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Original Paper

# DIFFICULT AIRWAY PREDICTORS FOR ANTICIPATED OR UNANTICIPATED DIFFICULT AIRWAY IN PATIENTS WITH FIBREOPTIC INTUBATION: A RETROSPECTIVE OBSERVATIONAL STUDY

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*Airway management is a cornerstone of anaesthesia. The aim of the study was to identify difficult airway (DA) predictors for patients with fibreoptic intubation (FOI). This retrospective cohort study included 135 adult patients undergoing general anaesthesia with the use of FOI at Rīga East University Hospital from 1 January 2018 to 31 December 2022. For analysis, 135 patients were divided into two groups according to unanticipated (un-DA, n = 33) or anticipated DA: (a-DA, n = 102). Data were analysed using SPSS 26.0,* $p < 0.05$. *FOI was used only in 135 cases of 50,186 general anaesthesia cases over the study period. Of 135 FOI cases, 75 (55.6%) were males with a median age of 62 ± 19 years; 24.4% FOI was used in acute and 75.6% in elective surgeries. Those with a-DA had a higher Mallampati score, on average 3.2 vs. 2.1, p = 0.002. Unanticipated DA were reported statistically more frequently in acute admission cases compared to elective surgeries — 39.3% vs 10.8% of cases. Previously known tracheal pathologies such as dislocation (*$p = 0.001$*) and stenosis (*$p = 0.011$*) were statistically reliable factors for the anticipated DA. Comparing a-DA and un-DA groups for combinations of predictors (Mallampati score, admission and tracheal pathology) we found a sensitivity and specificity 70.3% and 68.7% to predict DA. Mallampati score, acute admission, and previously known tracheal pathology are reliable predictors of DA in patients undergoing FOI. Acute admission had the greatest impact on unanticipated DA.*

**Keywords:** *general anaesthesia, difficult intubation, difficult airway predictors.*

## INTRODUCTION

The unanticipated airway still occurs in anaesthesia practice. Difficult direct laryngoscopy is demonstrated in 1.5–8.5% of general anaesthesia cases with a similar incidence of difficult intubation. Consequently, failed intubation occurs in 0.13–0.3% of general anaesthesia cases (Crosby *et al.*, 1998). Nowadays, the use of point-of-care upper airway ultrasound during pre-anaesthetic adult airway evaluation to predict difficult intubation shows an increase in prediction of hard intubation up to 12.12% (El-Din Ibrahim, 2022).

Several factors have been identified as difficult airway predictors including obesity, short neck, limited mouth opening, high Mallampati score, thyromental distance (TMD), sternomental distance (SMD), upper lip bite test (ULBT), ratio of height to thyromental distance (RHTMD), protrud-

ing incisor, and receding mandible. These predictors have been evaluated in various studies to determine their ability to anticipate difficult airways (Maltby, 1991; Savva, 1994; El-Gamzouri *et al.,* 1996; Shiga *et al.,* 2005; Lee *et al.,* 2006; Goksu *et al.,* 2008; Aziz *et al.,* 2011; Apfelbaum *et al.,* 2013; Lundstrøm *et al.,* 2013; Pandit *et al.,* 2014; Al-Ramadhani *et al.,* 2015; Frerk *et al.,* 2015; Caputo *et al.,* 2017; Detsky *et al.,* 2019; Ahmad *et al.,* 2020). The precision of these predictors in predicting DA is controversial. Some studies report that specific predictors have high sensitivity and specificity to predict difficult intubation (Savva, 1994; El-Ganzouri *et al.,* 1996; Goksu *et al.,* 2008; Lundstrøm *et al.,* 2013; Detsky *et al.,* 2019), while others have demonstrated conflicting results (Maltby *et al.,* 1991; Pandit *et al.,* 2014; Raval and Doshi, 2015; Sharma and Sood, 2015).

The Mallampati classification system is one of the most widely used. In a study by Detsky *et al.* (2019), Mallampati class III and IV have been associated with an increased incidence of difficult intubation (Apfelbaum *et al.,* 2013). Moreover, the Mallampati score in patients undergoing elective surgery was found to be the strongest predictor of difficult intubation (Detsky *et al.,* 2019).

A short TMD of less than 6 cm has been associated with an increased incidence of difficult intubation (Frerk *et al.,* 2015). In addition, a short SMD of less than 12.5 cm has also been found to be a predictor of difficult intubation (El-Ganzouri *et al.,* 1996; Aziz *et al.,* 2011). A class III ULBT, indicating an inability to bite the upper lip, has been associated with an increased incidence of difficult intubation and was found to be a more sensitive predictor of difficult intubation than the Mallampati score (Savva, 1994; Caputo *et al.,* 2017). Additionally, a low RHTMD of less than 18 was found to be a significant predictor and is associated with an increased incidence of difficult intubation (Lee *et al.,* 2006; Lundstrøm *et al.,* 2013). In addition to these predictors, several other factors have been evaluated in various studies, including the Cormack-Lehane score, neck circumference, and age (Shiga *et al.,* 2005; Al Ramadhani *et al.,* 2015; Ahmad *et al.,* 2020).

The use of multiple predictors in combination might improve the accuracy of predicting difficult airways. In a study by Lee *et al.* (2006) a combination of Mallampati score, TMD, and SMD was found to be more accurate than each predictor alone (Salimi *et al*., 2017). Similarly, in the study by Yildiz *et al.* (2010) a combination of the Mallampati score, ULBT, and neck circumference was found to be more accurate.

Nowadays, still not all DA can be anticipated. Unanticipated DA can occur even in patients with normal airway predictors (Lee *et al*., 2020). A DA management plan has been published, including steps ABC (Apfelbaum, 2022). In each of the steps, fibreoptic intubation (FOI) can be applied in appropriate circumstances and knowledge. FOI is a procedure that involves passing a flexible bronchoscope through the patient's airway to visualise and guide the endotracheal tube (ETT) into the trachea.

FOI is indicated in a DA due to anatomical abnormalities, trauma, or tumours with limited mouth opening, retrognathic mandible, restricted neck movement, or unstable cervical spine. In addition, FOI can be used for patients with gastric distension with a high risk of aspiration (Ovassapian *et al.,* 1996; Hung *et al*., 2005; Cooper, 2003). Rarely, but still FOI can be applied as a rescue technique when traditional intubation has failed in laryngeal tumours, airway oedema, or severe inflammation patients. A retrospective study (Jindal *et al*., 2020) found that FOI was used in 5.5% of intubations in a tertiary care hospital setting, while in a large teaching hospital it was demonstrated (El-Boghdadly *et al*., 2018) demonstrated that FOI was used in 8.6% of all intubations performed. In a survey among Latvian anaesthesiologists in 2022 we found that FOI is still a big issue for most of anaesthesiologists, because only 1.2% of 163 respondents feel comfortable to use FOI regularly and 54.6% of respondents ask assistance of interventional pulmonologist to perform FOI. (Difficult Airway society annual scientific meeting in Newcastle in October of 2022 (Fig. 1)

The aim of the present study was to retrospectively evaluate the use of fibreoptic intubation for anticipated or unanticipated DA based on difficult airway predictors. Furthermore, the impact of anticipated or unanticipated DA management on haemodynamic and respiratory function and major adverse effects was analysed.

## MATERIALS AND METHODS

**Study subjects and data collection.** This retrospective cohort study included 135 adult patients undergoing emergence of elective surgery under general anaesthesia concomitantly with the use of elective or urgent FOI at Rīga East University Hospital "Gaiļezers", Latvian Oncology Centre, and Burns Centre "Biķernieki" in a four-year period from 1 January 2018 to 31 December 2022.

Given the observational and retrospective nature of our study, the attending physicians made clinical management decisions about the prediction of a difficult airway and the use of the fibreoptic device.

Primary data for patient selection were obtained from the statistics department according to a previously defined protocol and inclusion criteria: age 18 years, general anaesthesia with endotracheal intubation, acute or elective surgery.

Thoracic surgery cases were excluded since the FOI there is used for intubation and localisation of the endotracheal tube routinely.

All analysed parameters afterwards were manually precisely obtained from electronic health records. Demographic data and the main predictors of DA marked in the patient's medical documentation (Mallampati score, where I and II classi-

## Survey of current practice in difficult airway management in Latvia

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**Background:**

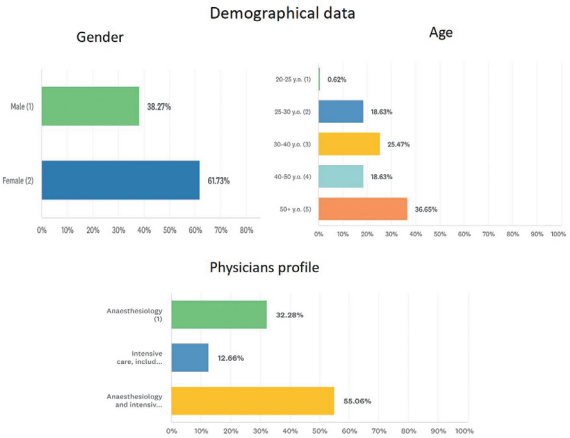
- There have been steady improvements in airway management, particularly becoming important during COVID.

**Aim:**

- To assess how anaesthesiologists deal with airway assessment and difficult airway management currently in Latvia.

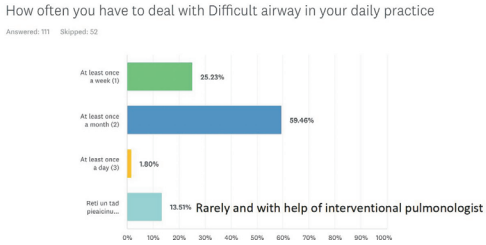
**Materials and Methods:**

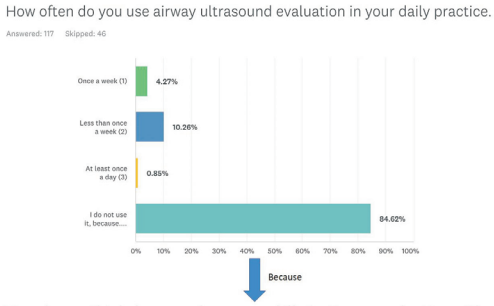
- We created a cross-sectional 30-question digital survey, approved by Riga Stradins university Ethics commission, in 2021 November among 315 anaesthesiologists in Latvia.
- Survey included demographic data, airway assessment and experience Difficult airway (DA management).
- Responses were collected and analyzed, using Statistical Package of Social Sciences (SPSS) version 21.

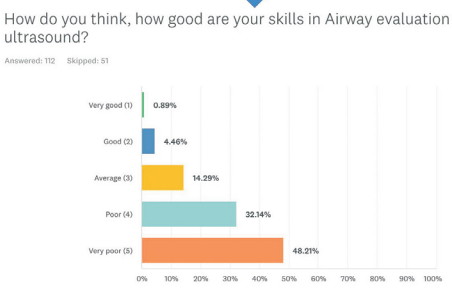


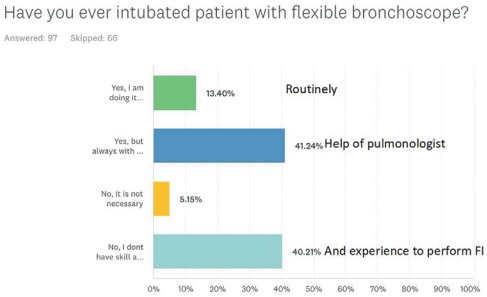

**Results:**

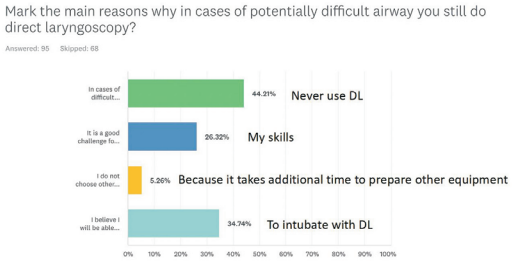
- Response rate was 163 (52%) (trainees 37 (22.84%), specialists 125 (77.16%)), working in Latvia.
- Most of physicians (55.6%) combines work in intensive care (IC). Solely in IC work 12.66% and in anaesthesiology 32.28%.
- Most of specialists 123 (80%) work in the university hospitals, which are well equipped.
- Difficult intubation once in a month were uncounted by 66 (59.46%) of specialists, once in a week by 28 (25.3%). With variable frequency 118 respondents marked that video-assisted intubation is most often used for DA management, 72,3% respectively.
- We found that 99 (84.62%) do not use ultrasound for airway assessment, as majority do not feel educated well enough. Moreover, only 30% stated that ultrasound could improve DA prediction rate and patient safety.
- Awake fibreoptic intubation at least once was performed only by 36 (34%) specialists, only 2 specialists would perform it regularly.
- Surprisingly, 89 (81.91%) anaesthesiologists need assistance from interventional pulmonologist to perform awake fibreoptic intubation which would be planned in situations when obvious signs of DA are present, like Mallampati IV and at least one another sign: head, neck mouth tumours or burns (62%), mouth opening < 3.5cm (50%).




**Conclusions:**

- Our survey showed, that in most of cases DA management is performed with video-assisted intubation.
- Most of specialists when DA looks inevitable perform awake fibreoptic intubation with assistance of pulmonologist.
- Ultrasound is a new method in airway assessment and is not used daily.
- Vast majority also stated that skills to use alternative methods to DL un videoassisted TI, improves patients safety, therefore…
- Further training in ultrasound and techniques such as fibreoptic intubation are essential to integrate them more in daily practise.
- We still have high percentage of physicians that still have this "mythical thinking" of belief in succesfull intubation in Difficult Airways

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*Fig. 1.* Survey of current practice in difficult airway management in Latvia. presented as poster in Difficult Airway Society annual scientific meeting in Newcastle, October 2022

fied as prognostic easy airway and III and IV as potentially difficult airway), small mouth opening < 3.5 cm, obesity with BMI > 30, short neck, limited neck movements, post-radiotherapy status of neck tumours, tracheal dislocation or stenosis, airway oedema, previous history of difficult intubation, known head-neck trauma or tumour were identified. As well as acute or elective admission, type of surgery, course of general anaesthesia induction, urgent or elective FOI. The respiratory parameters (lowest $SpO_2$) during airway management were documented. The main adverse effects associated with airway management were defined as a significant drop in $SpO_2$ < 70%, airway or oropharyngeal trauma, airway bleeding, increased ICU or hospital stay due to failure of airway management.

In total, 50,186 general anaesthesia surgery cases were identified. In 135 of cases FOI were used. Based on our aim, 135 patients were selected for further analysis and divided into two groups according to unanticipated or anticipated DA: unanticipated difficult airway (un-DA, n = 33) when FOI was used as an urgent tool when intubation with direct and video assisted laryngoscopy had failed, and anticipated difficult airway (a-DA, n = 102), when difficult DA was predicted timely and awake FOI or flexible bronchoscope intubation was used as a planned tool.

In our institution FOI is performed mainly by bronchoscopy specialists (interventional pulmonologists). Whenever anaesthesiologists recognise undoubtedly DA, bronchoscopists are called and awake FOI is performed with flexible bronchoscopes (Olympus Europa SE & Co. KG (Hamburg, Germany) or Pentax HOYA Corporation PENTAX Lifecare Division, Showanomori Technology Center, (Tokyo, Japan)) of different sizes and models.

**Definitions of anticipated and unanticipated airway, elective, and acute surgeries.** The anticipated difficult airway was defined as predicted by DA predictors and written in the patient's medical documentation in the pre-anaesthetic chart. In those cases, conducted in a planned setting, an awake FOI with a flexible bronchoscope is used as part of the intubation plan. During awake FOI slight sedation was used with Midazolam (Dormicum®, F. Hoffman-La Roche AG, Switzerland) 2.5 mg i/v and Lidocaine 4.6 mg spray (Egis Pharmaceuticals PLC 1106 Budapest, Hungary) in the throat applying a maximum of 20 mg of Lidocaine.

Unanticipated difficult airway was defined if difficulty to intubate was met after induction of anaesthesia without predication by DA predictors. In those cases, being performed in an acute setting, when induction of anaesthesia is given and the patient cannot be intubated, but can be ventilated by facemask, asleep FOI intubation is performed.

Elective surgery was defined when the patient was admitted to the hospital electively through the patient registration desk that had previously undergone a pre-anaesthesia evaluation with a known type of anaesthesia and a note of anticipated difficult airway in the pre-anaesthesia chart.

Acute surgery was defined when the patient was admitted to the hospital through the emergency department and required urgent surgical intervention under general anaesthesia, or a person was admitted to the hospital through the patient registration desk with surgical or non-surgical pathology, but due to the course of treatment or hospital stay, required urgent surgical intervention under general anaesthesia.

**Outcomes.** As a primary outcome, the authors looked at the incidence of FOI usage in anticipated or unanticipated difficult airway cases and the association with difficult airway predictors. Secondary outcomes were the impact of anticipated or unanticipated DA management on haemodynamic and respiratory function and the major adverse effects.

**Statistical analysis.** Statistical analysis was performed using SPSS 26.0 (Statistical Package for Social Sciences). No sample size calculation was performed due to the retrospective nature of this study. Continuous variables were presented as mean ± standard deviation (SD) and categorical variables as percentages (%). Non-parametric data is represented as medians with IQR.

The authors compared predictors of difficult airway between anticipated and unanticipated group, when intubation with direct or video-assisted laryngoscopy was not possible, with a Mann–Whitney U test for non-parametric variables and a two-sample t test or ANOVA for parametric variables. The Chi-square test was used to analyse categorical data. Stepwise logistic regression was performed for predictors of a difficult airway to observe the influence of each predictor on the decision for fibreoptic intubation. The area under the curve (AUC) was used to analyse the sensitivity and specificity of combinations of signs for difficult airway prediction.

Statistical significance was assumed if two-tailed $p < 0.05$.

## RESULTS

**Incidence of FOI and comparison between acute and elective airway management.** FOI was used in 135 (0.26%) cases of which 33 (24.4%) patients were with un-DA and 102 (75.6%) patients with a-DA. Out of 135 cases, in 33 (24.4%) FOI was applied in acute and in 102 (75.6%) elective surgeries. Tracheal intubation with FOI was done immediately after induction of anaesthesia in the a-DA group, but there was an average waiting time from 10 to 20 minutes until FOI was performed to provide tracheal intubation in the un-DA group.

**Patient characteristics and difficult airway predictors in anticipated and unanticipated difficult airways.** From all analysed cases 75 (55.6%) were males with median age 62 ± 19 years. There were no noticed significant differences in analysed FOI patient population between groups with unanticipated and anticipated DA regarding gender ($p = 0.282$), age ($p = 0.477$) and body mass index distribution ($p = 0.12$), as depicted in Table 1.

*Table 1.* Demographic characteristics and predictors of difficult airways between unanticipated and anticipated difficult airway groups

| Variables | Totally n = 135 | un-DA n = 33 | a-DA n = 102 | *p*-value |
|---|---|---|---|---|
| Demographic data | | | | |
| Male sex, n (%) | 75 (55.6) | 21 (63.6) | 54 (52.9) | 0.282 |
| Age, years | 60.4 ± 14 | 61.9 ± 14 | 59.9 ± 14 | 0.477 |
| BMI, kg/m$^2$ | 28 ± 6.4 | 27.4 ± 5.8 | 29.4 ± 6.6 | 0.12 |
| Acute admission, n (%) | 24 (17.7) | 13 (39.3) | 11 (10.8) | .001 |
| Predictors of DA | | | | |
| Mallampati score (median; IQR) | 3.2 | 2.1 | 3.2 | 0.002 |
| Mouth opening < 3.5 cm, n (%) | 10 (7.4) | 2 (6) | 8 (7.8) | 0.734 |
| Tracheal dislocation, n (%) | 32 (23.7) | 1 (3) | 21 (20.6) | 0.001 |
| Tracheal stenosis, n (%) | 35 (25.9) | 3 (9.1) | 32 (31.4) | 0.011 |
| Airway oedema, n (%) | 9 (6.7) | 2 (6.1) | 7 (6.9) | 0.872 |
| Risk of aspiration, n (%) | 20 (14.8) | 4 (12) | 16 (15.7) | 0.616 |

Data are presented as mean and standard deviation or median interquartile ranges, or number and percentages, as appropriate. Abbreviations: BMI (Body Mass Index; un-DA (unanticipated Difficult Airway), a-DA (anticipated Difficult Airway)

The results indicate a significant difference in Mallampati scores between a-DA an un-DA groups [U = 2266, Z = 3.1, $p$ = 0.002]; those with predicted a-DA had a higher Mallampati score on average 3.2 vs 2.1 compared with the un-DA group. In total, there were 83 (61.5%) patients with Mallampati score III and IV. As expected, when comparing the incidence in the a-DA vs. un-DA groups, more often patients with Mallampati score ≥ III were detected in the a-DA group, 69 (67.6%), vs. 14 (42.4%), respectively, $p$ = 0.01.

Furthermore, statistically more often unanticipated DAs were reported in acute admission cases compared to elective surgery — in 39.3% vs 10.8%; $p < 0.001$. In contrast, previously known tracheal pathologies like dislocation ($p$ = 0.001) and stenosis ($p$ = 0.011) were statistically reliable factors for anticipated DA.

There were no found statistical differences between groups in mouth opening < 3.5, airway oedema and increased risk of aspiration, shown in Table 1.

Statistically reliable predictors of DA were found to be Mallampati score, acute admission, and previously known tracheal pathology. Furthermore, by comparing the a-DA and non-DA groups we found that acute admission has the greatest impact on unanticipated DA (< 0.001) (Table 2).

Mallampati score, acute admission and previously known tracheal pathology differed significantly between a-DA and un-AD patients. Comparing groups for combinations of these three predictors, we found a sensitivity and specificity of 70.3% and 68.7%, as demonstrated in Fig. 2.

The mean $SpO_2$ was higher in the a-DA group compared to the un-DA group during airway management — 96.37 ± 4.32 vs. 90.7 ± 12.38; $p < 0.001$. We did not identify any major adverse effects of airway management. Significant desaturation was found only in the un-DA group, where two patients had a short time desaturation of $SpO_2$ 54 and 43% with no documented other adverse effects, as presented in Table 3.

*Table 2.* Association between difficult airway predictors and the risk of a difficult airway

| Dependent variables | β; p; 95% CI; $R^2$% |
|---|---|
| Acute admission or emergency airway | 0.51; < 0.001; (0.359–0.624) 31.8 |
| Mallampati score | 0.21; 0.002; (0.038–0.169) 35.6 |
| Tracheal dislocation* | 0.15; 0.041; (0.006–0.288) 38.5 |

*Tracheal stenosis was excluded as there was tight correlation between tracheal dislocation and stenosis. Stepwise logistic regression analysis. Data are presented as 95% confidence intervals, or $p$ value, or β and $R^2$%.

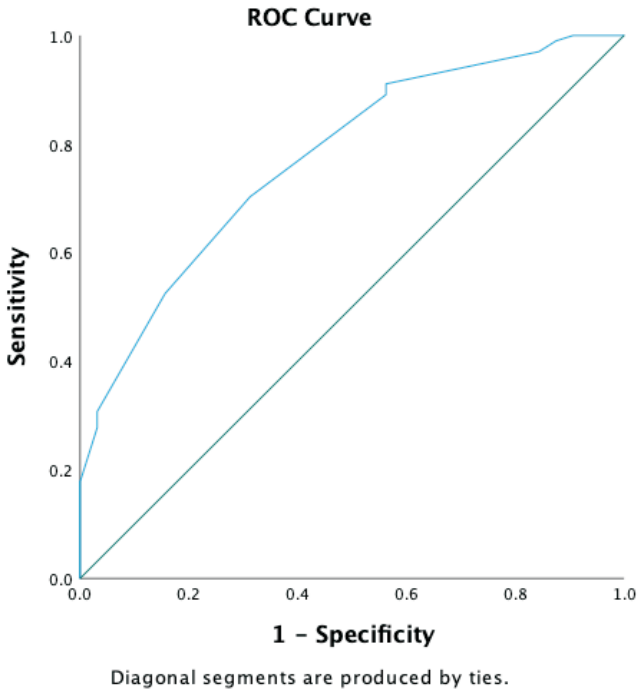


*Fig. 2.* Impact of anticipated DA (Mallampati III - IV, elective surgery, and previously known tracheal pathology) management with FOI on haemodynamic and respiratory function and adverse effects.

## DISCUSSION

The present study aimed to investigate the association between difficult airway predictors and anticipated or unanticipated DA and to analyse the impact of DA management on the major adverse effects in patients undergoing FOI. The authors hypothesised that the use of DA predictors would help to predict DA early and perform awake FOI if appropriate.

The study found that among the 135 adult patients undergoing surgery under general anaesthesia with use of the elective or urgent FOI, 102 had a-DA and 33 had un-DA. We

*Table 3.* Variables during intubation

| Variables during intubation | Totally n = 135 | un-DA n = 33 | a-DA n = 102 | *p*-value |
|---|---|---|---|---|
| $SpO_2$, % during airway management | | 90.7 ± 12.38 | 96.37 ± 4.32 | 0.001 |
| Major adverse effects: | | | | |
| short time desaturation, n (%) | 2 (%) | 2 (%) | 0 | NS |
| airway trauma, n (%) | 0 | 0 | 0 | - |
| ICU admission, n (%) | 0 | 0 | 0 | - |

HR, heart rate), ICU, Intensive Care Unit

Data are presented as mean and standard deviation or median interquartile ranges as appropriate.

observed an association between DA predictors and an anticipated or unanticipated difficult airway. Patients with a-DA had significantly higher Mallampati scores, more frequent use of awake FOI, and a lower incidence of failed intubation than patients with un-DA. These results are consistent with previous studies that have demonstrated the effectiveness of the Mallampati score in predicting DA (Apfelbaum *et al.,* 2013; Samsoon and Young, 1987).

This study also found that statistically more often unanticipated DAs were reported in acute admission cases compared to elective surgery, which can be associated with several patient related factors as well. Therefore, we assume a relation to job organisation, as bronchologists are not available after hours and anaesthesiologists take bigger risks, especially when patient cannot wait for bronchologist to arrive.

The study also found that the use of urgent FOI was associated with a higher incidence of desaturation than the use of elective FOI. These findings are consistent with previous studies that have reported higher rates of complications with urgent FOI (Benumof and Scheller, 2004; El-Orbany and Connolly, 2012). It is important to note that we did not observe significant differences in adverse effects between the two groups, indicating that both anticipated and unanticipated DA management was performed safely.

Our findings have important implications for clinical practice. Although DA predictors are useful in identifying patients with an anticipated DA, they may not be reliable in identifying patients with an unanticipated DA. Therefore, it is important to have a comprehensive approach to airway assessment, including a detailed history and examination, as well as the appropriate equipment and expertise readily available for unexpected DA. Furthermore, our results suggest that with appropriate management, outcomes for patients with anticipated or unanticipated DA can be similar.

The study has several limitations, including that the study was retrospective, which means that the data was collected after the patients had already undergone the procedures. This could have introduced bias into the study, as we were unable to control for all possible confounders. Furthermore, the sample size was relatively small, with only 135 patients. This could limit the generalisability of the findings and make it difficult to draw definitive conclusions. Furthermore, the study did not include a control group, which means that it is difficult to determine whether the observed results were specifically related to DA management or if they would have occurred regardless. Additionally, the experience level of the anaesthesiologists performing the FOI was not reported, which could have influenced the results. Anaesthesiologists with more experience may have been able to manage DA more effectively than those with less experience. Finally, the study did not consider the impact of comorbidities or other factors of the patient on the incidence of DA or adverse events. Factors such as obesity, smoking status, and pre-existing respiratory conditions could all influence the results of the study as physiological compensatory capabilities could be decreased, which would lead to more severe adverse effects and that could also affect decision making for awake FOI.

In conclusion, Mallampati score, acute admission, and previously known tracheal pathology were found to be statistically reliable predictors of a difficult airway. Acute admission had the greatest impact on unanticipated DA. Short time desaturation in the unanticipated DA group was not associated with major adverse effects.

## ETHICS

The study protocol and the informed consent form were approved by the Ethics Committee of Rīga East Clinical University Hospital (Approval Number 22-2/597/2021).

## CONFLICTS OF INTEREST

The authors declare no conflicts of interest.


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GRŪTU ELPCEĻU PROGNOZĒTĀJI IEPRIEKŠ PAREDZĒTU VAI NEPAREDZĒTU GRŪTU ELPCEĻU PACIENTIEM AR FIBROPTISKO INTUBĀCIJU: RETROSPEKTĪVS NOVĒROŠANAS PĒTĪJUMS

Elpceļu nodrošināšana ir anesteziolo ̧ijas pamats. Pētījuma mērķis bija identificēt grūtu elpceļu pazīmes pacientiem, kam pielietota fibroptiska intubācija. Retrospektīvs kohortas pētījums ar 135 pacientiem, kuriem pielietota fibroptiska trahejas intubācija Rīgas Austrumu klīniskās universitātes slimnīcā laika posmā no 2018. gada 1. janvāra līdz 2022. gada 31. decembrim. Pacienti tika sadalīti divās grupās — iepriekš neparedzētu grūtu elpceļu pacientu grupa (un-DA, n= 33) un iepriekš paredzētu grūtu elpceļu grupa (a-DA, n = 102). Dati tika analizēti, izmantojot SPSS 26,0, $p < 0,05$. Fibroptiska intubācija (FOI) tika pielietota tikai 135 gadījumos, no kuriem 75 (55,6%) bija vīrieši ar vecuma mediānu 62 ± 19 gadi, 24,4% FOI tika pielietots neatliekamās un 75,6% plāna operācijās. Pacientiem ar a-DA bija lielāks Mallampati novērtējums: vidēji 3,2 pret. 2,1, $p = 0,002$. Un-DA statistiski biežāk bija neatliekamos gadījumos, salīdzinot ar plāna operācijām: 39,3% pret 10,8% gadījumiem. Iepriekš zināmas trahejas pataloģijas kā trahejas dislokācija ($p = 0,001$) un stenoze ($p = 0,011$) bija statistiski ticami faktori prognostiski grūtiem elpceļiem. Salīdzinot a-DA un un-DA grupas kombinētos prognostiskos faktorus (Mallampati skala, uzņemšana plāna vai neatliekama un iepriekš zināma trahejas pataloģija), konstatējām sensitivitāti un specifiskumu 70,3% un 68,7% atbilstoši, lai paredzētu grūtus elpceļus. Mallampati skala, neatliekama uzņemšana, un iepriekš zināma trahejas patoloģija ir uzticami grūtu elpceļu prognostiski faktori pacientiem, kuriem veic FOI. Ja pacients ir neatliekami uzņemts, tas ir nozīmīgs faktors nespējai adekvāti prognozēt grūtus elpceļus.