

Unintentional tracheal extubation during prone position: What is the best rescue airway device?

[Germano De Cosmo](#) and [Elisabetta Congedo](#)¹

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Unintentional tracheal extubation during surgery is a dramatic situation and may be a life-threatening event if it is not followed by a rapid reintubation.

This is particularly true in patients with difficult airways or in patients whose airways are difficult to access such as patients undergoing facial surgery or in prone position. The patient prone is a problem for the anesthesiologist because accidental tracheal extubation in this setting could be a catastrophic event often treated by turning the patient supine for ventilation and tracheal reintubation. However, patient's rotation in supine position is not always achievable and requires time, the support of personnel not necessarily immediately available, and it may contaminate the sterile surgical field with serious postoperative complications.[1] In the last years, several reports have been published to describe the anesthesiological management after unexpected intraoperative tracheal extubation particularly focusing on devices more often used.[2,3] The laryngeal mask airway (LMA) has become the most used device in the catastrophic situation “cannot intubate, cannot ventilate” and in literature, it has been described its insertion as rescue airway management in patients with unintentional tracheal extubation during general anesthesia in prone position.[4] In 1993, McCaughey and Bhanumurthy have inserted for the 1st time a supraglottic airway device (SAD) following the induction in prone position and from that time several studies have been performed to evaluate the facility and the security of insertion in this position. In fact, it has been shown that prone insertion may be easy as in the supine because the tongue falls anteriorly and creates an open space for the placement of LMA device (LMAD), whose seal is improved by the cephalic displacement of the larynx. Moreover, the risk of aspiration is reduced because regurgitant fluid for the gravity will be drained from the airway.[5]

In the issue of “Journal of Emergencies, Trauma, and Shock” Gupta *et al.* describe an observational study that they conducted to test the feasibility of SAD insertion for ensure airway ventilation in prone position and fixed head as in neurosurgical patients during accidental extubation.[6] Forty participating anesthesia residents were asked to place to airway trainer (Laerdal) manikin in the prone position three SADs; i-gel, LMA Proseal™ (PLMA), and LMA Classic™ (CLMA). The authors found that despite all three SADs were successful as rescue devices during accidental extubation in prone position, however, the ease of insertion was maximum with i-gel followed by CLMA and PLMA, in fact, i-gel was characterized by fewer time taken for insertion, least resistance in insertion, no maneuvers required for optimal positioning and bronchoscopic view and insertion score was significantly higher with i-gel as compared to CLMA and PLMA. Therefore, the authors compared three different SADs of which CLMA belongs to the first generation of LMA, whereas PLMA and i-gel to second generation of LMA. Second generation LMA was born to reduce the problems associated to the first generation LMA such as the difficult in positioning, the relatively low airway pressures with the risk of aspiration, and dislodgment. The second generation

LMADs like proseal have a gastric channel allowing the passage of a tube for gastric decompression. i-gel is a more recent SAD with a non-inflatable cuff made of a thermoplastic elastomer, able to provide a seal by conforming to differently shaped throats.

Several studies have compared the i-gel with various types of LMADs regarding to efficacy and ease of insertion. In a systematic review and meta-analysis performed by de Montblanc *et al.*, i-gel was superior regarding first generation LMAD in terms of time of insertion and leak pressure despite this superiority was not for i-gel compared to the second generation LMADs. The main clinical advantage of the i-gel was the less frequent sore throat.[7] Furthermore, in the study of Gupta *et al.* i-gel seems to have better quality of insertion. The novelty of this manuscript is that the authors' aim was to compare the insertion of different SADs in prone position during emergency situations such as accidental extubation and nowadays the evidence is lacking regarding the feasibility of SADs insertion in prone position in emergency situations because all the data were derived from elective setting or observational studies and case reports and translation of experience of elective cases into emergent situations could be misleading. It is not ethic to conduct randomized clinical trials to test the best rescue airway device for emergency airway management. Therefore, the authors have tried to get around this limit by performing a manikins study.

In recent years, it became very difficult to conduct clinical research and obtain ethical approval. Therefore, it was born a research based on manikin studies. For these studies, the approval ethic committee is usually easily obtained, there are no adverse effects, and the studies can be fastly completed. However, manikins are not like real patients for their hard plastic and lack of secretions so the results cannot be simply extrapolated and extended to humans. Howes *et al.* have evaluated the insertion of LMA supreme first in a manikin and then in patients. All participants have inserted successfully the device at the first attempt in the manikin phase of the study. In the patient phase of the study, insertion was successful in only 86% of cases on the first attempt.[8] Rai and Popat have attributed this difference to population diversity that could not be simulated and that is clinically challenging.[9]

The studies evaluating the feasibility of insertion of SADs in elective prone position after induction of anesthesia have stressed that the anesthesiologist should have considerable experience with the use of supraglottic airways in the prone position and that for these techniques low-risk patients should be selected. Moreover, the frequent endpoints of the studies regarding positioning of SADs in prone position evaluate the simplicity of insertion, the reduction of complications, and the insertion speed but probably the most important issue in this situation is the most appropriate SAD in terms of successful of insertion, adequate ventilation, utility for intubation through laryngeal mask, and the best position of the operator to insert the device. In fact, for the insertion in prone position different techniques have been described. Some authors describe the insertion of the SAD by the anesthesiologist while an assistant opens the patient's mouth by extending the tip of the patient's chin while in the Stevens and Mehta technique the assistant extends and turns the patient's head to the side.[10,11] However, the condition of insertion of SAD is quite different in an emergency situation, and the expertise of the operator is very important to position the LMA. The insertion of SAD is not elective, and the head cannot be turned. The evenience of an unaspected extubation during surgery in the operating room is not paragonable with the scenario described by authors. Therefore, it is not possible to extrapolate the experiences from the elective to the emergent situation since the insertion of SADs in prone position and emergency situations is not like the insertion in elective series where preoxygenation is often performed and a second bed is positioned alongside the operating table. Furthermore, the assistance of another operating room nurse or anesthesia assistant is often required to open the patient's mouth during the SAD insertion.[10]

In conclusion, more prospective randomized studies are needed to investigate the best management for airway management in patient in prone position. Many questions exist regarding to the best device to be used for the feasibility of insertion and the patient's security and currently, the first

recommendation for the anesthesiologists involved in surgical procedures with the patient in prone position is to firmly anchor the endotracheal tube to avoid an accidental extubation because the question regarding which SAD is the best choice is still unresolved.

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