How should paramedic pre-hospital "first pass intubation success" be defined?

There is one thing of which one can say neither that it is one metre long, nor that it is not one metre long, and that is the standard metre in Paris.

Ludwig Wittgenstein
§50 Philosophical Investigations

Based upon best physician practices, and the statistics around those, paramedics who work in ground based EMS systems in Canada are set for first pass intubation failure in non-arrested patients, and penalized for what is probably best paramedic Sedation Facilitated Intubation (SFI) practice. This is a bold statement and I ask your permission to let me clarify before you rail against it. The statement is meant to broach the question of what the pre-hospital yardsticks of best clinical airway care should be.

In general, Canadian ground based Advanced Care Paramedics tasked with performing intubation in the pre-hospital care are not given the same drugs to perform intubation as the physicians to which they deliver their patients to. These drugs include paralytics and certain inductive and analgesic agents which improve the intubator's view of anatomy and likelihood of success. There may be good reason for preventing giving these medications to the paramedics to use - research by physicians such as Wang and Davis show that these drugs may be a "poison" for paramedics to administer - they may increase mortality and morbidity as well as increase the likelihood of adverse events. The reason for these finding might be due to the limited training and education of paramedics, lack of incidence of use, skill dilution in all-ALS systems, the environment in which they work in, but may also be due to limited and costly on-going training, physician oversight, and QI that would be needed if these drugs were to be incorporated safely.

In the correlation between multiple intubation attempts and increases in adverse events, mortality and morbidity in airway management in the hospital population, "first pass success" is often used as a surrogate marker of good patient care in Airway management. Sackles has shown that there is evidence for this surrogate clinical marker to be considered seriously. In his study, he defined intubation success as the percentage of intubations attempted by intubators in which the trachea was intubated after the first attempt at orotracheal intubation. He defined an attempt at orotracheal intubation as insertion of the laryngoscope blade into the oropharynx "regardless of whether an attempt was made to pass the endotracheal tube". In a recent paper by Brown et al (on behalf of the Near III investigators), an intubation attempt was defined as "any single effort to place a tracheal tube, which occurred when the leading edge of the laryngoscope blade entered the oral cavity past the alveolar ridge". Despite giving no specific definition of first pass success, these numbers were presented by Brown.
However, I think the definition of first pass success in this research flows logically from their definition of an intubation attempt, so this is not as much of a criticism but pointing out what seems to me an oversight. The question becomes this - should placing the laryngoscope past the alveolar ridge or simply into the oropharynx always be considered an attempt at intubation when we talk about airway management and patient safety? What happens if the physician places the laryngoscope past the alveolar ridge and there is no attempt at passing a tube - for example in the case of visualization for suctioning or use of McGill forceps to remove an object? Does this increase the likelihood of adverse events? Does it increase mortality and morbidity? Does the same logic of Sakles' apply when an "awake intubation" is performed by a physician?

In essence, the clinical definition of success in airway management is maintaining oxygenation, ventilation, and hemodynamic stability while avoiding adverse events through intubation attempts. Is an "attempt" as defined by Sakles or Brown a good surrogate marker of success for paramedic intubation? In physician based research, first pass success is evaluated by surrogate markers in a hospital environment where things such as Etomidate, Ketamine, Fentanyl, Succinylcholine, Rocuronium and phenylephrine are used to assist in intubation and RSI is the norm. But let's look at how the average ground ACP paramedic in Canada intubates a patient: due to a lack of paralysis and certain inductive and analgesic agents, different choices need to be made. Best paramedic1 practice is probably to induce a moderate level of sedation with thorough topicalization of the oral anatomy with anesthetizing agents such as lidocaine. Provided the patient tolerates the noxious laryngoscope blade in the innervated lower pharynx, once the endotracheal tube is in the oropharynx, the paramedic must now make a choice when visualizing the cords with the laryngoscope - they can either attempt to pass the tube through the glottic opening straight away, or use the laryngoscope to move away anatomy and anesthetize the vocal cords prior to placing the endotracheal tube.

Choosing not to fully topicalize a patient's airway, and especially the vocal cords if needed, is sometimes due to concerns about "the statistic of the medical oversight" but, in my experience, may be clinically appropriate for the more obtunded patient (very low GCS' - say 3 or 4). However, patients who were that obtunded that required no anesthesia of the lower airway were the minority of the non-arrested patient I felt needed airway protection. For a larger majority - for the less obtunded patient - thoroughly anesthetizing oral anatomy was essential to intubation success and anesthetizing the cord was often needed. However, this would "decrease my success rate" because of introduction of a laryngoscope to aid the anesthetization process if the yardstick was first pass success via the definition used for physicians. If the laryngoscope is always placed to anesthetize the cords before an attempt to pass a

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1 Bad paramedic practice, which occurs all too often, is to induce deep sedation through sedative and analgesic agents, and then make your best attempt - let's call this a "drug facilitated intubation attempting to mimic RSI conditions".
tube, then the paramedic will have 0% first pass success. I struggle with Sakles' findings because, although intuitively it makes sense the more times you place a large metal laryngoscope blade in the mouth the more likely you are to cause harm, Sakles' research was performed on patients in hospital intubations where 87.0% were performed with RSI and only 2.3% (31 of 1,333 patients in the study) of the intubations used a sedative approach similar to the approach the average paramedic in Canada would use. If we as paramedics are not given the same tools as the physicians and must follow different processes, why are we measured by the same yard stick? Does anesthetizing the oral anatomy and cords in non-paralyzed patients increases or decrease the incidence of adverse events? Does it increase or decrease mortality and morbidity? I suggest Sackles's finding may not apply to paramedics who apply a different armaments to achieve their task.

I ask then that medical leaders consider a different yardstick to frame paramedic intubation success. I propose that the physicians overseeing EMS medical practice where a sedation facilitated only approach to intubation is advocated (i.e. a non-RSI approach) consider tracking paramedic first pass intubation success rate - With Intentions To Pass A Tube (WITPAT) to evaluate paramedic intubation success. It should be defined as such: the percentage of intubations attempt by paramedics in which the trachea was intubated after the first attempt at orotracheal intubation where an attempt at orotracheal intubation is defined as insertion of the laryngoscope blade into the oropharynx with the intentions of the intubator to pass a tube or the insertion of any bougie or airway device (e.g. ETT or extra-Glottic device) past the lips. If paramedic First Pass Success - WITPAT is considered, it should be compared to the traditional definition of first pass success as defined by Sackles in the same patient group to compare rates of adverse events and mortality and morbidity between the two. Using the first pass success-WITPAT marker of Intubation will answer an important question about the applicability of Sakles research to paramedic airway management. Differentiation will help to answer a number of important questions around best practices for paramedic airway management.

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