

# Face-to-Face Intubation in Adults: A Comparison of Video Laryngoscopes Kingvision and Airtraq for Intubation in Morbidly Obese Patients – Series of Cases.

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## Research article

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# Abstract

**Background:** Traditional endotracheal intubation demands unlimited access to the patient and possibility to stand behind his head. However, in case of difficult conditions in emergency settings we can use an alternative method. Face-to-face intubation can be performed in patients in semi-erect position, prone position and in the situation of difficult access to the head.

**Method:** After obtaining an approval from the Local Ethics Committee Nr RNN/62/20/KE and written informed consent from the patients, we performed 8 procedures of face-to-face intubations in 8 patients who were scheduled for planned operations, using Kingvision and Airtraq video laryngoscopes chosen in random way.

**Results:** The intubation time was comparable between devices:  $9.25 \pm 2.217$  s vs  $8 \pm 2.3$  s ( $p=0.2322$ ) in Kingvision and Airtraq videolaryngoscopes respectively. Both devices appeared to deliver an optimal view of the larynx inlet and enable the operator to intubate with face-to-face method without any complications.

**Conclusions:** There were no significant difference in effectiveness between Kingvision and Airtraq video laryngoscopes during face-to-face intubation. Utilisation of these devices allowed the anesthetist to stand in front of the patient during endotracheal intubation and ensured an excellent view of larynx entrance. We assume that in case of difficult access to the patient's head or untypical position, the usage of examined video laryngoscopes, should be considered.

## Background

In a typical endotracheal intubation, the patient is in the supine position, with the anesthetist standing behind the patient's head and with adequate access to the head and neck of the patient. However, there are plenty of situations, where traditional intubation is extremely difficult or even impossible. In immobilised trauma victims, difficult access settings or suspected cervical spine injury, an inverse intubation (performed by a person standing in front of a patient) could be the only chance to support the airways. <sup>[1],[2]</sup> Likewise, in bariatric anesthesia, face-to-face intubation is increasingly being considered due to semi-sitting position, recommended in this group of patients. Postural change from supine to semi-erect position decreases the risk of an airway obstruction, caused by pharyngeal soft tissues collapsing in patients undergoing general anesthesia and muscle relaxation, suffering from obstructive sleep apnoea. <sup>[3]</sup> Nevertheless, facemask ventilation in lying positioned patient might be complicated due to fat tissue collected in cheeks and palate, tonsil hypertrophy, larynx relocation and limited mouth opening. <sup>[4]</sup> These are the reasons why postural change might be crucial to ensure an optimal ventilation and intubation conditions in bariatric patients. Airtraq optical laryngoscope (Prodol, Barcelona, Spain), widely used in anesthesiology, increases the effectiveness in intubation in first attempt and reduces the need of additional maneuvers. <sup>[1]</sup> The device is equipped with a tube guidance channel, supporting an appropriate placement of an endotracheal tube (Fig. 1.). This optical laryngoscope can be used with a

screen attached to the device which makes it working as videolaryngoscope. It is available in several sizes and can be used in adults and children. Kingvision video laryngoscope (Ambu, Netherlands) is equipped with disposable blades with or without tube guidance channel. It is also available in adult and children version. The device has a built-in screen, however we can watch a video on a separate monitor using connection cable (Fig. 2). In our study we used Airtarq with the screen attached to optical laryngoscope. For both videolaryngoscopes blades with guidance channel were used.

## Methods

The aim of the study was to compare clinical performance of two videolaryngoscopes in intubation efforts in face-to-face intubation in morbidly obese patients. Eight patients scheduled for planned sleeve gastrectomy were randomly (computer randomisation) allocated to group Airtarq and KingVision. After obtaining an approval from the Medical University of Lodz, Poland, Ethics Committee Nr RNN/62/20/KE and written informed consent from the patients study was commenced. All patients have similar demographic features and were anesthetised in the same way.(Table 1) The standard anesthesia monitoring involved electrocardiogram, pulseoxymetry, non-invasive blood pressure and end-tidal carbon dioxide. All patients were positioned with upper body elevation by about 30 degrees. The induction of general anesthesia involved the intravenous administration of  $1-2 \mu\text{g.kg}^{-1}$  of fentanyl and  $2-2.5 \text{ mg.kg}^{-1}$  of propofol. After facemask ventilation possibility was confirmed, rocuronium in a dose of  $0.6 \text{ mg.kg}^{-1}$  were given intravenously. After obtaining an optimal muscle relaxation, face-to-face intubation was performed. 4 patients were intubated with Airtraq and 4 with Kingvision video laryngoscopes. The devices were randomly selected before a procedure. A intubating anesthetist was standing on the left side of a patient and was observing the larynx entrance on the screen attached to the device. An intubation time was measured from the mouth opening to the right placement of the tube by assistant with a stopwatch. An intubation time, the need of additional manoeuvres, esophagus intubation, mucosal or teeth injuries were noted. The presence of sore throat or dysphagia were assessed in post-anesthesia care unit. In case of prolonged intubation ( $> 120 \text{ s}$ ) or 2 unsuccessful attempts, patients were supposed to be intubated in a traditional way with the same video laryngoscope.

Table 1  
Demographic features

Case	1	2	3	4	5	6	7	8
Gender F/M	F	F	M	F	F	F	F	M
Age [yrs]	35	35	42	37	48	35	41	24
Height [cm]	170	164	183	169	169	165	160	176
Weight [kg]	116	113	150	123	105	109	119	168
BMI kg/m <sup>2</sup>	40,14	42,01	44,79	43,07	36,76	40,04	46,48	54,24
Mallampati score	2	2	3	2	2	2	2	3
Micro/retrognathism	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0

Statistical analysis was performed using Microsoft Excell package (Microsoft, USA). The analysis method was T-student test for paired data assuming different variations.

## Results

The intubation time was comparable between devices:  $9.25 \pm 2.217$  s vs  $8 \pm 2.3$  s ( $p = 0.2322$ ) in Kingvision and Airtraq videolaryngoscopes respectively. In all cases an optimal larynx entrance visualisation was achieved and all patients were successfully intubated in a time not exceeding 11 s. (Table 2) The baseline vital parameters during the whole procedure remained stable. There were no complications observed. Written consent for photos publication were obtained from the patients.

Table 2.

### Results

Case	1	2	3	4	5	6	7	8
Laryngoscope	K	K	K	K	A	A	A	A
Intubation time	6	10	11	10	10	6	6	10
Need for manoeuvres	no							
Esophageal intubation	no							
Mucosal damage	no							

## Discussion

Our study demonstrated the utility of 2 video laryngoscopes in face-to-face endotracheal intubation. According to literature, our measured times of intubation do not exceed the results of other studies.<sup>[1],[5]</sup>

There are publications describing a possibility of using Macintosh laryngoscope.<sup>[2],[6]</sup> Nevertheless, it seems that a video laryngoscope is better suited for this technique, achieving higher effectiveness, shorter intubations time and conveniences for anesthetist.<sup>[7]</sup> Some authors report, that inverse intubation can be performed by one person successfully and does not demand an assistant.<sup>[8],[9]</sup> The anesthetist (standing on the left side of the patient) can hold a video laryngoscope with his right hand and insert the tube with the left one.<sup>[10],[11]</sup> It is optional to introduce the device with the left hand (like in traditional approach) and after obtaining satisfying larynx inlet visualisation, relocate a video laryngoscope to the right hand and insert intubation tube with the left one. Independently from the method, a video laryngoscope is a better choice than traditional Macintosh device undoubtedly.

There are plenty of publications comparing an effectiveness of video laryngoscopes. However, a number of researches involving face-to-face approach is limited. Arslan et al. indicated superiority of Airtraq over Glidescope during inverse intubation, achieving intubation times 14 vs 25 s. respectively.<sup>[1]</sup> The authors did not find a report consisting a comparison of Airtraq and Kingvision devices regarding inverse intubation conditions, however there is a publication demonstrating the predominance of Airtraq during traditional intubation.<sup>[12]</sup> In our study all patients were intubated successfully and there were no complications during anesthesia and post-anesthesia period observed. The anesthetists have not noticed differences in usage and effectiveness between examined devices.

## Conclusion

The authors conduct 8 successful face-to-face intubations in bariatric patients positioned with upper body elevation. We assume that an inverse intubation could be taken into account in patient in semi-erect position as long as elevation of the upper body ensures better conditions for ventilation and airway management. Utility of Airtraq and Kingvision for that purpose could be considered.

## Abbreviations

Not applicable

## Declarations

- Ethics approval and consent to participate:

Local Ethics Committee of Medical University of Lodz, Nr RNN/62/20/KE and written informed consent from the patients

- Consent for publication

written informed consent from the patients was obtained

- Competing interests

Authors declare no conflict of interest

- Funding

No funding

- Authors' contributions

JNT wrote manuscript, performed study, analysed the results

TG study conceptualisation, methodology, writing manuscript, supervision of study

- Acknowledgements

Not applicable

- The datasets used and/or analysed during the current study available from the corresponding author on reasonable request.

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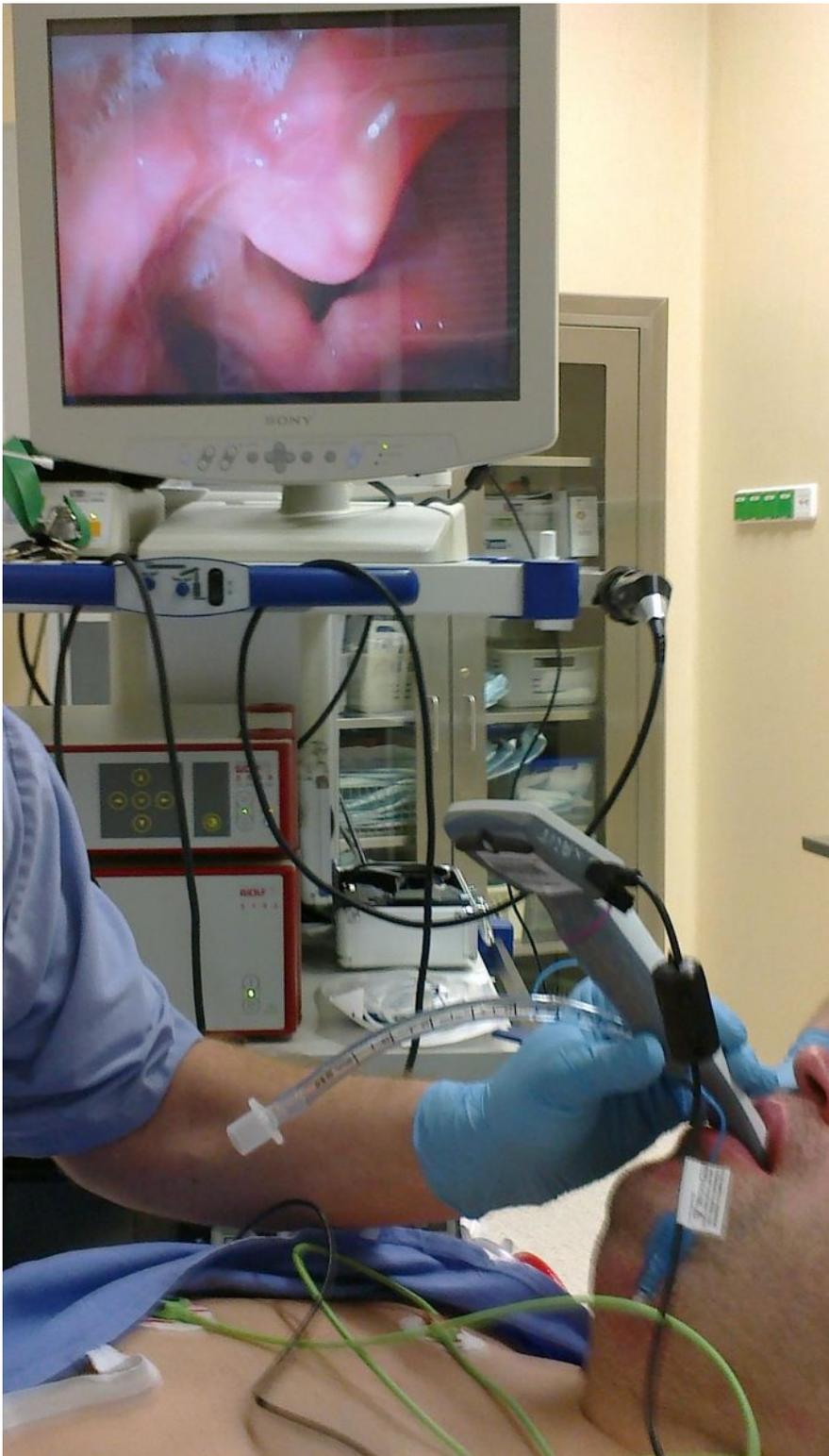
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## Figures



**Figure 1**

Reverse intubation using KingVision videolaryngoscope connected to external monitor with wire (Authors own material).



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Reverse intubation using KingVision videolaryngoscope connected to external monitor with wire (Authors own material).



**Figure 1**

Reverse intubation using KingVision videolaryngoscope connected to external monitor with wire (Authors own material).



**Figure 2**

Reverse intubation using optical laryngoscope Airtraq with attached monitor (Authors own material).



**Figure 2**

Reverse intubation using optical laryngoscope Airtraq with attached monitor (Authors own material).



**Figure 2**

Reverse intubation using optical laryngoscope Airtraq with attached monitor (Authors own material).