Prosedur intubasi pada pasien dengan cidera leher

Yuddy Imowanto

Disampaikan pada acara Pertemuan Ilmiah Tahunan ke-4 PERDAMSI, tanggal 7 – 11 November 2018
di Ijen Suite Resort & Convention Malang Jawa Timur

Pendahuluan - Prinsip Penting

- Manajemen jalan nafas harus dikuasai dalam prosedur resusitasi pasien kritis dan merupakan ketrampilan oleh dokter yang bekerja di area perawatan kritis.
- *The emergency physician has primary responsibility for management of the airway, and all airway management techniques lie within the domain of emergency medicine.*
- *Rapid Sequence Intubation* → sering dipakai memfasilitasi intubasi trakea, beberapa teknik intubasi dan ketersediaan peralatan penting, kesiapan dalam menghadapi *difficult airway*, dan teknik yang dikuasai bila intubasi gagal harus disiapkan.

Rosen's Emergency Medicine. Concept and Clinical Practice. 8th Edition. 2014

Pendahuluan – Prinsip Penting

1. Gagal mempertahankan patensi jalan nafas
2. Gagal ventilasi atau oksigenasi
3. Antisipasi terjadinya perburukan

Keputusan intubasi - gagal ventilasi – oksigenasi

- Respiratory failure that is not reversible by clinical means or persistent hypoxemia despite maximal oxygen supplementation is a primary indication for intubation.
- This assessment is clinical and includes evaluation of the patient's general status, oxygen saturation by pulse oximetry, and respiratory pattern.
- *Continuous capnography* also can be helpful but is not essential if oximetry readings are reliable.

Rosen's Emergency Medicine. Concept and Clinical Practice. 8th Edition. 2014

Keputusan intubasi – Anticipasi terjadi perburukan

- Multiple trauma with hypotension, an open femur fracture, and diffuse abdominal tenderness warrant early intubation even if the patient is initially awake and alert without airway injury or hypoxemia.
- *Trauma patients with high suspicion of cervical spine injury should be intubated as early as possible.*

Rosen's Emergency Medicine. Concept and Clinical Practice. 8th Edition. 2014

Decision to Intubate - Anticipated Clinical Course

- Aggressive resuscitation, pain control, the need for invasive procedures and imaging outside of the emergency department, and inevitable operative management argues strongly for early airway control.
- Early intubation is advisable with any evidence of vascular or direct airway injury because these patients tend to deteriorate and increasing hemorrhage or swelling in the neck tend to both compromise the airway & confound later attempts at intubation.

Keputusan intubasi - prosedur

Bagaimana melakukan prosedur intubasi yang aman pada pasien yang menderita cidera leher dan atau tulang leher?

Keputusan intubasi – prosedur aman?

1. Teknik terbaik?
2. Alat bantu terbaik?
3. Medikasi – obat2an "terbaik" yang dipilih?

Cidera leher – Teknik intubasi aman?

- Kebanyakan pasien yang dicurigai menderita trauma tumpul tulang leher diintubasi secara oral dengan direct laryngoscopy secara *in-line cervical spine immobilization*.
- Visualisasi glotis kurang adekuat dan gaya mengangkat secara berlebihan sering diperlukan → kurang aman/berisiko
- *Video laryngoscopes provide superior laryngeal views without excessive lifting force or cervical spine movement and have higher intubation success rates when compared with conventional direct laryngoscopy*.

In line position

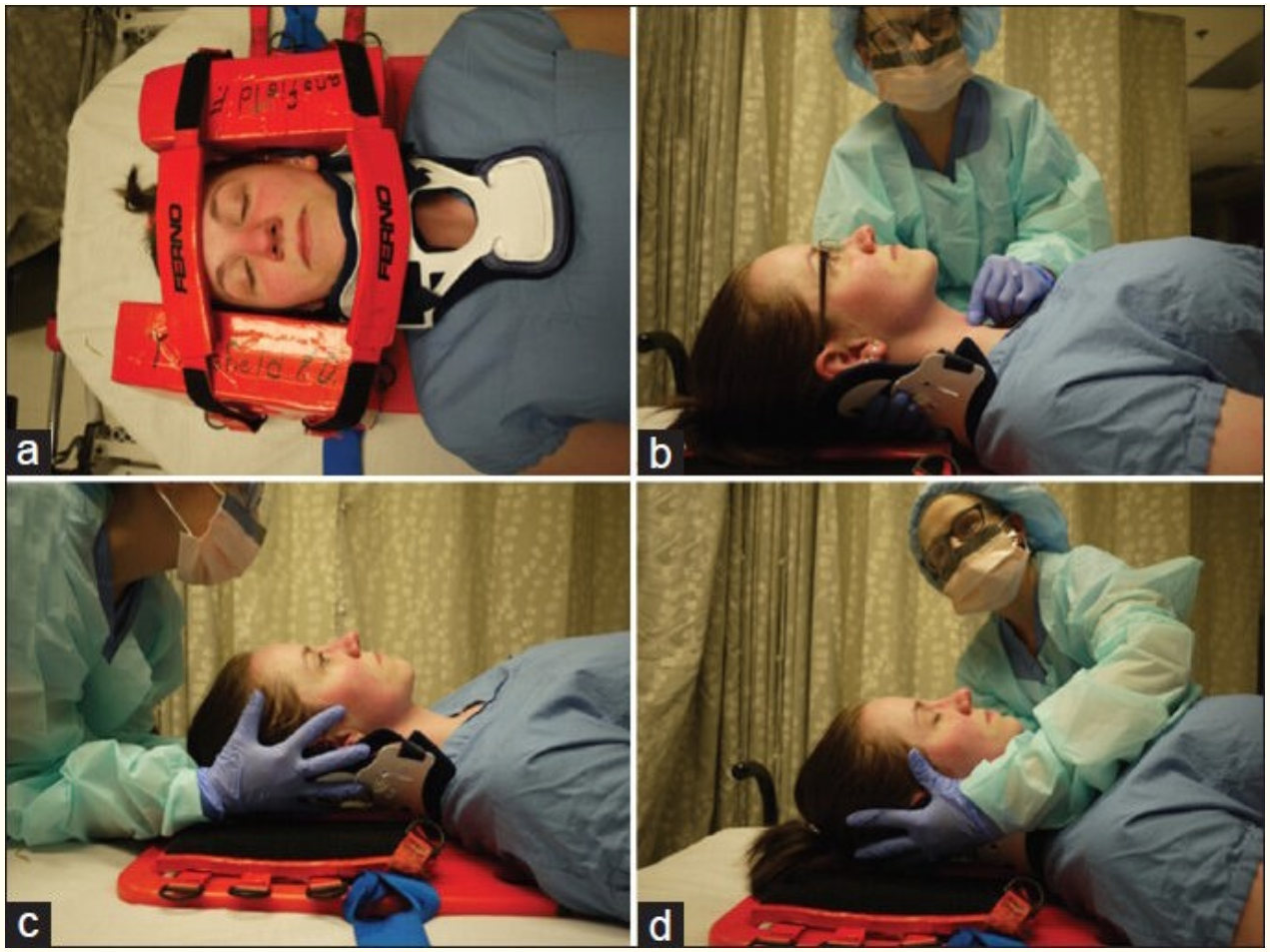


Figure 4

Neck Maneuvers During Airway Management. (a) Neck stabilization using sandbag-collar-tape on hardboard for pre-hospital care, (b) Cricoid pressure application with anterior half of hard cervical collar removed and other hand behind posterior cervical collar, (c) Manual in-line stabilization from the head of bed, with anterior cervical collar removed and hands cradling occiput and mastoid process, (d) Manual in-line stabilization from side of bed to facilitate airway intervention from head of bed

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3982371/

Cidera leher – Teknik intubasi aman?

- Prosedur intubasi dengan bantuan LMA (ILMA = *Intubating Laryngeal Mask Airway*) dipercaya dapat mengurangi gerakan tulang leher dibanding dengan *direct laryngoscopy*.
- Alat alternatif selain laringoskop juga telah dibuktikan aman dipergunakan untuk membantu prosedur intubasi pada pasien yang menderita cidera tulang leher.
- A fluoroscopic study in which intubation with the Shikani optical stylet (SOS) was compared with direct laryngoscopy showed signifcantly less cervical spine movement with the SOS but a slightly longer intubation time (28 seconds vs. 17 seconds).

Cidera leher – Teknik intubasi aman?

- The Airtraq and Pentax Airway Scope are curved intubation devices that integrate an ETT channel and either a viewing lens or a video screen to facilitate intubation.
- Both devices have shown high levels of intubation success and minimal cervical spine motion compared with direct laryngoscopy.
- The CTrach, a fiberoptically enhanced ILMA, also has demonstrated success both with and without in-line cervical spine stabilization.

Cidera leher – Teknik intubasi aman?

- In the absence of a coexistent blunt traumatic mechanism or a neurologic examination indicating spinal cord injury, cervical spine immobilization for intubation of patients with penetrating head and neck trauma rarely is indicated.
- It is not proven whether patients with gunshot or shotgun injuries to the head or neck are at risk of exacerbation of cervical cord injury during intubation, and there is no report of such a patient, with or without clinical evidence of spinal cord injury, who was injured by intubation.

Cidera leher – Teknik intubasi aman?

- In addition, cervical spine immobilization in patients with penetrating neck injuries may be harmful.
- *A recent large retrospective review of more than 45,000 trauma patients with penetrating injuries found that those in whom prehospital cervical collars were applied were two to three times more likely to die.*
- Delays in transport and patient assessment and added diffculty for airway procedures were postulated as potential contributors.

Rosen's Emergency Medicine. Concept and Clinical Practice. 8th Edition. 2014

Alat yang terbaik?

Journal List › Int J Crit Illn Inj Sci › v.4(1); Jan-Mar 2014 › PMC3982371

IJCIIS Official Publication of International Network of Critical Illness and Injury Trial Experts
International Journal of Critical Illness & Injury Science
Connecting Cells, Clinics and Communities across Continents

Home
Current issue
Instructions
Submit article

Int J Crit Illn Inj Sci. 2014 Jan-Mar; 4(1): 50–56.
doi: [10.4103/2229-5151.128013]

PMCID:
PM

Airway management in cervical spine injury

Naola Austin, Vijay Krishnamoorthy, and Arman Dagal

Author information ► Copyright and License information ► Disclaimer

Airway management options for the patient with potential cervical spine injury

Airway management device	Pros	Cons
Awake fiberoptic intubation	Excellent for cooperative patients Allows for documentation of neurologic exam before and after intubation	Relatively expensive Longer time to perform (not ideal for urgent situation) Not appropriate for Anxious/uncooperative patient Excess blood/secretions in the airway Provider with little experience with this technique
Video laryngoscopy	Often excellent laryngeal visualization Less for laryngoscopic view required Less mouth opening required	Not always available (i.e., in the field) Blood/secretions may obscure camera view Relatively new technology, with lack of definitive outcome studies in this area
Direct laryngoscopy	Most studied technique Usually available, even in remote locations Allows rapid ability to secure airway	High percentage of Grade III and Grade IV views May require adjunctive equipment (i.e., gum elastic bougie)
Laryngeal mask airway	Essential tool in the difficult airway algorithm	May not be appropriate for routine intubation in cervical spine injury

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3982371/

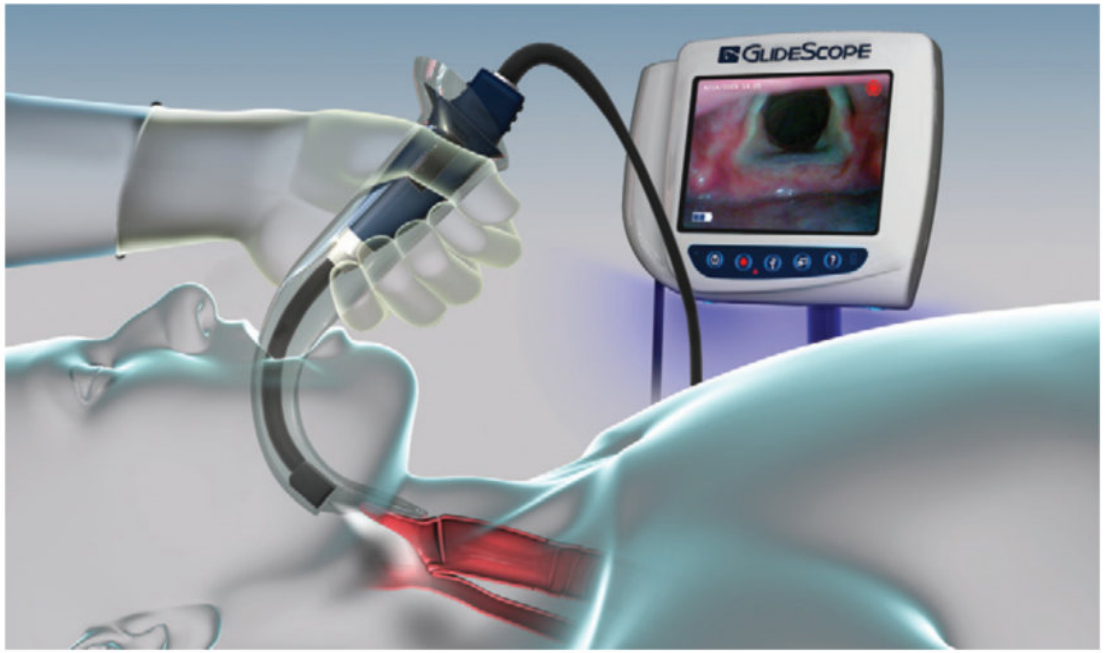


Figure 1-11. GlideScope AVL (Verathon Inc.) uses a high-resolution digital display; includes single-use Stats (blade sheaths) that cover the video baton; and has the ability to record still images and video clips through internal and removable storage devices. (Courtesy Verathon Inc.)

Figure 1-12. The C-MAC video laryngoscope (Karl Storz Endoscopy) uses an integrated complementary metal oxide semiconductor (CMOS) video chip to capture a video image from near the distal tip of an otherwise conventional laryngoscope blade. The image is conveyed to a video screen, where it is viewed by the intubator. (From Walls RM, Murphy MF, eds: Manual of Emergency Airway Management, 4th ed. Philadelphia: Lippincott, Williams & Wilkins; 2012; with permission.)

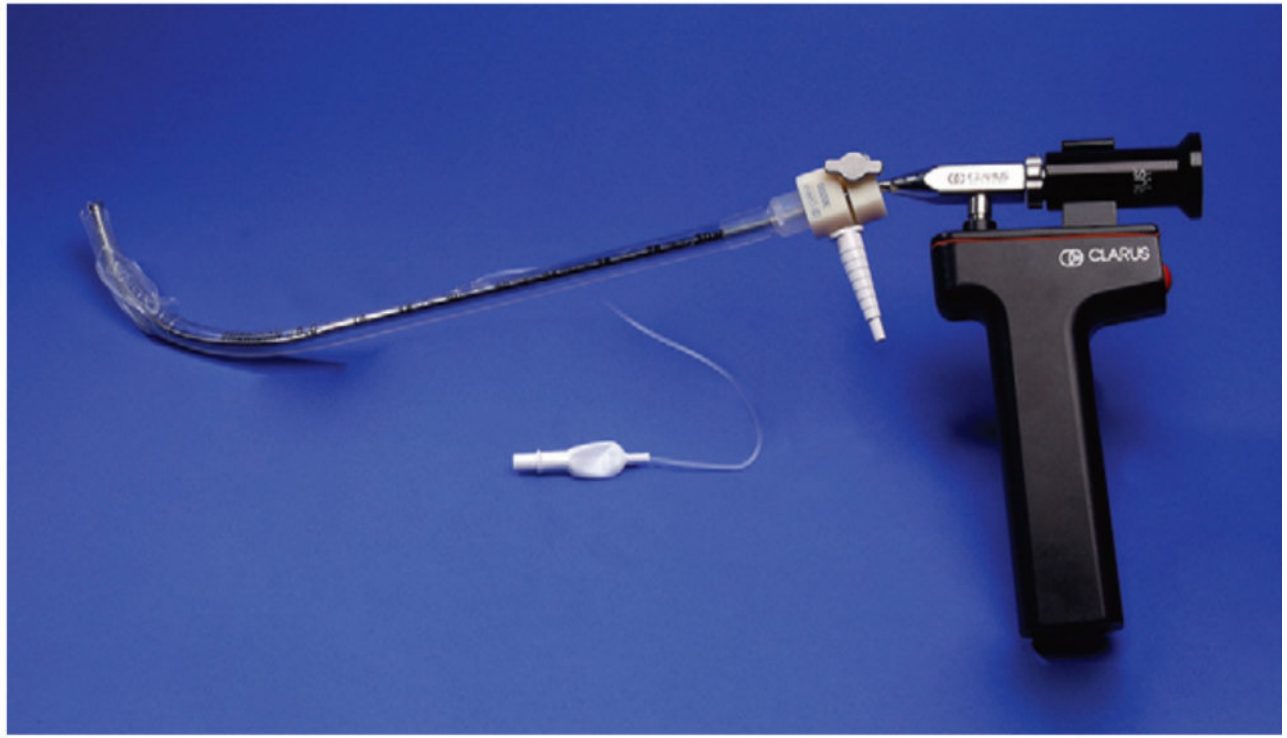
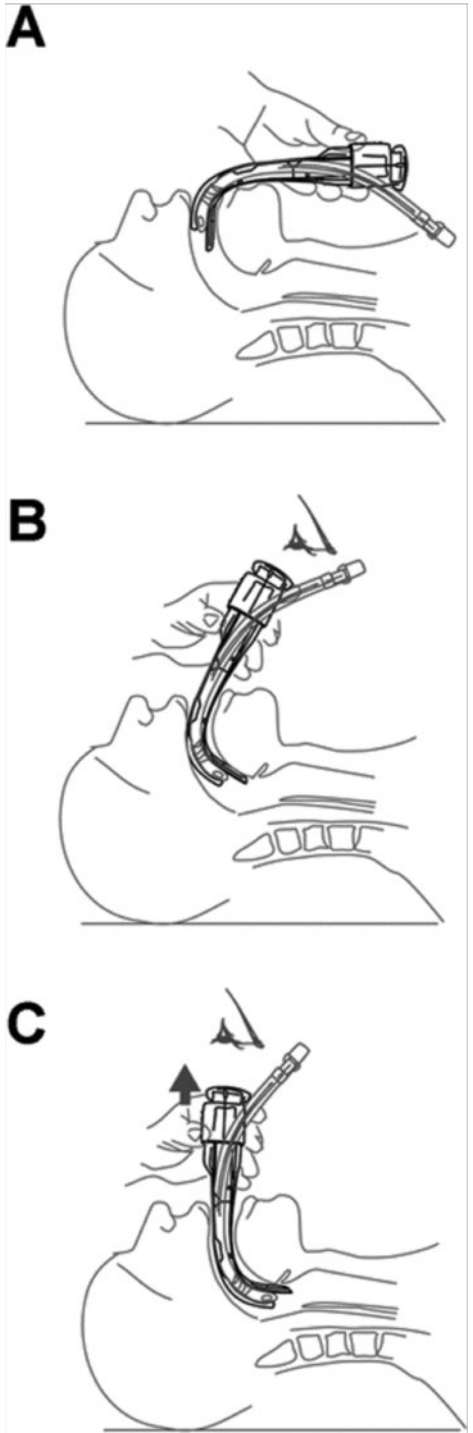


Figure 1-14. The Shikani optical stylet (SOS; Clarus Optical) with endotracheal tube mounted. The eyepiece and battery pack are at the right.



Photograph of the Airtraq laryngoscope with an endotracheal tube in place in the side channel.

Flexible Intubating Scopes

Intubation using a flexible endoscope is an important option for certain difficult airways, particularly in those with distorted upper

Figure 1-13. The Clarus Video System (Clarus Medical) incorporates a curved fiberoptic stylet surrounded by a malleable but rigid protective metal sheath. Images are displayed on a video screen attached to the handle. The screen can swivel for optimal viewing as the stylet is inserted into the mouth. (Image courtesy Clarus Medical, with permission.)

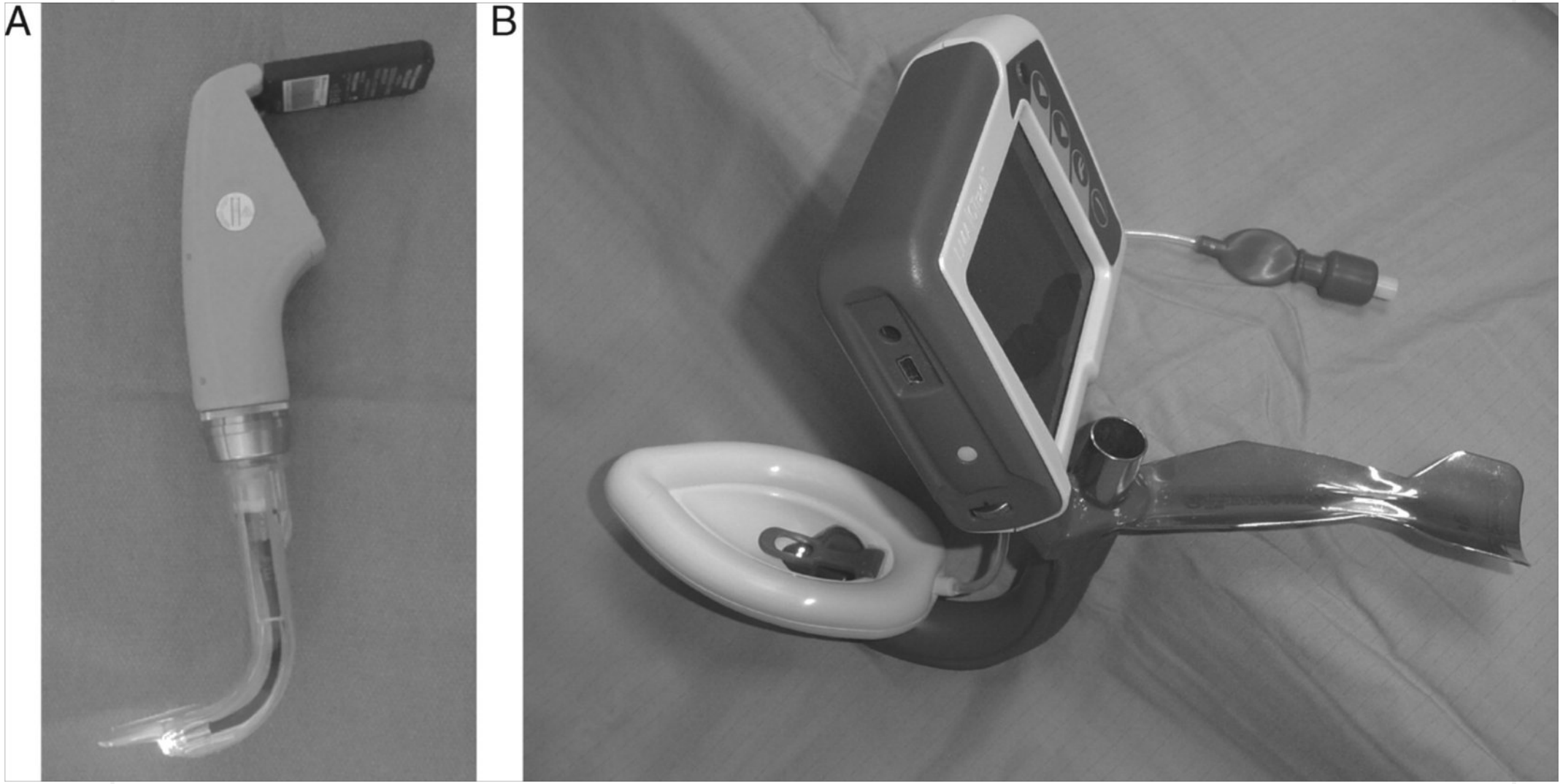


Fig 1 (a) Photograph of the Pentax AWS® laryngoscope with a single-use blade clipped onto a camera system. (b) Photograph of the LMA CTrach®. The tracheal tube is passed through the LMA while glottic inlet is viewed on the screen.

ILMA

Figure 1-17. The intubating laryngeal mask airway is modified to facilitate insertion of an endotracheal tube after placement and ventilation have been achieved. The epiglottic elevator *(arrowhead)* lifts the epiglottis to allow passage of the special endotracheal tube *(arrow)*.

KEY CONCEPTS

- Knowledge of the clinical course of the patient's condition and anticipation of possible deterioration are crucial to the decision to intubate, especially if the patient is to leave the ED for a time (e.g., interfacility transfer, diagnostic testing).
- Assessment of the patient for potential difficulty with intubation, bag-mask ventilation (BMV), ventilation using an extraglottic device (EGD), and cricothyrotomy is an essential step before neuromuscular blockers are administered. The mnemonics *LEMON, MOANS,* and *RODS* can serve as useful aids.
- In the absence of a "crash" patient (agonal, unresponsive to laryngoscopy) or a difficult airway, RSI is the airway management method of choice for ED patients.
- Tube placement confirmation using end-tidal CO_2 ($ETCO_2$) is essential after intubation, and failure to detect adequate quantities of exhaled CO_2 is evidence of esophageal intubation until proved otherwise.
- Videolaryngoscopy is transforming intubation by eliminating the traditional anatomic barriers to direct laryngoscopy. Practitioners responsible for emergency airway management should transition their routine airway management from direct laryngoscopy to videolaryngoscopy
- Cricothyrotomy is indicated in the "can't intubate, can't oxygenate" failed airway and should be performed without hesitation once this situation has been identified. Delays may increase the likelihood or severity of hypoxic injury to the patient.

Premedikasi – pelumpuh otot pilihan?

Tidak ada obat sedasi, analgetik dan pelumpuh otot terbaik

Pilihan sangat tergantung kondisi klinis pasien

Obat sedative, pelumpuh otot sering memberikan efek hipotensi yang dapat memperburuk keadaan (komorbid dengan syok spinal)

Analgetik poten sangat dibutuhkan → fentanyl jadi pilihan

Bila hemodinamik tidak stabil → Ketamin jadi pilihan

Pelumpuh otot → suksinilkolin atau rocuronium

Riwayat penyakit/pengobatan penting jadi pertimbangan (bila ada)

TABLE 29-6 Pretreatment Agents Considered in Rapid-Sequence Intubation

Agent	Dose	Indications	Precautions
Lidocaine	1.5 milligrams/kg IV/ topically	Elevated ICP	Lack of evidence-based studies on effectiveness in ICP[12]
		Bronchospasm	No evidence of improved outcome and may not be better than inhaled albuterol
		Asthma	
Fentanyl	3 micrograms/kg IV	Elevated ICP	Respiratory depression
		Cardiac ischemia	Hypotension
		Aortic dissection	Chest wall rigidity
Atropine	0.02 milligram/kg IV	Children <5 y with bradycardia	Minimal dose 0.10 milligram
		Children <10 y receiving succinylcholine and with bradycardia	Recommend giving in response to bradycardia, not as routine agent[13]
	0.01 milligram/kg IV	Bradycardia from repeat succinylcholine in adults	

Abbreviation: ICP = intracranial pressure.

TABLE 29-7 Preferred Rapid-Sequence Intubation Induction Agents

Agent	Dose	Onset	Duration	Benefits	Caveats
Etomidate	0.3–0.5 milligram/kg IV	<1 min	10–20 min	↓ ICP	Myoclonic jerking or seizures and vomiting in awake patients
				↓ Intraocular pressure	No analgesia
				Neutral BP	↓ Cortisol
Propofol	0.5–1.5 milligrams/kg IV	20–40 s	8–15 min	Antiemetic	Apnea
				Anticonvulsant	↓ BP
				↓ ICP	No analgesia
Ketamine	1–2 milligrams/ kg IV	1 min	10–20 min	Bronchodilator	↑ Secretions
				"Dissociative" amnesia	↑ BP
				Analgesia	Emergence phenomenon

Abbreviations: BP = blood pressure; ICP = intracranial pressure.

TABLE 29-12 Sedation During Mechanical Ventilation

Drug	Initial Bolus	Starting Infusion	Comments
Fentanyl	1-2 micrograms/kg IV	0.5–1 microgram/kg/h	Often combined with midazolam
Remifentanil	1.5 micrograms/kg IV	0.5–1 microgram/kg/h	Ultra-short-acting
Midazolam	0.05 milligram/kg IV	0.025 milligram/kg/h	Often combined with fentanyl
Propofol	0.5 milligram/kg IV	20-50 micrograms/kg/min	Can cause hypotension
Ketamine	0.5–1 milligram/kg IV	0.5 milligram/kg/h	May provide broncho-dilation; sympathetic stimulation

TABLE 29-9 Paralytic Agents in RSI

Agent	Adult Intubating IV Dose	Onset	Duration	Comments
Rocuronium (intermediate/long)	1 milligram/kg	1–3 min	30–45 min	Tachycardia. Longer duration of action and onset compared to succinylcholine. Most common alternative to succinylcholine in RSI.[15]
Vecuronium (intermediate/long)	0.08–0.15 milligram/kg	2–4 min	25–40 min	Prolonged recovery time in obese or elderly, or if there is hepatorenal dysfunction.
	0.15–0.28 milligram/kg (high-dose protocol)		60–120 min	
Succinylcholine	1.5 milligrams/kg	45–60 s	5–9 min	Provides optimal intubating conditions most quickly. There are several rare but important contraindications (see Table 29-8).

Rosen's Emergency Medicine. Concept and Clinical Practice. 8th Edition. 2014

RSI…

Box 1-6 The Seven Ps of Rapid

1. *P*reparation
2. *P*reoxygenation
3. *P*retreatment
4. *P*aralysis with induction
5. *P*ositioning
6. *P*lacement of tube
7. *P*ostintubation management

TABLE 29-5 Rapid-Sequence Intubation Steps

1. Set up IV access, cardiac monitor, oximetry, and capnography/capnometry.
2. Plan procedure incorporating assessment of physiologic status and airway difficulty.
3. Prepare equipment, suction, and potential rescue devices.
4. Preoxygenate and denitrogenate.
5. Consider pretreatment agents based on underlying conditions.*
6. Induce with sedative agent.
7. Give neuromuscular blocking agent immediately after induction.
8. Bag-mask ventilate only if hypoxic; otherwise, provide high flow oxygen during apneic phase. Cricoid pressure during laryngoscopy only, if needed.
9. Intubate trachea after muscle relaxation has been achieved.
10. Confirm placement and secure tube.
11. Provide postintubation sedation and low tidal volume (6 cc/kg start) management.

*It is unclear if pretreatment improves outcome.[12]

TABLE 29-3 Instructions for Endotracheal Tube Insertion

Step	Comments
1. Hold laryngoscope in left hand.	Holding the laryngoscope at the base, where the blade inserts to the handle, aids proper use and lift; do not hold further up the handle.
2. Use right hand to:	Remove dentures and any obscuring blood, secretions, or vomitus suctioned before insertion of the ETT.
Insert the ETT	Use a properly sized, semi-rigid, malleable, blunt-tipped, metal or plastic stylet to assist with tube placement. The tip of the stylet must not extend beyond the end of the ETT or exit the Murphy eye.
Operate suction catheter.	
Manipulate larynx externally to enhance the visualization.	
3. Insert blade into the right corner of the patient's mouth.	The flange of the curved Macintosh blade will push the tongue toward the left side of the oropharynx.
	If the blade is inserted directly down the middle, the tongue can force the line of sight posteriorly, impairing the view.
4. Visualize arytenoids.	—
5. Lift epiglottis.	Lift the epiglottis directly with the straight blade or indirectly with the curved blade.
6. Expose larynx.	Pull laryngoscope handle in the direction that it points (i.e., 90 degrees to the blade).
	Cocking the handle back, especially with the straight blade, risks fracturing central incisors and is ineffective at revealing the cords.
7. Advance blade incrementally.	Look for the arytenoid cartilages to avoid overly deep insertion of the blade, which is a common error. BURP maneuver may improve visualization.
8. Advance ETT.	Visualize tube *and* cuff passing through vocal cords.
	Correct tube placement is a minimum of 2 cm above the carina (approximately 23 cm in men and 21 cm in women).
	The base of the pilot tube (a tube with the adapter to inflate the cuff) is usually at the level of the teeth.
9. Check ETT placement.	Listen for bilateral breath sounds and the absence of epigastric sounds.
	Confirm placement with colorimetric carbon dioxide detector or capnography.
10. Inflate balloon.	Use 5–7 cc of air. Ask the technician to check cuff pressure to avoid tracheal injury from pressure (target 25–40 cm H_2O).
11. Secure ETT.	Do not impede cervical venous return with umbilical tape or a fixator; circumferential securing devices can cause skin breakdown if too tight or in place too long.
	Use a modified clove-hitch knot or a commercial fixator to avoid kinking the pilot tube.

Abbreviations: BURP = backward-upward-rightward pressure; ETT = endotracheal tube.

Kesimpulan akhir…

Menajemen jalan nafas salah satu goal utama pada tatalaksana pasien kritis.

Teknik buka jalan nafas dasar dan alat2 bantu sederhana "sering" cukup memadai pada tatalaksana awal untuk mempertahankan jalan nafas terbuka dan memberi bantuan pernafasan pasien sampai tim yang lebih berpengalaman datang untuk melakukan intubasi.

Patients with significant cervical blunt trauma are treated as if they have unstable spinal injuries until formal clearance procedures have been completed.

Induksi, pemakaian laringoskopi dan intubasi pada pasien cidera leher sangat beresiko dan harus dikerjakan oleh dokter Bersama tim yang mampu dan berpengalaman.

Emergency Airway Management in Neck Trauma. The Egyptian Journal of Hospital Medicine (January 2018) Vol. 70 (3), Page 409-413

TERIMA KASIH