Laryngeal mask Unique® position in paediatric patients undergoing magnetic resonance imaging (MRI): prospective observational trial

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Background and Goal of Study: Laryngeal mask (LMA) is nowadays well established supraglottic airway device. The primary aim of the study was to evaluate the incidence of the radiologic malposition of the LMA under magnetic resonance imaging (MRI) according to the size of the mask. The secondary outcome was the clinical performance of the LMA (1st attempt success rate, audible leak, peak leak pressure) and to compare the clinical performance of the LMA classified as radiologically misplaced with clinical performance of the LMAs located in the radiologically correct position (Fig.1.A). Malposition of the LMA outside the hypopharynx was defined as Malposition A (Fig.1.B). Malposition of the proximal cuff outside C1-C2 were defined as Malposition B (Fig.1.C). Malposition C was defined as the distance A ≥ distance B (distance A = distance between proximal cuff end and aditus laryngis, distance B = distance from distal cuff end and aditus laryngis) (Fig.1.D).

Materials and Methods: Prospective observational study was approved by local ethics committee and registered at Clinicaltrials.gov (NCT02940652). In the study period, paediatric patients undergoing elective MRI of the brain were enrolled. The distances were measured on the MRI (Panorama HFO by Philips (high field open MRI scanner) field strength 1.0T, T1 sagittal sequence). The statistical significance of differences in laryngeal mask malposition between LMA sizes was assessed using the exact Fisher test.

Results and Discussion: 220 patients were enrolled and 202 were eligible for analysis.

Laryngeal mask was properly inserted on the 1st attempt in 91.1% (n=184) cases. The overall radiological malposition (A+B+C) was detected in 26.2% (n=53) patients (Table 1. – in 1 patient the size of the mask was not specified). Audible leak was detected in 5.6 % (n=3) patients with LMA in malposition and in 2.7% (n=4) patients with LMA in correct position (Table 2.). There were no single case of LMA failure with the need for alternative airway management. The rate of associated complications was 1.5% (n=3): laryngospasm, desaturation, cough. In 4.0% (n=8) the LMA was soiled from blood.

Conclusion: Radiological malposition was frequent and was not associated with impaired clinical performance of the LMA or the need for alternative airway management.

Figure 1. Radiological position of the LMA on MRI

Table 1. Radiological malposition according to the size of LMA

LMA size*	Malposition (A+B+C)		Radiologically correct position		p-value
	n	%	n	%	
LMA 1.0	1	14.3%	6	85.7%	<0.001
LMA 1.5	10	50.0%	10	50.0%	
LMA 2.0	20	18.0%	91	82.0%	
LMA 2.5	14	28.0%	36	72.0%	
LMA 3.0	3	37.5%	5	62.5%	
LMA 4.0	4	100.0%	0	0.0%	

Table 2. Position vs. malposition according to presence of the leak

	Malposition overall (A+B+C) (n=53)	Radiologically correct position (n=149)	p value
Leak	5.6% (n=3)	2.7% (n=4)	p=0.309