



Evaluation of difficult laryngoscopy in diabetic patient

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Abstract

Difficult airway is the critical phase in which well-trained anesthesiologist unable to visualize any part of vocal cords facing hurdles in upper airway to ventilate the patient with facemask or with endotracheal tube to secure the patient ventilation. The aim of this study was to find out the incidence of difficult intubation and difficult laryngoscopy in diabetic patients undergoing general anesthesia. A cross sectional study was conducted at Mardan medical complex for which convenient sampling, which is a type of non-random sampling techniques, was used for collection of data from the subjects. A total 50 diabetic patients undergoing general anesthesia were preoperatively assessed for their airway manipulation using different airway indices and physical examination. Out of 50 participants, (84%) n = 42 were female and only (16%) n = 8 were male. The mean age of the subjects was 51.9 ± 11.3 . After observing all the 50 participants for difficult intubation, among them (32%) n = 16 participants faced the difficult laryngoscopy while rests of the (64%) n = 34 were easily intubated. From this study, we observed that diabetic patients were more prone to difficult laryngoscopy and the only reason we found was limited mobility of the neck and less mouth opening in them. We also assumed from this study that a short term diabetic patient has no such changes in their neck mobility and mouth opening due to they were less exposed to the disease.

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Introduction

Conducting zone and respiratory zone are practically isolated respiratory frameworks. The way by which the air entertain into the bronchioles are conducting zone and the respiratory zone is involved in exchange of gases. The ways by which air can reached into alveoli are Nose or mouth, nasal cavity and pharynx which connect the oral and nasal passage into larynx. Three medically important space of pharynx names as retro palatal space, retro glossal space and retro epiglottis space lead to obstruct the upper airway during anesthesia (Shorten *et al.*, 1994). Being as anesthesiologist it is mandatory to have knowledge regarding respiratory system Physiology along with airway anatomy to secure the patient airway for surgical procedure. 80% Morbidity and mortality occur during the initial phase of anesthesia link with patient respiratory airway collapse lead to decrease the oxygen saturation (Brismar *et al.* 1985).

Difficult airway is the critical phase in which well-trained anesthesiologist unable to visualize any part of vocal cords facing hurdles in upper airway to ventilate the patient with facemask or with endotracheal tube to secure the patient ventilation (Katz, 2012). According to the American Society of Anesthesiologists (ASA) Difficult intubation is defined as failure in inserting of endotracheal tube into trachea by 3 attempts or spend more than 10 mints in order to ensure the patient airway is called difficult tracheal intubation (Report by the American Society of Anesthesiologists Task Force on Management of the Difficult Airway, 2013). Many factors which have contribution in difficult airway are classified as patient factor, congenital abnormalities Such as Pierre Robin Syndrome, Down Syndrome, Klippel feil`s syndrome, Trachear Collin`s syndrome, stiffness, scleroderma which lead to restricted mouth opening less than 4cm including the TMD (thyromental distance) less than 6 cm and with positive Mallampatti grading like Grade III and IV.

A cohort prospective study were done in Turkey result of that study shows 4.8% incidence of difficult intubation which is nearest to studies of other

countries (Yildiz *et al.*, 2007) as it ratio increase 13.8% in emergency obstetric and obese patient (Basaranoglu *et al.* 2010; Kim *et al.*, 2011) 30% mortality ratio associated with anesthesia occurs due to failure to secure the patient airway (Bellhouse and Dore, 1988; Benumof, 1991).

The American diabetes association defines the diabetes as “Diabetes mellitus is metabolic diseases describe by high blood glucose level resulting defect in secretion of insulin or function of insulin or both. Thus the risk factor associated with diabetic would increase with the time. About 422 million adult suffered from diabetes as per World health Organization (WHO) annual report and it has been reached to 425 million as per 2017 report (WHO, 2017). Patient suffered from diabetes shows many sign and symptom like severe thirst, polyuria, polyphagia and fatigue due to increase the metabolic activity. These kinds of factors are responsible to increase the risk of foot ulcer, limited joint mobility, cervical stiffness, heart attack, cerebrovascular disease and nephropathy (Wyatt and Ferrance, 2006). Approximately 2.6% people suffer from global blindness due to long term defect in micro vascular structure of retina (Leasher *et al.*, 2016). Meanwhile Diabetic people with a ratio of 50% experiencing surgeries in their life (Stevanovic *et al.*, 2015). Several factor like Limited Joint mobility, cervical disease has been related with the patient who diabetes more than 5 years due to this anesthetist facing the difficulty to intubating the patient. Studies reported that approximately 27-31% ratio of difficult laryngoscopy observed in diabetic patient.

The reason behind is non-enzymatic glycosylation of collagen and its accumulation in joint result in restricted joint mobility (Hogan, *et al.*, 1988; Reissell *et al.*, 1990; Nadal *et al.*, 1998). The aim of this study to find out the incidence of difficult intubation in a diabetic patient undergoing general anesthesia.

Methodology

Study design and duration

This cross sectional study was conducted from

September 2017 to January 2018 in Mardan medical complex, a district of Khyber Pakhtoonkhwa.

Sample size

A total of 50 diabetic patients were collected for this study aging 20 to 60 years.

Patient selection/inclusion and exclusion

Diabetic patients of age less than 20 years and greater than 60 years were excluded from this study. All patients were preoperatively assessed through different airway indices for airway evaluation excluding the congenital abnormalities.

Study approval

This study was conducted after the approval from hospital.

Procedure

Every patient was asked for their history of diabetes, drugs history, their recent laboratory investigations including the blood Glucose profile and physical examination was also done preoperatively.

Preoperative assessment of research respondents was evaluated using different airway test like Mallampatti, Inter-incisor gap and thyromental distance to identify the difficult laryngoscopy. Data was received from the patient directly through examination or by using proforma based evaluation.

Data analysis

Table 2. Frequency of difficult laryngoscopy and intubation.

Parameter	Status	Frequency
Intubation	Difficult	32% (n=16)
	Easy	68% (n=34)
Total		100% (n=50)

The weight of each participant was measured by using Digital Scale. Their mean weight was 83.26 ± 10.35 . The maximum weighted participant was 98kg and the lowest was of 35kg.

The total participants of this study were then divided into Group A and Group B on the basis of their

Data analysis was done using Statistical Products of Social Sciences version 22 (SPSS) and the data were analyzed and represented in the results through tables.

Results

Random sampling of 50 diabetic patients was done and was studied for the aims and objectives of this study. All patients were presented for surgery and the general anesthesia technique was used for their procedures. All of the 50 patients were assessed preoperatively for the presence of difficult laryngoscopy in them. Among them 84% (n=42) participants were female and 16% (n=8) were male participants (Table 1). After analyzing this data for their mean age distribution we get a mean age of 51.90 and their standard deviation was calculated ± 11.28 . The maximum age participants were of 60 Years while least age participant was 20 Years old.

Table 1. Patient are distributed according to gender.

Gender	Frequency
Male	16% (n=8)
Female	84% (n=42)
Total	100% (n=50)

The assessment of difficult Laryngoscopy was done in 50 patients, among them 32% (n=16) patients faced difficult laryngoscopy and intubation. While in 68.00% (n=34) patients the endotracheal intubation and laryngoscopy was easy (Table 2).

diabetes history. Group A patients were n=21 and their history of diabetes was of less than 5 Years and we named them as short term diabetic patients.

Group B patients were n=29 and their history of diabetes were greater than 5 Years which we called long term diabetic patients (Table 3).

Discussion

For the prediction of difficult laryngoscopy and intubation most of the experienced anesthetists perform airway assessment, preoperatively. Securing patient airway during anesthesia is a big challenge for

every anesthetist. When comparing intubation and laryngoscopy with non-diabetic population, in diabetic patients due to tissues glycosylation leads to joints stiffness, this task is very difficult in the diabetic patients.

Table 3. Ratio of difficult laryngoscopy short term and long term diabetes.

Diabetes	Characteristics	No of patients	Ratio B/W short and long term
Short term	< 5 years duration	21	1.0 : 1.3
Long term	> 5 years duration	29	
Total		50	

This study reported difficult laryngoscopy in those having long term diabetic patients while there were less difficult laryngoscopy in short term diabetic patients presented for surgical procedures (Chang *et al.*, 1980; Reissell *et al.*, 1990). he proved that diabetic patient have abnormal collagen metabolism along with increase cross-linked formation this make sure that diabetic patient have increased probability to face difficulty in intubation. Recent studies on this complication of diabetic patients reported 30% incidence while that was 3% for non-diabetic patients (Eleborg *et al.*, 1988), this large difference in the incidence between diabetic and non-diabetic was because of the stiffness in the cervical region and reduced mobility of the neck in diabetic patients. One another research reported the incidence in type 1 diabetic patients with 31% difficulty in intubation and laryngoscopy (Reissell *et al.*, 1990), while this study reported 32% incidence of difficult laryngoscopy but this study reported the incidence in type-2 diabetic population. Many researchers studied the ratio of difficult intubation by using different airway indices in the long term diabetic patients and reported the incidence of 32%, which was similar to this study finding. This value is the nearest to study which was reported by (Hogan, *et al.*, 1989). Diabetes was one of the most important factors associated with difficult laryngoscopy and intubations, because this study also reported a huge frequency of diabetic patients who faced difficulty in laryngoscopy as well as intubation.

Conclusion

From this study, we observed that diabetic patients

were more prone to difficult laryngoscopy and the only reason we found was limited mobility of the neck and less mouth opening in them. We also assumed from this study that a short term diabetic patient has no such changes in their neck mobility and mouth opening due to they were less exposed to the disease.

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