

Development and Implementation of an Evidence Based Practice Guideline Related to the Management of Adult Angioedema

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Introduction & Background

- Over 1 million angioedema (AE) visits/year in the U.S.
- 25% of Americans may experience AE in their lifetime
- Expanded Angiotensin – converting enzyme (ACE) inhibitor use led to increased AE ED visits
- AE hospital admissions on the rise
- 34% require airway interventions
- Up to 6.6% may need an emergency surgical airway (ESA)
- ED providers have a 19% fail rate on AE airways

Significance to Anesthesia

- Anesthesia providers are the airway experts, but
- ED providers do not ask for assistance in AE leading to
 - difficulties in airway placement
 - unnecessary ESAs
- AE often requires alternative airway techniques
- Anesthesia providers are not confident in surgical airway skills:
 - lack of training and practice
- 25% of anesthesia related deaths due to the inability to ventilate
- Average litigation cost for airway related events: \$950,000+

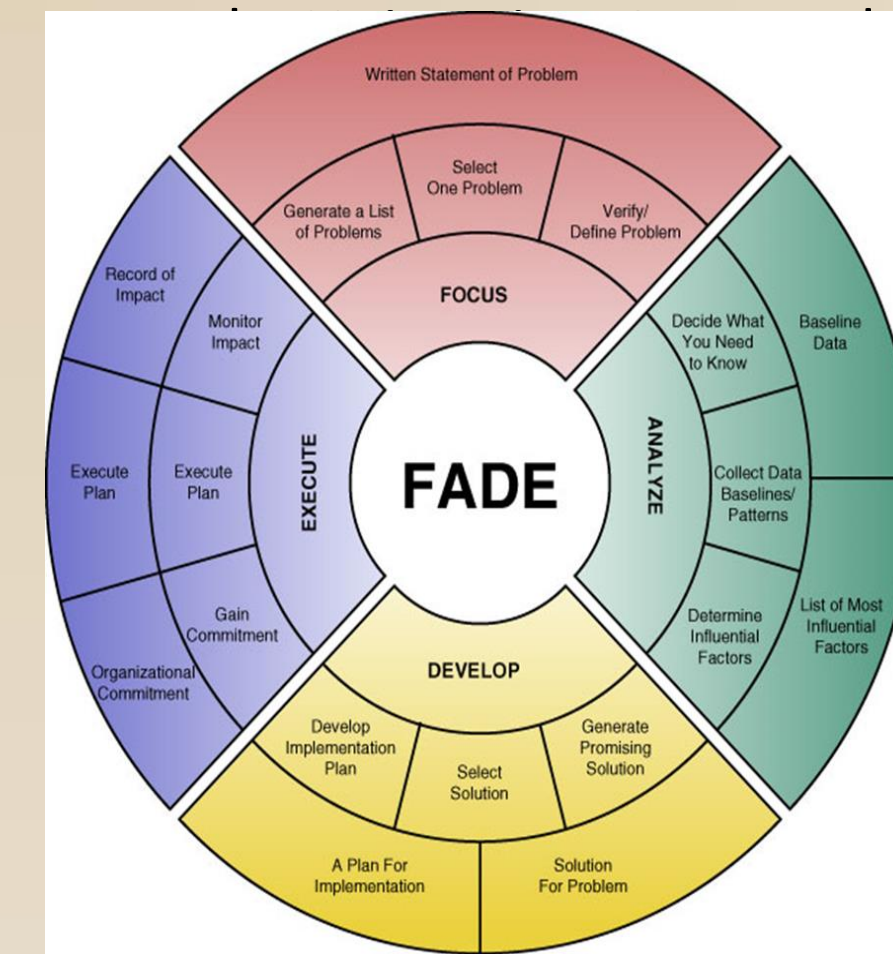
Problem Statement

Current practice for AE varies by provider, leading to delays in recognition and care increased morbidity and mortality.

PICOT Question

“In patients presenting emergently with airway difficulties related to angioedema (AE) (P), how would the development and implementation of evidence-based practice (EBP) guidelines for AE airway management (I) vs traditional practice (C) affect patient morbidity and mortality and airway placement metrics (O)?”

Project Framework Model



From *What is Quality Improvement*, by Wiseman, B. and Kaprielian, V., 2021, Josie King Foundation and Duke University School of Medicine (https://josieking.org/patientsafety/module_a/methods/fade.html). Patient Safety module series used with permission from Duke University © Duke University 2002-2022

Literature Review

Medications

- Treat as anaphylaxis first!
- FFP no longer recommended as first line treatment
- 3 FDA Approved drugs: Icatibant, ecallantide, C1-INH
- No consensus on most efficacious medication

Icatibant selected due to availability and safety profile

Airway Techniques

- No consensus on video laryngoscopy versus fiberoptic bronchoscope (FOB)
- FOB historical “gold standard”
- Newer literature recommends video laryngoscopy
 - faster, similar safety profile compared to fiberoptic bronchoscope
- Endo (ETT) vs. Nasotracheal (NTT) tube: depends on patient characteristics
 - literature leans towards nasotracheal tubes.

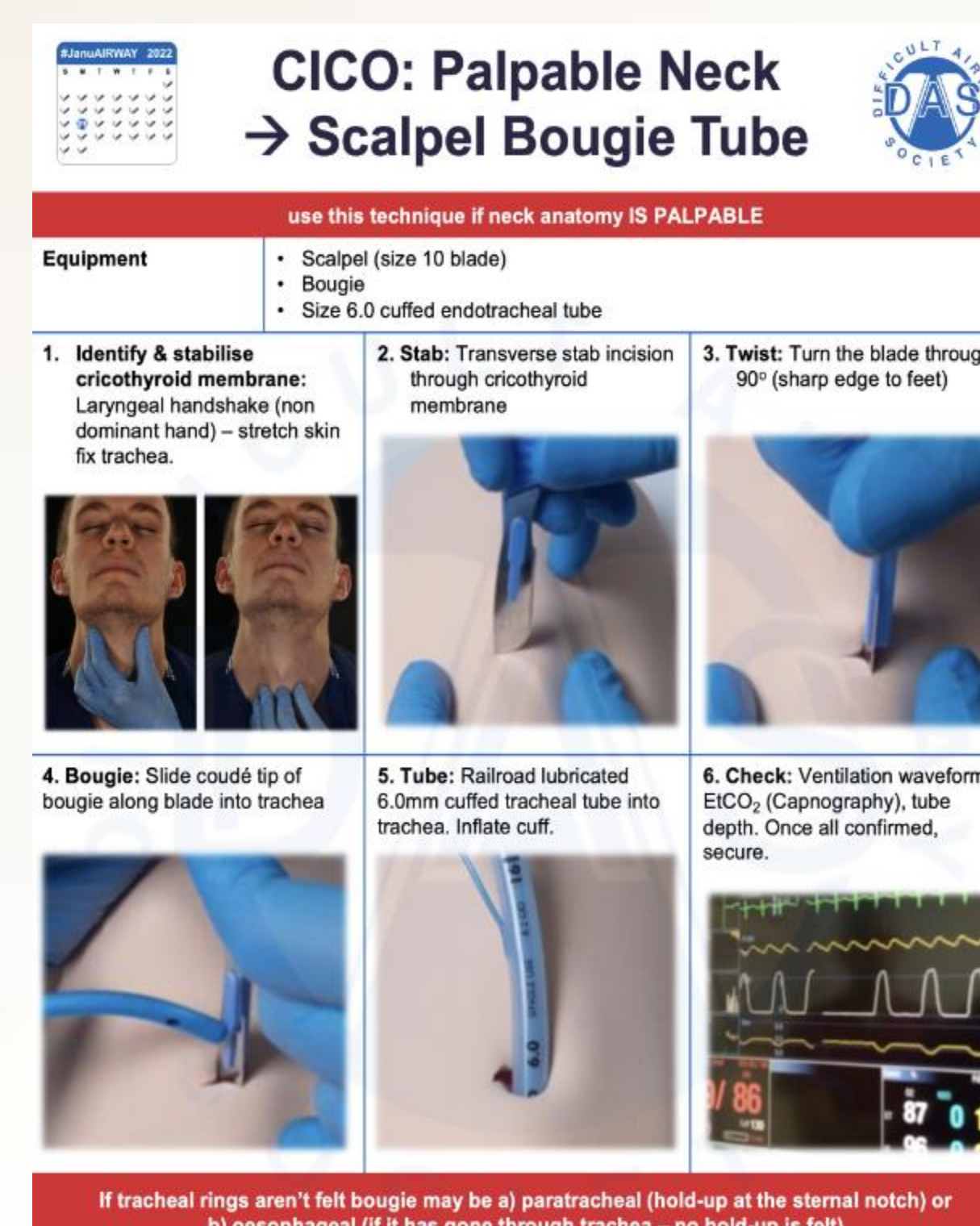
Video laryngoscopy selected due to faster time to airway securement; ETT vs. NTT left to provider selection

Surgical Airways

- Premade kits/Seldinger technique no longer recommended
 - increased difficulties and time to place airway

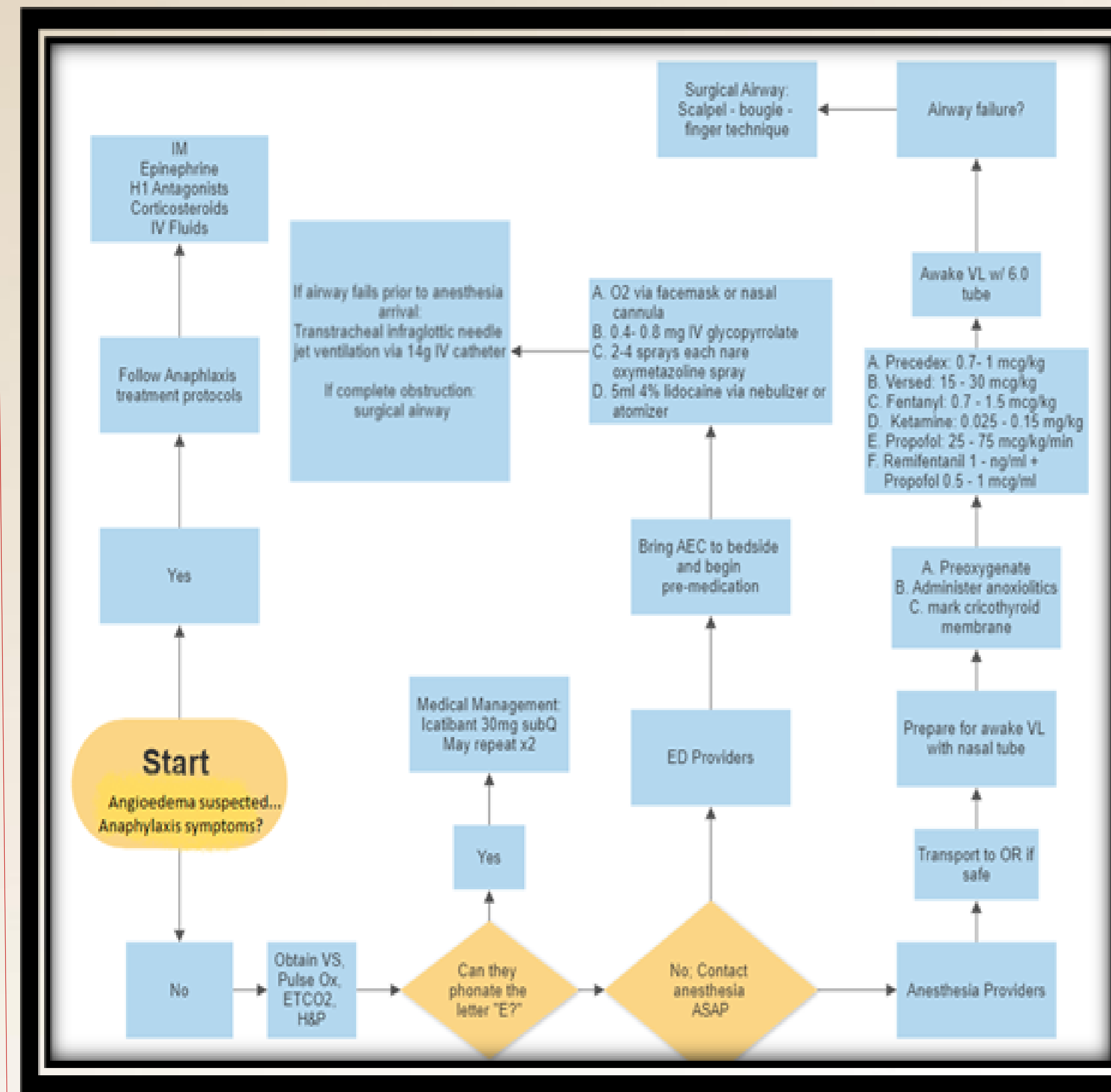
Scalpel – finger – bougie technique recommended ESA technique

Scalpel – Finger – Bougie ESA Technique



Reproduced from - Difficult Airway Society 2015 guidelines for management of unanticipated difficult intubation in adults. C. Frerk, V. S. Mitchell, A. F. McNarry, C. Mendonca, R. Bhagrat, A. Patel, E. P. O'Sullivan, N. M. Woodall and I. Ahmad, Difficult Airway Society intubation guidelines working group. *British Journal of Anaesthesia*, 115 (6): 827-848 (2015) doi:10.1093/bja/aev371

Proposed Angioedema Guideline



Budget

	Potential Cost
Training	
Materials	\$7,000 ₁
Angioedema Cart	\$10,250 ₂
Staff Training	
Total	\$17,236
Surgeon	\$1,584
CRNA	\$8,820
Anesthesiologist	\$6,400
Sim Lab RN	\$432
Potential Total	\$34,486

Non – Financial Costs:

- Additional job responsibilities
- Time away from patient care for training and AEC tasks

Employee Training

ED Staff

- Jet ventilation and needle cricothyrotomy refresher in – service for ED providers
- Optional Sim lab training with anesthesia

RN, RT, Pharmacy, Anesthesia Technicians

- Training/guideline dissemination via work email

Anesthesia Providers

- 2 hour training session
- Guideline review with rationale
- Scalpel – finger – bougie technique ESA taught by trauma/ENT surgeon
- ESA practice session with critique
- Simulated AE intubation practice

Project Implementation

Sample/Setting

- Mid – sized, inner city, level 1 trauma hospital in the Midwest
- Target Audience: ED & anesthesia providers, ED/ICU RNs, RT, pharmacy
- Target population: Age 18 with AE S&Sx

Retrospective Data Collection

- Retrospective chart review of ED visits and hospitalizations for AE in the last 5 years
- Utilization of ICD 10 code T78.3 angioneurotic edema
- Tracking: patient mortality, hypoxic brain injury, cardiac arrest, time/attempts to airway securement, ESAs

Guideline Development

- Defines ED and anesthesia provider roles and medications

Guideline Implementation

- Total timeline: 12 months
- 2 month training period
- AE Cart creation
- Guideline posted in critical staffing areas and on the AE cart

Monitoring Impact

Data Collection

- IT flag for AE cases by ICD code
- Data collection at one, six and twelve months post implementation
- Evaluation frequencies may need to be adjusted based on AE frequency

Outcome Evaluation

- Assessed for changes in patient mortality, hypoxic brain injury, cardiac arrest, time/attempts to airway securement and number of ESAs.
- If successful, project can be used on a larger scale for system-wide implementation

Potential Points of Failure

- Lack of funding/grants for implementation
- Lack of buy – in from staff/administration
- Inadequate/improper training session – was the session appropriate for staff needs?
- Insufficient number of AE cases
- Guideline not followed
- Delay/hesitation in calling for help
- ED providers attempting airway interventions
- Continued inappropriate airway techniques (direct laryngoscopy)
- Reluctance/delay in ESA

Conclusions

- Prevalence and severity of AE is increasing
- AE guidelines require interdepartmental collaboration
- AE guidelines increase patient safety and hospital efficiency
- AE carts provide easy availability of supplies needed in an AE emergency
- An organized approach to AE leads to speedier interventions and faster relief of AE symptoms

Angioedema guidelines lead to a reduction in invasive airways, ICU length of stay, hospital expenses and morbidity/ mortality rates.

Abstract



References

