assault Referral Centre team. The guideline takes into consideration patient symptoms and signs, as well as the timing of presentation to the centre after non-fatal strangulation. Those patients who have serious symptoms and signs within 24 hours of a non-fatal strangulation are referred to the ENT registrar urgently, as well as other medical specialties as indicated. The ENT registrar then determines whether or not the patient needs to be seen urgently in the emergency department. Imaging investigations can be arranged in the emergency department if necessary. If the patient is stable from an airway perspective, the ENT registrar may refer the patient for urgent ENT out-patient clinic follow up.

In England and Wales, the new Domestic Abuse Act 2021 will make non-fatal strangulation a chargeable offence, with perpetrators being sentenced up to five years if found guilty. Prior to the introduction of this bill, a person could be charged with strangulation in accordance with the Offences against the Person Act 1861, Section 21, if it was the belief that the perpetrator committed the strangulation to commit another offence.<sup>15</sup> The maximum sentence if found guilty of such a crime is life imprisonment. Hence, meticulous documentation is required, as medical reports may well be relied on in legal proceedings and may come to play an important role in the justice process.

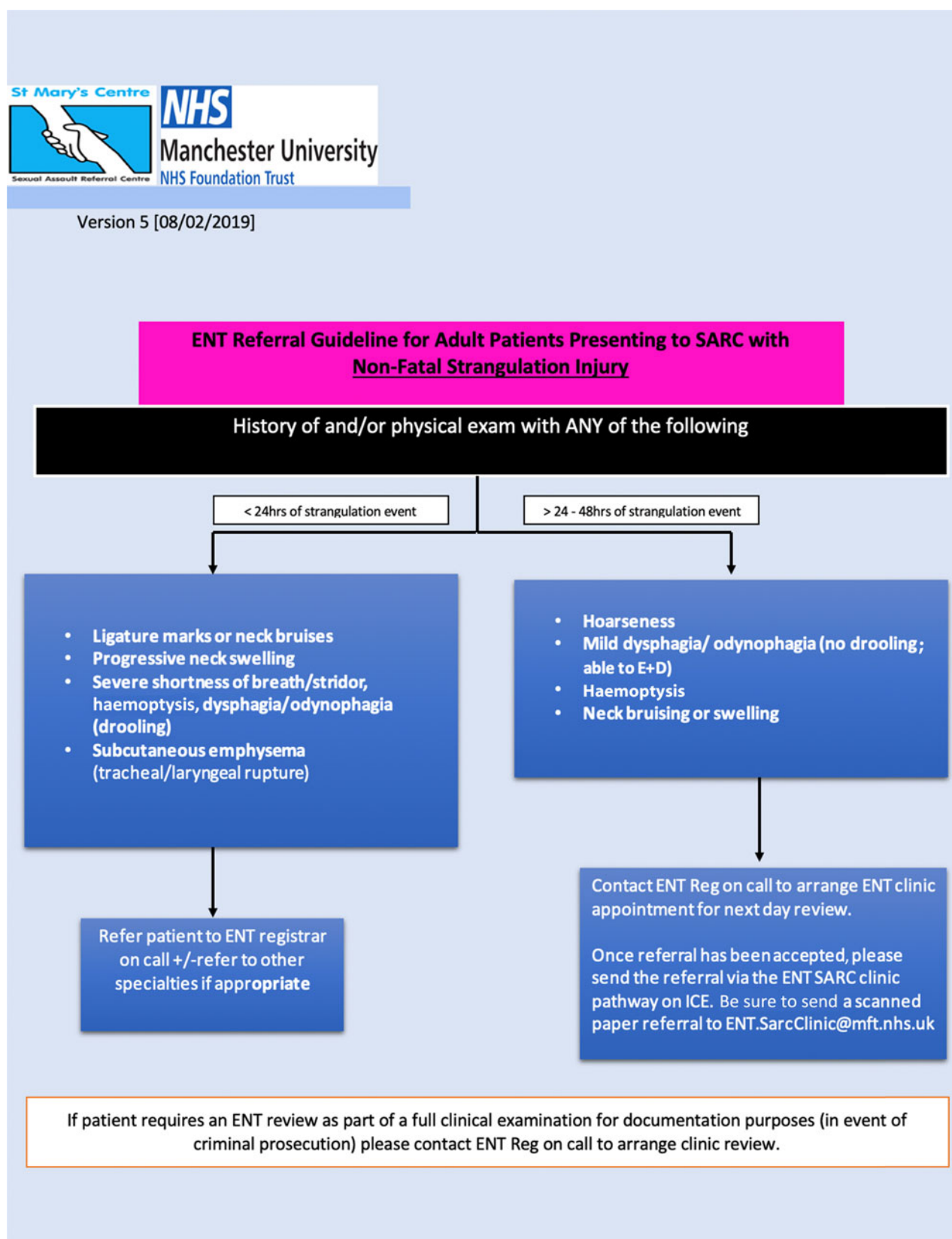
In our study, 30 out of the 86 patients (35 per cent) referred to ENT gave a history of having previously been subjected to non-fatal strangulation by the same alleged assailant prior to the non-fatal strangulation for which they were currently being seen. Given the evidence from the literature, the occurrence of non-fatal strangulation involving repeat offenders should be considered a major red flag in and of itself given that it predicts a high risk of murder. It must, without exception, be followed by major safeguarding flags being raised, irrespective of the severity of clinical presentation.

- Non-fatal strangulation as a consequence of either sexual assault or domestic violence can result in serious bodily harm
- The occurrence of non-fatal strangulation in domestic violence cases increases the risk of subsequent homicide
- Delayed airway oedema may occur in patients presenting more than 24 hours after the strangulation event
- Non-fatal strangulation is a chargeable offence in the new Domestic Abuse Act 2021
- Recording of laryngeal findings using high-definition cameras should be the standard of care when examining non-fatal strangulation patients

### Study limitations

The criteria for patients to be seen face to face were based on the patient's presenting symptoms and on the clinical experience of the ENT doctor accepting the referral from Saint Mary's Sexual Assault Referral Centre. As a retrospective study, the level of evidence is inferior compared to prospective studies.





**Figure 1.** The ENT referral guideline for patients presenting with non-fatal strangulation injury. SARC = sexual assault referral centre; hrs = hours; E+D = eat and drink; Reg = registrar; ICE = integrated clinical environment system

## Conclusion

Non-fatal strangulation, as its name suggests, represents a physical and psychological assault that may have life-threatening consequences. In the setting of domestic abuse and/or sexual assault, its occurrence has criminal justice

implications that can lead to a long prison sentence if alleged assailants are found guilty. Signs and symptoms depend on the force, duration and type of strangulation method. Although physical signs of upper airway injury are not commonly seen during flexible laryngoscopy, missing such signs could lead to devastating complications due to delayed laryngeal oedema.

Meticulous documentation is key, as medical records may be used as evidence in criminal investigations. We suggest that a forensic ENT examination with video recording of laryngeal findings using high-definition cameras should be the standard of care when examining non-fatal strangulation patients. We recommend that national guidelines are created to assist NHS Trusts in managing these patients effectively.

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