Introduction to Direct Laryngoscopy

Objective: To achieve the highest possible first-pass success in DL the patient is presumed one of the unpredictable 50% of difficult intubations, who may require maximal support to obtain even minimal exposure. Even when glottic exposure proves less difficult the series of maneuvers is carried out to optimize exposure rather than merely settling for adequate exposure.

Mechanics: DL is primarily displacement of the tongue and the epiglottis, and their foundation structure the hyoid bone. The tongue is displaced by lifting into the subglossal space; the epiglottis is displaced by precise control of the ligament by which it is suspended from the hyoid. Lifting of the hyoid may be constrained by the ligamentous suspension system that flexibly secures the hyoid bone to the skull. That constraint is relieved by maximal head elevation, which is flexion of the upper thoracic as well as cervical spine. Therefore in difficult cases intubation may require a combination of maneuvers to retain fine motor control while achieving maximal head elevation.

Required components: In every case the trainee is to be prepared to incorporate each of the following seven key considerations.

1. Avoidance of gross motor effort to retain fine motor control. In a difficult intubation optimal exposure can require flexion of the upper thoracic as well as cervical spine, therefore gross motor effort can be required in small to average patients as well as the morbidly obese. Strong effort by the person intubating is not compatible with retention of fine motor control that is required for careful manipulation of tissue, so the trainee is expected to use supports for the head and shoulders and have an assistant do all the heavy lifting.

2. Optimal initial positioning: Preparation for maximal head elevation typically requires a shoulder roll because flexion of the upper thorax is often beyond the assistants’ ability, and head support as high as does not interfere with insertion of the blade. “Linen” blocks 2 and 4 inches high are available. Manual in-line stabilization of the cervical spine (MILS), with assisted jaw thrust is considered optimal positioning for trauma patients.

3. Prepared explicit instruction: We require the fellow be prepared to give clear explicit instructions to their bystander/assistants, such as for head support. For example, “If I release the laryngoscope and the head drops, that’s not enough support.”

4. Bimanual laryngoscopy: Laryngoscopy becomes “bimanual” as soon as the blade is deep enough that the right hand can release the patient’s lips, rather than as a secondary effort. The right hand, which is not yet ready to accept the endotracheal tube (since there is no visualization of the airway yet), is moved immediately to the thyroid (not cricoids) cartilage. Bimanual laryngoscopy is identical to external laryngeal manipulation (ELM) by the laryngoscopist (Levitan). Note that bimanual laryngoscopy provides considerably greater benefit to the novice laryngoscopist than the more experienced operator. Note that the right hand is available because an assistant is required for head support. Bimanual laryngoscopy allows better appreciation of the dynamic anatomy than exploration with only the blade;
its use early in the lab imprints the value of the bimanual technique as a primary rather than secondary maneuver.

5. **Optimal control of the epiglottis:** The trainee is requested to invariably practice fine motor control by “flipping” the epiglottis - with blade tip pressure against the hyoepiglottic ligament and/or with ELM. The instructor monitors this on the external screen of a Storz fiberoptic lansoscope while the trainee uses the blade for conventional DL.

6. **Precise control of the endotracheal tube (ET):** Details include firmly securing the adaptor, clean technique, stylet formed straight-to-cuff (a “hockey stick” configuration of the styletted endotracheal tube, rather than an arch shape), cuff deflated and air-filled syringe secured, minimal contact of cuff with teeth, glottic view maintained during transglottal placement, precise atraumatic insertion without poking, use of informed delicate maneuvers to overcome obstruction (such as hang-up on anterior laryngeal wall), insertion to proper depth, continuous secure grip on ET, and cuff inflation by pressure monitor or minimum leak technique rather than volume.

7. **Duration of laryngoscopy:** Our concern for pulmonary instability limits laryngoscopy time to 30 seconds, with immediate withdrawal to resume CPAP recruitment. (It can be helpful to hold your own breath as an estimate.) However the priority is skillful integration of all the maneuvers likely to gain first-pass success. That skill set must be demonstrated before the 30-second limit is imposed.

8. **Informed cricoid pressure:** Since virtually all of the “critical care” airways that fellows manage are emergent in nature, integration of cricoid pressure is essential. An assistant must be designated to carry this out, and his technique assessed and critiqued (hence “informed” cricoid pressure), since inappropriate pressure may be injurious or ineffective, or make the view of the glottis worse. In many cases, fellows are called to a scene in which others have initiated bag-mask ventilation; the risk of gastric insufflations are substantial. Positioning of the head, face and mandible in a position most effective at opening the airway tends to lift the cricoid and open the piriform recess and upper esophagus during BMV, resulting in further risk of gas delivery to the stomach. Until the epiglottis is secure cricoid pressure should be maintained until it might be contributing to a poor view of the larynx, then adjusted accordingly.

Note also:

Approach over the dorsum of tongue is intuitive, but a lateral approach using the curved or straight blade may be more effective in difficult cases so merits routine practice.

The curved blade provides most reliable control of epiglottis, but the straight blade by lateral (paraglossal, retromolar) approach may be more effective in the most difficult cases.

Semantics: Percent of glottal opening (POGO) is the preferred estimate of glottal exposure. This scheme, developed by Levitan, relies on an estimation of that portion of the glottic opening which is apparent to the laryngoscopist (Levitan). In general, a POGO of greater than 50% should provide relative ease of tube placement, whereas progressively smaller views of the glottis make tube placement challenging.
The time-honored Cormack-Lehane scoring system is primarily descriptive, with a score of 1 representing visualization of the entire glottis, a score of 2 representing a view of only the posterior portion of the glottic opening, a score of 3 pertaining to a view only of the epiglottis, and a score of 4 describing a view of only the pharynx, with no visibility of the glottis or epiglottis.