

Compression machines in cardiac arrest – the end of a short story or just the beginning of a new era?

Christer Axelsson RN/AN, Phd stud
Gothenburg EMS system
Sahlgrenska University hospital
Sweden

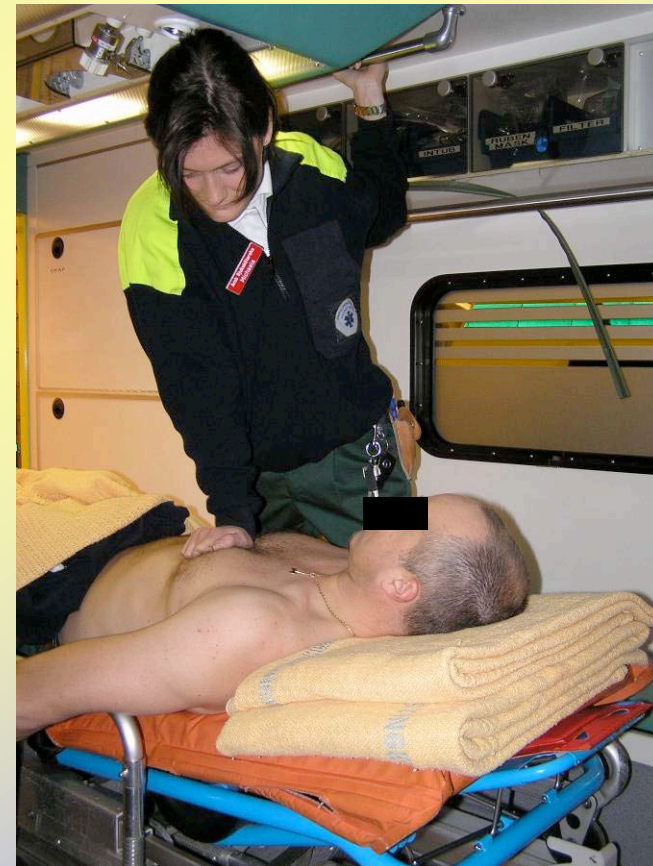


Fatigue deteriorates the chest compressions
some minutes before the rescuer
feels subjectively exhausted

Hightower D: Annals of Emerg. Medic. 1995

Difficult to perform during transport on a stretcher and in a moving ambulance

Sunde K: Resuscitation 1997



A study of the quality and quantity of manual chest compressions in OHCA found that compressions was made:

1. during 50% of the treatment period, and most of them were too shallow.
2. during 67% of the treatment period and most of them were too deep
3. during 80% of the treatment period and most of them were correct

Compared with manual chest
compressions
mechanical ACD-CPR provide
increased blood flow to heart and
brain

- Steen et al: Resuscitation 2002
- Rubertsson S: Resuscitation 2005

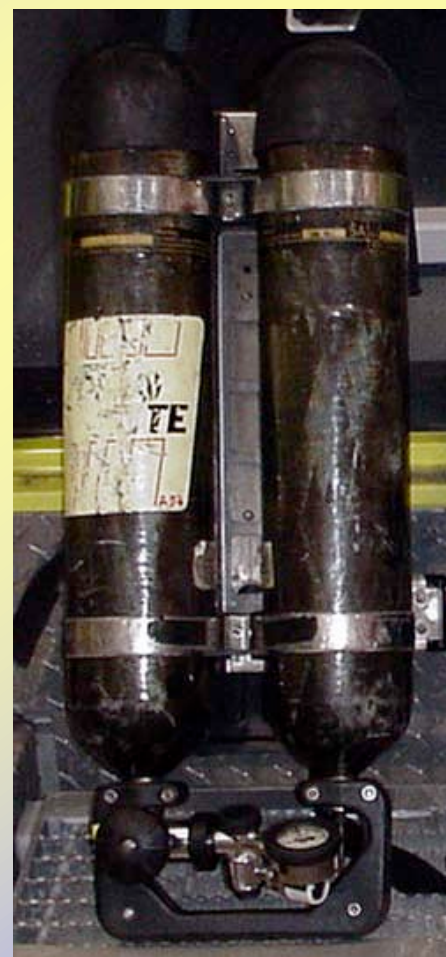
SMEK-STUDY

Standard CPR vs. Mechanical ACD-CPR in out of hospital cardiac arrests – A pilot study

A co-operation between
Göteborg and Södertälje EMS

Axelsson C. et al: Resuscitation (2006) 71, 47-55

LUCAS



Göteborg and Södertälje (two tier system)



1:e tier (BLS)

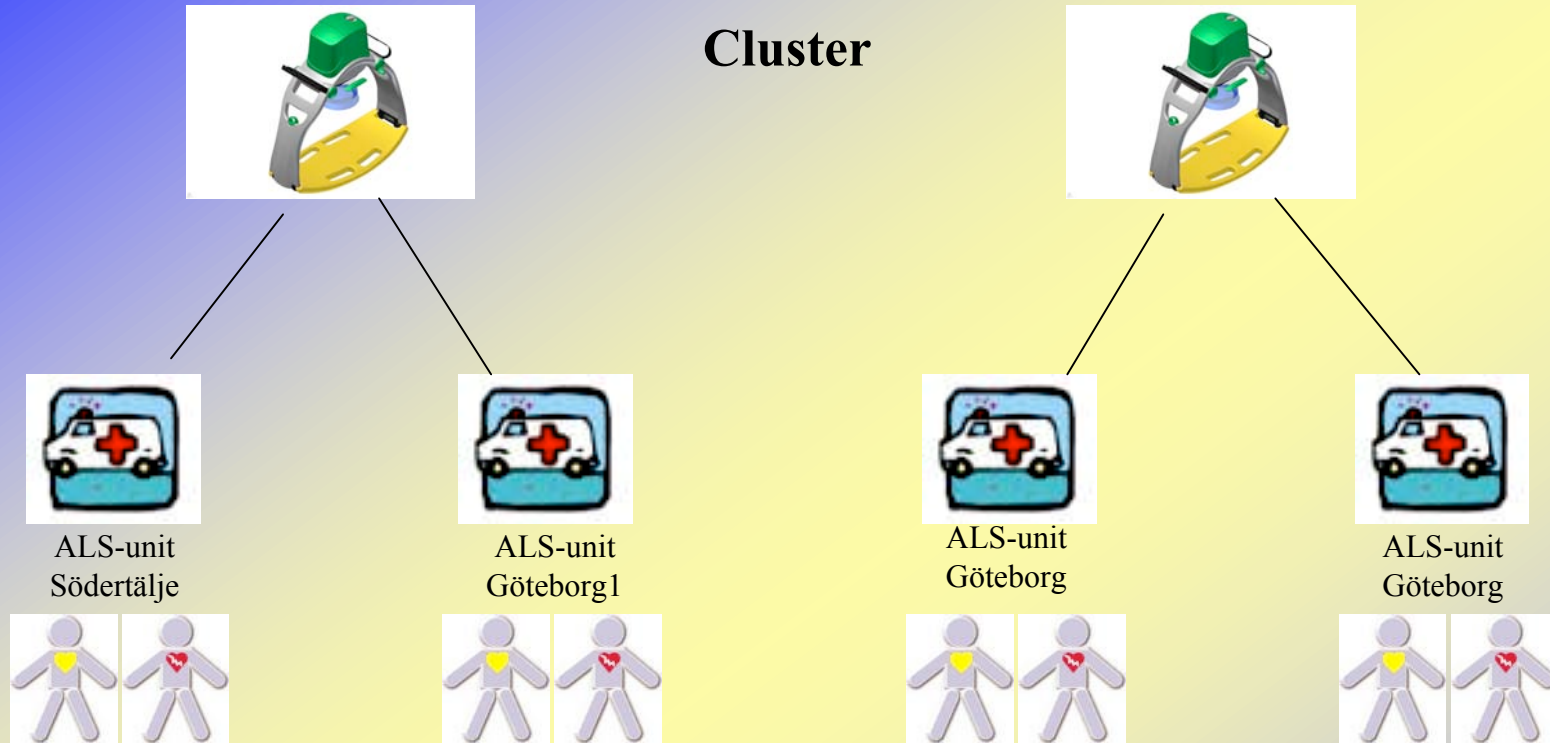


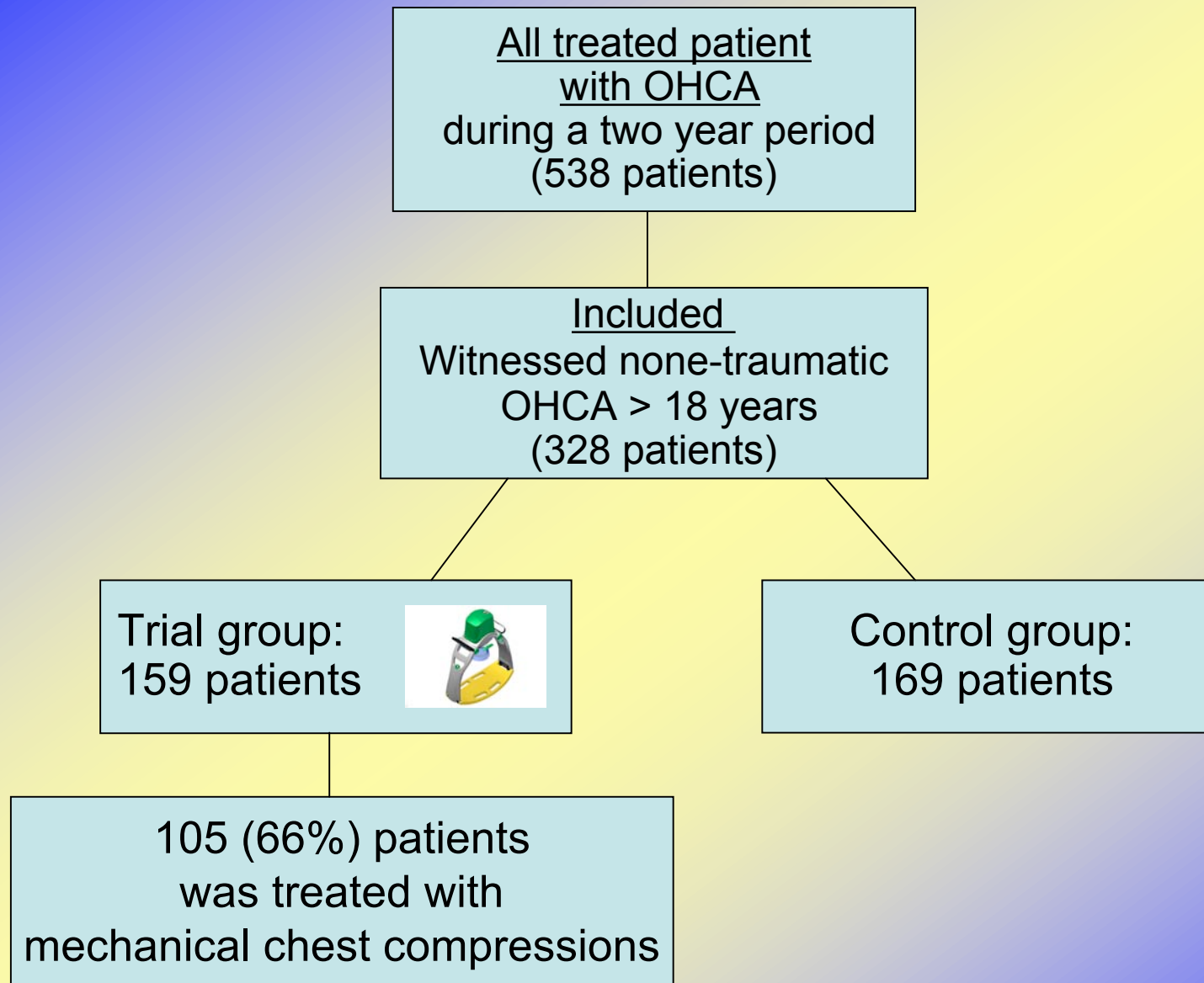
2:e tier (ALS)

What is the total weight of the full equipment?

- 1 35 kg
- 2 44 kg
- 3 65 kg

Cluster





Time intervals

	Mechanical chestcomp. n=159 %	Control- group n=169 %	p*
Time from cardiac arrest to (median;min)			
Start of CPR	3	3	
Arrival of BLS (to patient)	10 ¹	10 ¹	
Arrival of ALS (to patient)	12 ¹	12 ¹	
Start of mechanical chest compressions	18		

¹ Crew witnessed not included

* p-value denoted if < 0.2

ROSC and survival

	Mechanical chest- compressions n=159 %	Control- group n=169 %	p*
ROSC	51	51	
Alive at hosp. admision	38	37	
Discharged alive	8	10	

p-value denoted if < 0,2

Patients in whom the device was used versus a matched control

All patients	Mechanical chest-compressions n=105 %	Control group n=105 %
ROSC	50	49
Alive at hospital admission	36	35
Discharged alive	2	4

*Matched according to: Age, initial rhythm, bystander-/crew witnessed status, etiology and delay to start of CPR.

p-value denoted if < 0,2

Axelsson C. et al: Resuscitation (2006) 71, 47-55

Reasons for not using mechanical chest compressions

54 patienter (~~33%~~)

24%

Group 1 (with LUCAS)

- Patient too small 1
- Patient too large 2
- Technical errors 3 3
- Cardiac arrest close to hospital 3 2
- Early ROSC 12

Group 2 (without LUCAS)

- Lack of experience, forgot to bring the device 7 7
- Dispatch codes not related to cardiac arrest. 23 4
- Missing 3

How many OHCA do you think has the dispatch code “Cardiac arrest”??

1. 20%
2. 45%
3. 66%

All treated
cardiac arrest
N=350

Dispatch codes %

Unclear unconsciousness
and unconsciousness (other) 45

Cardiac arrest
(CPR in progress) 20

Codes related to
breathing problems 10

Chest pain, angina 10

Other codes 10

**Cardiac arrest occurring
after alert of first Ambulance 27**

Conclusion

- No difference in outcome
- Only 66% was treated in the trial arm
- According to the EMS personal:

Increased safety.....

More hands free.....

Should routine use of mechanical CPR be started in Gothenburg after these results?

1. **Yes!** Improved safety and work environment for the EMS personnel, and indication of no harm to patients from mechanical CPR
2. **No!** First a large (multi centre) randomised controlled trial must show positive findings
3. **Not sure!**

