



## PERI-OXYGENATION USING HFNO DURING DIRECT LARYNGOSCOPY.

### Anaesthesiology

<b>Dr. Runali Patel</b>	MBBS, Resident, Department of Anesthesiology, GMERS Medical college, Vadodara – 390021.
<b>Dr. Anup Chandnani*</b>	MD, Professor, Department of Anesthesiology, GMERS Medical college, Vadodara – 390021. *Corresponding Author
<b>Shaji Manuel</b>	MD, Assistant Professor, Department of Anesthesiology, GMERS Medical college, Vadodara – 390021.

### ABSTRACT

Direct laryngoscopy (Lidolm) with tissue biopsy is short procedure where airway is shared between the Surgeons and Anesthetists. Conventionally, the procedure is done during the apnoea phase of DMR1. Peri-oxygenation with HFNC during the intervention maintains the oxygen levels and prevents the dip in saturation seen with conventional approach which inevitably forces the anesthetist to intervene in between the procedure. HFNC also has the advantage of easy set-up, high tolerability, and produce positive airway pressure preventing the fall in oxygen saturation.

This case series of 20 patients of DL scopy with biopsy for laryngeal growth, incorporated the use of HFNC right from preoxygenation to the end of procedure and compared it with the conventional method of apnoeic oxygenation (10 patients each in two groups). A substantial rise in PaO<sub>2</sub> with the use of HFNC proving better apnoeic oxygenation during apnoea phase was observed. No dip in the saturation was seen all throughout the procedure with use of HFNC.

### KEYWORDS

HFNO: High Frequency Nasal Oxygenation, HFNC: High Frequency Nasal oxygenation, Apneic oxygenation, direct Laryngoscopy (Lidolm), DMR: Depolarising Muscle Relaxants.

### INTRODUCTION:

The conventional standard protocol of adequate pre-oxygenation with face mask technique before induction of anesthesia and conventional laryngoscopy may not be sufficient to provide apneic oxygenation during short surgeries specially where the airway is shared between the Surgeon and the Anesthetist. Apneic oxygenation or peri oxygenation during direct laryngoscopy followed by short procedure like taking diagnostic tissue biopsy, where intubation is avoided, helps to maintain the adequate oxygen levels, preventing hypoxia and allowing uninterrupted surgical procedure<sup>2</sup>. HFNC – a novel device used for these cases helps to prolong the time to oxygen desaturation by increasing the oxygen reserve (PaO<sub>2</sub>).

### CASE SERIES:

In a series of 20 patients of ASA status II and III, Mallampatti grade of I & 2, posted for Direct Laryngoscopy (Lindolm) with biopsy under General Anesthesia, patients were subjected to either HFNC (@55 L/min humidified oxygen and FiO<sub>2</sub> 100%) or conventional SFM with apnoeic oxygenation. Standard ASA monitoring (Pulse, non-invasive blood pressure, Electrocardiogram, plethysmography and capnography) and arterial line secured to collect ABG samples at predefined time intervals (room air, after 3 min of pre-oxygenation, 3 min after start of procedure and at the end of procedure) was done in all patients. The procedure was allowed post induction and administration of DMR. Patients were monitored for dip in saturation and change in the vital parameters. ABGA parameters: pH, PaO<sub>2</sub>, PaCO<sub>2</sub> were recorded and compared at the foresaid time intervals. Patients were induced with Inj. Propofol 2mg/kg and Inj. Succinylcholine 2mg/kg after a good premedication and pre-emptive analgesia.

As shown in table 1, Mean rise in PaO<sub>2</sub> was seen up to 530 mmHg after peri-oxygenation with HFNC as compared to 355 mmHg in SFM group. The fall in PaO<sub>2</sub> during the apneic phase while performing the conventional laryngoscopy for securing the airway was upto 115 mmHg in case of SFM group which was not seen in the HFNC cases as the peri oxygenation was continued all throughout the procedure with uninterrupted surgical procedure. Four patients in the SFM group showed a dip in saturation (<93%) at the end of 2 min, forcing the anesthetist to interrupt with the procedure for mask ventilation and further allowing the procedure after the saturation stabilized. Intermittent use of Inj. Propofol and Depolarising muscle relaxants were administered for maintain a proper relaxation for the procedure to be completed<sup>1</sup>.

### DISCUSSION AND CONCLUSION:

The results of rise in PaO<sub>2</sub> seen during the peri oxygenation with use of

HFNC as compared to SFM ensures a better oxygen back up during the apnoeic phase of muscle relaxants used for securing airway. It definitely gives us more breathing period by delaying hypoxemia and the dip in saturation. The surgical procedure of direct laryngoscopy with biopsy (Lidolm laryngoscope) may take multiple attempts to properly visualize and collect adequate sample size. If required, top-up doses of DMR given during the procedure without the need for mask ventilation and uninterrupted perioxygenation provides prolonged apneic period, and favoring ENT surgeon to perform the procedure without any hindrance.

HFNO, owing to several merits, has become an efficient, superior alternative to conventional method of preoxygenation which reduces hypoxemia during apnea periods, providing improved patient safety, that is also favorable to ENT surgeons. Its use can be extrapolated to other similar procedures like removal of foreign body from airway, MLS which are more time consuming<sup>3</sup>.

**Table 1:**

Parameter	PaO <sub>2</sub> (mmHg) (mean)		PaCO <sub>2</sub> (mmHg) (mean)		SpO <sub>2</sub> % (mean)	
	SFM	HFNO	SFM	HFNO	SFM	HFNO
Baseline	145	155	38	39	100	99
After 3 minutes of preoxygenation	340	550	36	38	100	100
After 3 min of starting of procedure	260	510	36	38	100	100
At the end of procedure	245	490	35	34	99	100

### REFERENCES:

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