RESULTS

This chapter presents the result of direct versus video laryngoscope on endotracheal intubation. All sampled (n=96) patients were willing to participate, yielding a response rate of 100 %.

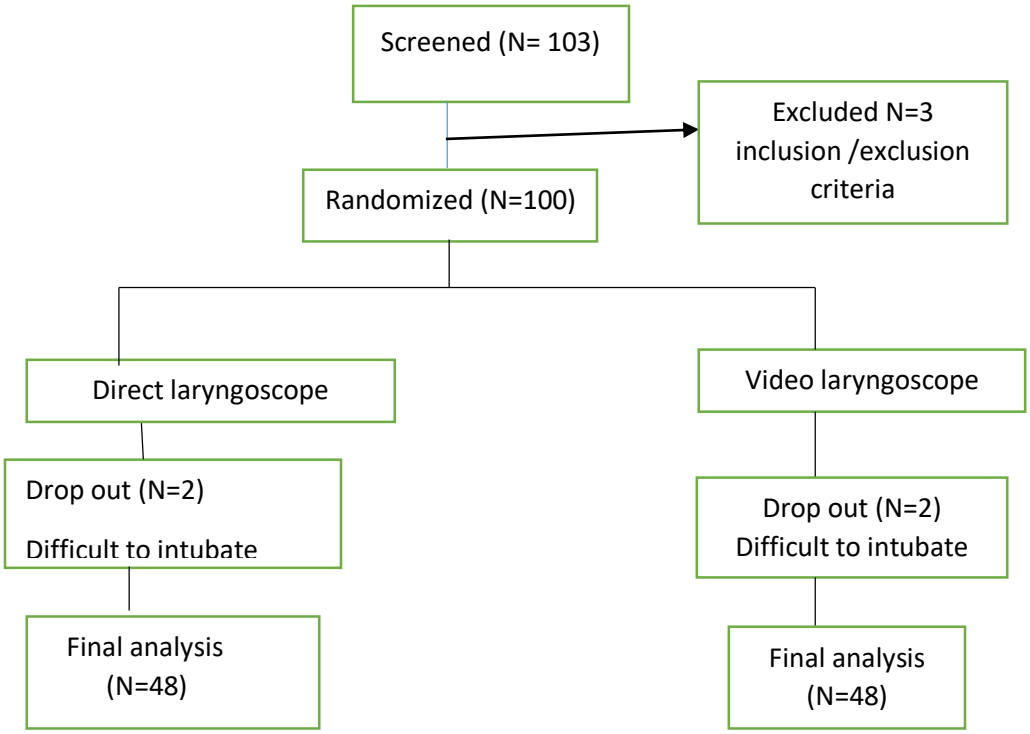

Figure 1. Flow chart of patient enrollment

Demographic characteristics

The summary demographic characteristics of the patients under direct and video laryngoscope is shown in Table 1. The mean age of the patients who were under direct and video laryngoscope was 48.33 (SD=15.15) and 49.06 (SD=13.09) respectively. The proportion of males who were under direct (31.3%) was not significantly different (p=0.827) from those who were under video laryngoscope (33.3%). Moreover, the proportion the categories of marital status (p=0.206) and educational level (p=0.583) under direct and video laryngoscope were not significantly different. Almost one third of the employed patients were under direct laryngoscope (37.5%) and similar proportion of employed patients were under video laryngoscope (35.4%). The proportion of participants from Orotta hospital under direct laryngoscope (45.8%) and video laryngoscope (27.1%) was not significantly different.

Table 1: Demographic characteristics of the study participants

Variables	Direct Laryngoscope n (%)	Video Laryngoscope n (%)	Total n (%)	*p*-value
Gender				
Male	15 (31.3)	16 (33.3)	31 (32.3)	0.827
Female	33 (68.8)	32 (66.7)	65 (67.7)	
Marital status				
Married	39 (81.3)	44 (91.7)	83 (86.5)	0.206
Single	8 (16.7)	3 (6.3)	11 (11.5)	
Divorced	0 (0)	1 (2.1)	1 (1.0)	
Widowed	1 (2.1)	0 (0)	1 (1.0)	
Educational level				
Illiterate	12 (25.0)	15 (31.3)	27 (28.1)	0.583
Elementary	13 (27.1)	7 (14.6)	20 (20.8)	
Junior	10 (20.8)	9 (18.8)	19 (19.8)	
Secondary	6 (12.5)	9 (18.8)	15 (15.6)	
Post-secondary	7 (14.6)	8 (16.7)	15 (15.6)	
Occupational status				
Employed	18 (37.5)	17 (35.4)	35 (36.5)	0.832
Unemployed	30 (62.5)	31 (64.6)	61 (63.5)	
Site (Hospital)				
Orotta	22 (45.8)	13 (27.1)	35 (36.5)	0.056
Halibet	26 (54.2)	35 (72.9)	61 (63.5)	
	Direct Mean (SD)	Video Mean (SD)	Overall Mean (SD)	p-value
Age	48.33 (15.15)	49.06 (13.09)	48.7 (14.09)	0.801

Clinically related background characteristics

The proportion of patients under direct and video laryngoscope across the categories of clinically related background characteristics is shown in Table 2. Almost seventy percent of the patients under direct (70.8%) and video laryngoscope (68.8%) were at Mallampati grade I. The distribution of the patients by ASA classification under direct laryngoscope and video laryngoscope was perfectly the same (p=1.000). However, slight difference (p=0.037) in proportion of patients with CROM $<35^0$ under direct laryngoscope (6.3%) was observed when compared to those under video laryngoscope (20.8%). Similarly, slight difference in proportion of patients with TMD categories

was observed between direct and video laryngoscope (p=0.037). However, there was similar proportion of participants across the categories of HMD (p=0.399) and MO (p=0.336) under both direct and video laryngoscope.

Table 2: Percentage distribution of the patients according their clinical characteristics

Variables	**Direct Laryngoscope n (%)**	**Video Laryngoscope n (%)**	**Total n (%)**	***p*-value**
Mallampati grade				
Grade I	34 (70.8)	33 (68.8)	67 (69.8)	0.309
Grade II	12 (25.0)	15 (31.3)	27 (28.1)	
Grade III	2 (4.2)	0 (0)	2 (2.1)	
ASA classification				
ASA I	36 (75.0)	36 (75.0)	72 (75.0)	1.000
ASA II	12 (25.0)	12 (25.0)	24 (25.0)	
Cervical Range Of Motion (CROM)				
<35^{o}	3 (6.3)	10 (20.8)	13 (13.5)	0.037
>=35^{o}	45 (93.8)	38 (79.2)	83 (86.5)	
Thyro Mental distance (TMD)				
>=6.5 cm	45 (93.80	38 (79.20	83 (86.5)	0.037
<6.5 cm	3 (6.3)	10 (20.8)	13 (13.5)	
Hyo Mental Distance (HMD)				
<3 cm	2 (4.2)	4 (8.3)	6 (6.3)	0.399
>=3 cm	46 (95.8)	44 (91.7)	90 (93.8)	
Mouth Opening (MO)				
>4 cm	44 (91.7)	41 (85.4)	85 (88.5)	0.336
<=4 cm	4 (8.3)	7 (14.6)	11 (11.5)	

Comparison of vital signs and duration of intubation between DL and VL

Comparison of the vital signs and duration of intubation was performed between DL and VL using independent samples T-test or Mann-Whitney U test, depending on the normality of the data as shown in Table 3.

The median time to intubation under DL (Md=40 seconds, IQR=24 seconds) was significantly greater (P<0.01) as compared to that of VL (Md= 28 seconds, IQR =17 seconds). However, there was no significant difference between DL and VL across the change in vital signs.

Table 3: Vital signs and duration of intubation comparison between DL and VL

Variable	M/SD, Md/IQR Direct	M/SD, Md/IQR Video	Min, Max Direct	Min, Max Video	t/Z-value	p-value
Duration of intubation[s]	40 (24)	28 (17)	21, 160	10, 120	-4.5	<0.001
SPO2 at baseline[n]	97 (2.06)	96.67 (1.86)	92, 100	93, 100	0.831	0.408
SPO2 after induction[s]	100 (1)	100 (1)	94, 100	89, 100	-0.505	0.614
SPO2 after 1 minute[s]	100 (1)	99 (2)	96, 100	94, 100	-0.679	0.497
SPO2 after 5 minutes[s]	96 (100)	99.5 (2)	96, 100	94, 100	-1..085	0.278
PR at baseline[n]	94.63 (18.49)	88 (17.82)	59, 144	51, 121	1.759	0.082
PR after induction[n]	92.50 (17.12)	92.13 (15.47)	56, 140	57, 134	0.113	0.911
PR after 1 minute[n]	95.25 (18.41)	92.44 (17.90)	50, 138	59, 135	0.759	0.450
PR after 5 minutes[s]	90 (15)	90 (18)	60, 145	55, 129	-0.084	0.933
MAP at baseline[s]	99 (16)	98 (24)	60, 163	62, 124	-0.084	0.933
MAP after induction[s]	86.5 (27)	88 (18)	52, 132	62, 164	-1.092	0.275
MAP after 1 minute[n]	94.35 (24.88)	89.95 (19.02)	43, 153	62, 137	0.996	0.322
MAP after 5 minutes[s]	89.5 (25)	86.5 (22)	44, 167	55, 128	-0.509	0.610

S- skewed, n- normal

Comparison of DL and VDL during intubation

The potential variables that might have association with the usage of direct and video laryngoscope during intubation were assessed using Fisher's exact test and presented in Table 4. The result showed that the proportion of patients with post-operative throat pain under direct laryngoscope (47.9%) was significantly greater (p=0.001) than those under video laryngoscope (14.6%).

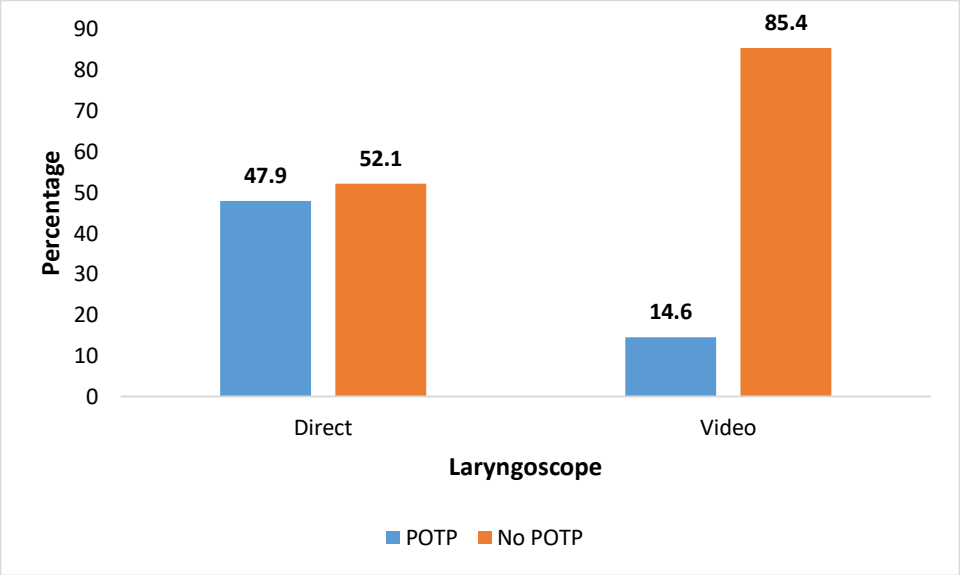

Figure 2: Comparison of post-operative throat pain by patients under direct and video laryngoscope

Moreover, significantly higher proportion of patients (p=0.012) were observed to use esophageal intubation under direct (14.6%) as compared to video laryngoscope (0%). However, there was no significant difference between usage of DL or VL across the categories of ease of intubation (p=0.311), presence of airway trauma (p=0.238), Cormack Lehane grade (p=0.577), success of intubation (p=1.000), and drug type (p=0.292).

Table 4: Differences in DL or VL across the categories of the variables during intubation

	Laryngoscope			
Variables	**Direct n (%)**	**Video n (%)**	**Chi-square value**	**Fisher's p-value**
Ease of intubation				
Easy	29 (60.4)	35 (72.9)	2.805	0.311
Satisfactory	15 (31.3)	8 (16.7)		
Difficult	4 (8.3)	5 (10.4)		
Presence of airway trauma				
Yes	15 (31.3)	9 (18.8)	-	0.238
No	33 (68.8)	39 (81.3)		
Cormack Lehane grade				
Grade I	32 (66.7)	37 (77.1)	1.346	0.577
Grade II	13 (27.1)	9 (18.80		
Grade III	3 (6.3)	2 (4.2)		
Success of intubation				
First attempt	37 (77.1)	37 (77.1)	0.352	1.000
Second attempt	8 (16.70	9 (18.8)		
>=3 Attempt	3 (6.3)	2 (4.2)		

Post-operative throat pain				
Yes	23 (47.9)	7 (14.6)	-	0.001
No	25 (52.1)	41 (85.4)		
Drug type				
Propofol	27 (56.3)	33 (68.8)	-	0.292
Thiopental	21 (43.8)	15 (31.3)		
Esophageal intubation				
Yes	7 (14.6)	0 (0)	-	0.012
No	41 (85.4)	48 (100)		

Factors affecting the first attempt success

Factors affecting the first attempt success were assessed using bivariate logistic regression as shown in Table 5. The results revealed that duration of intubation (p=0.006), ease of intubation (p=0.001), and Cormack Lehane grade (p<0.001) were significant determinants of first attempt success. With unit increase in duration of intubation, the odds of first attempt success decreases by 3%. The odds of first attempt success was observed to increase with increase in easiness of intubation (p=0.001). Similarly, with increase in Cormack Lehane grade, there was significant decrement in first attempt success (p<0.001).

However, the variables age (p=0.747), gender (p=0.137), and laryngoscope used (p=1.000) were not significant determinants of the first attempt success.

Even though three variables were found to be significantly associated with first attempt success, multivariable logistic regression could not be conducted for the sample size was not modest enough to run the model.

Table 5: Factors affecting first attempt success using bivariate logistic regression

Variable	**Crude Odds Ratio**	**95% CI**	**p-value**
Age	0.99	0.96, 1.03	0.747
Gender			
Male	0.48	0.18, 1.27	0.137
Female	Reference		
Mallampati grade			
Grade I	3.19	0.19, 53.91	0.588
Grade II	4.4	0.23, 82.98	

Grade III	Reference		
Duration of intubation	0.97	0.96, 0.99	0.006
Ease of intubation			
Easy	Reference		0.001
Satisfactory	0.02	0.002, 0.12	
Difficult	0.00	0.00	
Cormack lehane grade			
G-I	Reference		<0.001
G-II	0.11	0.04, 0.33	
G-III	0.2	0.03, 1.36	
Laryngoscope			1.000
Direct	1.00	0.39, 2.59	
Video	Reference		

Adverse events:

There were no adverse events during the study

Outcome measures:

The primary endpoint of the study was to measure the hemodynamic changes by monitoring the vital signs at the first 5 min, time of intubation, intubation attempt and postoperative throat pain. Esophageal intubations were less under video laryngoscope in comparison to direct laryngoscope. However, first attempt success rate, presence of airway trauma, Cormack lehane grade, drug type, ease of intubation, haemodynamic status were found to be statistically insignificant. Over all these finding demonstrate the efficacy and superiority of video laryngoscope. The secondary outcomes can be explained by the secondary effect of the provided interventions. Besides the primary outcome, they also have a secondary outcome on the patient conditions such as post- operative throat pain. The incidence of post-operative throat pain under direct laryngoscope (47.9%) was significantly greater (P=0.001) than video laryngoscope (14.6%).