



Clinical Communiqué >



Next Edition: March 2020

Editorial

Dr Nicola Cunningham

Welcome to the final edition for 2019. This has been an exciting year for us, with changes to the look, feel, and accessibility of The Communiqués, combined with our ongoing mission to continue to deliver lessons from coronial investigations that are relevant and important to clinicians practicing in health care.

This year we welcomed Dr Brendan Morrissey to our editorial team and Mr Paul Ikin to our design team. We launched a new look for our publications - keeping the themes and content that our readers are familiar with, while updating our layout and designs to allow us to evolve and engage our readers across all contemporary platforms. The Communiqués are also now available via Twitter. Follow @TheCommuniques for regular updates and access to our latest editions.

This edition focusses on a specific clinical entity which has the dangerous combination of a missable diagnosis, and a potential for rapid, lethal deterioration. Epiglottitis, also referred to as supraglottitis, describes inflammation of the epiglottis and adjacent supraglottic structures. This diagnosis is not commonly considered in adults as few clinicians will have seen, let alone managed, an adult patient with epiglottitis and difficulty breathing. It is a time-critical cause of acute airway compromise, and the rapidity of progression from onset of symptoms to fulminant airway obstruction is confronting for even the most experienced airway proceduralists.

The two cases of adult epiglottitis in this edition demonstrate the importance of early recognition of the condition and the 'red flags' for severe airway compromise. Both patients, previously well, died within 12 hours of complaining of a sore throat. There was the sense that the staff involved were only just realising their patients were unwell, when the situation suddenly became catastrophic and unsalvageable.

We are very fortunate in this edition to include two expert commentaries from specialists who have seen first-hand the effects of adult epiglottitis. Dr Melanie Archer is a forensic pathologist at the Victorian Institute of Forensic Medicine whose commentary reveals the evolving microbiological causes, pathological findings, and disease trends of epiglottitis. Dr Bridget Langley's commentary offers an anaesthetist's well-considered perspective on the presenting symptoms, rapidity of onset, and complications, in particular, the practical management of impending airway obstruction.

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PUBLICATION TEAM

Editor-in-Chief:

Nicola Cunningham

Consultant Editors:

Joseph E Ibrahim
Brendan Morrissey

Designers:

Samuel Gillard
Paul Ikin

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FEEDBACK

The editorial team is keen to receive feedback about this communication especially in relation to changes in practice. Please contact us at:
cc@thecommuniques.com



Case #1 Minutes matter

Case Number
COR 2017 3402

Case Précis Author
Dr Suzanne Doherty
MB BCh BAO, FACEM
Emergency Physician

i. Clinical Summary

Mr PM was a 48 year old man with an increased body mass index (BMI), whose only medical history was a chronic fungal ear infection. On the afternoon he became unwell, Mr PM had developed a sore throat and hoarse voice within an hour of eating doughnuts. At 4pm he purchased an over-the-counter medication, but his hoarseness worsened. He was able to eat pizza between 4pm and 8:30pm, but by 8:45pm he was having difficulty breathing, difficulty speaking and was unable to swallow his own saliva. An ambulance was called. It arrived 2 minutes later, followed by a Mobile Intensive Care Ambulance at 8:54pm.

When paramedics first attended to Mr PM, they treated him for anaphylaxis, with both nebulised and intramuscular adrenaline. Shortly afterwards he had a seizure and a cardiac arrest.

The paramedics instigated cardiac arrest and airway management protocols. They inserted an iGel laryngeal airway mask through which Mr PM was initially ventilated. His airway was soiled with vomit however, and this device soon failed. Subsequently, there were three unsuccessful attempts to secure Mr PM's airway using different advanced airway techniques. It was noted that there was severe swelling of his airway, a large amount of vomit, and distortion of the normal anatomical structures and landmarks. A decision was made to perform a percutaneous cricothyroidotomy and a Quicktrach II device was inserted into his airway via the neck.

There was an initial trace on the carbon dioxide (CO₂) monitor which confirmed successful placement, but after a brief period the trace deteriorated, and the paramedics were unable to ventilate him via this route. There was a further attempt to reposition the device which was also unsuccessful. Mr PM did not achieve return of spontaneous circulation. Paramedics declared him deceased at 9:33pm.

ii. Pathology

At autopsy, there was evidence of florid epiglottitis and upper airway obstruction. Correct placement of the Quicktrach II device could not be confirmed as the crico-thyroid region was swollen, rendering it difficult to visualise a puncture of the cricothyroid membrane. There was no evidence of anaphylaxis, foreign body obstruction, or lung involvement. *Fusobacterium necrophorum* was identified as the culprit organism for the epiglottitis.

iii. Investigation

Mr PM's death was reported to the coroner as it was both unexpected and unnatural. The coronial investigation focussed on the timeliness of the airway management and the use of the Quicktrach II device for the cricothyroidotomy.

At the time of the paramedics' arrival, Mr PM was able to talk. A rapid and pre-emptive procedure to secure the airway at that point may have altered the

iv. Coroner's Findings

The coroner found that Mr PM died from fulminant epiglottitis caused by an infection with a relatively rare organism. The coroner remarked that despite the initial incorrect diagnosis of anaphylaxis, this would not have made any difference to the outcome as the management of critical airway obstruction is the same regardless of the cause. The coronial investigation found that the paramedics '*acted with skill in a desperate situation*'.

Managing an imminent airway obstruction, or indeed a fully occluded airway, can be fraught with difficulty for many reasons. Optimal clinical performance is challenged in such a pressured and, high-risk environment. Critical emergencies like this are better managed if practitioners have had an opportunity to rehearse the situation, either mentally, or physically in a simulated environment.

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chain of events, however, Mr PM 'deteriorated extraordinarily rapidly and this particular situation was critical and confronting'. With the combination of vomit in the airway, swollen tissues, distorted anatomy and increased BMI, securing Mr PM's airway would have been incredibly difficult, even for highly skilled professionals working in an ideal performance environment.

The medical director for the ambulance service gave evidence that although the autopsy could not confirm correct placement of the Quicktrach II device, it appeared to work for a brief period of time, and the presence of an end-tidal CO₂ trace would imply that it had been inserted successfully. It was therefore possible that it became dislodged or obstructed.

v. Author's Comments

This case demonstrates the frightfully rapid deterioration that may happen in cases of epiglottitis. Symptoms can progress from a sore throat to an occluded airway in a very short period of time. It is important to consider the diagnosis in any patient presenting with symptoms or signs of upper airway obstruction, and to act swiftly to protect the airway and confirm the diagnosis.

There are national and international guidelines on managing the '*can't intubate, can't oxygenate*' (CICO) scenario. In this case, the paramedics followed their organisational guidelines on the difficult airway, and the coroner acknowledged the inherent clinical complications they faced.

The use of checklists is another well-recognised method to reduce the inherent cognitive stresses and improve team performance. Being familiar with your local guidelines, checklists, and equipment is key to ensuring that you are able to provide the highest level of care possible and offer the best opportunity for survival. In cases such as these, minutes matter.

vi. Resources

Hearns S. Checklists in emergency medicine. *Emerg Med J* 2018; 35(9): 530-531.

vii. Keywords

Airway, epiglottitis, paramedics, cricothyroidotomy, Quicktrach II, sore throat



Case #2 A precipitous sentence

Case Number
COR 2016 000072

Case Précis Author
Dr Nicola Cunningham
B.Med, MForensMed,
FFCFM (RCPA), FACEM
Emergency and Forensic Physician

i. Clinical Summary

Mr DN was a 37 year old male prisoner with a past medical history that included smoking, back pain, migraines, and anxiety. He presented to the medical centre of the correctional facility at 2:42pm complaining of a sore throat for two days and a bad taste in his mouth with difficulty swallowing. He was prescribed simple analgesia by the medical officer and returned to his cell. At 8:20pm that evening, Mr DN requested another medical review. A nurse saw him through the trap door of his cell and, finding him breathing and talking without difficulty, reassured him and planned for a follow-up review the following morning.

At 9:45pm Mr DN's cellmates used the intercom to alert officers in the control room that Mr DN had deteriorated and could no longer talk. They called again at 9:50pm requesting help as Mr DN was '*hysterical, struggling to breathe, and had the chills*'. Prison staff were busy responding to a fire alarm elsewhere however, so did not attend Mr DN's cell until 10:01pm at which time they urgently radioed the nurse to assist. She arrived soon after and found Mr DN audibly wheezing.



Believing that he was suffering an asthma attack, she arranged for him to be transferred to the correctional medical centre by motorised buggy, so that he could be given oxygen and nebulised salbutamol. At the medical centre, Mr DN's oxygen saturations were 97% and he looked panicked and was struggling to breathe.

An ambulance was called at 10:25pm, arriving at 10:40pm to find Mr DN in severe respiratory distress. He was treated with oxygen, salbutamol, ipratropium bromide and adrenaline, and urgently transferred to hospital. He went into cardiorespiratory arrest on arrival at the hospital and despite resuscitative attempts, was declared deceased at 11:31pm.

ii. Pathology

An autopsy was conducted revealing a '*swollen, erythematous epiglottis with fibrin deposition and abscess formation*'. Pulmonary oedema, cardiomegaly, and narrowing of the left anterior descending and right coronary arteries was also seen. The forensic pathologist listed the cause of death as acute epiglottitis with a contributing factor of coronary artery atherosclerosis, and the coroner accepted that death was due to natural causes.

iii. Investigation

Mr DN's death was reported to the coroner as it was unexpected, but also because he died in custody.

The coroner was provided with details of a case review conducted by the corrections service following Mr DN's death. The review identified three issues relating to the nurse's review of Mr DN at 8:20pm:

1. The nurse did not have any equipment with her to assess him
2. The cell door was not opened by prison staff, so the nurse only conducted a limited assessment through the trap door, and
3. There was a lack of clinical documentation.

The coroner heard that as a result of the review, the corrections service had introduced a minor response bag for nurses to carry, with lightweight equipment and forms to record vital signs and other clinical observations. The service had also reiterated the importance of nurses obtaining access to a cell to conduct a full assessment of a prisoner.

iv. Coroner's Findings

The coroner was satisfied with the improvements made by the corrections service as a result of Mr DN's death, and while emphasising that '*a sentence of imprisonment does not mandate inferior health care*', acknowledged that a more thorough review by the nurse, or different medical treatment at

the time, may not have altered the outcome for Mr DN. The coroner considered that further investigation was not required and, as Mr DN had died of natural causes, there was no public interest in holding an inquest.

vi. Keywords

Prisoner, epiglottitis, respiratory distress, corrections, nurse, sore throat



Expert Commentary

Acute epiglottitis in adults - An anaesthetist's perspective

Dr Bridget Langley

FANZCA

Consultant Anaesthetist

St Vincent's Hospital Melbourne

Acute epiglottitis typically presents with high fever, severe sore throat, difficulty swallowing and pain on swallowing resulting in drooling of saliva. The patient may adopt an upright posture and prefer to sit forward. Inspiratory stridor, dyspnoea and a hoarse voice along with features of toxæmia (including tachycardia) are also evident. Some of these patients may present or be referred late due to difficulty in distinguishing acute epiglottitis from more benign causes of sore throat and dysphagia such as a viral syndrome.¹ Differential diagnoses for epiglottitis can include anaphylaxis, angioedema, caustic ingestion, pharyngitis, laryngitis and foreign body aspiration.²

In severe cases of acute epiglottitis, oedema of the epiglottis and supraglottic structures leads to airway obstruction. Onset of symptoms and progression to airway obstruction can be rapid (less than 24 hours).² Nasal endoscopy can provide information in stable patients regarding the extent of supraglottic oedema and the presence of an epiglottic abscess.

There is a risk of significant morbidity and mortality from acute epiglottitis. Worsening hypoxaemia from airway obstruction can progress to cardiac arrest. There is a risk of failure to establish a definitive airway as well as complications related to airway interventions such as laryngospasm and pulmonary aspiration.³ Late complications of acute epiglottitis include deep neck space infections, vocal granulomas and recurrence.

Any impending airway obstruction is an emergency that needs to be recognised and managed rapidly. The patient with acute epiglottitis requiring tracheal intubation should be anticipated to have a difficult airway. They should be managed in a monitored environment. Special consideration needs to be made as to the physical location, the staff expertise required and the specific equipment necessary for this procedure (such as a difficult intubation trolley, fibreoptic and videolaryngoscopes). The tracheal intubation of a patient with acute epiglottitis ideally should be undertaken in an operating room and performed under the supervision of an experienced anaesthetist. A surgeon, preferably an ear, nose and throat specialist, should also be present along with theatre staff and an anaesthetic assistant.

Supine positioning may worsen the airway obstruction, therefore maintenance of the patient in an upright posture during induction of anaesthesia is desirable. In general, a deep level of anaesthesia is achieved by administration of volatile anaesthetics with the patient spontaneously ventilating throughout. Muscle relaxants are to be avoided. When a deep level of general anaesthesia is achieved, laryngoscopy is performed and tracheal intubation attempted with a small diameter endotracheal tube.

Both bag-mask ventilation and ventilation via supraglottic devices, such as laryngeal masks, may be impossible due to the supraglottic oedema.

Vigilance and awareness of the situation dynamics is required as it can rapidly escalate into a 'can't intubate, can't oxygenate' (CICO) crisis. Repeated attempts at direct or indirect laryngoscopy should be avoided, and a second anaesthetist or surgeon should be preassigned to perform front of neck access (cricothyrotomy) in the event it is required.⁶

It is critical in planning and preparing for tracheal intubation in patients with acute epiglottitis that there is a co-ordinated team approach.

There are case reports of other approaches to airway management of acute adult epiglottitis. In one case, induction of general anaesthesia was achieved maintaining spontaneous respiration with intravenous anaesthesia and oxygenation with high flow nasal oxygen and a C-MAC videolaryngoscope® (Karl Storz, Tuttlingen, Germany) was successfully used in the airway intubation.⁴ Consideration could also be made for tracheostomy under local anaesthesia, insertion of a transtracheal cannula or cricothyrostomy, or an awake fibreoptic intubation.⁵

It is critical in planning and preparing for tracheal intubation in patients with acute epiglottitis that there is a co-ordinated team approach.

The airway management of patients with acute epiglottitis is complex and challenging. Early recognition of airway obstruction and the involvement of a team of experienced clinicians is crucial in these individuals.

Resources

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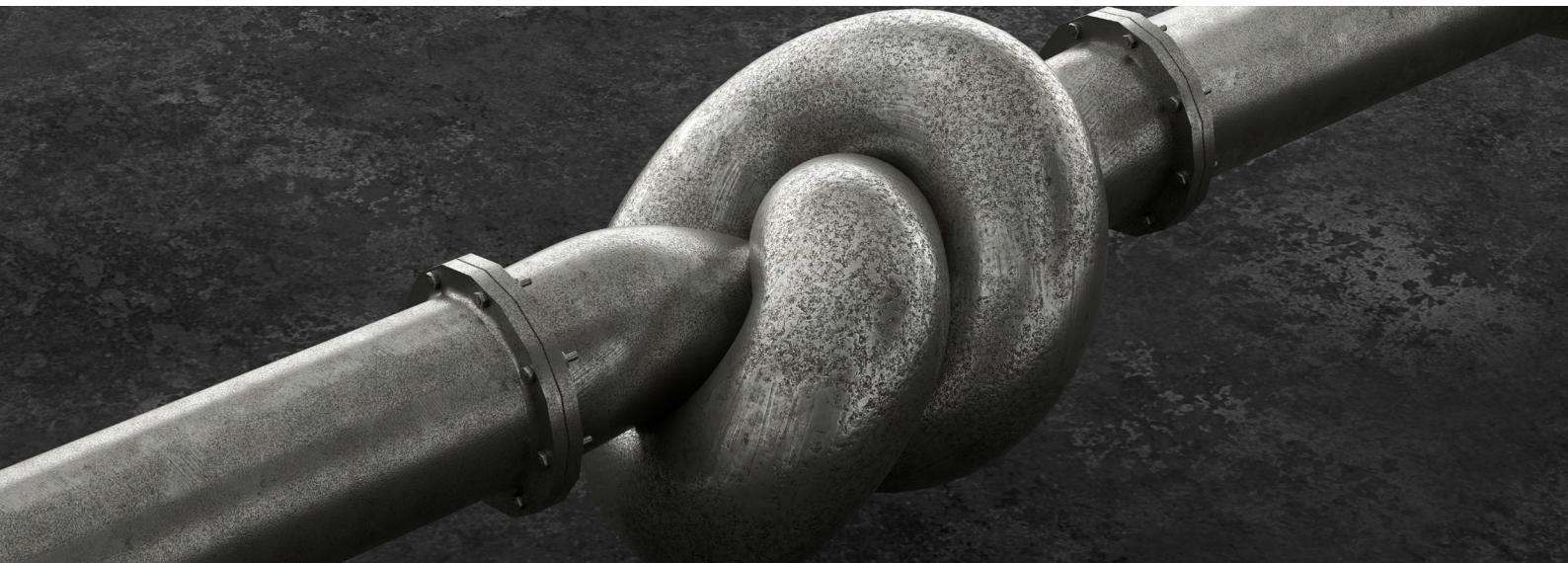
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Expert Commentary

Adult epiglottitis – So much more than just a pain in the neck

Dr Melanie Archer
BSc (Hons), PhD, MBBS, FRCPA
Forensic Pathologist
Victorian Institute of Forensic Medicine

Epiglottitis is essentially inflammation of the epiglottis. But in adults especially, inflammation may also involve the aryepiglottic folds, pharynx, uvula and base of the tongue. In some cases, the epiglottis may even be relatively spared from inflammation.¹ Adult epiglottitis is therefore sometimes referred to as supraglottitis.^{2,3} The cause of epiglottitis in any age group is most often infectious, with bacterial pathogens predominating; the aetiology is only rarely viral or fungal. A minority of cases are also caused by burns, trauma or chemotherapy reactions.³ Some believe that epiglottitis tends to run a more benign course in adults compared with children.¹

However, one study found that almost 30% of affected adult patients developed airway compromise requiring intubation.⁴ Airway closure can also happen surprisingly rapidly as swelling around the epiglottis advances.³ This can result in death or hypoxic ischaemic brain injury and progression to multi-organ failure if management is not sufficiently timely.^{4,5}



Most readers would be well aware of the risks associated with paediatric epiglottitis. This applies especially to those who practiced in the era prior to Haemophilus influenzae type-b vaccination, when the disease was significantly more common in children than it is today.^{4,5} Adult epiglottitis is

a lesser known entity,^{2,6} but can be as fulminant and potentially devastating as the paediatric form. Moreover, there is some evidence that the incidence of adult epiglottitis is rising.^{2,4,6,7} The mortality rate from epiglottitis is also higher in adults when compared to children, and this has been postulated to be due to misdiagnosis and mistreatment.² Therefore, because the disease is seen relatively infrequently, and because it is not always so readily associated with adults, it is timely to recap the essential features of adult epiglottitis to ensure prompt recognition.

Death due to adult epiglottitis has not been formally tracked in Victoria (Australia), but Victorian Institute of Forensic Medicine autopsy records for the last five years showed nine cases (8 males; deceased age range 37 to 85 years).

A retrospective autopsy study from the more populous Ontario (Canada) showed an estimated rate of 0.8 cases per year (11 cases in the 13 years between 2001 and 2014) although the authors noted that not all fatal cases necessarily received an autopsy if the diagnosis had been made prior to death.⁷ A clinical study from Victoria involving four tertiary hospital centres revealed much higher numbers of survivors, with 87 cases of adult epiglottitis between 2011 and 2016, and no deaths from that case series.⁴

Early suspicion of epiglottitis remains the most essential management tool, as it does for other disorders that can involve severe upper airway swelling (e.g. peritonsillar abscess). However, epiglottitis was not considered as a clinical diagnosis in several Victorian autopsy cases because of

Around half of patients with epiglottitis treated in a French intensive care unit had visited a medical practitioner for their symptoms and been sent home prior to being hospitalised.⁵ Even red flag symptoms such as voice changes, respiratory compromise, and a rapidly developing extremely sore throat, did not arouse suspicion for epiglottitis in several Victorian autopsy cases, although the severity of the symptoms at the time of medical consultation was unclear. This is relevant given that many cases of severe adult epiglottitis have a prodrome of 1 to 2 days or more before the onset of the most dramatic and dangerous symptoms.¹ This may create situations where patients who present early, that is before the onset of more worrying features, are reassured and do not realise the need to re-present if 'red flag' symptoms develop.

It is quite common for patients with epiglottitis to have no comorbidities or a scant medical history. Of the cases in the Victorian study, half had no medical comorbidities, whereas 8% had severe medical comorbidities.⁴ The French and Canadian studies also found relatively low levels of severe comorbidity.^{5,7} The remaining causes of death featured epiglottitis in combination with pneumonia, ischaemic heart disease, cardiomegaly and congestive cardiac failure. It is unclear whether there is an association with smoking. Some studies suggest an association while others report no evidence.^{2,5,7}

Adult epiglottitis is notable for the sheer variety of pathogens that may cause the disease,³ and for the fact that a pathogen is not identified in many cases.¹ Most infections are bacterial, with agents such as *Haemophilus influenzae* implicated in paediatric cases, although it is not closely associated with adult epiglottitis. Some common pathogens include *Klebsiella pneumoniae*, *Haemophilus parainfluenzae*, *Fusobacterium necrophorum* and *Streptococcus pneumoniae*.^{3,6} Fungi may be seen in immunocompromised patients, namely *Candida* and *Aspergillus*.² There has been suggestion that respiratory viruses are involved in some of the less severe cases, and may even account for some cases where a pathogen is not identified.¹

At autopsy, epiglottitis is very clearly identifiable due to florid soft tissue oedema, erythema and pus in the soft tissues around the epiglottis, usually extending to the surrounding supraglottic area. The swelling is significant and may partially or fully occlude the airway.

It is quite common for patients with epiglottitis to have no comorbidities or a scant medical history. Of the cases in the Victorian study, half had no medical comorbidities, whereas 8% had severe medical comorbidities.

the clinician's focus on alternative diagnoses such as anaphylaxis, tonsillitis, asthma, and influenza. It is also pertinent that the first diagnosis of the condition in all but one of the Victorian coronial cases over the last five years was at autopsy, even though eight of nine patients had received at least some form of medical or paramedical attention for their symptoms. This lack of recognition was a theme also noted in the Ontario autopsy series, where several patients were sent home with antibiotics and died soon afterwards.⁷

Patient demographics for adult epiglottitis point to a predominance of relatively young males. The disease also seems to occur mainly in temperate climates.⁶ The male predominance is seen both for autopsy (73%),⁷ and clinical hospital cases (68 - 85%),^{4,5} although a female predominance (64%) was seen in one analysis of 28 clinical cases.¹ Some have speculated that epiglottitis could simply be more severe in males,⁵ but it is still unclear why they are overrepresented in most case series. The disease can occur at all ages,⁶ but the mean ages (in years) seen in both clinical and autopsy studies tend to range between mid 40's to early 50's.^{4,5,7}

Abscess formation in the supraglottic tissues is common, and it is thought that abscess formation may be more frequent in adult than paediatric cases.³ The histological appearance is usually of confluent necrosis and oedema in the affected region, with very large numbers of neutrophils. Clinically, a lateral soft tissue radiograph may show a 'thumb sign', which equates to the swollen epiglottis. A CT scan may also show abscess formation and soft tissue swelling and oedema in the area of interest.

Case studies from both clinical and autopsy series suggest that there is often a small window of time in which clinicians can provide effective treatment for adult epiglottitis.

However, recognition of a potential airway-related emergency is a crucial first step, and suspicion for the presence of epiglottitis is the necessary second step.

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Disclaimer

All cases discussed in the Clinical Communiqué are public documents. We have made every attempt to ensure that individuals and organisations are de-identified. The views expressed are those of the authors and do not necessarily represent those of the Coroners' Courts, The Communiques Australia Inc, Monash University or the Victorian Managed Insurance Authority.

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