Dispatcher-assisted telephone cardiopulmonary resuscitation using a French-language compression-ventilation pediatric protocol

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INTRODUCTION

Pediatric out-of-hospital cardiac arrest (OHCA) is a devastating event associated with low survival rates, partly due to lack of bystander cardiopulmonary resuscitation (CPR) (1). While telephone dispatcher-assisted CPR instructions (T-CPR) improve the frequency and quality of bystander CPR for OHCA in adults (2), this support remains undeveloped in pediatry. Our primary objective was to assess the effectiveness of a new pediatric T-CPR protocol in both previously trained and untrained bystanders and secondarily, to determine the utility of the ventilations in the protocol.

METHODS

Adults with no CPR experience were recruited in a public movie center in Liège, and among second degree bachelor nursing students in Liège district. All volunteers where randomly assigned either to «T-CPR» or to «no T-CPR» using a simple randomization system. Volunteers were submitted to an infant OHCA scenario, in which they had to perform CPR for 6 minutes. CPR performance data were extracted from video and infant manikin using the Laerdal Simpad® SkillReporter.

RESULTS

161 volunteers were recruited and 115 met the inclusion criteria. They were assigned into 4 groups: untrained non guided group (U-NG, n=27), untrained guided group (U-G, n=32), trained non guided group (T-NG, n=26), trained guided group (T-G, n=30). T-CPR increased CPR attempts (p=0,0007). Overall CPR performance improved in both guided groups significantly (p<0,0001), but median time to first chest compression was longer in guided groups. Details of CPR performance outcomes are depicted in table 1 and Fig. 1.

81,2% of the U-G group and 83.3% of the T-G group managed to give 2 ventilations after each compressions cycle. However, the average tidal volume (Vt) delivered was higher for each group (Fig. 2) and the fraction of time required to give ventilations was significant higher for guided groups (p <0,0001).

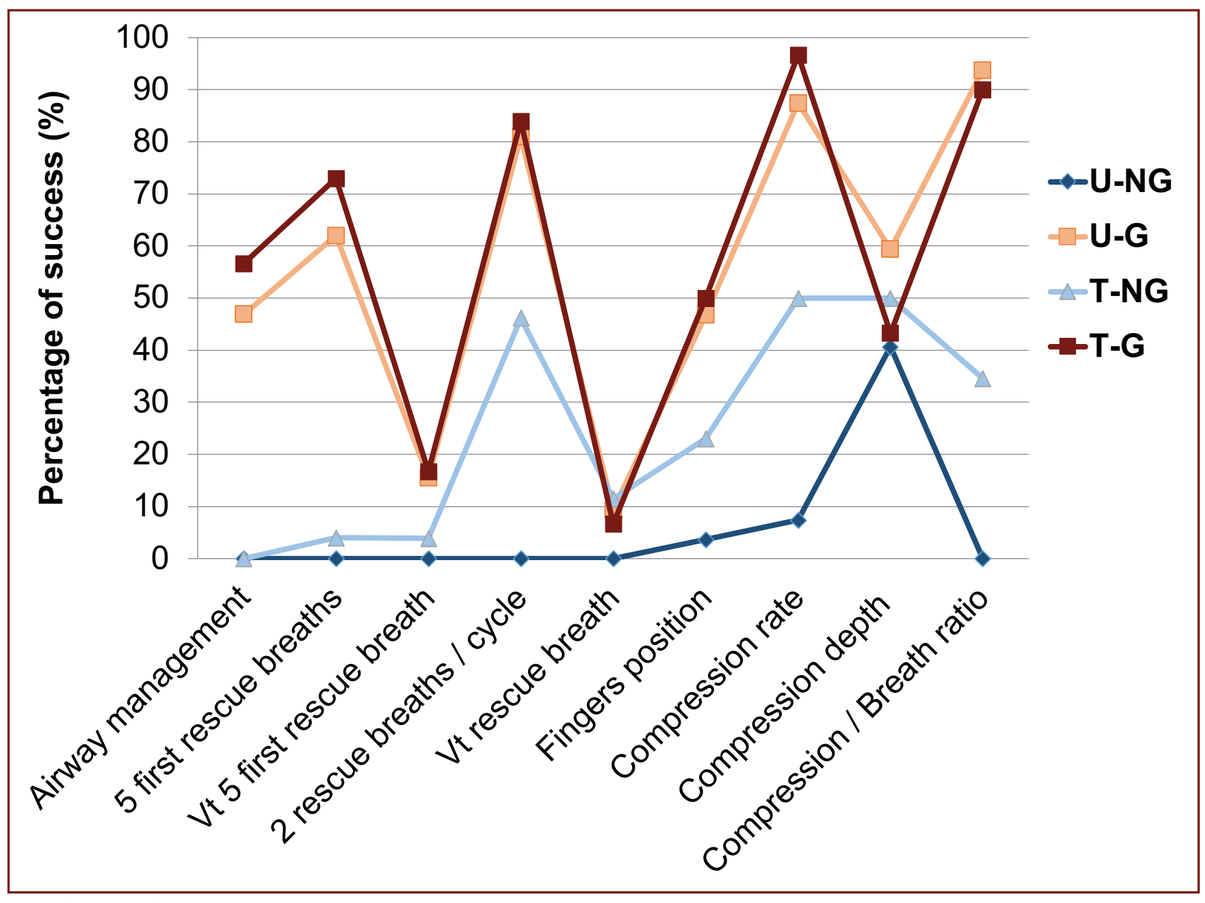

Fig. 1. Percentage of success of each variable component global performance score

Table 1: CPR performances

	Group				p-Value
	U-NG (n=27)	U-G (n=32)	T-NG (n=26)	T-G (n=30)	
Correct airway management, n (%)	0 (0,00)	15 (46,9)	0 (0,00)	17 (56,7)	< 0,0001
Chest compressions performed, n (%)	20 (74,1)	30 (93,8)	26 (100)	30 (100)	0,0007
Correct fingers position for CPR, n (%)	1 (3,70)	16 (50,0)	6 (23,1)	15 (50,0)	0,0002
Number of compressions/minute	24,7 (0 - 36)	27 (22 - 31)	64,4 (54 - 88)	26,8 (26 - 27)	< 0,0001
Compression rate (n/min)	79 [a] (65 - 93)	97 [b] (94 - 103)	115 (99 - 134)	102 (100-106)	< 0,0001
Compression depth (mm)	36 [a] (22 - 39)	36,8 [b] (32 - 40)	39,5 (29 - 41)	32,5 (29 - 39)	0,2330
2 rescue breaths / cycle, n (%)	0 (0,00)	26 (81,2)	12 (46,1)	25 (83,3)	< 0,0001
Fraction of minute to ventilate (%)	27 [c] (7 - 36)	69 (62 - 75)	34,5 (23 - 44)	73,3 (72 - 74)	< 0,0001
Global performance score (%)	7,7 (0 - 7)	61,5 (42 - 69)	23,1 (15 - 30)	61,5 (53 - 69)	< 0,0001
No-flow-time (sec)	17 (10 - 97)	176 (159 - 189)	16,5 (11 - 24)	160 (155 - 164)	<0,0001

[a] n=20 [b] n=30 [c] n=17

CONCLUSIONS

T-CPR instructions have the potential to increase the number and the performance of bystander CPR in trained or untrained volunteers (3,4). Mouth to mouth ventilations was responsible for major interruptions in chest compressions. In addition we identified an overall tendency to manikin hyperventilation among the different groups.

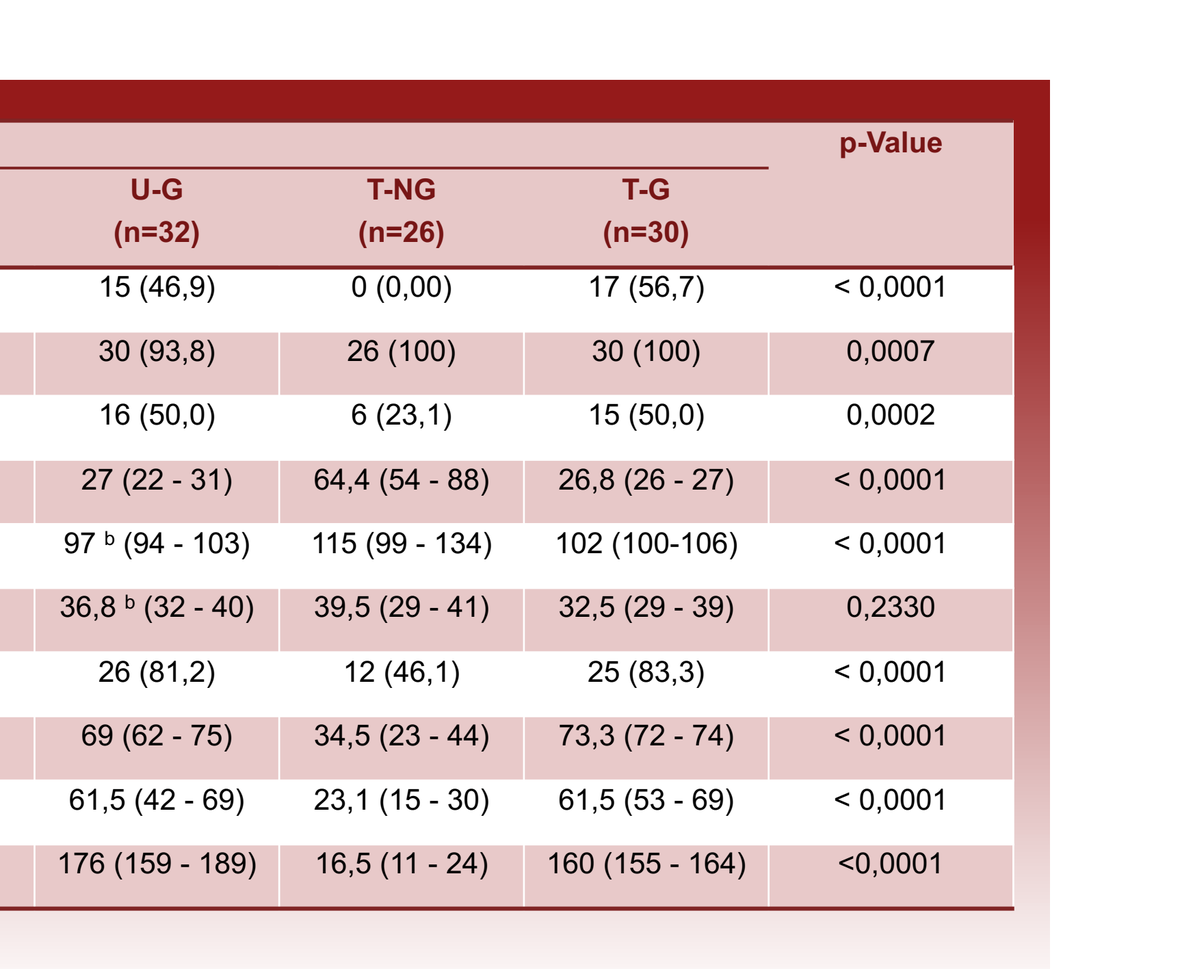

Fig. 2. Mean tidal volume (± SE) delivered by the 4 groups during CPR. The target tidal volume (24 to 40 ml) is represented by the interval between the two red lines; p=0,2112.

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