Minimal Exhaled Nitric Oxide Production in the Lower Respiratory Tract of Healthy Children aged 2–7 years

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INTRODUCTION

- Nitric oxide (NO), produced by endothelial cells, has been shown previously to be a potent smooth muscle relaxant in pulmonary vasculature

INTRODUCTION

- More recent work has demonstrated the presence of NO in gas exhaled from the respiratory system, and has been postulated as a marker of the inflammatory response in the mucosa of the airway

INTRODUCTION

- Several authors have documented the changes in production of nitric oxide with the degree of inflammatory activity in asthmatic patients, although the techniques and measured amounts vary widely between laboratories

INTRODUCTION

- Contamination from the upper airway already known to be a source of NO production

OBJECTIVE

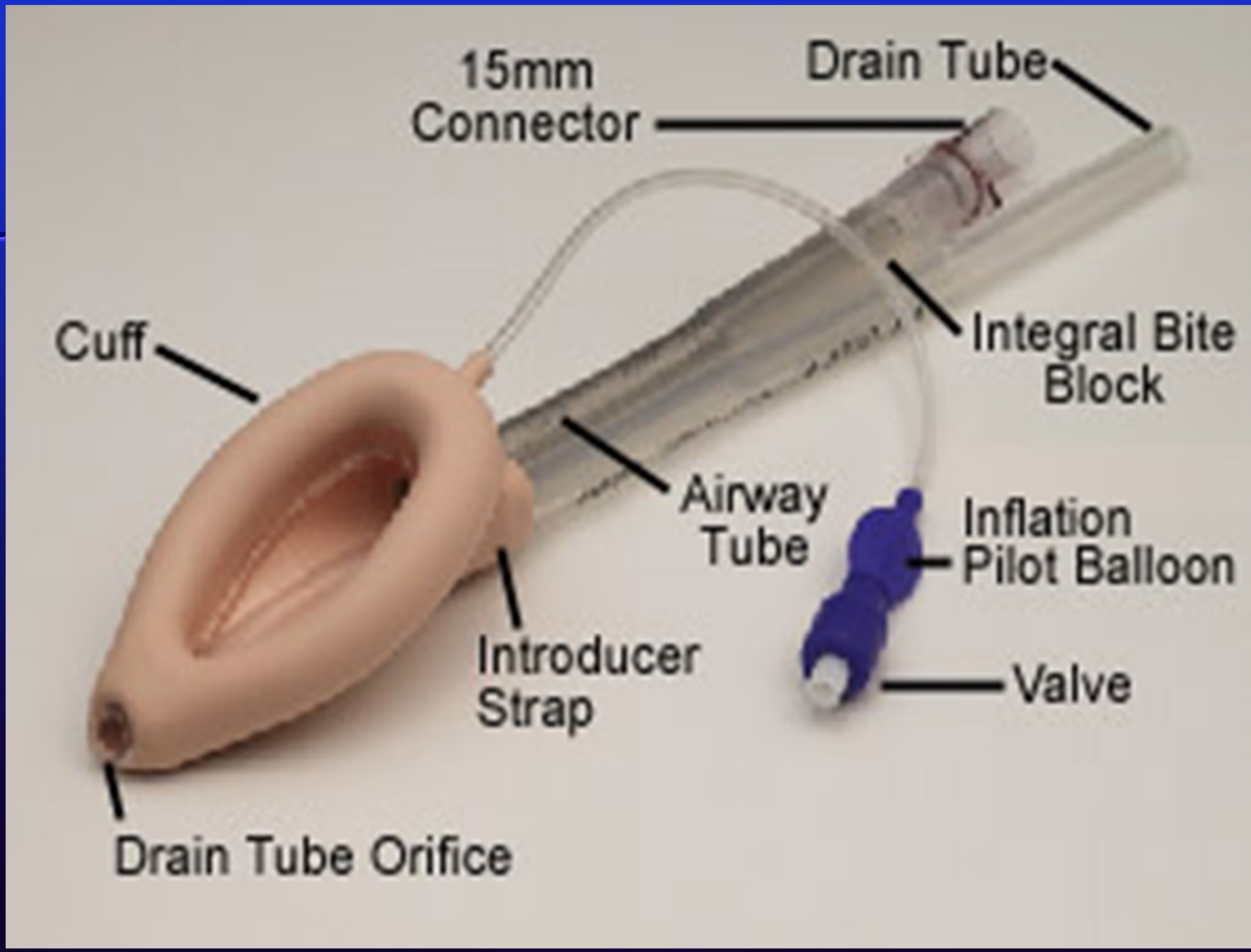
- To measure exhaled Nitric Oxide (eNO) levels in normal preschool children and to know the location of production of eNO

SETTING (University Teaching Hospital)

- Patients recruited:
  - 50 children
  - 2 to 7 years old
  - Undergoing elective surgery
  - Excluding airway procedures
- Children with known respiratory disease or acute viral infections were excluded

INTERVENTION

- Gas for eNO measurement was collected in a non-diffusion bag
  1. Via the mask after inhalation induction of anesthesia
  2. Via endotracheal tube (ETT) or laryngeal mask airway
  3. During emergence
- Measurement was off-line by chemi-luminescent analyzer


15mm
Connector
Drain Tube
Cuff
Integral Bite
Block
Airway
Tube
Inflation
Pilot Balloon
Introducer
Strap
Valve
Drain Tube Orifice

MEASUREMENT & RESULTS

MASK GROUP

- Mean eNO level by mask was 10.23 ppb (mean value ± SD 8.8 – 11.1 ppb) after induction
- On emergence mask eNO level was 8.35 ppb (mean value ± SD 5.9 – 10.8 ppb)

MEASUREMENT & RESULTS

INTUBATED GROUP

- Mean eNO for the intubated group (n = 25) was 0.75 ppb (mean value ± SD 0.4 - 1 ppb) ($p<0.0001$ vs mask)

MEASUREMENT & RESULTS

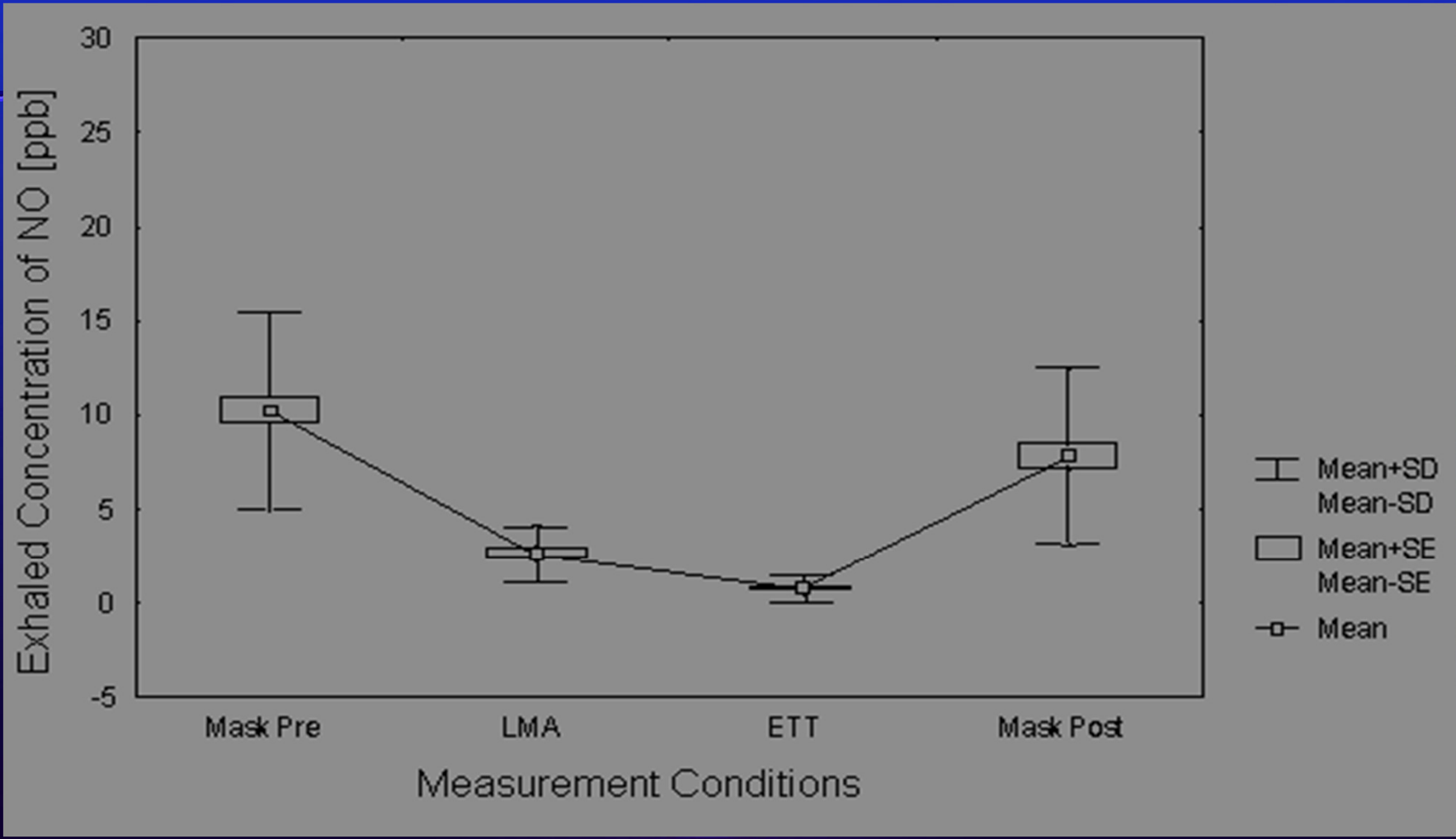
LMA GROUP

- Mean eNO for LMA group (n = 25) was 2.6 ppb (mean value ± SD 2 – 3.2 ppb), which different from the mask ($p < 0.0001$) and from ETT values ($p < 0.0001$)

Table 1. **Demographic data of 25 Patients**

	GP. I Intubated		GP. II Laryngeal mask	
	Mean	Mean value ± SD	Mean	Mean value ± SD
Gender	Male 13	Female 12	Male 18	Female 7
Age (yr)	3.2	2.31 - 4.01	5.1	4.07 - 6.19
Weight (kg)	15.8	13.1 - 18.6	20.4	16.8 - 24.0
Time of surgery (min)	66.1	52.4 - 74.8	41.2	36.8 - 45.5
Total	**13**	**12**	**18**	**7**

Figure 1. Represents mean exhaled nitric oxide concentrations (eNO, ppb) with different techniques of collection, before (pre) and after (post) surgical procedure



CONCLUSION

- Most eNO is produced by the upper airway in healthy pre-school children
- The lower airway constitutive eNO production is very low

CONCLUSION

- The LMA does not completely isolate the upper airway and current mask collection techniques allow significant contamination of samples by sino-nasal eNO production in young children

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