Hands-only CPR, are we doing the best? Results from Multicenter International Randomized Controlled Manikin Study on Different Protocols of Cardiopulmonary Resuscitation for laypeople (MANI-CPR Trial) - NCT02632500

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Purpose

Hands-only cardiopulmonary resuscitation (HO-CPR) is one of the most debated topic. However, if high-quality CPR is a key factor to improve survival after an out-of-hospital cardiac arrest (OHCA), it is very difficult to perform a high-quality CPR until the arrival of EMS with HO-CPR. Our aim was to verify whether the inclusion of intentional interruptions of different frequency and duration during the CPR could increase laypeople CPR quality compared with HO-CPR.

Methods

We randomised 572 laypeople who passed a basic life support course in 8 training centers to one of four CPR protocols in an 8 minutes simulated cardiac arrest scenario on a manikin: 30 compressions and 2 seconds pause (30c2s), 50 compressions and 5 seconds pause (50c5s), 100 compressions and 10 seconds pause (100c10s) and hands-only (HO-CPR). The primary endpoint was the percentage of chest compressions performed with correct depth evaluated by a computerised feedback system. The secondary endpoints were percentage compressions with correct release, with correct hand position, with adequate rate and the number of interruptions lasting more than 10 seconds (10s-pause).

Results

68.5% of the study population were males, mean age was 32.2±11.6 years, mean height was 174.5±8.3 cm and mean weight 73.7±13.6 kg. There were no difference among the anthropometric characteristics of the 4 protocol groups. Regarding primary outcome, there was a statistical significant difference among the 4 groups (p=0.006). Comparing each protocol to the standard (HO-CPR) through a post-hoc analysis, 30c2s (96%, p=0.007) and 50c5s (96%, p=0.001) were significantly better than HO-CPR (79%), whilst 100c10s did not reach significance (92%). Among secondary endpoint only the 10s-pause was significantly different among the groups (p<0.001), with more 10s-pause in 100c10s (4, IQR 2-6) respect to the others (0, IQR 0-0).

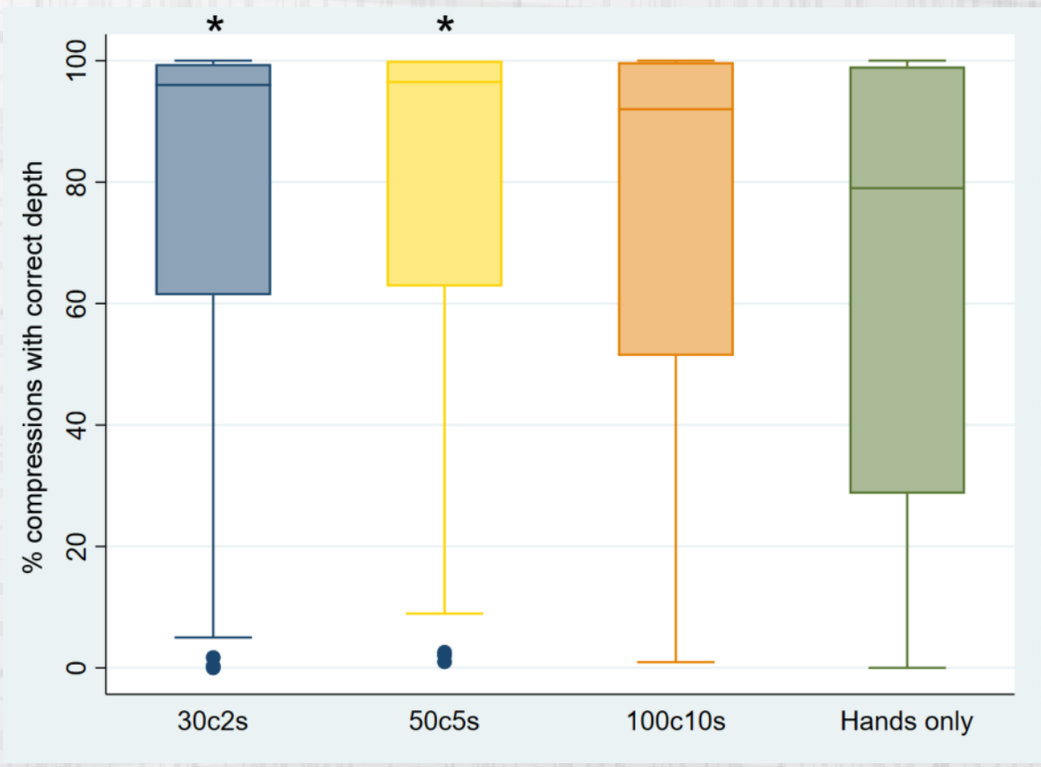
Conclusions

The inclusion of intentional interruptions during CPR increase laypeople CPR quality. The protocols consisting in alternating 30 compressions and 2 seconds of pause or 50 compressions and 5 seconds of pause seems to be the more promising to maintain HQ-CPR during an 8 minutes scenario.

	Group					p-values			
	30c2s (n=129)	50c5s (n=129)	100c10s (n=129)	hands-only (n=130)		overall	30c2s vs h-o [a]	50c5s vs h-o [a]	100c10s vs h-o [a]
% of compressions with correct depth	96 (61.4-99.4)	96 (63.0-100.0)	92 (55.0-100.0)	79 (29.1-99.0)		0.006	0.023	0.003	0.07
% correctly released compressions	98 (85.0-100.0)	99 (91.0-100.0)	98 (90.0-100.0)	98 (88.0-100.0)		0.54			
% compressions with correct hand position	100 (89.0-100.0)	100 (91.0-100.0)	100 (96.0-100.0)	100 (91.0-100.0)		0.95			
Compression rate (/min)	111 (103.0-118.0)	112 (106.0-118.0)	111 (106.0-117.0)	114 (110.0-119.0)		0.019	0.020	0.095	0.023
Chest compression fraction (%)	87.5 (83.5-90.8)	83.5 (80.6-86.0)	84.4 (82.3-86.7)	100 (97.7-100)		<0.001	<0.001	<0.001	<0.001
n° interruptions of more than 10 seconds	0 (0.0-0.0)	0 (0.0-0.0)	4 (2.0-6.0)	0 (0.0-0.0)		<0.001	>0.9	0.382	<0.001

[a] post-hoc analysis

	Fractional logistic regression for % of compressions with correct depth	
	OR (95%CI)	p value
Sex (M vs F)	3.94 (2.85-5.45)	<0.001
Age (Years)	0.99 (0.98-1.01)	0.831
BMI (Kg/cm²)	1.11 (1.06-1.17)	<0.001
Protocols		
Hands-only	1	
30c2s	2.12 (1.40-3.20)	<0.001
50c5s	2.09 (1.36-3.23)	0.001
100c10s	1.41 (0.93-2.15)	0.100
Level of physical activity		
Low	1	
Intermediate	1.29 (0.79-2.11)	0.304
High	1.51 (0.94-2.40)	0.083



* = statistically significant difference respect to hands-only.

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