

Routine use of videolaryngoscopy as a clinical risk mitigator in tracheal intubation of adult and pediatric patients: the risk management experience of E. Profili Hospital in Fabriano

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BACKGROUND Airway management in tracheal intubation represents one of the crucial issues in current anaesthesiological practice, in which risk management, defined as a set of multidisciplinary complex actions carried out to improve health care quality in order to ensure the maximum safety of the patient, plays an essential role. Three quarters of adverse respiratory events are due to three causes of injury: inadequate ventilation (38% of cases), esophageal intubation (18% of cases) and difficult tracheal intubation (17% of cases). The international literature shows that difficult intubation in non-obstetrical-gynecological adult surgery has an incidence of 3-8%, with an incidence of impossible intubation of 0.006-0.4%. In gynaecological-obstetrical surgery the incidence of difficult intubation is 1.6-5.7% with impossible intubations less than 0.7%. In pediatric surgery the incidence of difficult intubation is 0.2-5.5%, with impossible intubations of 0.08%; instead, the prevalence of difficult OTI is 1-2%, a proportion which rises to 50% when considering the subpopulation of pediatric patients with cervical spine diseases. Among obese patients the incidence of difficult intubation can be up to 15%. **At the moment, videolaryngoscopy is considered the main technique to facilitate tracheal intubation and reduce its complications. In the operating block of Profili Hospital in Fabriano videolaryngoscopy has been the routine practice since November 2021.**

OBJECTIVES The main objective of this preliminary prospective observational study is **to evaluate the routine use of videolaryngoscopy as a mitigator of clinical risk and unexpected difficulties occurring during tracheal intubation in the adult and pediatric surgical setting.** The secondary objective is **comparing the Fremantle Videolaryngoscope Scoring System with parameters and preoperative scores predicting difficult intubation** such as El-Ganzouri Risk Index in adult patients and Colorado Pediatric Airway Score in the pediatric ones.

RESULTS AND DISCUSSION Our case history shows that **94.15% of adult patients and 96.97% of pediatric patients underwent tracheal intubation at the first attempt, with no need, in any case, for additional devices.** The clear benefit of less time spent on the manoeuvre has led to an optimisation of the operating lists in our operating block, as well as a reduction in costs derived from a more efficient use of the operating room and no need for additional devices for difficult intubations. **The routine use of videolaryngoscopy for both adult and pediatric patients has allowed us to eliminate impossible intubations, regardless of laryngoscopic view, and its consequences, both clinical (e.g. admission in UTI), organizational (e.g. postponement of surgery) and psychological (e.g. work-related stress for operators).** **In adult patients, an El Ganzouri Risk Index bigger than or equal to 4 was found in 12.86% of cases, indicating that intubation was likely to be difficult; in these patients we obtained a complete videolaryngoscopic view according to Fremantle classification in 90.90% of cases, partial and no view both in 4.54% respectively. In 81.81% of cases, tracheal intubation was performed at the first attempt, requiring a second attempt in only 18.18% of cases.** In 22.72% of cases, we equipped our videolaryngoscope with a specific blade made for difficult intubations. In 87.13% of adults with an El Ganzouri Risk Index less than 4, which is predictive of a non-difficult intubation, we instead found no videolaryngoscopic view in 0.67% of cases, partial in 16.77% of cases and complete in 82.55% of cases. In 95.97% of cases, tracheal intubation was performed at the first attempt, however, a second attempt was required in 4.02%. **Among adult patients, partial or no videolaryngoscopic view was found in 45.45% of patients with inter-incisive distance less than 4 cm, in 21.73% of patients with a BMI greater than or equal to 30, in 16.66% of patients with a distance between thyroid and chin less than or equal to 6.5 cm, in 16.50% of patients with a neck circumference greater than or equal to 40 cm, in 15.62% of patients with Mallampati of 3 or more, in 13.20% of patients with neck mobility of 90° or less, in 9.52% of patients unable to protrude their mandible. As regards pediatric patients, a Colorado Pediatric Airway Score of more than 7 was found in 12.12% of cases, indicating a possible problematic intubation; in these patients, however, we obtained a complete videolaryngoscopic view in 100% of cases and 100% of the patients were intubated at the first attempt despite not using in any case the specific blade for difficult intubations.** In 87.87% of pediatric patients with a Colorado Pediatric Airway Score of 7 or less, predictive of a non-problematic intubation, we found a complete videolaryngoscopic view in all cases. Only 3.44% of cases required a second intubation attempt. A standard blade was used in all cases. **The benefit of the routine use of videolaryngoscopy therefore largely exceeds that of the predictive scores of difficult intubation in both children and adults, since it has guaranteed successful intubation in 100% of cases regardless of the predicted and unpredicted difficulty (the latter, in our adult case series, amount to 17.44%).**

CONCLUSIONS Airway management is one of the key issues in current anaesthesiological practice, in which human error plays an important role. **The routine use of videolaryngoscopy in the operating block of Profili Hospital in Fabriano has made it possible to encourage and optimise training and teamwork, to optimise economic resources** (reduction in time spent in the operating room and reduction in the use of additional devices for managing difficult airways), **to completely eliminate the clinical risk of difficult intubation**, achieving correct tracheal intubation in 100% of cases, **eliminating impossible intubations and their clinical and organisational consequences, particularly in pediatric patients**, who are a particularly high-risk category in airway management, **to overcome the limits of individual parameters and difficult intubation predictor scores such as the El Ganzouri Risk index for adult patients and the Colorado Pediatric Airway Score (COPUR) for pediatric patients** making it easy to manage difficult airways not predicted by these scores, to hypothesize, for the near future, although with a preliminary study worthy of further investigation, the abandonment of individual parameters and scores predictive of difficult intubation, **with enormous benefits on the time spent in the preoperative evaluation of the surgical patient.**

METHODS **204 patients** were recruited at the E. Profili Hospital in Fabriano - Anaesthesia, Resuscitation, Intensive Care and Pain Management Unit, including **171 adults and 33 pediatric patients** (the latter aged less than 16 years of age), who underwent in a scheduled or emergency regimen in the specialties of general surgery, urology, gynecology, ophthalmology, odontostomatology, otorhinolaryngology, orthopaedics and spinal neurosurgery. Preoperative data such as surgical specialty and type of surgery, gender, age, weight, height, BMI, neck circumference measured in cm, "El-Ganzouri Risk Index" for adult patients and "Colorado Pediatric Airway Score (COPUR)" for pediatric patients were collected for each patient recruited. During the intubation manoeuvre through videolaryngoscope, the visual findings were assessed using the Fremantle classification.

Fremantle score component		
View	F (full)	
	P (partial)	
	N (none)	
Ease	1 - Easy	TT passed first time using manufactures technique
	2 - Modified	TT passed with more than 1 attempt or a modified technique or adjunct used
	3 – Unachievable	Unable to pass TT
Device		Name of the device and blade used

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